

**FIAT INTERNATIONAL POSTGRADUATE
SYMPOSIUM 05**

and

FIAT UNDERGRADUATE SYMPOSIUM 01

**ABSTRACT
BOOK**

**"Agriculture Resilience for Food Security"
2023**

FACULTY OF AGRO BASED INDUSTRY

UNIVERSITI MALAYSIA KELANTAN

**FIAT INTERNATIONAL POSTGRADUATE SYMPOSIUM 05
AND
UNDERGRADUATE SYMPOSIUM 01**

“Agriculture resilience for food security”

Organized by
Faculty of Agro-based Industry (FIAT)
Universiti Malaysia Kelantan



Editors

Nor Dini Rusli
Nik Nur Azwanida Zakaria



PREFACE

This book contains an insightful collection of abstracts from the next generation of agriculture and food security leaders who participated in the International Postgraduate Symposium 05 in conjunction with FIAT Undergraduate Symposium 01. Organised by the Faculty of Agro-based Industry, this symposium brought together postgraduate and undergraduate students to discuss agriculture's critical issues and the strategies needed to ensure food security for all.

With chapters on categories including agrotechnology, product development, animal science, food science and social science, this book provides a comprehensive look at the industry's challenge and opportunities.

Written by postgraduate and undergraduate students, the abstracts in this book offer fresh perspectives and innovative solutions for anyone working in agriculture or interested in food security. Whether you are a student, researcher or professional in the agro-based industry, this book is an essential resource for understanding the complex issues facing agriculture today and the steps we can take to ensure food security for all.



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MESSAGE FROM THE DEAN

DEAN OF FACULTY OF AGRO-BASED INDUSTRY

**Associate Professor Dr. Seri Intan Binti
Mokhtar**



Assalamualaikum,
Salam Sejahtera, and very good morning. In the name of Allah, the Most Gracious and the Most Merciful.

On behalf of the Faculty of Agro-based Industry, Universiti Malaysia Kelantan, I welcome you to the 4th Postgraduate Symposium 2021. This year, our central theme is “Research and Innovation towards Sustainable Food System”. I would like to extend our greetings to all distinguished speakers, participants and guests from Malaysia, India, Indonesia, and Thailand who are here with us today. High appreciation is also extended to the committee members of this symposium for organizing it and ensuring that it proceeds smoothly.

Research and innovation are crucial in ensuring a sustainable food system for our ever-expanding global population, reaching 10 billion people in 2050. At the same time, the agriculture sector faces the critical challenge of producing and distributing sufficient food in climate change conditions and scarce natural resources. Because of that, we must share knowledge in the face of such challenges; a challenge shared is a challenge divided, but knowledge shared is knowledge multiplied.

Building sustainable food systems requires work in all three dimensions of sustainable development – social, economic, and environmental. More efficient food systems are critical for alleviating poverty, meeting the world’s food needs, and shrinking agriculture’s ecological impact.

Today we will be witnessing, discussing, and listening to progress made in the area of sustainable food systems from distinguished speakers and excellent participants. I wish the participants a very fruitful and productive symposium. I am looking forward to hearing the outcome and constructive conclusions of this meeting.

Thank you very much.

MESSAGE FROM THE CHAIRMAN

CHAIRMAN OF FIAT INTERNATIONAL POSTGRADUATE SYMPOSIUM 05

Assoc. Prof. Dr. Fatimah Kayat



First of all, Thanks to the Almighty, Allah for grace and blessing that we can organize this 5th Postgraduate Symposium in conjunction with the 1st FIAT Undergraduate Colloquium today. This program is an annual event that aims to provide students with an understanding of the research project being carried out throughout their study. It is also aims to ensure that the research journey carried out is on the right track thus help them to complete their studies and graduate within the stipulated time. As the organizer, we hope that this program can provide a good platform for sharing ideas, increase the understanding and knowledge in related field and further creating professionalism among the students and academics involved.

I would like to thank the UMK Library of Jeli Campus for allowing this symposium to be held here. Not forgetting the Faculty of Agriculture, PPI, CCI, MCP and the secretariat who have worked hard to ensure that this program can be run in the right manner. Thank you also dedicated to the Postgraduate Studies Center for their support in ensuring the smoothness of the program today. I would also like to express my appreciation to our guest speakers, dean, deputy dean, head of department and fellow lecturers who also made this program a success.

Before ending this speech, I would also like to express my deepest appreciation to all the participants of this symposium and colloquium for their participation and commitment. Therefore, I hope that this symposium and colloquium succeeds in achieving its main objective, which is towards strengthening and empowering academic excellence among all those involved who in turn can contribute towards the human well-being.



SYMPOSIUM COMMITTEE

Patron	Assoc. Prof. Dr. Seri Intan Mokhtar
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Refreshments & Food

Dr. Suniza Anis Mohamad Sukri (Head)
Mrs. Marina Rohim
Mrs. Nur Aiashah Ibrahim
Mrs. Nor Hidayah Hamzah



TENTATIVE PROGRAMME

FIAT International Postgraduate Symposium 05

Date: 18 January 2023, Wednesday (08:00 a.m - 05:00 p.m)

Venue: Seminar Room, Library UMK Jeli Campus, Kelantan

Hybrid Platform: <https://www.facebook.com/umkfiat>

ZOOM link: <https://umk-edu->

my.zoom.us/j/95870334412?pwd=cHRXMDNNMjYxK0xkTE1PN0Y4QWZnZz09

Time	Program
08:00 - 08:30 a.m	Arrival of participants & registration of the FIAT International Postgraduate Symposium 05
08:30 - 08:45 a.m	Opening ceremony and welcoming remarks by: Assc. Prof. Dr. Fatimah Changgrok@Kayat , Chairperson for the FIAT International Postgraduate Symposium 05, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan. Officiating speech by: Prof. Dr. Mohd Rosli Mohamad , the Dean, Center for Postgraduate Studies, Universiti Malaysia Kelantan.
08:45 - 09.15 a.m	Keynote speech Speaker: Dr. Baharuddin Bin Mohamed (D' Impian Agro Farm, Malaysia). Title: Sustainable Agro for National Food Safety.

Physical Presentation Session 1 : Seminar Room, 1st Floor, Library UMK Jeli Campus

09:30 - 09.45 a.m	Regeneration of Haploid Calluses from Ovary Culture of Cucumis Melo L. and Its Activity towards Hormonal Combination. <i>AG01 Fadzlin Qistina Binti Fauzan</i>
09:45 - 10:00 a.m	Internet of Things (Iot) Technology to Monitor Agri-Environmental of Banana Soil. <i>AG02 Muhammad Akmal Mohd Zawawi</i>
10:00 - 10:15 a.m	Myorganic Adoption Framework Among Vegetable Farmers in Peninsular Malaysia. <i>AG03 Wan Nor Syafikah Binti Wan Abdullah</i>

- 10:15 - 10:30 a.m **Isolation and Identification of Plant Growth Promoting Fungus of Phalaenopsis Amabilis Blume Orchid.**
AG04 Nur Salsabila Binti Shafiee
- 10:30 - 10:45 a.m **Nutritional Composition and Antioxidant Activities of *Pleurotus Pulmonarius*'s Grown with Different Substrates.**
AG05 Norsyafiera Syuhada Binti Fadzil
- 10:45 -11:00 a.m **Effect of Soil Factors on the Phytotoxicity and Persistence of Bis (2-Ethylhexyl) Phthalate.**
AG06 Basiri Bristone
- 11:00 - 11:15 a.m **Effect of Different Substrate on the Quantification of B-Glucan Content in Mushroom Species of *Pleurotus ostreatus*, *Pleurotus florida*, and *Schizophyllum commune*.**
AG07 Siti Maryam Salamah Binti Ab Rhaman

Virtual Session (ZOOM Link): <https://umk-edu-my.zoom.us/j/95870334412?pwd=cHRXMDNNMjYxK0xkTE1PN0Y4QWZnZz09>
Meeting ID: 958 7033 4412
Passcode: 684820

- 09:30 - 09.45 a.m **Turbidity Reduction by Nanomagnetic Biocarbon Composite: Isotherm and Kinetics Studies.**
PD01 Huda Binti Awang
- 09:45 - 10:00 a.m **Molluscicidal Activity Of Aqueous Extract From Five Plants Species Against Golden Apple Snails (*Pamocea Canaliculata*).**
PD04 Mohd Freezaillah Arkmey Bin Md Din
- 10:00 - 10:15 a.m **Chemical Characterization and Antidiabetic Activities of *Cocos nucifera* Sap (Cns) in Stz-Induced Diabetic *Sprague dawley* (Sd) Rats.**
PD06 Nurul Amira Binti Zainurin
- 10:15 - 10:30 a.m **Analysis of Rhizosphere Endophytic Bacteria of Selected Mangrove Plants and Their Role in Salt Tolerance of Crop Plants.**
FS02 Y. Nagarathnamma
- 10:30 - 10:45 a.m **Foxtail Millet (*Setaria italica* L.) Landraces as a Novel Allelic Source for Climate Smart Agriculture and Nutritional Security : Mapping Population Development, Linkage Map Construction and QTL Identification.**
FS03 Shaik Sameena
- 10:45 -11:00 a.m **A Review on the Effect of Aflatoxins on Food Security.**
FS05 Modumudi Kiranmayee
- 11:00 - 11:15 a.m **Total Flavonoid, Phenol Content and Antioxidant Activity of Red and White Onion (*Allium cepa* L.) Bulbs.**
FS06 M.Vidya Vani

11:20 - 11:40 a.m **Invited Speaker 1: Dr L. Veeranjanya Reddy** (Yogi Vemana University)
Title: Agriculture Crop Residue as a Renewable and Economical Bioresource for Biofuels.

Physical Presentation Session 2 : Seminar Room,1st Floor, Library UMK Jeli Campus

11:45 - 12:00 a.m **Effect of *Blaptica dubia* on Growth and Liver Histology of *Oreochromis* Spp.**

AG08 Munirah Binti Mokhtar

12:00 - 12:15 a.m **Effects of Combined Fertilizer Sources on Pest Population and Plant Growth Performance of Chilli.**

/p.
m *AG09 Rivitra a/p Vintisen*

12:15 -12:30 p.m **Effect of Pelleting The Creep and Growing Ration on Its Chemical Composition.**

AS01 Ahmad Rahimi Bin Razlee

12:30 -12:45 p.m **Sexual Behavior of Male Goat in Different Isolation Period.**

AS02 Fathin 'Athirah Binti Mohd Sabri

12:45 - 01:00 p.m **Effect of Pelleting on the Shelf Life of Total Mixed Ration for Lactating Dairy Goats.**

AS03 Norfarahin Nabila Binti Mohd Shah

01:00 - 01:15 p.m **Comparison Treatment Between Cidr and Herbal in Detection Estrus Signs and Follicle Size of the Female Goats.**

AS04 Nur Nazhiyah Amirah Binti Mohd Subaimi

01:15 - 02:15 p.m Lunch Break

02:15 - 02:35 p.m **Invited Speaker 2: Prof. Dr. Shamsul Bahri Bin Abd Razak** (Faculty of Fisheries and Food Science, Universiti Malaysia Terengganu, Malaysia)
Title: Stingless Bee Rearing as a Potential Activity to Generate Income.

Physical Presentation Session 3 : Seminar Room,1st Floor, Library UMK Jeli Campus

02:40 - 02:55 p.m **Effect of Gallocatechin-Silver Nanoparticles Impregnated Cotton Gauze Dressing on Normal and Diabetic Wound Healing Rat Model.**

PD02 Nagarjuna Reddy Vendidandala

03:10 - 03:25 p.m **Synergetic Effects of Bitter Gourd Honey with Treated Cornsilk Extract on Total Phenolic Content.**

PD03 Chan Ke Xin

03:25 - 03:40 p.m **Microscopic Assessment of Leaf, Root and Rhizome of Curcuma Sumatrana.**

PD05 Rival Yuhendri

03:40 - 03:55 p.m **Optimization of Grass Jelly Formulation by Addition of Gelatin: Physicochemical and Textural Analyses.**

FS01 Muhammad Firas Hamizan Bin Hassan

03:55 - 04:10 p.m **Pre-Treated Black Soldier Fly Larvae (BSFL) as Sustainable Alternative Protein Source for Broiler Chicken.**

FS04 Nurul Athirah Binti Mohd Zuki@Rosli

04.40 - 05:00 p.m **Closing ceremony**

Closing speech by:

Assoc. Prof. Dr. Seri Intan Mokhtar, the Dean, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan.

- Award giving ceremony for Best Presenters
- Photography session

05:00 p.m End of the FIAT International Postgraduate Symposium 05 session.

TENTATIVE

Undergraduate Symposium 01, Faculty of Agro-based Industry (FIAT)

Date: 19 January 2023, Thursday (08:00 a.m - 03:30 p.m)

Venue: Ground Floor, Library UMK Jeli Campus, Kelantan.

Time	Program
08:00 - 09:00 a.m	Registration of Undergraduate Symposium 01& Poster installation
09:00 - 09:15 a.m	Welcoming remarks and Undergraduate Symposium 01 briefing
09:15 - 01:15 a.m/p.m	Poster Presentation Session
01:15 - 02:30 p.m	End of Poster Session/ Lunch Break
02:30 - 03:30 p.m	Closing ceremony <ul style="list-style-type: none">● Best Presentation Awards - announcement for each category● Photography Session
03:30 p.m	End of Undergraduate Symposium 01 session



POSTGRADUATE ABSTRACTS

Category: Agrotechnology

SS01

Regeneration of Haploid Calluses from Ovary Culture of *Cucumis melo L.* and Its Activity Towards Hormonal Combination

QF Fadzlin¹, M Arifullah^{1*}, MR Midin², Z Suhana¹, MR Raimi¹ and S Dwi¹

¹ Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

² Kulliyah of Science, International Islamic University Malaysia, 25200 Kuantan, Pahang, Malaysia

*Corresponding author: aurifullah@umk.edu.my

ABSTRACT

Gynogenesis or ovary culture is one of the approaches used to attain homozygous pure lines in plants apart from androgenesis, parthenogenesis and interspecific crossing. Gynogenesis is less common compared to androgenesis and parthenogenesis but it is a very useful tool to produce haploid plant materials especially when the androgenesis is inapplicable. The ineffective androgenesis can occur due to the inability of cultures to respond to in vitro manipulations, raise in the level of albino regenerated plants, male infertility, or the dioecious nature of plants. In these cases, gynogenesis that utilized the ovule or ovary in producing haploids can be applied to replace unsuccessful androgenesis to promote better haploid regeneration. In F1 hybrid Glamour Japanese Rock melon or *C. melo* of reticulatus var., the study on its female flowers as starting materials for haploid production has yet to be recorded. This current study therefore aims to provide beneficial information on the practicality of using ovary culture of Glamour Rock melon to produce haploid materials and the suitable hormonal combination for the haploid regeneration. Based on the study, hormonal combination played a very significant role in initiating the callus induction, maturation and embryonic production. The result from this study can benefit the breeders and researchers in term of understanding the convenience condition to promote excellent callus growth of Glamour Japanese Rock melon or *C. melo* of reticulatus var.

Keywords: Rock melon, *C. melo*, Haploid, Gynogenesis, Ovary Culture, Dihaploid

Category: Agrotechnology

Internet of Things (IoT) Technology to Monitor Agri-environmental of Banana Soil

MAM Zawawi¹, M Muhammad^{2,*}, NSA Latif³, L Naher¹ and MF Jusoh^{1,4}

¹ Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600, Jeli, Kelantan, Malaysia.

² Faculty of Earth Science, Universiti Malaysia Kelantan, Jeli Campus, 17600, Jeli, Kelantan, Malaysia.

³ Faculty of Computer and Mathematical Sciences, University Teknologi MARA, 40450, Shah Alam, Selangor Malaysia.

⁴ Biosystem and Agricultural Engineering Programme, Faculty of Chemical Engineering Technology, Universiti Malaysia Perlis, 02600, Arau, Perlis, Malaysia.

***Corresponding author:** marinah@umk.edu.my

ABSTRACT

Banana is the second most extensively farmed crop in Malaysia, after durian. Implementing Internet of Things (IoT) technology for smart monitoring of soil conditions could boost banana yield. To reduce the impact of banana trees from soilborne disease i.e., Fusarium wilt disease, it is essential to maintain healthy soil conditions. In addition, if the farmer does not have access to soil information, it will be difficult for them to maintain and develop early disease management. Thus, the aim of the present study is to build a banana soil monitoring system for agri-environmental factors in real time. The sensor measured ambient temperature, air humidity, and soil moisture during laboratory testing. These characteristics are critical for determining the soil threshold values for the occurrence of Fusarium wilt disease. The selected sensors are then connected to the ESP8266 microprocessor, which is responsible for data collection, processing, and analysis. With the assistance of WiFi connections, the data that have been measured are uploaded to Thingspeak in order to store the data. The findings demonstrated that the proposed system was able to successfully measure, analyze, communicate, and display the measurements of the banana soil parameters on Thingspeak.

Keywords: Fusarium wilt disease, IoT, sensors, soil properties.

Category: Agrotechnology

MyOrganic Adoption Framework Among Vegetables Farmers in Peninsular Malaysia

WN Syafikah¹, TH Sa'adiah^{1*}, MZ Norhafizah¹, AA Farah¹, Z Suhana¹, M Norsida¹, AS Jasmin¹

Faculty of Agro-Based Industry, Universiti Malaysia Kelantan¹

Faculty of Agriculture, Universiti Putra Malaysia²

***Corresponding author:** wnsyafikah223@gmail.com

ABSTRACT

Organic farming is one strategy for ensuring food safety and security in Malaysia. From that, the Department of Agriculture Malaysia (DOA) created the Malaysian Organic (myOrganic) certification to encourage farmers to use organic methods rather than conventional methods. Unfortunately, out of 35,780 vegetable farmers in Peninsular Malaysia, 54 vegetable farms have adopted the program and received myOrganic certificate. Thus, this study aims to develop a framework for organic farming practices adoption to ensure food safety and security among vegetable farmers in Malaysia. The dependent variable in this study is organic farming adoption while the independent variables are attitude, performance expectancy, effort expectancy, social influence, facilitating conditions, and extension service as a construct variable. Furthermore, behavioral intention is a mediator variable. A quantitative research design will be employed for this study and 384 questionnaires will be distributed by using cluster sampling techniques at Pahang, Kedah, Selangor, and Johor. This study will be using a combination of the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Theory Planned Behaviour (TPB). Structural Equation Modeling (SEM) will be used to analyze all the objectives of the study. Besides, based on the previous study, all the variables will have a high mean score. This study also expected there is a significant relationship on all independent variables with the mediator variable and dependent variable. This study, hopefully, can increase the practice and adoption of organic farming among the farmers, allowing them to meet the Sustainable Development Goals (SDG) and Shared Prosperity Vision 2030, which were drafted by the government to improve food security and contribute to Malaysia's economy.

Keywords: Organic farming, myOrganic certificate, Unified Theory of Acceptance and Use of Technology (UTAUT), Theory Planned Behaviour (TPB)

Category: Agrotechnology

Isolation and Identification of Plant Growth Promoting Fungus of *Phalaenopsis amabilis* (L.) Blume Orchid

NS Salsabila ¹, Z Suhana ^{1,2*}, N Laila ¹, SAB Tengku Halimatun ^{1,2}

¹ Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli Kelantan, Malaysia

² Institute of Food Security & Sustainable Agriculture (IFSSA), Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia

***Corresponding author:** suhana@umk.edu.my

ABSTRACT

Phalaenopsis amabilis (L.) Blume Orchid is one of the genus *Phalaenopsis*. They are important in the floriculture industry because of their vivid, and enormous blossoms as well as their greater tolerance to the indoor environments. *Phalaenopsis amabilis* known as one of the epiphytic orchids that contain a large variety of endophytic fungus. Plants gain benefit from endophytic fungus as they help with nutrient uptake and the production of plant growth regulators. Plantlets produced *in vitro* are unable to develop resistance against minor and major microbial pathogens or other biotic and abiotic stresses caused by *in vitro* controlled conditions. Under those circumstances, co-cultivation of plantlets with endophytic fungus derived from orchid plant may be beneficial for *in vitro* culture and plantlet acclimatization, as well as for plantlet development and survival in greenhouse phase. This study aims to isolate and identify endophytic fungi as they were isolated from roots, leaves and stems of *Phalaenopsis amabilis* (L.) Blume Orchid using morphological and molecular methods. Fifteen fungi were isolated and further identified by morphological method. The fungi shows different characteristics such as texture, pigmentation and growth rate. These fungi will be confirmed by using molecular work and biochemical activities to investigate IAA production, the phosphate solubilization activity and ammonia production of fungi. Furthermore, co-cultivation of plantlets with identified fungus will be carried out *in vitro* and *ex vitro* to observe the growth promoting effect of *P. amabilis* (L.) Blume Orchid development.

Keywords: *Phalaenopsis amabilis* (L.) Blume Orchid, endophytic fungi, plant growth promoting activities, co-cultivation

Category: Agrotechnology

Nutritional Composition and Antioxidant Activities of *Pleurotus pulmonarius*'s Stem Waste Grown with Different Substrates (sawdust vs. pineapple waste)

NNZ Azwanida*^{1,2}, SF Norsyafiera¹ and TH Zuharlida^{1,2}

¹Fakulti Industri Asas Tani, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

²Functional Agroproduct Research Group, Fakulti Industri Asas Tani, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

***Corresponding author:** azwanida@umk.edu.my

ABSTRACT

Mushroom growth is influenced by several factors such as carbon-to-nitrogen ratio, pH, temperature, air composition and medium composition, which may act independently or interact with one another. In this study, the oyster mushroom (*Pleurotus pulmonarius*) grown with different substrates, which are sawdust (SS) and pineapple waste (PS) were evaluated for its nutrient composition and antioxidant properties. Each mushrooms blocks were harvested four-time in three months. All the samples were divided into three parts which is the cap, stem, and stem waste (SS-C, PS-C, SS-S, PS-S, SS-SW, and PS-SW), resulting in six samples. All the samples were analyzed for nutrient composition including moisture, ash, fat, fiber, protein, and carbohydrate. A glucan assay kit was used to determine the α - and β -glucan content in the samples while 2,2-diphenyl-1-picryl-hydrazyl-hydrate (DPPH) and 2,2'-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid (ABTS) assays were used to determine the antioxidant activities. All the samples were tested in triplicate for each test. The results showed that the SS-SW had significantly high ash content (1.84 % fresh weight) while PS-SW, SS-S, and SS-S waste had significantly higher carbohydrates (16.41,15.93, and 16.57 % fresh weight respectively). The PS-C, PS-S, and SS-C contained significantly more protein content 16.41,15.93, and 16.57 % fresh weight respectively). In both substrates, the beta-glucan compound was significantly more concentrated in the stem and stem waste compared to the cap which ranged from 31.45 ± 0.79 to 49.94 ± 0.48 %. Besides, the cap of the mushroom showed the highest antioxidant activity compared to the other parts, with an IC_{50} value ranging from 230.34 to 470.18 g/mL. In conclusion, the different substrates used have no significant effect on the nutrients and the antioxidant study. However, the stem waste part has shown the potential nutrient in terms of ash, carbohydrate, and glucan compounds. In addition, stem waste also has shown its potential for antioxidant properties which may contribute to the pharmaceutical and cosmetic industry. In the future, it is important to examine the other potential bioactivities and compounds specifically in stem waste.

Keywords: *Pleurotus pulmonarius*, macronutrient composition, antioxidant activity, stem waste, beta-glucan

Category: Agrotechnology

Effect of Soil Factors on the Phytotoxicity and Persistence of Bis (2-ethylhexyl) Phthalate

Basiri B1, MZ Norhafizah1, M Shamsull1, HY Ch'ng1, and N Laila1

1Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600, Jeli, Kelantan, Malaysia

***Corresponding author:** norhafizah.mz@umk.edu.my

ABSTRACT

Previous research findings have demonstrated a powerful phytotoxic effect of bis (2-ethylhexyl) phthalate (DEHP) on some selected weeds. However, there is no information on the phytotoxicity and persistence of DEHP in soil. The research aimed to evaluate the persistence of DEHP in the soil and its effect on the soil physicochemical and biological parameters. The persistence of DEHP was evaluated on sterilized and non-sterilized soils in the laboratory in Petri plates on the seeds of *Echinochloa colona* (jungle rice). Soil samples were treated with a series of DEHP application rates of 0.0, 1.2, 2.4, and 4.8 kg ai ha⁻¹, and arranged in a completely randomized design in three replications. In the first week, DEHP showed the highest inhibition of germination, shoot length, and root length at 4.8 kg ai ha⁻¹, with 85% and 83 %, 30 and 26%, and 52 and 32%, respectively, on the sterilized and unsterilized soil. In the 7th week, the germination, shoot length, and root length of *E. colona* were inhibited by 10 and 2%, 10 and 4%, and 5 and 9% at 4.8 kg ai ha⁻¹, respectively, on the sterilized and unsterilized soils. The presence of microorganisms in the non-sterilized soil indicates that soil microorganisms may degrade and alter the chemical structure of DEHP, which consequently lowers its toxicity. The result further showed that the physicochemical and biological properties of the soil affected the phytotoxicity of DEHP. Therefore, the demonstration of high herbicidal activity and the ability of microbes to degrade it via natural processes, DEHP may have the potential for development as a natural herbicide.

Keywords: *Echinochloa colona*, persistence, Phytotoxic compound, Microorganisms, sterilized and non-sterilized soil

Category: Agrotechnology

Effect of Soil Factors on the Phytotoxicity and Persistence of Bis (2-ethylhexyl) Phthalate

Basiri B¹, MZ Norhafizah¹, M Shamsul¹, HY Ch'ng¹, and N Laila¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600, Jeli, Kelantan, Malaysia

*Corresponding author: norhafizah.mz@umk.edu.my

ABSTRACT

Previous research findings have demonstrated a powerful phytotoxic effect of bis (2-ethylhexyl) phthalate (DEHP) on some selected weeds. However, there is no information on the phytotoxicity and persistence of DEHP in soil. The research aimed to evaluate the persistence of DEHP in the soil and its effect on the soil physicochemical and biological parameters. The persistence of DEHP was evaluated on sterilized and non-sterilized soils in the laboratory in Petri plates on the seeds of *Echinochloa colona* (jungle rice). Soil samples were treated with a series of DEHP application rates of 0.0, 1.2, 2.4, and 4.8 kg ai ha⁻¹, and arranged in a completely randomized design in three replications. In the first week, DEHP showed the highest inhibition of germination, shoot length, and root length at 4.8 kg ai ha⁻¹, with 85% and 83 %, 30 and 26%, and 52 and 32%, respectively, on the sterilized and unsterilized soil. In the 7th week, the germination, shoot length, and root length of *E. colona* were inhibited by 10 and 2%, 10 and 4%, and 5 and 9% at 4.8 kg ai ha⁻¹, respectively, on the sterilized and unsterilized soils. The presence of microorganisms in the non-sterilized soil indicates that soil microorganisms may degrade and alter the chemical structure of DEHP, which consequently lowers its toxicity. The result further showed that the physicochemical and biological properties of the soil affected the phytotoxicity of DEHP. Therefore, the demonstration of high herbicidal activity and the ability of microbes to degrade it via natural processes, DEHP may have the potential for development as a natural herbicide.

Keywords: *Echinochloa colona*, persistence, Phytotoxic compound, Microorganisms, sterilized and non-sterilized soil

Category: Agrotechnology

Effect of Different Substrate on the Quantification of β -glucan Content in Mushroom Species of *Pleurotus ostreatus*, *Pleurotus florida*, and *Schizophyllum commune*

SM Salamah¹, L Naher^{1,2*}, M Shamsul¹ and MS Nik¹

¹Faculty of Agro-Based Industry, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

² Institute of Food Security and Sustainable Agriculture, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia

***Corresponding author:** lailanaher@umk.edu.my

ABSTRACT

The mushroom industry has increased in prominence due its diverse applications towards human. A wide range of edible mushroom consumption has led growers to increase its production. This is because edible mushrooms contain bioactive compounds that can benefit for human health, such as β -glucans, which can lower the cholesterol levels in human bodies, insulin resistance, dyslipidemia, hypertension and promote healthy digestive health. The growth media as substrate can affect the nutritional component in the mushroom fruit bodies. However, limited study or no data was found for the effect of substrates on the β -glucans content in mushroom. Thus, this project was conducted to observe the effect of different substrates on the β -glucan content of three different mushroom species due to the different preference of mushroom species among the mushroom consumers. Grey oyster mushroom (*P. ostreatus*), white oyster mushroom (*P. florida*), and split gill mushroom (*S. commune*) was cultivated on sawdust, paddy straw and oil palm frond. In this study, the β -glucan from grey oyster mushroom, white oyster mushroom were analysed from three successive flushes which are first, second and fourth flushes while only two successive flushes (first and second flushes) were recorded by split gill mushroom due to the stop fruiting bodies growth. Mushroom cultivated on oil palm frond substrates produced the highest total β -glucan content in grey oyster mushroom (135.50%) followed by white oyster mushroom (121.09%) and split gill mushroom (96.53%). Mushroom cultivated on paddy straw recorded the lowest total β -glucan content in grey oyster mushroom (115.34%), white oyster mushroom (113.15%) and split gill mushroom (54.67%). While sawdust produced 124.45% in grey oyster mushroom, 108.08% in white oyster mushroom and 87.36% in split gill mushroom for the total β -glucan. It showed that substrates elements could impact the amount of β -glucan content in mushroom fruit bodies due to the difference of nutrient content in the substrates. Besides that, it also found total β -glucan content in grey oyster mushroom was highest among the thee species, which is the first choice mushroom among Malaysian consumer. Thus, cultivation of mushrooms on oil palm frond can be potential for enhance the β -glucan content in the fruit bodies that can be play role in functional food industry.

Keywords: edible mushroom, agricultural biomass, functional food industry, fruit bodies, β -glucan

Category: Agrotechnology

Effect of *Blaptica dubia* on Growth and Liver Histology of *Oreochromis Spp*

M Munirah^{1*} and Kumara T¹

¹Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, 17600, Jeli, Kelantan, Malaysia

*Corresponding author: munirahbtmokhtar@gmail.com

ABSTRACT

The Food and Agriculture Organization of the United Nations (FAO) recommended insects as a substitute to protein source in livestock feed due to the high demand on both animal-based and plant-based proteins in fish feed. This led to the overuse of natural resources and the subsequent price fluctuation in fish and feed production. . In this experiment, Red tilapia or *Oreochromis spp* has been used as an animal model. *Oreochromis spp* fingerlings were purchased from a private hatchery farm. All fish were acclimatized to the laboratory condition for seven days before the experiment began. there are five different treatment in this study with five different combinations of Dubia cockroaches every diet, *Balaptica dubia* and commercial pellet, namely T1 (60% *B.dubia* + 40% commercial pellet), T2 (70% of *B.dubia* + 30% commercial pellet), T3 (80% of *B.dubia* + 20% commercial pellet), T4 (90% of *B.dubia* + 10% commercial pellet) and T5 (100% of *B.dubia*). The control group of fish was fed with commercial pellets. Growth rate of experimental fish were monitored weekly for continuous fifteen weeks. The liver of the fish from each treatment was subjected to histology study in order to evaluate the cell structure of the liver from the fish . The present study showed the result that there was significant difference ($p < 0.05$) among the treatment diets towards the growth of red hybrid tilapia, where treatment T5 showed the best result in terms of growth rate which is $12 \pm 1.18\%$. However, histology study revealed that the fish liver suffered from abnormal fatty changes as the percent of *Blaptica dubia* increased in treatment diets. Therefore, full replacement of commercial pellet by *Blaptica dubia* meal is not recommended. The use of *Blaptica dubia* meal in feed formulation will require further study to prevent the abnormal fatty changes.

Keywords: protein source, fish feed, *Oreochromis spp*, *Balaptica dubia*, histology

Category: Agrotechnology

Effects of Combined Fertilizer Sources on Pest Population and Plant Growth Performance of Chilli

R Vinsen¹ and K Thevan² and MZ Norhafizah¹

Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600, Jeli, Kelantan, Malaysia

***Corresponding author:** rivitra.f19d006f@siswa.umk.edu.my

ABSTRACT

Several studies have reported the adverse effects of inorganic fertilizers while encouraging the use of organic fertilizer in agriculture. Biofertilizers are highly studied to explore their potential. Chilli (*Capsicum annuum* L.) is one of the most profitable crops in Malaysia. A field experiment was conducted on chilli to study the growth performance and pest population with different treatments of organic and inorganic fertilizer at Kg. Chong, Sik, Kedah in September 2020 to Mar 2021. 11 different fertilization treatments incorporating *Saccharomyces cerevisiae* as biofertilizer on Chilli Kulai 1033 was conducted. The data collected statistically analysed by multivariate ANOVA and the significant differences between the means were separated using Tukey's honestly significant difference (HSD) test. Results obtained showed that soil chemical properties have improved as the organic and biofertilizer increased. No significant differences in the pest population have proven that fertilization did not influence the pest infestation. Among the treatments, T10 and T11 have the highest agronomic efficiency than other treatments. NPK increased the fruit length yet failed to have any significant difference in the fruit weight. Therefore, the best treatment is T11 (2 tan/ha of NPK with poultry manure (10 t/ha) with 5g/L of *S.cerevisiae*) which influenced the yield and growth performance of chilli compared to other treatments

Keywords: Fertilizers, chilli, biofertilizer, pest

Category: Product Development

Turbidity Reduction by Nanomagnetic Biocarbon Composite: Isotherm and Kinetics Studies

A Huda¹ and SA Palsan^{1*}

¹ Faculty of Agro-Based Industry, Universiti Malaysia Kelantan Jeli Campus, 17600, Jeli Kelantan, Malaysia

***Corresponding author:** palsan.abdullah@umk.edu.my

ABSTRACT

In Kelantan, most of the rural population opted for groundwater for consumption. However, these water sources faced water contamination problems, especially turbidity. A nanomagnetic biocarbon composite (NBC) was developed to purify groundwater. The NBC consisted of coconut shell biocarbon coated with iron oxide nanoparticles (IONPs). In this study, isotherm and kinetics of the NBC in groundwater purification process were tested, and commercialized activated carbon (CAC) was used for comparison. The Brunauer-Emmett-Teller analysis (BET) revealed that BET surface area and pore volume of NBC (1092.12 m²/g; 0.67 m³/g) were higher than (CAC) (1079.57 m²/g; 0.66 m³/g). The experiments were carried out with 0.04 g of (<45µm) NBC and CAC in 10% w/v batch adsorption condition; 150 rpm of agitation at room temperature. The study revealed Langmuir isotherm Type III as the best fit model for NBC (R²; 0.9958) and CAC (R²; 0.999). The maximum uptake capacity (Q_{max}) of NBC (4.2136 NTU g⁻¹) was higher than CAC (0.1914 NTU g⁻¹). Both NBC and CAC showed the best fit kinetic model was intraparticle external film diffusion with lowest root-mean-square deviation (RMSE) between actual and experimental value for NBC (0.04) and CAC (0.13). The results showed that adsorbent with IONPs (NBC) has higher BET surface area and pore volume, therefore, increased uptake capacity during intraparticle external film diffusion process. Hence, this study depicted that the NBC is a competitive adsorbent in purifying groundwater.

Keywords: Groundwater, isotherm, Kelantan, kinetics, nanomagnetic

Category: Agrotechnology

Effect of Different Substrate on the Quantification of β -glucan Content in Mushroom Species of *Pleurotus ostreatus*, *Pleurotus florida*, and *Schizophyllum commune*

SM Salamah¹, L Naher^{1,2*}, M Shamsul¹ and MS Nik¹

¹Faculty of Agro-Based Industry, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

² Institute of Food Security and Sustainable Agriculture, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia

***Corresponding author:** lailanaher@umk.edu.my

ABSTRACT

The mushroom industry has increased in prominence due its diverse applications towards human. A wide range of edible mushroom consumption has led growers to increase its production. This is because edible mushrooms contain bioactive compounds that can benefit for human health, such as β -glucans, which can lower the cholesterol levels in human bodies, insulin resistance, dyslipidemia, hypertension and promote healthy digestive health. The growth media as substrate can affect the nutritional component in the mushroom fruit bodies. However, limited study or no data was found for the effect of substrates on the β -glucans content in mushroom. Thus, this project was conducted to observe the effect of different substrates on the β -glucan content of three different mushroom species due to the different preference of mushroom species among the mushroom consumers. Grey oyster mushroom (*P. ostreatus*), white oyster mushroom (*P. florida*), and split gill mushroom (*S. commune*) was cultivated on sawdust, paddy straw and oil palm frond. In this study, the β -glucan from grey oyster mushroom, white oyster mushroom were analysed from three successive flushes which are first, second and fourth flushes while only two successive flushes (first and second flushes) were recorded by split gill mushroom due to the stop fruiting bodies growth. Mushroom cultivated on oil palm frond substrates produced the highest total β -glucan content in grey oyster mushroom (135.50%) followed by white oyster mushroom (121.09%) and split gill mushroom (96.53%). Mushroom cultivated on paddy straw recorded the lowest total β -glucan content in grey oyster mushroom (115.34%), white oyster mushroom (113.15%) and split gill mushroom (54.67%). While sawdust produced 124.45% in grey oyster mushroom, 108.08% in white oyster mushroom and 87.36% in split gill mushroom for the total β -glucan. It showed that substrates elements could impact the amount of β -glucan content in mushroom fruit bodies due to the difference of nutrient content in the substrates. Besides that, it also found total β -glucan content in grey oyster mushroom was highest among the thee species, which is the first choice mushroom among Malaysian consumer. Thus, cultivation of mushrooms on oil palm frond can be potential for enhance the β -glucan content in the fruit bodies that can be play role in functional food industry.

Keywords: edible mushroom, agricultural biomass, functional food industry, fruit bodies, β -glucan

Category: Agrotechnology

Analysis of Rhizosphere Endophytic Bacteria of Selected Mangrove Plants and their Role in Salt Tolerance of Crop Plants

Y Nagarathnamma, KT Preetham, CS Akila¹ and CO Reddy Puli*

Department of Botany and ¹Biotechnology, Yogi Vemana University, Kadapa,
Andhra Pradesh. India.

***Corresponding author:** pcoreddy@gmail.com

ABSTRACT

Salinity stress is the most deleterious abiotic stress which hampers the plant growth, development and crop yield. Among various classical and advanced technologies being used to reduce the negative effects of salinity, the use of Plant Growth Promotion (PGP) endophytic bacteria is considered to be an efficient approach for bio-amelioration of salinity stress. The identification of salt-tolerant, or halophilic, PGP bacteria has the potential to promote sustainable saline soil-based agriculture. Mangroves harbors various endophytes, which can induces salt tolerance by triggering various molecular and biochemical traits, besides plant growth promotion in both host and non-host plants. In the present study we have collected different samples (leaves, stem, root, and rhizospheric soil, soil sediment) of the selective mangrove plants such as *Excoecaria agallocha* (L.) & *Aegiceras corniculatum* (L.) Blanco from the Thamminapatnam & Krishnapatnam of Nellore district Andhra Pradesh, India. A total of 415 individual bacterial species were isolated on the Nutrient Agar media through spreading grid plate technique. All the bacterial species were screened for their salt tolerance, the results indicated that some endophytic bacteria exhibited salt tolerance. The selective salt tolerant endophytic bacterial strains (thirteen) exhibited plant growth promoting traits as well as extracellular activities. Further, the selective endophytes (six) individually & in the form of consortium inoculated to the non-host crop plants (Rice *cv* NDLR1 & Peanut *cv* JL27). Post inoculated Peanut and Rice seedlings were subjected to the salt stress (0, 50,100,150,200&250mM NaCl concentrations). Further to evaluate the salt tolerance nature of the inoculated and non-inoculated plants, various morpho-physiological and biochemical traits were measured. The data clearly revealed that endophyte inoculation triggered the salinity tolerance in both of the studied crop plants. The Salinity Tolerance Index (STI) data suggest that the consortia inoculated plants displayed high STI (1.25) compared to the individual bacteria inoculated plants (1.1). The data clearly indicates that halotolerant bacteria from the Mangrove plants could improve the salt tolerance in crop plants.

Key words: Saline Tolerance, Endophytic Bacteria, Mangroves, Rice, Peanut

Category: Product Development

Synergetic Effects of Bitter Gourd Honey with Treated Cornsilk Extract on Total Phenolic Content

Chan Ke Xin¹, Pasupuleti Viswewara Rao², Marina Abdul Manaf³, and Nurhanan Abdul Rahman^{1*}

¹ Faculty of Agro-Based Industry, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

² Universiti Malaysia Sabah, 88400 Kota Kinabalu, Sabah, Malaysia.

³ Universiti Sains Malaysia Kubang Kerian Campus, 15200 Kota Bharu, Kelantan, Malaysia

***Corresponding author:** hanan@umk.edu.my

ABSTRACT

This research is aimed to determine the synergistic effect of bitter gourd honey with treated cornsilk extract on total phenolic content at different concentration of cornsilk extract. Different blanching treatments were used on cornsilk which were non-treated, steam blanching and hot water blanching before the cornsilk dried for 24 and 36 hours and extracted by using distilled water. The Folin- Ciocalteu colorimeter method was used to determine the total phenolic content of sample. The data was expressed in mg gallic acid equivalent (GAE) per 100 g dried cornsilk. The total phenolic content of cornsilk was increased after the blanching treatments which the cornsilk treated with steam blanching and dried for 24 hours contained the highest total phenolic content, 55.917 ± 0.992 mg GAE/ 100g dry cornsilk compare to the non-treated cornsilk, 50.802 ± 1.316 mg GAE/ 100g dry cornsilk. Meanwhile, the cornsilk that treated by hot water blanching and dried for 36 hours with cornsilk extract-honey ratio (3:2) has the highest total phenolic content, 63.662 ± 1.567 mg GAE/ 100g dried cornsilk. This showed the addition of bitter gourd honey was enhanced the total phenolic content of treated cornsilk extract.

Keywords: Bitter gourd honey, cornsilk, blanching, total phenolic content

Category: Product Development

Molluscicidal Activity of Aqueous Extract From Five Plants Species Against Golden Apple Snails (*Pomacea canaliculata*)

Mohd Freezaillah Arkmey Md Din and Shamsul Muhamad*

Faculty of Agro-Based Industry, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

*Corresponding author: shamsul.m@umk.edu.my

ABSTRACT

The quest for botanicals with molluscicidal activity became essential research when the Golden Apple Snails (*Pomacea canaliculata*) became a pest that invaded rice fields and resulted in a significant decrease in rice harvested in Malaysia. This study was conducted to screen the aqueous extracts of leaves of *Acacia mangium* (Fabaceae), *Allamanda cathartica* (Apocynaceae), *Catharanthus roseus* (Apocynaceae), *Euphorbia hirta* (Euphorbiaceae) and *Stachytarpheta jamaicensis* (Verbenaceae) as potential molluscicides. For each plant species, one kg of freshly crushed leaves was blended with 5000 ml of water and soaked at room temperature. After 24 hours, it was filtered, and this extract was named 100% aqueous extract. The two diluted concentrations of extracts, i.e., 10% and 50%, were prepared based on a 100% extract. Ten adult snails were treated at each concentration for molluscicide testing for 24 hours. Then it was replaced with chlorine-free water and left for 24 hours. Snails were considered mortal when they remained motionless if stimulated by a needle or if the body emerged from the shell or remained within it. The results showed that the most potent extracts were *Stachytarpheta jamaicensis* leaf extracts, followed by *Allamanda cathartica*, *Acacia mangium*, *Euphorbia hirta* and *Catharanthus roseus*. Therefore, this study suggested that *Stachytarpheta jamaicensis* warrants further investigation of the molluscicidal effect on controlling Golden Apple Snails.

Keywords: *Pomacea canaliculata*, molluscicidal, *Stachytarpheta jamaicensis*, pest.

Category: Product Development

Microscopic Assessment of Leaf, Root and Rhizome of *Curcuma sumatrana*

Yuhendri R¹, Nurainas², T Maideliza², L Meriko³, Alponsin², and IRA Wahab^{1*}

¹ Faculty of Agro-Based Industry, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

² Faculty of Mathematics and Natural Sciences, Universitas Andalas, Indonesia

³ Graduate School of Natural Science and Technology, Kanazawa University, Japan

***Corresponding author:** ikarastika@umk.edu.my

ABSTRACT

Curcuma sumatrana is a wild plant endemic to West Sumatra that is spread in the Bukit Barisan area. Currently, *C. sumatrana* is included in the International Union for Conservation of Nature (IUCN) criteria threatened with extinction, due to population decline in the environment. *C. sumatrana* is also believed to possess various therapeutic value that beneficial in treating various diseases. This research aims to find out the characteristics of the anatomical of leaves, root and rhizome through permanent preparations that could contribute to its phytochemical analyses. Observations of anatomical characteristics using a microscope and photographed using the DP2-BSW application. Anatomical study of leaf, with its adaxial and abaxial epidermal thickness of 49.8 μm and 31.7 μm , respectively. Furthermore, its mesophile thickness is 48.9 μm and leaf type is unifacial, prism-shaped crystal, and covers with non-glandular trichome. Its trichome height is 146.3 μm , aerchyma area of 198.1 μm , while its vessel area is 284.0 μm . On the other hand, anatomical structure of the root showed cortex thickness of 292.7 μm , endodermis thickness of 5.9 μm , xylem diameter of 34.7 μm and pith thickness of 244.6 μm . Meanwhile, anatomical structure of rhizome consists of eccentric starch, sand-shaped crystals, cortex thickness of 957.0 μm and endodermis of thickness 7.37 μm . This study has provided a baseline information on the anatomical structures of the leaves, root and rhizomes of *C. sumatrana* can be utilized in the propagation of this species from being threatened with extinction.

Keywords: *Curcuma sumatrana*, leaf, microscopic, rhizome, root.

Category: Product Development

Biochemical Analysis of *Cocos nucifera* Sap (CNS) in STZ - induced Diabetic Sprague Dawley (SD) Rats

Nurul Amira binti Zainurin¹, Noor Hafizoh binti Saidan^{1*}, Aidiahmad bin Dewa², and Nurul Fadzlinbinti Ab Llah¹

¹ Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600, Jeli, Kelantan, Malaysia

² Department of Pharmaceutical Chemistry, School of Pharmaceutical Sciences, Universiti Sains Malaysia, Minden, Pulau Pinang, Malaysia

***Corresponding author:** hafizoh.s@umk.edu.my

ABSTRACT

Type 2 diabetes mellitus (T2DM) is a chronic and one of the most common metabolic diseases affecting large proportion of world population. Thus, there is growing attention to avail of natural products in replacing table sugar as an alternative remedy in therapy for diabetes and has uncovered a good status. *Cocos nucifera* sap (CNS) 'Nira' or 'Tuak' is derived by tapping coconut flower inflorescence commonly used as a raw material of palm sugar. CNS has been claimed to be beneficial in providing energy with lowGI index, but not much information regarding the effect of CNS and its extract(s) on the blood glucose level (BGL) in STZ-induced diabetic model rats has been reported. Adult Sprague Dawley (SD) were grouped into six and treated separately with vehicle (non diabetic and STZ-induced diabetic rats), metformin (500mg/kg b.w.), CNS (1g/kg b.w.), ethyl acetate extract (1g/kg b.w.) and hexane extract (1g/kg b.w.). Compared to control G1 group, glucose levels significantly increased and insulin levels significantly decreased in G2 diabetic control group. Levels of these diabetes parameters significantly reversed in G3 to G6 groups of rats which were treated with metformin, CNS, ethyl acetate extract, hexane extract respectively compared to those in diabetic rats. Lipid profile parameters including, triglycerides, total cholesterols, LDL- cholesterols and VLDL-cholesterols were significantly increased and HDL-cholesterol levels were significantly decreased in diabetic rats as compared to control. These results suggest that CNS and its extracts would have higher potential as nutraceuticals and could serve as natural alternatives to anti-diabetic remedies.

Keywords: *Cocos nucifera* sap (CNS), anti-diabetic, blood glucose level (BGL)

Effect of Pelleting The Creep Feed and Growing Ration on Its Chemical Composition

AR Rahimi¹, ND Rusli^{1*}, K Mat¹ and MM Rahman¹

¹ Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli Kelantan, Malaysia

*Corresponding author: nordini@umk.edu.my

ABSTRACT

The main problem that local dairy producers frequently deal with is the high mortality rate during the kidding stage and the slow growth rate when it reaches the post-weaning stage. The inadequate intake of dry matter and the imbalance of nutritional supplements during creep feeding are the variables impacting the performance of goats that need to be decreased. Total mixed ration (TMR) can be a complete diet for the kids and lambs. However, the conventional TMR can be sorted by the animals easily. It is also prone to becoming overheated and spoiling. Therefore, the current study aims to develop a TMR pellet for the pre-weaning stage of dairy goats and to evaluate the impact of storage time on the composition of the TMR pellet from week 1 to week 6. The nutritional values of TMR pellets, this analysis was conducted. The chemical composition of creep feed in mash form is 19.67% of crude protein (CP), 1.3% of ether extract (EE), 15.37% of crude fibre (CF), 88.34% of dry matter (DM) and 10.60% of ash while creep ration pellet contained 22.28% of CP, 3.53% of EE, 18.69% of CF, 94.34% of DM and 10.85% of ash. For post-weaning TMR, the growing ration in mash form contained 15.51% of CP, 0.69% of EE, 23.70% of CF, 87.47% of DM and 10.82% of ash while the pellet form contained 14.31% of CP, 3.43% of EE, 22.46% of CF, 90.82% of DM and 10.69% of ash. Based on the current data, it was shown that the chemical composition of creep feed and growing ration have no significant difference ($p>0.05$) between mash and pellet form. For future study, both TMR mash and pellet will be evaluated in two feeding trials of pre-weaning and post-weaning dairy goats at local dairy farm, Gong Kedak, Pasir Puteh, Kelantan.

Keywords: *Total Mixed Ration, Brachiaria humidicola, TMR pellet, creep feed*

Category: Animal Science

Sexual Behavior of Male Goats in Different Isolation Period

F A Mohd Sabri^{1,*}, M N I Mohd Azman², M M Rahman¹ and R I A Raja Khalif¹

¹ Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, Jeli, 17600 Kelantan, Malaysia.

² Faculty of Bioresource and Food Security, Universiti Sultan Zainal Abidin, Besut Campus, Besut22200, Terengganu

***Corresponding author:** fathinathirah12@gmail.com

ABSTRACT

The behavior pattern of an animal was important for identifying their needs in order to increase their productivity. The aim of this study was to determine the reproductive activity such as anogenital sniffing, mount with intromission, mounting attempts, self-urination and flehmen in different isolation period in male goats. Females were synchronized for estrus prior to semen collection with artificial vagina. Boer male from local university (Group A) and Private Own Farm (Group B) was used in the study. In Group A, male (n=2) was isolated for 28 days, while isolation in Group B (n=2) was 14 days. Semen volume and sexual behavior were observed and recorded. The result showed that there was a significant differences ($p < 0.05$) in the success rate of semen collection between the two groups. Group A has $93.33 \pm 6.67\%$ success rate of semen collection compared to Group B ($26.33 \pm 14.50\%$). However, there was no significant differences ($p > 0.05$) for semen volume between groups (2.63 ± 0.45 and 1.33 ± 0.78 , respectively). Group B goats have higher sexual activity and sexual behavior such as anogenital sniffing, mounting attempts, self-urination and flehmen. There were a significant differences ($p < 0.05$) in term of anogenital sniffing, mount with intromission, self-urination and flehmen between both groups. In conclusion, there was a significant difference in sexual behavior of male goats with different isolation periods observed in Boer goat.

Keywords: Sexual Behavior, Day Length, Social Grouping

Category: Animal Science

Effect of Pelleting on the Shelf Life of Total Mixed Ration for Lactating Dairy Goats

NMS Norfarahin¹, NR Dini^{1*}, M Khairiyah¹, MHR Farhan²

¹Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan. ²Faculty of Veterinary Medicine, Universiti Malaysia Kelantan, Pengkalan Chepa 16100 Kota Bharu, Kelantan.

***Corresponding author:** nordini@umk.edu.my

ABSTRACT

Dairy goat farming is a fast-expanding livestock industry and a potentially lucrative venture. Lower animal performance is mainly constrained by nutritional deficiency as it is not easy to meet the demand of the dairy production stage. Total mixed ration (TMR) using local forages, cereals and nutritional supplements improved feeding efficiency and farm profitability. However, TMR can increase the wastage of feed materials and reduce the palatability of animals. Thus, this study aims to develop TMR with a newly established formulation into pellet form for lactating Saanen crossbreed goats as well as to evaluate the effect of TMR pellet on its shelf-life. The chemical analysis of raw materials and the production in the form of pelleted and un-pelleted TMR composed of the same formulation were analysed by standard methods of Association of Official Analytical Chemists (AOAC) for proximate analysis while the mineral analysis was based on acid digestion and inductively coupled plasma-optical emission spectroscopy (ICP-OES). For the shelf life, the result for crude protein (CP), ash and crude fibre (CF) shows no significant difference ($p > 0.05$) for TMR mash between the periods, while dry matter (DM) (0.007%) and ether extract (EE) (0.018%) had a significant difference for the loose form ($p < 0.05$). While for the pellet, only the CF (0.022%) had a significant difference compared to other analyses. The mineral analysis (%) was also done, and all the results showed the highest value in pellet form compared to the loose form for calcium (Ca) (0.39), phosphorus (P) (0.41), magnesium (Mg) (0.21), potassium (K) (0.99) while the sodium (Na) gave the undetected result for both forms. It is suggested that the pellet TMR provided a better result in feed analysis. It as a practical feeding management strategy uses pellet TMR.

Keywords: TMR pellet, lactating, proximate analysis, mineral analyses

Category: Animal Science

Comparison Treatment between CIDR and Herbal in Detection Estrus Signs and Follicle Size of the Female Goats

MS Nur Nazhiifah Amiirah¹, SM Mashitah² and RK Raja Ili Airina^{3,*}

¹ Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600, Jeli, Kelantan, Malaysia

² Department of Biology, Faculty of Science, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

***Corresponding author:** airina@umk.edu.my

ABSTRACT

The livestock sector in Malaysia is lagging behind, which threatens the rapid pace of this change and inevitably puts pressure on livestock systems. Hormonal regulation such as Control Internal Drug Release (CIDR) has been the main pillar to facilitate reproductive technologies by manipulating the length of the oestrus cycle. Nevertheless, herbal treatment has gained prominence because of its low cost and therapeutic properties related to reproductive performance. Therefore, the objectives of the present study were (1) to measure the expression of estrus signs in female goats and (2) to determine follicle size at the onset of treatment to ovulation. Thus, twenty-four non-pregnant female goats (n=24) were randomly assigned to three estrus synchronization treatments and fed treatment A (herbs; n=8), with herbs fed with total mixed ratio (TMR) for seven consecutive days. In treatment B (herbs+vitamin E), female goats were injected with vitamin E once before starting to feed herbs with TMR for 7 days. In treatment C (CIDR; n=8), goats were given an intravaginal device containing 0.3 g progesterone for 10 days. All female goats were examined for signs of oestrus immediately after treatment by visual observation four times daily. Simultaneously, the follicular pattern was confirmed by ultrasound at 24 hours after the start of treatment and repeated every 48 hours until ovulation. The study showed that the group with herbs and vitamin E (treatment B) had the most signs of oestrus at 72.92% ($P > 0.05$), while the group with herbs (treatment A) and CIDR (treatment C) achieved at 41.67% and 64.58%, respectively. There was no significant effect ($P > 0.05$) between ovarian follicular diameter and days to ovulation. The mean ovulatory follicle diameters observed with herbs+vitamin E was highest at 9.0 mm, compared with herbs 8.50 mm and CIDR 8.76 mm. Finally, the study shows that the novel approach of herbs+vitamin E is most effective in modulating hypothalamic GnRH secretion by inducing estrus synchronization through regulation of follicular growth.

Keywords: Estrus synchronization, follicle diameter, corpora lutea, ultrasonography

Category: Food Security

Optimization of Black Grass Jelly Formulation to Reduce Leaching and Increase Floating Rate.

MM Nor^{1,2*}, HI Sheikh⁴, MFH Hassan², S Mokhtar², A Suganthi³, A Fadhlina⁵

¹Institute of Food Security and Sustainable Agriculture, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan.

²Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia.

³Faculty of Earth Science, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia.

⁴Faculty of Fisheries and Food Science, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu Darul Iman, Malaysia.

⁵Fundamental Dental and Medical Sciences, Kulliyah of Dentistry, International Islamic University Malaysia, Kuantan Campus, 25200 Kuantan, Pahang.

*Corresponding author: maryana.mn@umk.edu.my

ABSTRACT

Black grass jelly (BGJ) is a popular black jelly used in preparing various drinks and desserts. Food industries often use preservatives to maintain the physicochemical properties of foods, such as color and texture. These preservatives (e.g., phosphoric acid) are linked with deleterious health effects such as kidney disease. Using gelling agents, carrageenan, and gelatin to make BGJ could improve its physicochemical and textural properties. This study was designed to optimize BGJ- selected physicochemical and textural properties using carrageenan and gelatin. Various black grass jelly formulations (BGJF) were designed using an I-optimal mixture design in Design Expert[®] software. Data from commercial BGJ were used as a reference during the optimization process. The combination of carrageenan and gelatin added to the formulations was up to 14.38g (~5%), respectively. The results showed that adding 2.5g carrageenan and 2.5g gelatin at approximately 5g (~5%) effectively maintained most of the physicochemical properties with an overall desirability function of 0.81. This formulation was selected as the optimum black grass jelly formulation (OBGJF). The leaching properties and floating duration were measured on the OBGJF and commercial grass jelly for 20 min and 40 min, respectively. The results indicated that OBGJF showed significantly ($p < 0.0001$) lower leaching rate and floating time ($p < 0.05$). Hence, further optimization is needed to increase the floating duration of carrageenan and gelatin-based BGJ.

Keywords: Cincau; *Mesona Chinensis*, Black grass jelly, Carrageenan, Gelatin

Category: Food Security

Foxtail Millet (*Setaria italica* L.) Landraces as a Novel Allelic Source for Climate Smart Agriculture and Nutritional Security: Mapping Population Development, Linkage Map Construction and QTL Identification

Sameena Shaik¹, Anand Kumar¹, S. Ananda Rajakumar¹, K. Tejaswani¹, Gunti Mallikarjuna¹, K. Sravana Simha Reddy, P. Chandra Obul Reddy², V. B. Reddy Lachagari³, Lekkala Sivarama Prasad³, H. S. Talwar⁴, Arjula R Reddy⁵ and A. Chandra Sekhar*¹

¹Molecular Genetics and Functional Genomics Laboratory, Department of Biotechnology, School of Life Sciences, Yogi Vemana University, Kadapa - 516005, AP., INDIA.

²Plant Molecular Biology Laboratory, Department of Botany, School of Life Sciences, Yogi Vemana University, Kadapa- 516005, A.P., India.

³Agrigenome Labs Pvt Ltd, #43A, SDF, CSEZ, Kakkanad, Kochi, Kerala - 682 037, India

⁴Principal Scientist, IIMR, Rajendra Nagar, Hyderabad

⁵Professor Emeritus, Department of Plant Sciences, School of Life Sciences, University of Hyderabad, Hyderabad – 500 046. Telangana., India.

***Corresponding Author:** chandrasekhar9@yahoo.com & sekharac9@gmail.com

ABSTRACT

Growing human population, is one of the biggest burdens to any Nation's Economic policy to provide quality food. Food security is one of the problems due to the insufficient food grains to meet the demand of 820 millions by end of 2025. Due to variety of biotic and abiotic problems, there is a tremendous pressure on the current agriculture systems across the globe. Therefore, it is important to consider and embrace alternative and/or complementary crops that are simpler to grow, tolerant of climate change, resource-efficient, more nutrient-dense for human consumption, and agriculturally sustainable. Millets, the staple food of old world are one of the perfect crops to meet the nutritional quality needs of modern human. They are known as crops of simpler to grow, tolerant of climate change, resource-efficient, more nutrient-dense for human consumption, and agriculturally sustainable. Foxtail millet is one among the millets in general that has a potential to replace present staple food grain system and we have selected foxtail millet landraces as our models. Foxtail millet (*Setaria italica* L. $2x = 2n = 18$, with a small genome of about ~515 MB) is a staple crop grown in arid and semi-arid regions of India. Landraces are the farmer varieties, known to adapt to the local harsh environmental conditions with high nutritional value. Based on the comprehensive studies in our lab, we have identified significant differences with respect to drought stress tolerance and seed micronutrient content along with high genetic polymorphism among land races compared to elite / released varieties. Based on the integrative data, different combinations of biparental crosses were made, true F₁'s were selected, advanced to F₇ generation and RIL mapping population(s) were developed. The potential utility of these genetic resources were evaluated in the field for various yield and yield related traits and their association with grain yield was derived. Further, the molecular genetic diversity assessment studies were initiated for the selected parental lines and the mapping population using high throughput illumina HiSeq2500 Next Generation Sequencing (NGS) technology based ddRAD sequencing.

Category: Food Security

Pre-Treated Black Soldier Fly Larvae (BSFL) as Sustainable Alternative Protein Source for Broiler Chicken

NMZ Athirah¹, I Noor Azlina², M Khairiyah¹, NR Dini¹, CH Hasnita¹, M Mahmud¹, N Samat³ and SM Al-Amsyar^{1*}

1 Faculty of Agro-based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan.

2 Faculty of Bioengineering and Technology, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan.

3 Malaysian Agricultural Research and Development Institute, 43400 Serdang, Selangor.

***Corresponding author:** amsyar@umk.edu.my

ABSTRACT

Black soldier fly larvae (BSFL), *Hermetia Illucens L.*, is an ideal protein source in animal feed formulation due to high protein content and excellent amino acid profiling comparable to high protein yet costly feedstuffs, such as fish meal and soybean meal. However, protein hydrolysis is still necessary to maximize protein absorption since only half of the BSFL protein is getting absorbed. The oligopeptides, peptides, and amino acids resulting from partial or extensive hydrolysis of protein absorbed by the animal's body may improve growth performance. A 35-day experimental trial was conducted to investigate the growth performance of broiler chickens fed dietary 10% of salt-treated (T1), 10% of protease-treated (T2), 10% of hybrid-treated (T3) combination of salt and protease and untreated BSFL meal (C) as protein sources in substitution to the fish meal. One hundred and twenty (day old) broiler chickens were randomly allotted into four treatment groups consisting of 30 selected chickens and three replicates of ten chickens each. Growth performances including average daily feed intake (ADFI), average daily gain (ADG), feed conversion ratio (FCR) and mortality rate were affected by the diets. The FCR in each group T1, T2, T3 and C demonstrated a significantly different in value which were 2.44, 2.71, 2.42 and 3.03. Meanwhile, mortality rate was greatly affected on control group and 10% salt-treated at the end of the weeks, 47% and 43%.

Keywords: Black soldier fly larvae (BSFL), protein, salt, protease, hybrid

Category: Food Security

A Review on the Effect of Aflatoxins on Food Security

M Kiranmayeea and K Riazunnisa*

Department of Biotechnology and Bioinformatics, Yogi Vemana University Kadapa, Andhra Pradesh, India-516005

***Corresponding author:** e-mail: krbtbi@yogivemanauniversity.ac.in; khateefriaz@gmail.com

ABSTRACT

Access to safe food for the healthy life of human beings is one of the key aspects in the present scenario of the increasing population. Foods contaminated with aflatoxins have led to serious health problems in humans and animals. The occurrence of aflatoxins in crops has vast economic and human health impacts worldwide. Aflatoxins are among the principal mycotoxins that contaminate economically important food and feed crops. Aflatoxins B1, B2, G1, G2, M1 and M2 are different types of aflatoxins with varying degrees of toxicity. Aflatoxin B1 is the most potent naturally occurring carcinogen known and is also an immunosuppressant. Among the different types of mycotoxins, aflatoxins (AFs) are widespread in major food crops such as maize, groundnuts, tree nuts, dried fruits and spices, and milk and meat products. Chillies, dry fruits and nuts are susceptible to infection by aflatoxin-producing fungi and subsequent contamination by aflatoxins at every stage of production and storage. Mycotoxins have been shown to have hepatotoxic, carcinogenic, teratogenic, and mutagenic effects on all animal species tested. The present review gives insights into the sources of contamination in different crops, occurrence, detection techniques and their effect on human health.

Key words: Mycotoxins, food crops, spices, dried fruits and human health

Category: Food Security

Total flavonoid, phenol content and antioxidant activity of red and white onion (*Allium cepa* L.) bulbs

M. Vidya Vani, C. Madhuri, K. Riazunnisa*

Department Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, Andhra Pradesh, India-516005

*Corresponding author: krbtbi@yogivemanauniversity.ac.in; khateefriaz@gmail.com

ABSTRACT

Allium cepa L. (Common Onion), the oldest cultivated crop which is used worldwide as both vegetable and flavouring. It belongs to the Amaryllidaceae family and is used traditionally for culinary, and medicinal purposes and its different pharmacological effects have been described. Phytochemicals such as phenols, flavonoids, quercetin, saponins, cepaenes, aglycones, and organosulfurs showed various pharmacological properties and therapeutic effects. The present study compares the bioactive components and antioxidant activities of red and white onion bulb extracts in methanol, ethanol and aqueous solvents. The comparative study showed that the DPPH scavenging activity is maximum in white onions methanol extract and minimum in ethanolic extract whereas in red onions it reciprocates. Maximum antioxidant activity was noted in aqueous extracts of both white and red onion bulbs. The highest flavonoid content was detected in the aqueous extract of the red variety and the minimum in white onion, the phenolic content was more in ethanolic white onion extract.

Keywords: *Allium cepa* L., Antioxidant activity, Methanol, Ethanol, Aqueous extracts.



UNDERGRADUATE ABSTRACTS

Study on the Effect of Different Fertilizer Application on the Growth Performance of Soybean Using Double Row Planting System

Muhamad Aiman Shazreen Abd Wahid* and Fatimah Kayat

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First author: manshaz278@gmail.com

ABSTRACT

Soybean (*Glycine max*) is one of the most important beans in the world. As legume, it could fix the nitrogen in the soil with the aid of nitrogen-fixing bacteria. It contains high protein and nutrient which made it popular raw materials for several products such as soy flour, soy protein, tofu, soy milk, soy sauce, and cooking oil. The objective of this study is to investigate the effect of organic and chemical fertilizer on the plant height, number of trifoliolate, number of pods, number of seed, pod weight and seed weight of soybean grown in sandy loam soil using double row planting system. The experiment was conducted using Complete Randomized Block Design (CRBD) comprising 6 treatments including control (without the application of any fertilizer) with 30 replicates for each treatment. Data obtained from the study was subjected to Excel data analysis. Result shown that the application of chicken dung had significantly enhance the growth performance of the soybean plant which can be seen in their plant height which gave the highest score at 46.10 ± 6.01 cm towards the end of experiment as compared to other treatments. However, there is no significant different observed in the number and weight of pods and seeds between the chicken dung and NPK treatments. Therefore, it can be suggested that the application of organic fertilizer could enhance the growth and development of soybean. However, the application of NPK fertilizer is still needed for the developments of pods and seeds as more nutrients are needed for the formation of pods and seeds.

Keywords: soybean, organic fertilizer, chicken dung

Growth Performance Pattern of Shoot and Root of Sacha Inchi (*Plukenetia volubilis*) Seeds, Stem Cutting and Under Different Light Intensity

Ahmad Irfan bin MD Fauzi and Mohd Bin Mahmud @ Mansor

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First author: irfan.f19a0007@siswa.umk.edu.my

ABSTRACT

The Sacha Inchi plant (*Plukenetia volubilis*), native to the Peruvian Amazon Forest, has been used for medicinal purposes by the Inca culture for thousands of years. It also has vast economic importance due to its health benefit. However, it has not been widely cultivated in Malaysia due to a lack of interest and low-income potential. This study aims to investigate the differences in growth and biomass accumulation between *P. volubilis* seedlings and mature stem cuttings and to determine the most effective starting material for cultivating the plant. The study was conducted using 10 seedling or stem cuttings planted in ten polybags and bottles, which were grown under different light intensities ranging from 20%, 40%, 60%, 80% and 100%. The experiment was conducted over 13 weeks starting from September until December. This study was conducted on 18 September 2022 and ended on 18 December 2022. The data showed that Sacha Inchi seedlings outperformed stem cuttings in tree height, number of leaves, and biomass accumulation. Every week the tree height data, the number of leaves, and biomass accumulation are measured to obtain the perception of the five replicates for planting as seeds and the five mature stems of this sachu inchi. This analysis is measured using measuring tools such as rulers and measuring tapes to measure the height and biomass of each tree and make observations and calculations to obtain the number of leaves that come out from the first week to the last week. These results suggest that seed nursery cultivation may be a more effective method for growing Sacha Inchi plants. It is recommended that future research on Sacha Inchi cultivation include groups of plants grown under optimal conditions, as well as a range of soil types and fertilization regimes to better understand their effects on plant growth and biomass accumulation.

Keywords: Sacha Inchi, seedlings, stem cuttings, growth, biomass, cultivation.

Herbicides Effect on *Pennisetum purpureum* (Napier grass) Control

Fatin Nor Suhada Binti Mazlan*, Kumara Thevan A/L Krishnan

Faculty of Agro Based Industry, University Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: suhada.f19a0033@siswa.umk.edu.my

ABSTRACT

The herbaceous plant Napier grass (*Pennisetum purpureum Schum.*) is renowned for having the highest biomass productivity among all plants, making it an excellent feedstock and to produce cellulosic biofuel. In any case, the Florida Exotic Pest Plant Council has also listed it as a possible bothersome species. The main purpose of the study was to examine the efficacy of using herbicides against the selected Napier grass. A variety of herbicides, including glyphosate 5.5ml, metsulfuron and glyphosate (0.17 + 3.3), Diuron 7.8 g, glyphosate furthermore metsulfuron (5.5 + 0.17), and control, were used in the field studies. Each treatment was applied with 100ml of herbicides (mixtures). For control, water applied. Result shows, the highest rate of chlorophyll content loss among them was observed during the Diuron treatment (9.4 SPAD units), which resulted in a change in color from green to brown, whereas the highest chlorophyll was untreated and was 28.6 SPAD units. The temperature and precipitation are 25.12 ± 2.058 and 24.47 ± 23.324 respectively. According to field evidence, glyphosate is the most effective kind of control. Therefore, research future needed for environmentally friendly herbicide to control Napier grass.

Keywords: Napier grass, Glyphosate, Metsulfuron, Diuron and chorophyll.

Effect of Benzylaminopurine on In Vitro Culture of *Caladium sp.*Izzah Nur Syazana Binti Tukiran¹, Suhana Binti Zakaria¹

Faculty of Agro Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First author: syazana.f19a0046@siswa.umk.edu.my**ABSTRACT**

Malaysia's economic resources include oil palm agriculture. Plant growth was dependent on soil conditions. Any increase in yield production that leads in increased output should helped to minimize agriculture's negative environmental effect, enhance food security, and promote sustainable agriculture. One of the alternatives to achieve these goals is by apply the correct rate of nitrogen fertilizer and herbicides in oil palm farming. The excessive application of nitrogen fertilizer and herbicides and could cause harmful effect for the non-target plants in oil palm, for example tropical kudzu (*Pueraria javanica*). Thus, this study was conducted in order to describe the toxicity of agrochemicals to the non-target plant species. An experiment was conducted at Agro-Technopark, Universiti Malaysia Kelantan (UMK), Jeli Campus, Kelantan, Malaysia. In this study, *P. javanica* plants were treated with a series application rate of nitrogen fertilizer (urea) at 0.0 kg N/ha (**C0**), 50 kg N/ha (**T1**), 100 kg N/ha (**T2**), 150 kg N/ha (**T3**), and 200 kg N/ha (**T4**) and GBH at 2.4 kg ai/ha for all treatment (**T1-T4**). The result from this study showed that there was no significant reduction on the leaf diameter and plant height of *P. javanica* across the treatments application. However, urea at 50.0 kg N/ha exhibit higher reduction compared to other treatments with the mean value of 2.48 cm and 14.59 cm, respectively. However, at the same application rate, *P. javanica* shows significant increase in cell injury of leaves with the mean values of 71.12% as compared to urea application alone (**CT1**) with 21.63%. For the chlorophyll content, **T1** significantly reduce the leaf greenness by 17.98 μm as compared to negative control (**C0**). Similar trend was also observed for shoot fresh weight of *P. javanica* where **T1** had cause higher reduction for this parameter. These results imply that **T1** would be the optimum rate that cause the toxicity to the non-target plant species.

Keyword: Tropical kudzu, Glyphosate-Based Herbicide (GBH), nitrogen fertilizer, growth, cell injuries

Effect of Oil Palm Kernel Shell, Corn Stalk Biochar and Charcoal Media on Growth Performance of Orchids (*Dendrobium bigibbum*)

Izzat Farhan Bin Che Asmadi*, Nik Nur Azwanida Binti Zakaria and Akmal Adilah Binti Idris

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: izzat.f19a0047@siswa.umk.edu.my

ABSTRACT

Orchids are known as the plants that can grow and regularly planted as an enlivening plant. However, in horticultural practices, potting media provides a better support and supplements for the growth of healthy and bountiful orchids. Orchid needs sufficient nutrients to ensure its growth and survive. In this study, the potting media compositions consist of biochar from oil palm kernel shell and corn stalk mixed with coconut husk were compared with the commercial charcoal. Oil palm kernel shell and corn stalk were used in this study to replace the media of orchid that basically uses peat moss. The objectives of this study were to identify the effectiveness of different potting media compositions on orchids and to determine the growth of orchids using oil palm kernel shell biochar, corn stalk biochar and charcoal media compositions. The oil palm kernel shell and corn stalks which were agriculture waste were pyrolyzed. The growth performance of *Dendrobium bigibbum* for 12 weeks was recorded. It was observed that, the orchid grown on biochar media composition recorded highest measurements for plant height (26.6cm), leaf count (2), and leaf length (13.5cm) for corn stalk biochar with coconut husk media composition. Corn stalk biochar with coconut husk media composition recorded the best result better than oil palm kernel shell biochar with coconut husk media composition that recorded measurements for plant height (20.2cm), leaf count (3), and leaf length (10.4cm). Meanwhile, charcoal with coconut husk media composition recorded lowest measurements for plant height with (16.7cm), leaf count (4) and leaf length (8.8cm). Biochar media composition is recommended as an effective media for *Dendrobium bigibbum* due to its effectiveness to support the growth of orchids. Economically, biochar presents a greater potential in agriculture and should be an alternative for aggregates which has been proved in this study.

Keywords: *Dendrobium bigibbum*, corn stalk biochar, oil palm kernel shell biochar, potting media

Evaluation and Comparison of Composting from Agriculture Waste

Mohd Asrul Asman*, and Tengku Halimatun Sa'adiah T Abu Bakar

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First author: asrasman.f19a0068@siswa.umk.edu.my

ABSTRACT

Excessive usage of chemical fertilisers may have a negative impact on both the soil's pH and its ability to absorb water from the atmosphere. Besides, the dumping of agricultural waste, which raises the issue of where the dumping takes place. This research aimed to ascertain the evaluation and comparison of composting from agricultural waste. The experiment has been conducted at the green house and laboratory in University Malaysia Kelantan. This study involved 2 types of compost, which are T₁ (rabbit manure, rice straw, rice straw biochar, mushroom residues and mushroom residues biochar) and T₂ (agricultural waste compost from chicken manure, rice straw, rice straw biochar, mushroom residues and mushroom residues biochar). The experiment has been employed Kjeldahl, Single Dry Ashing method and Total Carbon Determination method to determine physical and chemical composition of compost and composting materials. While, independent samples t-test was used to compare the physical and chemical composition of both compost. Finding of the study show that, the total values ranged of nitrogen (N), phosphorus (P), potassium (K), and carbon (C) were from 1.01 to 2.55 %, 0.05 to 0.42 %, 0.12 to 0.46 %, and 15.84 to 50.31 % respectively. Moreover, the pH value and moisture content values ranged from 5.16 to 9.34 and 16.18 to 80.65 % respectively. While, the C/N ratio values was ranged from 10.85 to 46.02 and total organic matter content values was ranged from 27.88 to 88.55 %. Finding also found that there is significant on N content and C/N ratio for both compost, while P, K, C and organic matter content similar with pH and moisture were insignificant for both compost with p value more than 0.05. In future, potential performance of agricultural compost also can add a new knowledge assessment towards producing good farming on the modern agriculture.

Keywords: Agriculture waste, rabbit manure, chicken manure, rice straw, mushroom residues

Response of Tropical Kudzu (*Pueraria javanica*) to Nitrogen Fertilizer and Glyphosate-Based Herbicide (GBH) at the Vegetative Growth

Muhammad Hamzani Abd Rahman, Laila Naher and Norhafizah Md Zain

¹Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan,

17600 Jeli, Kelantan

First author: hamzani.f19a0088@siswa.umk.edu.my

ABSTRACT

Malaysia's economic resources include oil palm agriculture. Plant growth was dependent on soil conditions. Any increase in yield production that leads in increased output should helped to minimize agriculture's negative environmental effect, enhance food security, and promote sustainable agriculture. One of the alternatives to achieve these goals is by apply the correct rate of nitrogen fertilizer and herbicides in oil palm farming. The excessive application of nitrogen fertilizer and herbicides and could cause harmful effect for the non-target plants in oil palm, for example tropical kudzu (*Pueraria javanica*). Thus, this study was conducted in order to describe the toxicity of agrochemicals to the non-target plant species. An experiment was conducted at Agro-Technopark, Universiti Malaysia Kelantan (UMK), Jeli Campus, Kelantan, Malaysia. In this study, *P. javanica* plants were treated with a series application rate of nitrogen fertilizer (urea) at 0.0 kg N/ha (**C0**), 50 kg N/ha (**T1**), 100 kg N/ha (**T2**), 150 kg N/ha (**T3**), and 200 kg N/ha (**T4**) and GBH at 2.4 kg ai/ha for all treatment (**T1-T4**). The result from this study showed that there was no significant reduction on the leaf diameter and plant height of *P. javanica* across the treatments application. However, urea at 50.0 kg N/ha exhibit higher reduction compared to other treatments with the mean value of 2.48 cm and 14.59 cm, respectively. However, at the same application rate, *P. javanica* shows significant increase in cell injury of leaves with the mean values of 71.12% as compared to urea application alone (**CT1**) with 21.63%. For the chlorophyll content, **T1** significantly reduce the leaf greenness by 17.98 μm as compared to negative control (**C0**). Similar trend was also observed for shoot fresh weight of *P. javanica* where **T1** had cause higher reduction for this parameter. These results imply that **T1** would be the optimum rate that cause the toxicity to the non-target plant species.

Keyword: Tropical kudzu, Glyphosate-Based Herbicide (GBH), nitrogen fertilizer, growth, cell injuries

Effect of Different Types of Planting Media on the Growth Performance of Eggplant Using Fertigation System

Muhammad Iqbal Mohamed Rashidi*, Muhammad Nurfaiz Abd. Kharim and Fatimah Kayat

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First author: iqbal.f19a0092@siswa.umk.edu.my

ABSTRACT

It is common that there is a significant initial cost related to the development of a fertigation system. Fertigation may result in an attractive return on investment, despite the larger initial outlay required, particularly when anticipating the cost of planting media in a long run. Cocopeat is a kind of planting media that is often used in fertigation systems to produce goods for commercial sale. Switching to an alternative planting media with a lower price could reduce the total cost of production. This study was conducted using a Randomized Complete Block Design (RCBD). The purpose of this study is to evaluate the potential of alternative planting media, such as rice husk, rice husk ash, boiler ash, and chimney ash, as a substitute for cocopeat in eggplant fertigation system, as well as the possibility of cost reduction by employing these alternative planting media. In addition, a study was conducted to determine the effect of different planting media on eggplant growth. The study lasted for seven months and included planting eggplant seeds, transplanting, fertilizing and maintenance, collecting data on parameters such as plant height, number of branches, number of leaves, total yield and weight and data analysis using one-way ANOVA. The study discovered that M3, a mixed media of cocopeat and boiler ash, has a significant difference in the rate of yield production when compared to other media that can affect plant growth, as revealed by Duncan's post hoc test ($p = 27.8750$). While using the Duncan post hoc test on the media that had been experimented on at the nursery, it was discovered that M11, which is 100% cocopeat, had a significant difference with a value of $p = 7.6000$. This research suggests that farmers can reduce raw material costs, support local and sustainable economies, and use multiple cultivation mediums. agriculture.

Keywords: Planting media, fertigation system, eggplant, cocopeat, boiler ash

Co-application of Urea and Empty Fruit Bunch (EFB) Compost to Improve Nitrogen Retention Capacity in a Tropical Acid Soil

Ng Sai You*, Ch'ng Huck Ywih

Faculty of Agro-based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First author: saiyou.f19a0104@siswa.umk.edu.my

ABSTRACT

Nitrogen (N) is vital for the development of plants. Nitrogen is one of the macronutrients for plant development. However, the nutrients would be lost through the leaching process. There was a dearth of information on the use of urea amended with EFB compost with a large surface area to minimize the N leaching from the applied urea in acid soils. The N retained in the form of exchangeable cations and anions would retard loss of N via leaching and thus N would be retained in the soil for crop uptake. The objectives of this study were to: (1) Assess the effects of amending urea with EFB compost on the daily and cumulative N losses in a laboratory-scale leaching study. (2) Determine the effects of amending urea with EFB compost on the soil pH, EC and total N after the laboratory-scale leaching study. A laboratory scale leaching study was conducted to determine the effects of EFB compost in reducing N losses from urea fertilizer. The list of treatment were: T0: Soil only; T1: Soil + 130 kg ha⁻¹ urea; T2: Soil + 130 kg ha⁻¹ urea + 5 t ha⁻¹ EFB compost; T3: Soil + 130 kg ha⁻¹ urea + 10 t ha⁻¹ EFB compost; T4: Soil + 130 kg ha⁻¹ urea + 15 t ha⁻¹ EFB compost; T5: Soil + 130 kg ha⁻¹ urea + 20 t ha⁻¹ EFB compost. After the leaching study, soil samples were subjected to selected chemical analysis. The experiment was conducted in a completely randomized design with three replications. The data obtained was subjected to one-way ANOVA and segregated through Tukey's test. The leaching study revealed that the application of 15-20 t ha⁻¹ EFB compost had significantly increased the soil pH, EC and total N in the soil after leaching study. Although the application of EFB compost did not delay the leaching of N from the urea fertilizer, 15-20 t ha⁻¹ EFB compost had retained significantly more N content in the soil. Further study on pot experiment and field trials is required to assess the long term effect of the EFB compost on minimizing N leaching from the urea fertilizer and reducing the cost of chemical fertilizer usage.

Keywords: Urea fertilizer, EFB compost, N leaching, Eutrophication

Efficacy of Botanical Fungicides Leaf Extract from Candle Bush (*Senna alata*), Neem (*Azadirachta indica*) and Senduduk (*Melastoma malabriticum L.*) for Controlling *Colletotrichum spp.* in Chili

Nik Nur Atierah Hashim*, Tengku Halimatun Sa'adiah T Abu Bakar

Faculty of Agro-Based Industry, University Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan.

First Author: atierah.f19a0106@siswa.umk.edu.my

ABSTRACT

The concept of environmentally conscious sustainable agriculture is gaining public attention, including organic fertilizers, fungicides and pesticides since used harmful chemicals. Unfortunately, the total chemical pesticide used increase every year. There are many synthetic poisons produced by industry that can cause negative effects on humans and the environment. Therefore, this study aimed to determine botanical fungicide leaves extracts from candle bush (*Senna alata*), neem (*Azadirachta indica*) and senduduk (*Melastoma malabriticum L.*) for controlling *Colletotrichum spp.* in Chili. This study has employed six treatments which are without treatment (Negative control), commercial fungicide Polyram (Positive control) candle bush leaf extract (T₁), neem leaf extract (T₂), senduduk leaf extract (T₃), and combination of bush leaf, neem, and senduduk leaves extract (T₄). The parameters observed in this study the Minimum Inhibitory Concentration (MIC) test, diameter of colony, spore formation, spore germination, and biomass of fungi. The finding shows that the MIC for each treatment is 0.6%. Besides, the study also found that, there is a significant on the effectiveness of botanical fungal leaf extracts to control *Colletotrichum spp.* in chili where the p-value is below 0.05 for each parameter. Hopefully, this study will help to reduce chemicals used in agriculture to boost the agricultural environment and provide high-quality, ecologically friendly crops.

Keywords: Botanical, Fungicides, Candle Bush (*Senna alata*), Neem (*Azadirachta indica*), Senduduk (*Melastoma malabriticum L.*)

Mushroom Crackers as an Alternative Healthy Snacks

Nor Asmahani Binti Mustaffa Bakri, Dr. Norhafizah Binti Md Zain, Dr. Mst Laila Naher

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan.

First Author: asmahani.f19a0113@siswa.umk.edu.my

ABSTRACT

Snacks are ready-to-eat food that is often rich in oil and seasoned with salt. The rising use of processed foods in the modern era has contributed to increasing salt intake, leading to health concerns, such as hypertension, in all communities, not only in Malaysian communities. Mushrooms are macrofungi that can be divided in edible and non-edible. The edible mushroom is rich in vitamins, minerals (potassium, magnesium) and dietary fibre. They are also low in carbs, making them an excellent choice for those on a low-carb diet. This study aimed to use grey oyster mushrooms to produce crackers to make healthy snacks and investigate the colour, texture of mushroom and sensory evaluation for consumer acceptability. The proximate analysis was used to determine the content of moisture, protein, fat, ash and carbohydrate. The result obtained from this study indicates that mushroom crackers contain low fat (11.34%), protein (2.19%) and carbohydrate (76.55%) while high in moisture (7.87%) and ash (2.06%) compared to commercial potato crackers. Colour analysis obtained that the mushroom cracker is low in lightness (L^*), redness (a^*) and yellowness (b^*), while in terms of texture, the mushroom cracker is low in hardness and springiness, which means crunchier compared to commercial crackers but low in cohesiveness. Overall acceptance of sensory evaluation towards mushroom crackers shows a high in “extremely like” percentage contribute about 66%. Thus, this study found mushroom crackers can be a potential for healthy snack.

Keywords: Grey Oyster Mushroom, Mushroom Cracker, Salt, Proximate Analysis, Snacks

Volatile Organic Compounds in Brood Cell of *Geniotrigona thoracica* and *Lepidotrigona terminata* using Gas Chromatography and Mass Spectrometry Detector (GC-MS)

Nor Halizah Binti Sulaiman*, Kumara Thevan A/L Krishnan

Faculty of Agro Based Industry, Jeli Campus, University Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: halizah.f19a0115@siswa.umk.edu.my

ABSTRACT

Stingless bees are seen in two different species, *Geniotrigona thoracica* and *Lepidotrigona terminata*. Volatile organic compounds in brood cells are compared between two economically important species have been carried out and recorded using the GC-MS methodology. The main objective is to identify the volatile organic compounds in brood cell and compare the different volatile organic compounds of the *G. thoracica* and *L. terminata*. The samples are gathered fresh from beekeepers and transported directly to laboratory. The volatile extraction of *G. thoracica* and *L. terminata* were kept for 24 hours in the JSK Table Top Shaker before filtration and continued with the GC-MS using hexane as solvent. A normality test was applied to the data to identify the volatile organic compounds in brood cells of two economic stingless bees (*G. thoracica* and *L. terminata*) using SPSS Software. Since the conditions of normality were not met, a nonparametric test to look at the correlation between two variables (Spearman's Rank Correlation Coefficient) was used. Overall, 21 volatile components of *L. terminata* brood cells and 19 volatile components of *G. thoracica* had been discovered. The lack of data on some chemicals' biological effects suggests that *G. thoracica* and *L. terminata* need more research, which might open the door for their development as drugs, health items, and cosmetics.

Keywords: *G. thoracica*, *L. terminata*, volatile, GC-MS, brood cell.

Effect of Indole-3-Acetic Acid and Activated Charcoal on *In Vitro* Propagation and Acclimatization of *Cymbidium* sp. Orchid

Nur Ain Binti Mohd Zulaili, Suhana Binti Zakaria

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: ain.f19a0124@siswa.umk.edu.my

ABSTRACT

Orchids are the most beautiful and attractive flowering plants in the world, made up of a unique group of plants under the family of Orchidaceae. *Cymbidium* is a well-known orchid genus with 68 species that are mostly found in Asia's tropical and subtropical regions. The mortality rate of orchid plants is high due to weak root system and poor cuticle development, particularly during transplantation from *in vitro* to *ex vitro*. Weaning *in vitro* orchids plantlets to the ambient environment improves plantlet survival and growth after transplantation to the *ex vitro* state. Acclimatization can be accelerated *in vitro* by hardening plantlets or after transplantation by slowing transpiration. It is very important to strengthen the roots of orchid plantlets before proceed with the acclimatization process. The objectives for this experiment were to investigate the effect of Indole-3-Acetic Acid (IAA) and Activated Charcoal in development of rooting system of *Cymbidium* sp. during *in vitro* culture and to observe the survival rate of treated *Cymbidium* sp. during acclimatization stage. Combination of different concentration of IAA (0 mg/L, 0.5 mg/L, 1.0 mg/L and 2.0 mg/L) and activated charcoal (0 g/L, 1.0g/L and 2.0 g/L) were tested. The highest number of leaves was 16.400 ± 1.158 which were obtained in Treatment 10 (MS media + 0.5 mg/L IAA + 2.0 g/L Activated Charcoal). The highest number of roots was 20.400 ± 4.153 which were obtained in control. The highest length of roots was 17.995 ± 6.959 cm which were obtained in Treatment 3 (MS media + 1.0 mg/L IAA). 56.67% of orchid plantlets were survive after transferred to acclimatization stage. In conclusion, the different concentration of IAA and AC can give different result for roots and shoots development.

Keywords: *Cymbidium*, Acclimatization, IAA and Activated Charcoal.

Study on the Effect of Different Fertilizer on Leaf Crunchiness and Taste of Mustard Green Grown in NFT Hydroponic System

Nur Anis Farisha binti Zainal*, Muhammad Nurfaiz bin Abd Kharim

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: farisha.f19a0130@siswa.umk.edu.my

ABSTRACT

Liquid fertilizers are becoming more widespread in the agricultural industry, especially in vertical farming. Liquid fertilizers have multiple functions that can help increase growth thus increasing nutrient absorption rates more effectively. This causes farmers to prefer to use liquid fertilizers. This study used various fertilizers to improve the growth, taste and texture of mustard greens. Because mustard greens are easy to grow and are in high demand in Malaysia, growing vegetables can be overcome by using vertical farming methods to cover the lack of vegetables supply in the market. However, consumers prefer to buy vegetables grown in soil over hydroponic systems because it is sweeter and crunchy. Different liquid fertilizers have been used to determine the best for improving the taste, texture, and yield of mustard greens. Morphological growth, such as plant height, leaf width, leaf SPAD chlorophyll content, and fresh weight, were measured in this study. Hence, under five different treatments, a total of 100 mustard green seedlings were grown using the NFT hydroponic system. The treatments used were control (T0), Fish Amino Acid (T1), Vita-grow (T2), Gibberellic Acid (T3), and Fermented Fruit Juice (T4). The sweetness and crunchiness of mustard greens were measured using a Refractometer and Texture Profile Analysis (TPA). Data were analysed using SPSS to obtain One-Way ANOVA and Tukey HSD value. Therefore, plant height (33.5cm), leaf SPAD chlorophyll content (171.2 Nos), fresh weight (65.15g), and sweetness (6.11%) showed the highest values in the fermented fruit juice (FFJ). Meanwhile, fish amino acids (FAA) showed the highest values for leaf width (12.0cm), crunchiness on the leaves (191.35g) and crunchiness on the stalks (575.95g). However, Gibberellin acid showed the lowest value which affected the growth of mustard green. Throughout the study, (FFJ) and (FAA) showed the most effective liquid foliar fertilizer in terms of growth, taste and texture.

Keywords: Mustard green, Foliar liquid fertilizer, NFT hydroponic system, Sweetness, Crunchiness.

Effect of Kinetin on Growth of Protocorm-Like Bodies (PLBs) Derived Plantlets of *Dendrobium bigibbum*

Nur Syazira Binti Manunzaman @ Mamon*, Noorhazira Binti Sidek

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: syazira.f19a0151@siswa.umk.edu.my

ABSTRACT

Dendrobium orchids are among the most prominent orchids, prized for their medicinal values and commercial significance in the potted and cut flower industries. However, orchids are notoriously difficult to reproduce. Tissue culture or *in vitro* procedures have made it easier to grow orchids. However, in tissue culture, *Dendrobium bigibbum* propagation faces problems where by it requires frequent subculture to avoid the orchids plantlets become too dense in the culture vessels. This will consequently stunt the growth of *Dendrobium bigibbum*, making it harder for them to survive after subculture. For this reason, the use of appropriate hormone concentration is required to accelerate orchid growth after they experienced a prolonged high confluency in the culture vessels. Therefore, this study was mainly focused on growth evaluation of PLBs-derived plantlets of *Dendrobium bigibbum* in different concentration of kinetin (0.5 mg/L, 1.0 mg/L, 1.5 mg/L, 2.0 mg/L, 2.5 mg/L). The plantlets were grown and subcultured in MS media with kinetin and maintained at 25°C in the growth room. The number of roots, number of shoots, fresh weight, and plant were observed for 5 weeks. The result shows that the treatment of 1.0 mg/L kinetin was optimum for roots development (8.1667) while control treatment for shoots development (3.000), fresh weight (0.7573), and plant height (1.3000). This *in vitro* evaluation proved the potency of kinetin usage as a suitable hormone candidate for future management of the growth of PLBs-derived plantlets of *Dendrobium bigibbum*.

Keywords: *Dendrobium bigibbum*, PLBs, kinetin, *in vitro*, media.

Response of Butterfly Pea (*Centrosema pubescens*) to Glyphosate-Based Herbicide (GBH) and Nitrogen Fertilizer at the Vegetative Growth

Nurul Athirah binti Mohd Nordin, Mst Laila Naher, Norhafizah binti Md Zain

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First author: athirah.f19a0160@siswa.umk.edu.my

ABSTRACT

Cultivation of cover crops is widely applied in plantation areas especially rubber and palm oil because it has an important role in maintaining agroecosystem functions as maintaining soil moisture, preventing soil erosion during rains and floods and also has a high of commercial value as animal feed. Therefore, the survival of the habitat of this cover crop needs to be protected to ensure that this crop always in good condition. However, exposure to the application of agrochemicals in agriculture especially farm areas can affect the response to vegetative growth in these crops. Therefore, a study was conducted at Agro Techno Park (ATP), University Malaysia Kelantan, Jeli Campus, Malaysia where in this study the cover crop species, *C. pubescens* was treated with a series of different concentrations of Glyphosate-Based Herbicide (GBH) and Nitrogen Fertilizer. This study started by treating the soil with nitrogen fertilizer and spraying Glyphosate-Based Herbicide (GBH) using the foliar spray technique on the plants based on the application rate that has been set and then several parameters were measured to evaluate the effect of agrichemical. It was found that, the use of Glyphosate-Based Herbicide (GBH) and Nitrogen Fertilizer on T3 and T4 treatments had a very positive effect on the vegetative growth of *C. pubescens* where there was a significant increase in terms of plant height, leaf diameter, fresh weight and chlorophyll content but at T4 had negative effect on the plant cell membranes through electrolyte leakage toward roots and leaves. Therefore, this study has shown that T4, (200 kg/ha N + 2.4 kg/ha GBH) is a very suitable application rate on the response of *C. pubescens* at vegetative growth and further suggests that the use of Glyphosate-Based Herbicide (GBH) and Nitrogen Fertilizer at the efficient rate in the growth of cover crop and able to become a new reference for agriculture field.

Keywords: Glyphosate-Based Herbicide (GBH), Nitrogen Fertilizer, *Centrosema pubescens*, Vegetative, Growth

Co-application of Zeolite and Goat Manure Compost to Reduce Ammonia Loss from Applied Urea Fertilizer in Tropical Acid Soil

Nurul Syazhwanie Binti Kamal 'Ariffin, Ch'ng Huck Ywih

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: Syazhwanie.f19a0172@siswa.umk.edu.my

ABSTRACT

Plants need nitrogen (N) to grow. Nitrogen fertilizer is used in Malaysian oil palm and paddy crops. Plants use half the N fertilizer they should. Farmers need lots of N to saturate soil and nourish crops. Fertilizers cost farmers and promote river algae growth, which is harmful for the environment. This study aims: (1) Assess the effects of co-application of zeolite and goat manure compost on the daily and cumulative NH_3 loss in a laboratory scale incubator study from the applied urea. (2) Determine the effects of co-application of zeolite and goat manure compost and urea fertilizer on the soil pH, total N, and EC. A laboratory-scale dynamic air flow incubator study examined the effect of zeolite and goat manure compost on urea N loss. T0: Soil only; T1: Soil + 130 kg ha⁻¹ Urea; T2: Soil + 130 kg ha⁻¹ Urea + 5 t ha⁻¹ Zeolite + 5 t ha⁻¹ Goat manure compost; T3: Soil + 130 kg ha⁻¹ Urea + 10 t ha⁻¹ Zeolite + 10 t ha⁻¹ Goat manure compost; T4: Soil + 130 kg ha⁻¹ Urea + 15 t ha⁻¹ Zeolite + 15 t ha⁻¹ Goat manure compost; T5: Soil + 130 kg ha⁻¹ Urea + 20 t ha⁻¹ Zeolite + 20 t ha⁻¹ Goat manure compost. Zeolite and goat manure compost slowed ammonia loss by 3 days. Zeolite and goat manure compost at 5-15 t ha increased soil, pH, and EC. Zeolite and goat manure compost did not reduce urea-induced ammonia loss in soil incubation. Zeolite and goat manure compost can amend soil pH and EC, but they did not decrease ammonia loss from urea fertilizer. Zeolite with goat manure compost may reduce urea fertilizer ammonia loss and chemical fertilizer costs, however further pot experiments and field trials are needed.

Keywords: nitrogen, ammonia loss, goat manure compost, urea fertilizer, air dynamic flow system

Response of Calopo (*Calopogonium mucunoides* Desv) to Glyphosate-Based Herbicide (GBH) and Nitrogen Fertilizer at Vegetative Growth

Rabiatul Adawiyah binti Mohd Shukri*, Mst Laila Naher and. Norhafizah binti Md Zain

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First author: adawiyah.f19a0175@siswa.umk.edu.my

ABSTRACT

The rate efficient use of chemical fertilizers through the use of Best Fertilizer Management Practices (BFMPs) techniques in supply the addition of optimal nutrients to oil palm tree should be practiced to maximize growth, production and minimizing the impact on the environment. The effects of the increasing use of herbicide and chemical fertilizers can cause long-term exposure to plant. Therefore, this study was conducted at Agro-Techno Park, UMK, Jeli to determine the effect of different nitrogen fertilizer (urea) rates on the growth and oxidative stress of cover crop plant, Calopo (*Calopogonium mucunoides* Desv) with a glyphosate-based herbicide (GBH). The soil was treated with urea fertilizer at 0.0 kg N/ha (**C0**), 50.0 kg N/ha (**T1**), 100.0 kg N/ha (**T2**), 150.0 kg N/ha (**T3**) and 200.0 kg N/ha (**T4**) while GBH with the fix rate of 2.4 kg ai/ha for all treatment. It was found that there was no significant reduction for all the parameter tested. The mean value of plant height *C. mucunoides* was lower at the application of GBH alone (**CT0**) with 60.5 cm as compared to other treatment (mean value ranging from 65-75 cm). In term of leaf diameter and chlorophyll content, it was observed that *C. mucunoides* exhibit lower mean value with 2.90 cm and 38 $\mu\text{mol m}^{-2}$, respectively. However, the mean values of shoot fresh weight at the application of urea 50-150 kg N/ha (**T1-T3**) were likely similar to negative control (**C0**) with the value of 1.80-2.00g. *C. mucunoides* also shows more lower reduction in membrane leakage of the leave part for both negative (**C0**) and positive control of GBH alone (**CT0**) with the average percentage value of 55%. Conversely, the root of *C. mucunoides* had more higher cell injury starting from the lowest application rate of urea, 50 kg N/ha (**T1**) to 200 kg N/ha (**T4**). These results suggest that the urea application at 50 kg N/ha (**T1**) could be the optimum rate to cause retardation in the growth of *C. mucunoides* and causing the cell injury for this cover plant.

Keywords: Calopo, nitrogen fertilizer, cover crop, growth, membrane leakage

***In-vitro* growth Response of *Oncidium* ‘Golden Anniversary’ Plantlets towards Exogenous 6-Benzylaminopurine (BAP) Supplementation**

Siti Aishah Sharif*, Noorhazira binti Sidek

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: aishah.f19a0181@siswa.umk.edu.my

ABSTRACT

The current demand for orchid plants is high, so various growing techniques are being further developed to boost the production of high-quality plants and avoid the extinction of unique orchid species. However, in abnormal circumstances *Oncidium* hybrids have a protracted juvenile period, taking between two and five years to mature and blossom. So this study was conducted to determine the optimum concentration of 6-Benzylaminopurine (BAP) hormone to enhance or speed up the growth of *Oncidium* in order to overcome the problem of *Oncidium* slow growth. This research used Murashige and Skoog (MS) media as it has a balanced composition and can be referred as the most suitable media for *Oncidium* Golden Anniversary orchid plantlets. The hormone used is 6-Benzylaminopurine (BAP) (0, 0.5, 1.0, 1.5, 2.0, 2.5 mg/L). It was found that the Treatment with 1.0 mg/L BAP (treatment 2) showed the highest mean value of shoot length (2.26 cm). The effect of BAP on *Oncidium* plantlet shows that Treatment 1 which consist of 0.5 mg/L BAP proved as the best concentration for the number of shoot which was 17.13. In addition, for the fresh weight, it shows that Treatment 1 with concentration of 0.5 mg/L BAP has the highest mean value which was 1.46 g. This study suggested that hormone BAP in concentrations of 0.5 mg/L and 1.0 mg/L promote significantly higher growth of *Oncidium* Golden Anniversary plantlets *in vitro*.

Keywords: *Oncidium* Golden Anniversary, 6-Benzylaminopurine (BAP), Murashige and Skoog

Response of Common Carpetgrass (*Axonopus fissifolius* (Raddi) Kuhl.) to Glyphosate-Based Herbicide (GBH) and Nitrogen Fertilizer at The Vegetative Stage

Siti Nuraini Binti Zainal*, Laila Naher² Norhafizah Binti Md Zain

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First author: aini.f19a0189@siswa.umk.edu.my

ABSTRACT

Managing weeds is essential because, if left uncontrolled, they may compete with other crops for nutrients. In plantation areas, excessive nitrogen fertilizer (urea) and Glyphosate-Based Herbicide (GBH) caused soil pollution, plant growth reduction, and cover crop cell injuries. Therefore, this research investigated the growth and cellular damage of common carpetgrass (*Axonopus fissifolius* (Raddi) Kuhl.) following different rates of urea and GBH. The experiment was conducted at the Agro-Techno Park, University Malaysia Kelantan (UMK), Jeli Campus. The soil medium was treated with urea at 0.0 kg N/ha (**C0**), 50.0 kg N/ha (**T1**), 100.0 kg N/ha (**T2**), 150.0 kg N/ha (**T3**) and 200.0 kg N/ha (**T4**) and GBH at 2.4 kg ai/ha for all treatments (**T0-T4**). The *A. fissifolius* cover plant showed a significant reduction in height at 50 kg N/ha+ GBH 2.4 kg ai/ha (**T1**), with a mean of 30.0 to 45.0 cm. The leaf diameter and shoot fresh weight of *A. fissifolius* at this application rate (**T1**) exhibit a lower mean value than other treatments (1.3 cm and 1.50 g, respectively). The chlorophyll content of *A. fissifolius* was reduced for both negative (**C0**) and positive (**CT0; GBH alone**) controls, with mean values of 15 to 18 μm , compared to other treatments (mean values of 28 to 38 μm). *A. fissifolius* root membrane leakage caused more cell injury than the leaf, with percentages ranging from 5 to 25% and 38 to 67%. Although not statistically different, GBH alone at (**C0**) exhibits a reduction in cell injury levels for the leaf and root of *A. fissifolius* at 5 and 38%, respectively. These findings imply that determining the appropriate phytotoxicity rate of urea and GBH at 50 kg N/ha and 2.4 kg ai/ha (**T1**) is essential to limit risk to non-target plants while achieving best management practices in plantation crops.

Keywords: Common Carpetgrass, Glyphosate-Based Herbicide (GBH), nitrogen fertilizer, growth, cell injuries

Effect of Different Concentrations of IAA and Activated Charcoal on *In Vitro* Propagation and Acclimatization of *Oncidium Golden Anniversary* Orchid

Wan Nur Hazreen binti Wan Rohim*, Suhana binti Zakaria

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600, Jeli, Kelantan

First Author: hazreenti.f19a0199@siswa.umk.edu.my

ABSTRACT

Oncidium Golden Anniversary orchid is a hybrid variety from *Oncidium spacelatum* and *Oncidesa sarcatum* orchid. The yellow flower that can bloom twice a year and can last up to a month have made them into the market. However, this orchid flower facing hard time when it requires strong matured pseudobulbs to bloom. Pseudobulbs store the nutrient absorbed by the roots. Therefore, this research is focusing on the growth of the roots in *in vitro* culture until acclimatization stage. In this research, different concentrations of Indoleacetic Acid (IAA) with 0.0mg/L, 0.5mg/L, 1.0mg/L and 2.0mg/L and different weights of activated charcoal (AC) (0.0g/L, 1.0g/L and 2.0g/L) were used as additional rooting growth stimulator. These components had been added in MS medium to observe its effect on the root length, number of leaves and number of roots. The result was recorded every four weeks. After *in vitro* growth, the orchids were acclimatized for a month to observe its survivability rate. Based on the result, treatment 10 with 0.5mg/L IAA and 2.0g/L AC gives the highest number of leaves which is 9.72 ± 1.74 . Moreover, number of roots gain rapid growth under treatment 2 with 0.5mg/L IAA by 9.82 ± 3.45 . Furthermore, length of roots increased when applied on treatment 3 contains 1.0mg/L IAA which gives longest roots of 93.95 ± 53.7 mm. Under acclimatization stages, treatment 2 with 0.5mg/L gives highest survivability rate with 100%. In conclusion, addition of IAA and activated charcoal have a positive effect on the growth of *Oncidium Golden Anniversary* orchid either in *in vitro* or acclimatization stage.

Keywords: *In Vitro* Propagation, Acclimatization, Activated Charcoal, Indoleacetic Acid (IAA), *Oncidium Golden Anniversary* orchid

Effect of 6-Benzylaminopurine (BAP) Concentration on Survival and Growth on *Spathoglottis plicata*

Zulika Aida Shahira binti Zulkifli*, Noorhazira binti Sidek

Faculty of Agro Based Industry, Jeli Campus, University Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: zulika.f19a0205@umk.siswa.edu.my

ABSTRACT

Orchids are considered the most beautiful, significant cut flower and pruned plants everywhere throughout the world. *Spathoglottis plicata* is also one of the famous cross breeds garden orchids due to its durability and ability to produce numerous flowers all year around and highly important in cut flower industry since *Spathoglottis* species produce high number of flowers consistently and it can stay fresh up to 4 weeks. However, in tissue culture, *Spathoglottis plicata* propagation face problems where the growth of orchids can become too dense in the culture vessels, thereby causing high toxicity due to phenolic acid that slows down the plantlets growth. Therefore, one of the ways to revive its growth after subculture is by supplementing the medium with plant growth regulators (PGRs) such as 6-benzylaminopurine (BAP). This study was carried out to determine the effect of different BAP concentrations on the survival and growth of the *Spathoglottis plicata*. The BAP was supplemented to the MS medium in concentration of 1, 2, 3, 4, 5 mg/L. Parameters such as plants height, fresh weight, number of shoots, number of roots and percentage of survival were recorded after 60 days of culture under in vitro conditions. Based on the result, orchid plantlets in the medium with 5 mg/L was the best substrate for all parameters measured including the fresh weight (0.24g), number of shoots (12.14), number of roots (5.14) and percentage of survival (100%). Therefore, this study suggested that 5 mg/L BAP supplementation to MS subculture medium enhances the survival and growth of *Spathoglottis plicata* plantlets.

Keywords: *Spathoglottis plicata*, 6-Benzylaminopurine (BAP), orchid, concentration

Minimizing Ammonia Volatilization from Urea Fertilizer Applied in Tropical Acid Soil using Empty Fruit Bunch (EFB) Compost

Chandrika Visallane A/P Chandiran *, Dr. Ch'ng Huck Ywih

Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan

First author: chandrika.f19a0237@siswa.umk.edu.my

ABSTRACT

Urea is commonly used as a fertilizer component in agriculture. The primary purpose of urea fertilizer is to deliver N to plants in order to encourage green leafy growth. However, the urea that were applied on cropland are mostly prone to loss up to 40% of urea N can be volatilized or vaporize and lost as a gas. The potential of empty fruit bunch (EFB) compost in minimizing NH₃ loss can occur due to the surface area of the compost which were negatively charged. There is a scarcity of knowledge on using EFB compost with a big surface area and a high load of negative charges to reduce urea induced NH₃ loss in acid soil. The objectives of this study are to: (1) assess the effect of EFB compost on the daily and cumulative NH₃ loss in an incubation study, and (2) determine the effect of EFB compost on the soil pH and EC after the incubation study. A laboratory scale incubation study using an air dynamic air flow system was carried out to assess the effects of EFB compost in reducing daily and cumulative N loss from urea fertilizer. The list of treatments are: T0: soil only, T1: Soil + 130 kg ha⁻¹ Urea, T2: Soil + 130 kg ha⁻¹ Urea + 5 t ha⁻¹ EFB compost, T3: Soil + 130 kg ha⁻¹ Urea + 10 t ha⁻¹ EFB compost, T4: Soil + 130 kg ha⁻¹ Urea + 15 t ha⁻¹ EFB compost. The incubation study revealed that the application of 5- 15 t ha⁻¹ of enriched EFB compost had delayed the ammonia loss by 3 days. The application of enriched EFB compost at a rate of 5-15 t ha⁻¹ had significantly increases the soil, pH and EC. In addition, the EFB compost also had significantly reduced the total ammonia loss from the urea applied to the soil in the incubation study. Hence, 5-15 t ha⁻¹ of EFB compost application can be adopted to minimize and delay ammonia loss from urea fertilizer while increasing the soil pH and EC to improve soil chemical properties for better plant N absorption. Further study on pot experiment and field trials is required to assess the long-term effect of EFB compost on minimizing ammonia loss from urea fertilizer and reducing the cost of chemical fertilizer usage.

Keywords: nitrogen, ammonia loss, EFB compost, urea fertilizer, air dynamic flow system

Optimization of *In Vitro* Protocol for Black Turmeric (*Curcuma caesia*)

Ghajendran Arnajalam*, Suhana Zakaria, Fatimah Kayat

Faculty of Agro Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

***First author:** ghajehndran.f19a0244@siswa.umk.edu.my

ABSTRACT

Black turmeric (*Curcuma caesia*) was known for rich in antioxidant, vitamin B6 and varies nutrients that are good for human health. The slow growth rate, long maturity period and increasing demand for its health benefit and medicinal purposes had contribute to the lack of black turmeric planting materials in the market. The objective of this studied was to study the effect of different combination and concentration of 6-Benzylaminopurine (BAP) and 1-Naphthaleneacetic acid (NAA) on the growth and development of *Cucurma caesia in vitro* based on the number of shoots. The experiment was conducted using CRBD with 4 replicates for each treatment. Data collected was analyzed using excel and SPSS version 2.7. Results show that black turmeric multiplication rate greater response to 0.5 mg/L BAP at (0.57 ± 1.94) , (0.88 ± 1.83) , (1.00 ± 0.49) and (2.71 ± 1.95) from week 3 to week 6, respectively. We can conclude that the results not significance which is ≥ 0.05 . As a conclusion, usage of BAP on black turmeric micropropagation is really recommended which in amount 0.5 mg/L BAP on MS media. This amount of BAP increases of multiplication rate and shoot production in *Curcuma caesia*.

Keywords: Black turmeric (*curcuma caesia*), survival rate, plant growth regulator, multiplication

Amending Urea Fertilizer with Vermicompost to Minimize Urea Loss Via Volatilization in A Tropical Acid Soil

Ifa Raziah Binti Abu Bakar; Dr. Ch'ng Huck Ywih

Department of Agricultural Sciences, Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

First author: raziah.f19a0246@siswa.umk.edu.my

ABSTRACT

Nitrogen (N) is one of the most essential plant micronutrients for crop growth and development. Rapid ammonia volatilization from surface applied urea fertilizer in soil is disadvantages as it tends to poor N use efficiency by plants and simultaneously increase the air pollution. The common practices to overcome the deficiency of N in the soil and increase the agricultural crop N uptake is farmers tend to apply unreasonable amount of N fertilizer which creates environmental problems, and it is costly. There are several potential where vermicompost can be used to minimize loss from the applied urea fertilizer. The objective of this study are to; (1) Asses the effects of vermicompost on the daily and cumulative NH_3 loss from the applied urea fertilizer in a laboratory scale incubation study. (2) Determine the effects of vermicompost on the soil pH, total N, and EC after an incubation study. A laboratory scale incubation study was performed to assess the effect of vermicompost in minimizing N loss from applied urea fertilizer. The list of treatments were: T0: Soil only; T1: Soil + 130 kg ha⁻¹ Urea; T2: Soil + 130 kg ha⁻¹ Urea + 5 t ha⁻¹ vermicompost; T3: Soil + 130 kg ha⁻¹ Urea + 10 t ha⁻¹ vermicompost; T4: Soil + 130 kg ha⁻¹ Urea + 15 t ha⁻¹ vermicompost. The incubation study revealed that the application of 15 t ha⁻¹ of vermicompost had distinct in reducing NH_3 volatilization. The application of vermicompost at a rate of 5 t - 15 t ha⁻¹ had significantly increased the soil pH and total N. However, the application of vermicompost did not significantly affect the soil EC. Vermicompost can be applied to improve the NH_3 loss, soil pH, and total N for soil amendment properties although they did not significantly affect the soil EC after application of vermicompost. Further study on pot experiment and field trials is required to assess the long-term effect of vermicompost in minimizing ammonia loss from urea fertilizer and reducing the cost of chemical fertilizer usage.

Keywords: Nitrogen, ammonia volatilization, urea, ammonium, nitrate, vermicompost

Study on The Healthiness, Monitoring & Stand Estimation Based on Drone Multispectral Analysis of Pineapple Cultivation

Muhammad Nazhif Bin Zahari @ Johari* Muhammad Nurfaiz Bin Abd. Kharim

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: nzhif.f19a0266@siswa.umk.edu.my

ABSTRACT

Drone technology is a new trend mechanization in pineapple cultivation. Recent surveys reveal more farmers are using drones for agricultural activities to move towards precision and smart farming. Drone technology can improve pineapple cultivation by increasing yields, saving money, reducing labour, and improving multispectral data collecting and processing. In pineapple farms, plant health, erroneous plant counts, and fruiting determination are major problem. This study wants to assess the health of pineapple plants and predict the stands estimation using the drones monitoring. This study uses a SPAD chlorophyll meter for leaf greenness index, a drone, RGB values software and GIS software to analyse aerial images. This study was performed at the Agro-Technology Park, UMK pineapple planting site. Sampling points for soil analysis, leaf analysis and data measurements (Plant height, leaf width, plant width, SPAD chlorophyll reading, RGB values and stands & fruits counting) were gathered for analysis to conclude study result from four different plots. The result of the study showed that there were various spatial and temporal differences in pineapple plants' growth & yield performances even though all the pineapples in the different planting plots were planted at a uniform time with similar farm management including fertilizer applications. Hence, higher plant heights, leaf width, plant width, SPAD meter reading, and higher plant stands & fruit counting were observed within Plot 2 compared to other plots. In the study, there was a strong relationship (correlation & regression analysis) between the SPAD meter reading of pineapple D-leaf with the RGB values of pineapple D-leaf which can be used for plant stands counting through predictive modelling by using GIS aerial images analysis. Through the aerial images analysis, the plant stands estimation percentage of pineapple can be measured, predicted, and located in the planting field to ease the later yield estimation & harvesting procedure.

Keywords: yield estimation, drone monitoring, multispectral, SPAD chlorophyll meter, RGB.

The Effect of Cassava Starch and Chitosan Based Edible Coating on Shelf Life of *Abelmoschus esculentus* at Room Temperature

Nimalatharsini a/p Perumal^{1*}, Cik Norshahida binti Abu Samah²

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: nimala.f19a0269@siswa.umk.edu.my

ABSTRACT

Abelmoschus esculentus or also known as okra is an extremely perishable agriculture fruit. Coatings of okra with edible starch extend quality and storage life of the fruits. A cassava starch edible coating incorporated with chitosan was developed for controlling the postharvest physiological activity of okra to extend postharvest quality at room temperature. Several concentrations of chitosan (1%, 2%, and 3%) was added with 3% of cassava starch. The efficiency of the coatings were evaluated in relation to variations in fruit physiochemical parameters, including weight loss, total soluble solids, fruit hardness, colour change, and antifungal. The results for physical, microbiological, and chemical testing revealed that the addition of starch on chitosan edible coating considerably decrease postharvest loss. The best treatment was the addition of 3% starch to edible coating with 3% chitosan because it can provide physical and chemical defense during storage at room temperature. Thus, this study is useful for consumers and okra fruit industry interested in knowing factors affecting shelf life and quality of okra.

Keywords: *Abelmoschus esculentus*, Edible coating, Cassava, Chitosan, physio-chemical characteristics

Effect of Different Kinetin Concentration on In-vitro Organogenesis of Protocorm-Like Bodies (PLBs) of *Oncidium* Golden Anniversary Orchid Growth

Nurin Aini binti Ahmad Fuzi*, Noorhazira binti Sidek

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: nurin.f19a0297@siswa.umk.edu.my

ABSTRACT

Orchids including *Oncidium* Golden Anniversary are in great demand in the flower market as cut flowers and vases because of their uniqueness. However, regeneration and organogenesis of protocorm-like bodies (PLBs) can be very slow. To overcome this problem, optimization of plant growth regulators such as kinetin which is also a cytokinin could be a potential solution. Therefore, this study was conducted to evaluate the effect of different concentrations of 6-Furfurylaminopurine (KN) on the growth of *Oncidium* Golden Anniversary orchids. In this study, protocorm-like bodies (PLBs) were treated in different concentrations of kinetin (0, 0.5, 1.0, 1.5, 2.0 and 2.5 mg/L). The results of this study show that the treatment with 2.5 mg/L KN (Treatment 5) shows the highest shoot length (0.65 cm) compared to other treatments. In addition, the control (0 mg/L KN) proved to be the best concentration for root length (0.42 cm). For the percentage of shoot regeneration, the results showed that 0.5 mg/L KN (Treatment 1) was proved to be the highest compared to the other treatments. Meanwhile the percentage of root regeneration shows that supplementation of 1.0 mg/L KN, 1.5 mg/L KN and 2.5 mg/L KN (Treatment 2, Treatment 3 and Treatment 5 respectively) show the highest mean value (2.00). The fresh weight of the plantlets shows that 0.5 mg/L KN (Treatment 1) has the highest overall fresh weight of 0.64 g compared to other treatments. Overall, it can be concluded that the use of kinetin hormone affects organogenesis in the protocorm-like bodies (PLB) of the orchid *Oncidium* Golden Anniversary *in vitro*.

Keywords: *Oncidium* Golden Anniversary Orchid, 6-Furfurylaminopurine (KN), Protocorm-like Bodies (PLB)

Effect of Converting A Secondary Forest to a Durian Planting Plot on the Soil Carbon Storage

Kurumani A/L Genasen and Dr. Ch'ng Huck Ywih

Faculty Agro Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan.

First author: kurumani.f19a0312@siswa.umk.edu.my

ABSTRACT

Soil is the thin layer of material covering the earth's surface and is formed from the weathering of rocks. It is made up mainly of mineral particles, organic materials, air, water and living organisms all of which interact slowly yet constantly. As in the case with any plant, durian trees do sequester carbon as they grow. Nevertheless, the process of clearing forest in order to establish a durian plot may release carbon. Little study has been done on the comparison of soil total carbon when secondary forest on mineral soil is converted to durian plot. The objectives of study were to: (1) quantify soil organic matter soil total carbon, soil pH, electrical conductivity, cation exchange capacity, and (2) compare soil to the carbon storage of a secondary forest with durian plot. Soil samples were collected from the secondary forest and durian plot in Agro Techno Park. Ten samples were collected at random with a mineral soil auger at 0-25cm depth. Soil to the carbon were determined and compared between the secondary forest and durian plot. The soil pH at the durian plot was significantly higher than forest. The soil pH in the durian plot was increased near to the neutral. However, there was no significant difference in electrical conductivity of both the secondary forest and durian plot. The amount of soil organic matter and soil to the carbon in the durian plot were significantly higher than those in secondary forest. This was attributed to organic fertilizer applied during the development of durian plants. Hence, commission of secondary forest on mineral soil to durian plot exerted a significant difference on soil carbon storage in mineral soil. Long term quantification study on a secondary forest and durian plot needs to be carried out in order to assess the carbon sequestration on the mineral soil in the secondary forest and durian plot.

Keywords: secondary forest, durian plot, carbon storage, land used commercial, mineral soil.

Assessing *Vanilla planifolia* Growth with Organic Fertilization

Sri Abilashaa A/P Thanabal , Kumara Thevan A/L Krishnan

Faculty Agro Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: sri.f19a0316@siswa.umk.edu.my

ABSTRACT

Vanilla Planifolia is a species of the orchid family Orchidaceae. It has the potential to become more prevalent in Malaysia, providing farmers with an alternative, high-value agricultural option. In the experiment, several applications of organic fertilizer with variable amounts were tested as an alternative to chemical fertilizers. The objective of this study was to establish whether rates of applying different organic fertilizers result in excellent development and whether there is a significant in terms of growth. The study was conducted at UMK's Tunnel Garden. The study was done using RCBD with four treatments and seven replications and a negative control with four replications. The four treatments included one positive control, a cinnamon treatment (T1) as a positive control, a treatment with 500 g of banana peel and one litre of water (T2), a treatment with 500 g of banana peel and two litres of water (T3), and a treatment with 500 g of banana peel and three litres of water (T4). It is required to get the data result provided by the argument. Compared to the performance of plant growth using banana peel, the performance of plant growth utilizing organic cinnamon fertilizer was much more extraordinary. This implies that cinnamon organic fertilizer is the best fertilizer for *Vanilla Planifolia* growth and will provide superior outcomes compared to banana peel treatment. The absence of harmful organisms in cinnamon fertilizer makes it a great option for use in plant development media. Additionally, this cinnamon fertilizer is less expensive and easier to get. In conclusion, cinnamon fertilizer is superior than banana peel fertilizer for promoting superior plant growth.

Keywords —*Vanilla planifolia*, growth performance, rates, organic fertilizer

The Effect of Gamma Ray Radiation on *Colocasia esculenta* (Black Magic) Growth

Afiq bin Roznan, Nik Marzuki bin Sidik

Faculty of Agro-based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan.

First Author: afiq.f19b0004@siswa.umk.edu.my

ABSTRACT

The development of new *C. esculenta* varieties in the Malaysian market need to be more robust to meet market demand. Productivity in the ornamental plant industry to enhance the production of this new variety of *C. esculenta* is considered low, resulting in a limited selection of this plant. This study aimed to improve the production of new varieties for the *C. esculenta* plant through gamma-ray radiation methods. In this study, the effectiveness of different gamma-ray doses on *C. esculenta* growth and the effect of gamma-ray on the survival rate of *C. esculenta* were investigated. The experiment used *C. esculenta* corms with 40 samples of corms, and the treatment was sorted out into four doses that were 0gy, 30gy, 60gy, and 90gy. Corms sample being penetrated using gamma-ray radiation with Cs-137 sources. Irradiated corms sample after one week has been planted directly into polybag and observed. The analysis indicates that the 0gy dose treatment for growth *C. esculenta* reached an average of 16cm-18cm, whereas the 30gy dose treatment only reached 1cm - 1.5cm. While the shoot height for the 60gy dose treatment was only 0.4 cm - 0.5 cm on average, the shoot height for the 90gy dose treatment was just 0.1 cm. Growth performance between dosages 30gy, 60gy, and 90gy that have potential for the growth of new varieties are 30gy in addition to the control treatment of 0gy. The 0gy dose showed steady growth up to the seventh week, whereas the 30gy dose showed growth only up to the sixth week before it started decaying—only the fifth week of growth for the 60gy dose and the fourth week for the 90gy dose. In the future, the suitable gamma-ray dose on this *C. esculenta* plant can use 30gy below to improve further using the gamma-ray radiation method.

Keywords: *Colocasia esculenta*, Black Magic, Gamma-ray, Caesium-137, Radiation

Effect of Different Foliar Application on Eggplant Growth Through Fertigation System

Amirul Mukminin bin Azmi*, Muhammad Nurfaiz bin Abd. Kharim and Akmal Adilah binti Idris

Faculty of Agro-based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan.

First author: mukminin.f19b0014@gmail.com

ABSTRACT

This study investigated the potential use of effective microbial foliar fertilizers as a supplement to traditional chemical fertilizers, specifically AB fertilizers. This method involves spraying fertilizer directly onto the leaves of the plant. One of the main reasons for this research is to reduce dependence on AB chemical fertilizers, this study uses cocopeat as a media to replace the soil. Then to support the growth of this *Solanum melongena*, the application of AB fertilizer with the supplement of EMB and EMD to study their effectiveness on plant height, stem circumference, leaf width and leaf length. This research shows that the effect of AB fertilizer application as control contributed slower growth in plant heights (no), meanwhile application of AB fertilizer with EMB supplementation in the 9 weeks had a good effect on the plant height with the mean reading from 28.42 cm to 48.087 cm. Other supplementation with EMD also showed a good effect on the development of leaf length where the mean showed the most leaf length in weeks 3 to 4 increased from 21.717 cm to 23 cm. Based on the observation, the use of AB and EMB fertilizers showed favourable crop development after 9 weeks of planting. Result showed that EMB has most increased plant height (40.199), and EMD has most growth of plant circumference (4.733), and water as control has a significant in leaves length (24.161). In conclusion, additional of EMB and EMD contributed to better crop growth compared to control.

Keywords: Effective Microbial, *Solanum melongena*, Effective Microbe Pokok Buloh (EMB), Effective Microbe Pokok Dara (EMD).

The Effect of Hormone and Effective Microorganisms (EM) Foliar Spraying on Sweetness and Crunchiness of Butterhead Lettuce (*L. sativum bot. var. capitata*) Grown Through Indoor-Nutrient Film Technique (NFT) Hydroponic System

Fatin Syarafina binti Zubaidi, and Muhammad Nurfaiz bin Abd Kharim

Faculty of Agro-Based Industry, Jeli Campus, University Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: syarafina.f19b0036@siswa.umk.edu.my

ABSTRACT

The Nutrient Film Technique (NFT) hydroponic system is an essential tool for indoor farming which supplied rich nutrient solutions to cultivate green leafy vegetables such as butterhead lettuce (*L. sativum bot. var. capitata*). Lettuce cultivated from the NFT hydroponic system tasted less sweet than other green leafy vegetables cultivated from soil grown. Therefore, an experiment was carried out using an indoor-NFT hydroponic system to study the effect of hormone and effective microorganism (EM) foliar spraying on the sweetness and crunchiness of butterhead lettuce. The objective of this study was to measure the effect on plant height (cm), leaf width (cm), sweetness (%), crunchiness (g), and fresh weight (g) when hormones and EM were sprayed onto butterhead lettuce. In this experiment, butterhead lettuce was cultivated for 56 days and each treatment was sprayed for every 7 days until it was harvested. The treatments applied were control (T0), gibberellic acid (T1), EM bamboo (T2), EM virgin tree (T3), fermented fruit juice (T4), and fermented amino acid (T5). All collected data were measured and analysed using XLSTAT, ANOVA, and Tukey HSD test. Based on the statistical analysis, the results showed gibberellic acid treatment has the highest average value for plant height (12.45cm), while fermented fruit juice has the highest value for leaf width (3.41cm) and SPAD-chlorophyll (31.12 Nos). EM virgin tree obtained the highest average value for sweetness, leaf crunchiness (67.21g), stem crunchiness (295.10g), and fresh weight (19.53g). The control showed the lowest value for all parameters throughout this study as it did not receive any supplementary foliar spraying. In conclusion, this research proved that hormone and EM can be applied as supplementary foliar spraying to the butterhead lettuce crop cultivated in indoor-NFT hydroponic as it can improve the sweetness and crunchiness.

Keywords: Nutrient Film Technique (NFT), Indoor Farming, Butterhead, Hormones, Effective microorganisms

Effects of Gamma Irradiation on Ornamental Yam Plants (*Alocasia longiloba*)

Khalid Izzuddin Mhuckim*, Nik Marzuki Nik Sidik

Faculty of Agro-Based Industry, Jeli Campus, University Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: izzuddin.f19b0059@siswa.umk.edu.my

ABSTRACT

Among the types of ornamental yam plants was *Alocasia longiloba*. Gamma radiation has been proven to be more economical and effective than other radiant radiation due to its availability and power penetration rate. Therefore, the objective of this research is (i) to study the effect of gamma irradiation on *Alocasia longiloba* plant survival rates. In addition, (ii) to study the effect of gamma irradiation on *Alocasia longiloba* plants heights. Gamma irradiation on *Alocasia longiloba* corms was performed with a 60 Cobalt source at the Malaysian Institute for Nuclear Technology Research (MINT) in Bangi, Selangor. The yam corms of *Alocasia longiloba* were treated using three radiation dose treatments namely 30Gy, 60Gy, and 90Gy. The performance of plant survival rate and plant height was measured for 7 weeks. The experimental design included three levels of treatment and ten replications. The average of the variables was evaluated and compared after 7 weeks using Microsoft Excel Spreadsheet Software. The dosage of 30 Gy, 60 Gy, and 90 Gy treatment on *Alocasia longiloba* was founded to have bad growth performance.

Keywords: *Alocasia longiloba*, Gamma-ray, Gamma radiation, Plant survival rate, Plant height.

In Vitro Antioxidant Activities of Kelulut Honey (*Meliponinies*) from Different Locations of Selangor

Mohammad Syafiq Fiqri Junoh* and Arifullah Mohammed

Faculty of Agro-Based Industry, Jeli Campus, University Malaysia Kelantan, 17600 Jeli, Kelantan.

First Author: fiqri.f19b0067@siswa.umk.edu.my

ABSTRACT

Honey is one of the famous natural products that have been used widely regardless age of the users. Honey is produced by the bees from plant nectar and contains a complex mixture of carbohydrates essentially together with other minor substances like organic acids, proteins, amino acids, vitamins, lipids, phenols, minerals and lesser pollen amounts. Flavonoids, phenolic acids and carotenoids are some of the bioactive compound that have been discover in kelulut honey with higher oxidants contains. However, all these compounds may be different depend on the nectar of plants, floral origins and environment surroundings.. The objectives of this research was to analyze the antioxidant activities a few samples that have been collected randomly from different places in Selangor. The in vitro antioxidant properties of the samples were screened using total phenolic contents (TPC), total flavonoid contents (TFC) and 2,2-diphenyl-1-picrylhydrazyl (DPPH) tests. Our results shows that Kelulut Honey sample 5, *Heterotrigona itama* that from Hulu Langat has the highest content of phenolics, flavonoids and antioxidant activity compared to the other samples tested. The difference may due to the geographical factor and source of nectar. These informations can be references for upcoming research in future.

Keywords: Kelulut Honey, Stingless bee, Total Phenolic Contents, Total Flavonoids Contents, DPPH, Antioxidant Activities.

Minimizing Nitrogen Loss via Leaching in a Tropical Acid Soil via Co-Application of Vermicompost and Zeolite

Muhammad Yazid bin Hussain, Ch'ng Huck Ywih

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: yazid.f19b0100@siswa.umk.edu.my

ABSTRACT

Nitrogen (N) is a macronutrient supply that is essential for plant growth, from the germination stage to the leaf formation stage. However, there is a risk of leaching when using Urea fertilizers on crops. Therefore, one of the concerns that must be addressed is the loss of important macronutrients and micronutrients. This is due to the fact that it will have an effect on plants and the environment. There is a scarcity of data on the usage of Vermicompost and zeolites with large surface areas to reduce N leaching from urea in acidic soils. The objective of this study are to : (1) Assess the effect of Vermicompost and zeolite on the daily and cumulative N leaching from the applied urea fertilizer in laboratory-scale leaching study. (2) Determine the effects of Vermicompost and zeolite on the soil pH, EC, and total N after the laboratory-scale leaching study. A laboratory-scale leaching study will be carried out to determine the effects of zeolite and Vermicompost in reducing N leaching from urea fertilizer. The list of treatments are: T0: Soil only; T1: Soil + 130 kg ha⁻¹ Urea; T2: Soil + 130 kg ha⁻¹ Urea + 5 t ha⁻¹ Vermicompost + 5 t ha⁻¹ zeolite; T3: Soil + 130 kg ha⁻¹ Urea + 10 t ha⁻¹ Vermicompost + 10 t ha⁻¹ zeolite; T4: Soil + 130 kg ha⁻¹ Urea + 15 t ha⁻¹ Vermicompost + 15 t ha⁻¹ zeolite; T5: Soil + 130 kg ha⁻¹ Urea + 20 t ha⁻¹ Vermicompost + 20 t ha⁻¹ zeolite. After the leaching study soil sample will be subjected to selected chemical analysis. The leaching study revealed that the application of 10 - 20 t ha⁻¹ Vermicompost and zeolite had delayed the leaching by 3 days. The application of Vermicompost and zeolite had significantly increased the soil pH and EC. In addition, the 5 - 15 t ha⁻¹ Vermicompost and zeolite also had significantly reduce the total N leaching from urea fertilizer. Hence, 5 - 15 t ha⁻¹ Vermicompost and zeolite can be adopted to minimize and delay N leaching from urea fertilizer while increasing the soil pH and EC to improve soil chemical properties for better plant N absorption. Futher study on pot experiment and field trials is required to assess the long term effect of Vermicompost and zeolite on minimizing N leaching from urea fertilizer and reducing the cost of chemical fertilizer usage.

Keywords: zeolite, Vermicompost, urea fertilizer, N leaching

Effect of Different Plant Growth Regulators on the Growth of Bentong Ginger in Vitro Cultivation (*Zingiber officinale*)

Muhammad Zulfadhli Kamaruizam*, Fatimah Kayat

Faculty of Agro Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First author: zulfadhli.19b0101@siswa.umk.edu.my

ABSTRACT

Currently, the supply of Bentong ginger (BG) rhizomes in the Malaysian market is low compared to the increasing demand especially from cosmetics and pharmaceutical companies that use Bentong Ginger as a component in their products due to its beneficial phytochemical that benefits human health. The slow growth rate and long maturity period contribute to the lack of Bentong Ginger planting materials in the market. This study aims to increase the rapid and mass production of Bentong Ginger planting material through micropropagation technique. The effects of different combinations and concentrations of plant growth regulators, 6-Benzylaminopurine (BAP) & 1-Naphthaleneacetic acid (NAA) on the growth and development of Bentong Ginger in vitro were investigated based on the number of shoots, height of shoot and number of roots produced. Experiments that have been conducted using CRBD and produce are subjected to one-way ANOVA. The results of the study found that plantlets cultured using MS medium + 2mg/L BAP produced good survival rate 100% alive as compared to other treatments. In addition, the rate of plantlet multiplication showed that MS medium added with 2 mg/L BAP produced the highest rate at 5.81.

Keywords: Bentong ginger, plant growth regulation in vitro

Performance of Grey Oyster Mushroom (*Pleurotus sajor-caju*) Growth Using Mixed Formulation Substrates from Agriculture Waste

Nik Raihan Binti Nik Hassan and Mst Laila Naher

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: raihan.f19b0108@siswa.umk.edu.my

ABSTRACT

Malaysia produced a lot of agriculture waste from oil palm plantation and paddy farm however only 1-5% used for animal feed and source of energy. However, sawdust (SD) is a main substrate for mushroom cultivation in Malaysia. The demand of sawdust makes the scarcity to supply a lot of sawdust for the rural farmer. This study aimed to find alternative substrate produces from agriculture residue for grey oyster mushroom cultivation. The formulation was consistings rice straw (RS), empty fruit bunch (EFB), palm pressed fiber (PPF), oil palm fiber (OPF), rice bran (RB) and lime (L). The treatments were according to mixed formulation with ratio T0 (control: 97.2% SD, 0.8% RB + 2% L), T1 as mixed ratio (60% RS + 22.2% EFB + 15% PPF + 0.8% RB + 2% L) and T2 as mixed ratio (60% OPF + 22.2% EFB + 15% SD + 0.8% RB + 2% L). However, 7 parameters were conducted such as mycelia full colonization, pinhead formation, duration of time taken for first harvest after spawning, weight yield, stipe length, pileus diameter and biological efficiency to determine the growth performance of grey oyster mushroom cultivation using the formulated substrate. The result shows T1 is a better performance as pinhead formation took (41 days), time taken for harvesting after spawning took (42 days), total weight yield (245.43g), pileus diameter (5.75cm) and highest biological efficiency (222.33%) compared to T0. T1 (rice straw based) shows a good performance compare to T0 and T2. Therefore, T1 can establish as new substrate for mushroom production.

Keywords: Agriculture waste, lignocellulose residue, grey oyster mushroom, sawdust, mushroom cultivation, mixed formulated substrate, parameter

Antibacterial Activities of Kelulut Honey (*Meliponinies*) from Different Location in Selangor

Nor Yasmin Mohd Noor, Arifullah Mohammed

Faculty of Agro Based Industry, University Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

First Author: yasmin.f19b0119@siswa.umk.edu.my

ABSTRACT

Kelulut or stingless bee honey is one of the species of honey that has a strong antimicrobial effect. The various components present in honey contribute to the antibacterial effectiveness of honey. Thus, the present study, aimed to test the antibacterial activity of stingless bee honey collected from Selangor using agar well diffusion method. The samples were obtained from Rawang, Batang Bejuntai, Bangi, and Hulu Langat. In this investigation, the antimicrobial efficacy of four selected honeys was assessed against gram positive and negative bacteria like *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, and *Bacillus subtilis*. The results showed that All of the examined honeys had a growth-inhibiting impact on the bacteria *E. coli*, *P. aeruginosa*, *B. subtilis*, and *S. aureus*, and all of the sample honey demonstrated antimicrobial activity. But, the highest zone of inhibition showed for *P. aeruginosa* among all the bacteria used. The minimum inhibitory concentration (MIC) assay revealed that four samples of honey with all pathogens had a lower value (20% v/v). The effectiveness of honey against microorganisms depends on the type of honey produced, the health of the bees, where the bees come from, and the processing method. This study revealed that the stingless bee honeys from selected area in Selangor have promising antibacterial activity against pathogens tested, and this type of honey could be an alternative in treating microbial infections and infected wounds.

Keywords: Kelulut Honey, Stingless bee, Antibacterial Activities, MIC, Well Diffusion

Development of F1 Population on Selected Banana Species

Nurul Nuralis Diwani Binti Abdul Aziz*, Fatimah Binti Kayat and Akmal Adilah Binti Idris.

Faculty of Agro-Based Industry, Jeli Campus, University Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: alis.f19b0171@siswa.umk.edu.my

ABSTRACT

Banana mostly propagated by micropropagation methods. Micropropagation is an in vitro generation of plants from cells, protoplasts, tissues or organs on specially formulated nutrient media. Embryo culture utilized in this study to gather explant materials from banana crosses to produce an F1 population. The objectives for this study is to produce F1 banana population for breeding program and to compare seed development, embryo germination rate and multiplication rate of two F1 populations from crosses of bananas. The embryos extracted from banana seeds grown in a petri dish containing MS media without plant hormone (BAP) stored in a dark growth room at Tissue Culture Laboratory, University Malaysia Kelantan. The germinated embryos transferred to jars contained MS media mixed with plant hormone (BAP) + 100ml coconut water for plantlets multiplication and growth. The average multiplication rate observed in this study for WJB F1 population was 3.64, whereas multiplication rate of WOP F1 population was 3.98. While, the numbers of developed seeds was 88.27 and the number of germinated embryo was 9.08 for WJB F1 population, whereas the numbers of developed seeds was 78.39 and the number of germinated embryo was 8 for WOP F1 population. In conclusion, F1 populations were successfully developed through embryo rescue and embryo culture techniques. Furthermore, WJB F1 population multiplication thrived, meanwhile WOP F1 population showed better germination rate. Moreover, the development of seed and germination rate of embryos in WJB F1 population was higher than WOP F1 population.

Keywords: Banana, Micropropagation, Embryo culture, Plant hormone (BAP), Population.

Effect of Corn Stalk Biochar on Growth Performance of Bentong Ginger using Fertigation System

Zahirul Jazrin Bin Mohd Zakir*, Fatimah Binti Kayat and Akmal Adilah Binti Idris

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: zahirjazrin.f19b0204@siswa.umk.edu.my

ABSTRACT

Zingiber officinale var. Bentong or commonly called Bentong ginger is the highest market price of all other gingers. Hence, the growth performance of Bentong ginger was studied in this research. In this research, Bentong ginger cultivation using fertigation system and soilless media were used to replace the soil such as rice husk, coir dust, charcoal and corn stalk biochar. The focus of this research is to determine the effectiveness of corn stalk biochar application on Bentong ginger growth performance through fertigation system on the weight of the Bentong ginger yields. The control for this research was using rice husk and coir dust as media, treatment 1 was added with commercial charcoal and treatment 2 was added corn stalk biochar. The result showed that by adding corn stalk biochar to soilless media increased the yield of the Bentong ginger. The highest mean of weight was recorded for treatment 2 (237.44 g) followed by treatment 1 (142.94 g) and control (107.81 g). The differences amongst these means, showed that treatment 2 with addition of the corn stalk biochar gave an outstanding result.

Keywords: Corn stalk biochar, *Zingiber officinale var Bentong* (Bentong ginger), soilless media, fertigation system

Study on the Effect of Difference PGR Concentrations on the Micropropagation of *Phalaenopsis amabilis*

Arifuddin Alias*, Fatimah Kayat

Faculty of Agro Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First author: arifuddin.f19b0236@siswa.umk.edu.my

ABSTRACT

Phalaenopsis amabilis orchid is one of the orchid species in the *Phalaenopsis* genus. They are well-known for being easy to grow and producing beautiful seasonal flowers. In addition, *Phalaenopsis amabilis* responds to cold weather. This species usually flowers in the first quarter of the year and can bloom for a long period of time, about 1 to 1-1/2 months, and can grow up to 10 cm in diameter. This study focuses on the effects of using plant growth regulators (PGR) and different additives on the growth of *Phalaenopsis amabilis in vitro*. The PGR used in this study is BAP and IAA at different concentrations with different additives such as charcoal and coconut water using MS medium. The results of the study found that the addition of coconut water to MS medium resulted into a good growth rate of *Phalaenopsis amabilis* orchids with high survival rate compared to other treatments. The total rate of seedling multiplication shows that MS medium with added coconut water shows a high increase in the number of plantlets at an average rate of 3.43.

Keywords: Micropropagation, *Phalaenopsis amabilis*, *in vitro* culture, PGR concentration

Performance of white oyster mushroom (*Pleurotus ostreatus*) growth using mixed formulation substrate from agriculture waste

Hanisah binti Mohd Firdaus Ganga, Mst Laila Naher

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First author: hanisah.f19b0245@siswa.umk.edu.my

ABSTRACT

Sawdust is a main substrate for mushroom cultivation in Malaysia. However, the full dependency on sawdust making scarcity of supply the material. Besides, Malaysia produces a lot of agricultural waste from oil palm and rice straw. Only 1-5% of this agriculture waste is used for animal feed, energy production, or other purposes and the rest is waste that is managed through burning. Additionally, oil palm and rice straw biomass are structurally suitable for mushroom substrate conversion. This study aimed to analyse the growth and yield performance of white oyster mushroom (*Pleurotus ostreatus*) cultivation using new formulated substrate from agriculture waste that compare with commercial sawdust substrate. Treatments (T) were designed as T0 (control which is commercial): 97.2% sawdust, T1: 60% rice straw + 22.2% empty fruit bunch + 15% palm pressed fibre, and T2: 60% oil palm frond + 22.2% empty fruit bunch + 15% sawdust. The growth performance was carried out based on days of mycelium full colonization, day of pinhead formation, first harvest after spawning, yield weight, stipe length, pileus diameter and biological efficiency. The result in this study showed that treatment 1 was better performance for pinhead formation (38 days), first harvest after spawning (43 days), total yield weight (282.5g), stipe length (4.2cm), pileus diameter (6.8cm), and biological efficiency (254%) and treatment 2 was better for mycelium colonization (16 days). In conclusion, treatment 1 with main substrate rice straw has the higher yield performance than commercial sawdust substrate and suitable to be used as alternative substrate.

Keywords: Agriculture waste, *Pleurotus ostreatus*, commercial substrate, new formulated substrate, growth performance.

Initiation Protocol for Micropropagation of Pisang Tanduk, *Musa acuminata* x *balbisiana* (AAB)

Mohd Fadhil Ibrahim and Fatimah Kayat

Faculty of Agro Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: Fadhil.f19b0257@siswa.umk.edu.my

ABSTRACT

Currently, the availability of Pisang Tanduk in the Malaysian market is low due to the high demand for banana chip production. This has led to a severe shortage of planting materials of Pisang Tanduk in the market. Mass propagation using *in vitro* methods faced difficulties due to the issue of high phenolic compound problems during the initiation and multiplication stages. This study aims to increase the rapid production of Pisang Tanduk seedlings by optimizing the Pisang Tanduk micropropagation protocol. The experiment is focused on the initiation culture of Pisang Tanduk in MS media supplemented with 5 mg/L BAP and addition with different additives such as coconut water, activated charcoal, ascorbic acid and citric acid. The study is conducted using Complete Randomized Block Design (CRBD) with 6 replicates for each treatment. The survival rate, presence and absence of browning and number of shoots produced were evaluated to determine the optimal amount of additives to be added into the medium. Results obtained showed that the initiation technique used also affected the viability of cultured explant. Corm cut into halves cultured in MS media containing 100 ml/L of young coconut water and 1 ml/L activated charcoal showed the highest survival rate at 50%. Therefore, it can be suggested that the addition of activated charcoal and young coconut water could reduce the incidence of browning in Pisang Tanduk cultures.

Keywords: Pisang Tanduk, initiation culture, additives, browning

Effect of Bean Sprout on *In Vitro* Multiplication of *Musa paradisiaca* (Pisang Berangan)

Muhammad Izzat Bin Rossdeen, Suhana Binti Zakaria

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: izzat.f19b0264@siswa.umk.edu.my

ABSTRACT

The banana was one of the most essential fruit crops on the earth. In Kelantan, Pisang Berangan were extremely popular, but due to lack of knowledge with modern farming technologies, many *Musa Paradisiaca* had diseases and low quality. Plant tissue culture had numerous advantages, including a rapid rate of multiplication, physiological homogeneity, and the prevention of disease. Chemicals such as BAP for hormone treatment are commonly used in media treatment for bananas, although MS media production is expensive for low-income farmers. Therefore, this research had been done by substituting the BAP hormone by using bean sprout extract as an organic supplement for banana culture. This study would take time about 4 – 5 months and data had been collected based on the height of the leaves, number of leaves, length of roots and multiplication rate and contamination rate of the *Musa paradisiaca* (Pisang Berangan). The additives that were used in this project were bean sprout extract at a different concentration, which were 5%, 10%, 15% and 20% that applied in the MS media. 2 different methods were used in this experiment which are centrifuge and non-centrifuged bean sprout extract. In this study, the positive control treatment with MS + 5 mg/L BAP media recorded the highest mean value in the length of roots ($6.45 \pm 0.36\text{cm}$). Meanwhile the positive treatment also showed the numbers of leaves and height are 2.62 ± 0.58 and $5.69 \pm 0.13\text{cm}$ respectively. From the observation, the bean sprout as an additive was not suitable for Pisang Berangan media and it had the highest contamination rate than other treatments with almost 90 % of contamination after 2 weeks.

Keywords: Pisang Berangan, *Musa paradisiaca*., Tissue culture, Bean sprout, MS media

Germination indices of rice (*Oryza sativa* L.) cultivar MARDI SIRAJ 297 under salinity stress

Muhammad Rafiq bin Zulrani*, Noorhazira Binti Sidek

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: rafiq.f19b0267@siswa.umk.edu.my

ABSTRACT

Salt stress is a major concern for rice farmers, as high levels of salinity in soil can negatively impact the growth and development of rice plants. In Malaysia, rice is a staple crop and a key source of food security. To better understand the effects of salt stress on rice, this study was conducted to determine the threshold level of the most important Malaysian rice *Oryza sativa* cultivar MARDI Siraj 297 towards salinity. The study involved exposing the seedlings to different levels of salinity for a 15-day period, and measuring various parameters such as shoot length, root length, fresh weight, percentage of the seed final germination, and mean germination index. At a salinity concentration of 0 mM. The highest value for Shoot length is 108.25 ± 3.326 mm, root length is 55.25 ± 7.653 mm, fresh weight is 117 ± 11.098 mg, Germination Rate Index (GRI) is 7.579 ± 0.174 , FGP is 100 ± 0 , MGT is 6.391 ± 0.919 , Germination Index (GI) is 7.8 ± 1.8 . The lowest value for shoot length is 9 ± 1.826 mm, weight is 41.75 ± 3.902 mg at a salinity concentration of 200 mM. The lowest value for FGP is 20 ± 6.236 at a salinity concentration of 100 mM and 200 mM. The lowest value for root length is 0 ± 0 mm at salinity concentrations of 175 mM and above. At a salinity concentration of 250 mM and 300 mM, the lowest value for MGT is 0 ± 0 , GI is 0 ± 0 and GRI is 0 ± 0 . suggesting that the seedlings may have difficulty germinating or may not germinate at all under these conditions. Rice farmers in Malaysia should carefully monitor and manage soil salinity to maximize crop productivity as 200 mM is the threshold for seed germination.

Keywords: *Oryza sativa*, MARDI Siraj 297, rice, salinity, germination

Effect of Different Concentrations of Gibberellin Acid on The Germination of Sacha Inchi (*Plukenetia Volubilis Spp.*)

Nur Afiqah binti Ros Khuzaimi*, Mohd bin Mahmud @ Mansor

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: ros.f19b0277@siswa.umk.edu.my

ABSTRACT

Plant growth regulators are chemicals that are used to improve plant growth or modify plant physiology. Gibberellin acid is a type of plant growth regulator that plays a role in seed and flower formation, vegetative growth, and seed germination. In this study, we aimed to evaluate the effect of different concentrations of gibberellin acid on the germination of sacha inchi (*Plukenetia volubilis* spp.) seeds and on the growth of *P. volubilis* including embryos, hypocotyls, and adventitious roots. The experiment was conducted in a randomized complete block design with five treatments, each with four replicates of 10 seeds, and applied gibberellin acid mixed with distilled water at concentrations of 0.0 g (T0), 0.1 g (T1), 0.5 g (T2), 1.0 g (T3), and 0.1 g (T4) (applied on the 7th day for the final treatment). Our results showed no significant effect on the germination rate of *P. volubilis* seeds over the observation period. However, statistical analysis of germination after 72 hours showed a significant difference. Additionally, the application of gibberellin acid at various concentrations had no significant effect on embryo length, hypocotyl length, adventitious root production, or root length. Therefore, we conclude that gibberellin acid does not enhance the germination rate or plant growth of sacha inchi. It is recommended for further study to try soaking the seeds in gibberellin acid solution rather than sowing seeds onto wet tissue that contains gibberellin acid concentration. Besides, in this experiment, seeds were treated with the fungicide Bayer Previcur 840, which has propamocarb as an active ingredient, however, fungi still contaminated the seeds. Applying another fungicide, such as Betan 80WG which contains Captan as an active ingredient to inhibit mycelial growth from contaminating the seeds from fungal infection is recommended to improve germination and plant growth.

Keywords: plant growth regulator, gibberellin acid, germination, sacha inchi, *Plukenetia volubilis* spp., plant growth.

Physico-Chemical Properties of Kelulut Honey (Meliponinies) Collected From Different Location of Selangor

Nur Elisa Shahira Rozmi, Arifullah Mohammed

Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia.

First Author: elisa.f19b0284@siswa.umk.edu.my

ABSTRACT

The physicochemical properties obtain as a composition of bee honey to determine its nutritional and medicinal uses. Studies on physico-chemical properties of kelulut honey or stingless bee honey are limited in Malaysia. In this study, eight honey samples were analyzed to determine their physicochemical properties. The kelulut honey were obtained from different places of Selangor, such as Bangi, Hulu Langat, Batang Berjuntai, Shah Alam. The selected honey was produced from the bee species, *Geniotrigona Thoracica* and *Heterotrigona Itama*. The physical properties of honey such as pH and color, chemical components such as sugar, ascorbic acid and hydroxymethylfurfural (HMF) were analyzed and obtained different results. Overall, the pH values of all honey samples were acidic with the pH range of 4.53 to 5.06 and the highest is honey 5 and the lowest is honey 1. Studies on honey physico-chemical analysis help to prevent fraud as well as maintain the authenticity in the quality and composition of the honey.

Keywords: Kelulut Honey, Stingless bee, pH, Sugar Contents, Ascorbic Acid, Hydroxymethylfurfural (HMF).

Assessment of Floating Garden Made Up from Recycle Material as Growth Platform for Spinach (*Amaranthus viridis*) and Water Spinach (*Ipomoea aquatica*)

Nur Liyana Binti Azlan, Nik Marzuki Bin Sidik

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: liyana.f19b0288@siswa.umk.edu.my

ABSTRACT

This study of the floating gardens₁ aims to optimize the use of lakes or ponds₂ as a new alternative in the agricultural sector, using only the water surface area. The design of this system has been built from recycled materials₃, such as the plastic of drinking bottles. Additionally, to make a comparison, the cultivation between two types of systems used the conventional method as control and the floating garden as the treatment. The cultivation vegetable types used in this study are water spinach (*Ipomea aquatica*) and spinach (*Amaranthus viridis*). The growth performance has been measured by the leaf width, the number of leaves, stem height, wet weight, and the dry weight of the vegetables. The effectiveness of using recycled₃ plastic bottles as a floating garden₁ was successfully floating on water for 60 days until the harvest of vegetables. The media used in control and treatment is coconut husk and peat moss. By comparing the control and treatment for growth was a significant difference by direct sowing the seeds, the average lifespan of cultivation vegetables alive is only 10% for the floating garden₁ compared to the conventional method was 100% alive. The experimental result shows that selecting component soil and the method of sowing seeds can affect the parameter of the growth performance of vegetables.

Keywords: floating garden, lake or pond, recycle materials.

Response of *Azolla pinnata* R.Br. to Glyphosate-Based Herbicide (GBH) and Nitrogen Fertilizer at Vegetative Growth

Nur Nabihah binti Ghazali*, Mst Laila Naher and Norhafizah binti Md Zain

Department of Agricultural Science, Faculty of Agro-based Industry, University Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

First author: nabihah.f19b0289@siswa.umk.edu.my

ABSTRACT

It is of utmost importance to understand the risks of combined effects of herbicide and nitrogen fertilizer to non-target plants, including aquatic plant species, which have a crucial role in maintaining agroecosystems functions of fish habitat. This study will be conducted to access *Azolla* growth and to determine the oxidative stress of cell injuries in *Azolla* after treated with different rates of nitrogen fertilizer and Glyphosate-Based Herbicide (GBH). The experiment was conducted at the Animal Laboratory, University Malaysia Kelantan (UMK), Jeli Campus. The water medium were treated with a series application rate of urea at 0.0 kg N/ha (C0), 50.0 kg N/ha (T1), 100.0 kg N/ha (T2), 150.0 kg N/ha (T3) and 200.0 kg N/ha (T4) while the GBH was applied at the fix rate with 2.4 kg ai/ha for all treatments (T0 to T4). Data obtain will be subjected to One-way Analysis of Variance (ANOVA). The application of GBH and nitrogen fertilizer at T3 (150 kg/ha + 2.4 kg ai/ha GBH) were affected the growth of *Azolla* which is inhibition for fresh weight is 88.88%, moisture content 1.01% and chlorophyll is 11.11% while for the cell injuries were affected at T1(50 kg/ha + 2.4 kg ai/ha GBH). For the water quality which is temperature and dissolved oxygen were affected at T3. However, the pH of *Azolla* indicated strong reduction for T4 with the mean value 5.87 compared to other treatment (means value range from 6.40-5.99). As a conclusion for this experiment, the aquatic plants could affect when how much the rate of fertilizer and herbicide were applied. When applied the fertilizer and herbicide on *Azolla* the cell injuries can see at treatment between the control.

Keywords: *Azolla*, Glyphosate-Based Herbicide (GBH), nitrogen fertilizer, cell injuries.

The Effect of Gamma Radiation the Growth of *Caladium bicolor*

Nurain Aisyah Binti Mohd Arshad, Nik Marzuki Bin Sidik

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: aisyah.f19b0294@siswa.umk.edu.my

ABSTRACT

Caladium bicolor variant still has a low production rate when compared to other ornamental plants. It is now the focus of most people and has a high market value. Mutation breeding, or gamma radiation, is a reliable method for producing new *Caladium bicolor* cultivars. This radiation method uses gamma rays that can penetrate the plant and change genetics or original traits to produce genetics in new plants. Therefore, this study was carried out to examine the effectiveness of different gamma rays on the growth of *Caladium bicolor* plants and the effect of survival on *Caladium bicolor* plants by using the gamma ray method. Gamma irradiation on *Caladium bicolor* corms was exposed to Cs-137 at doses of 30 Gy, 60 Gy, and 90 Gy of gamma radiation. The life span of cultivation and plant height were measured for seven weeks. The average highest growth rate was 0.175 cm from 60 Gy while the lowest average was 0.05 cm from 90 Gy. Radiation is evaluated based on the survival percentage of the *Caladium bicolor* plants. The highest plant survival rate recorded was 50% at 30 Gy treatment, while the lowest survivality was 30% at 60 Gy and 90 Gy at peak time, which is in the fourth week. The 90 Gy dose treatment was found to have significantly reduced shoot growth compared to the control treatment. Plant growth performance began to decline by 20% in the fifth week for the 30 Gy dose treatment and by 30% in the fifth week for the 90 Gy dose treatment. The growth of plants exposed to gamma radiation began to decline and decay in the fifth week for 30 Gy and 60 Gy and in the seventh week for 90 Gy. The experimental results of this study showed that the dose of gamma radiation that was irradiated on the dose treatment of 30 Gy, 60 Gy, and 90 Gy against *Caladium bicolor* corms had reduced the growth rate and plant survival rate.

Keywords: *Caladium bicolor*, Radiation, Gamma ray

The Study on Sensory Evaluation of the Product Mushroom Crackers

Siti Ayu Nasiha Binti Muhammad Sukhri, Mst Laila Naher

Faculty of Agro-Based Industry, Jeli Campus, University Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: nasiha.f19b0308@siswa.umk.edu.my

ABSTRACT

Mushroom is highly perishable commodities that deteriorate very fast, resulting as loss especially for the small grower. This project intends to reduce post-harvest loss by transforming a sacks product of grey oyster mushrooms into crackers and conducting a survey to determine the acceptability of this new crackers. The market snacks are rich in the ingredient of artificial salt of monosodium glutamate (MSG), which causes health problems if consumed in large quantities. On the other hand, the mushroom is naturally rich in umami flavour, which resembles MSG salt. Thus, the 2nd aim of this study was to prepare healthy snacks using mushroom powder without adding any artificial MSG salt. The proximate analysis was conducted for nutritional determination. The result obtained from the proximate analysis that mushroom crackers contain high in protein (2.28%), ash (1.83), and moisture (8.81%) while low in fat (11.42%) and carbohydrates (75.66%). For commercial purposes (onion crackers), low in protein (1.95%), ash (1.25%) and moisture (7.11%) but high in fat (12.19%) and carbohydrates (77.48%). It shows that mushroom crackers are potential as healthy snacks. Colour measurement is also used in mushroom crackers. Results for colour measurement are low because no colour enhancer is done during the manufacture of crackers. Next is the texture profile analysis, tested with three parameters. The value is lower than commercial crackers due to the use of different materials. The four factors' overall acceptability range is 88.5% for the highest score, 4, meaning like very much. The remaining 11.5% of score 3 represented like slightly mushroom crackers. This proves that this mushroom cracker product can be accepted by snack lovers and can be marketed.

Keywords: mushroom, crackers, proximate, texture, colour

In Vitro Antidiabetic Effects of Kelulut Honey (*Meliponinies spp*) from the Selected Areas of Selangor

Mohamad Noor Sulaiman Bin Mahamad* Arifullah Mohammed

Faculty of Agro Based Industry, Universiti Malaysia Kelantan. 17600 Jeli, Kelantan, Malaysia

First Author: sulaiman.f19b0317@siswa.umk.edu.my

ABSTRACT

Diabetes mellitus is one of the fastest spreading metabolic disorder on the globe. The disorder is caused due to insufficient amount of insulin being produced of the beta-cells in the pancreas which regulate blood glucose levels as well as storing excess glucose. Honey a natural drug that is filled with an abundance of nutrients, vitamins, enzymes and phenolic compounds that are beneficial to improve the metabolism. Thus, the objective of this study is to determine Kelulut honey antidiabetic properties. Alpha-amylase inhibition assay and also to estimate total alkaloid contents of 16 samples collected from various locations of Selangor. The results showed highest percentage of inhibition activity of different concentration of 50 μ L (60.6 %), 100 μ L(73.9%) and 150 μ L (89.0%) from sample honey 8 of the *Heterotrigona itama spp* from Rawang while the lowest was sample 2 with the concentration 50 μ L (17.0%), 100 μ L (54.8%) and 150 μ L (63.9%) of the *Heterotrigona biighami spp* from Petaling jaya. While for Total Alkaloid Content (TAC) showed sample 7 honey from *Heterotrigona itana spp* from Bangi has the highest concentration of 50 μ L (0.49 ± 0.17) mg/ μ L, 100 μ (1.09 ± 0.15) mg/ μ L and 150 μ (1.64 ± 0.132) mg/ μ L and the lowest is sample 15 of the *Heterotrigona apica spp* from Shah Alam with the concentration of 50 μ L with (0.30 ± 0.11) mg/ μ L, 100 μ L (0.62 ± 0.55) mg/ μ L and 150 μ L (1.36 ± 0.26) mg/ μ L The difference observed is may be due to the difference in botanical sources of the nectar collected by the bees in that area.

Keywords: Kelulut Honey, Stingless bee. Alpha-Amylase Inhibition, Total Alkaloid Content, Antidiabetic Properties.

Rejuvenation of Infected Pineapple Suckers from Death Root Disease by Using Effective Microorganism and Organic Fertilizers Foliar Spraying

Ahmad Rusyaidi Bin Mohd Yamin, Muhammad Nurfaiz Bin Abd Kharim

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600, Jeli, Kelantan

First Author: rusyaidi.f19b0322@siswa.umk.edu.my

ABSTRACT

Pineapple disease management was an important aspect to increase the quantity and quality of fruit production. One of the common diseases that attacked the pineapple was Basal Stem Root disease (BSR) or known as death root disease. BSR cause huge loss to farmers because the disease reduces the quantity of plant stands and affect the total yield production. So, there was a high additional cost for farmers to buy new suckers to replace the infected suckers. BSR was caused by the fungus *Thialaviopsis paradoxa* which attacked the pineapple plant at a young age from 4 to 8 months after transplanting. The objective of this study is to investigate the plant morphological growth of infected pineapple sucker treated with an effective microorganism (EM) & organic fertilizer. Treatment of the study consists of Fish Fermented Amino (FFA), Fermented Fruit Juice (FFJ), Bamboo, and Virgin Forest and control. Data sampling such as SPAD-chlorophyll meter reading, plant height, and width were recorded throughout the young age planting and were evaluated using ANOVA and Tukey HSD through SPSS statistical analytical software. As for the result, for SPAD chlorophyll meter measurement showed that the FFJ (74.16) was higher compared to other treatments. Meanwhile, bamboo treatment got the highest reading of plant height (36.38 cm) and the highest reading of plant width (37.86 cm). These results illustrate that there was a positive effect towards EM & organic fertilizer to rejuvenate infected pineapple suckers from death root disease to be used as planting material for the main field transplanting.

Keywords: Rejuvenate, Pineapple Sucker, Basal Stem Root, EM fertilizer, SPAD chlorophyll meter

Acclimatization of *Cymbidium sp.* Orchid by using Different Planting Media

Wan Shahril Amri Bin Wan Azlan, Suhana Binti Zakaria

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600, Jeli, Kelantan

First Author: amri.f19b0342@siswa.umk.edu.my

ABSTRACT

Acclimatization is the process of transferring plantlets from the artificial media to the outside environment. This study was focus on the effect of different planting media on the growth of the *Cymbidium sp.* orchid during acclimatization phase. The main problem of orchid at acclimatization stage which they not steadily associated towards the planting media will fail to engage nutrient that provided for them and in result there is no growth and later on will die. Therefore, the purpose of this study to investigate the effect of different planting media on growth performance of *Cymbidium sp.* tissue culture in acclimatization stage. These treatments consist of combination of saw dust and sugarcane bagasse (T1), combination of sugarcane bagasse and charcoal (T2), combination of sugarcane bagasse and coconut husk (T3), combination of sugarcane bagasse and peatmoss (T4), sugarcane bagasse only (T5) and charcoal as a control. The data was evaluated by using Duncan's test and one-way analysis of variance (ANOVA). Data was recorded based on leaf length and width, height of plantlets, and number of leaves of *Cymbidium sp.* in acclimatization phase. As a result, the combination of sugarcane bagasse performed well in growth of orchid than lone media. T1 showed the highest plant height which the value was 8.94 ± 1.22 cm and T2 have the highest in producing leaf number which gave 8.2 ± 1.14 . Meanwhile, T4 have the highest leaf length (12.04 ± 2.07 cm) and width (0.76 ± 0.12 cm). These results illustrate the positive effect towards combination of sugarcane bagasse with other media. Hence, it was suggested that the agro-waste product such as sugarcane bagasse has a potential to use as an orchid media especially from tissue culture plantlet.

Keywords: Growing media, Sugarcane bagasse, Acclimatization, Growth, *Cymbidium sp.*,

Physicochemical Properties, Proximate Composition and Cooking Qualities of Parboiled Rice Available in Malaysia

Shaline Muniandy^{1*}, Mohd Shaiful Azman bin Abdul Rahim¹

¹Faculty of Agro based Industry, University Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

First Author: shaline.e19a0099@siswa.umk.edu.my

ABSTRACT

Rice (*Oryza sativa*) is the main source of food in many countries in today's world. White rice is high in glycaemic index which causes spikes in blood sugar level and leads to diabetes. Parboiled rice is low in glycaemic index thus much healthier compared to white rice. The objective of this study was to compare the physicochemical properties, proximate composition, and cooking qualities of local rice and parboiled rice available in Malaysia. The appropriate methods were carried out such as AOAC to determine proximate composition and manually cooking the rice and recording the results for the rest. The results showed that there were no significant differences in pH value, water activity (aw), amylose content, fat content, protein content and ash content between parboiled rice and local rice. Further results indicates that the elongation ratio of parboiled rice was significantly ($p < 0.01$) higher than the local rice, the water activity (aw) of cooked parboiled rice is significantly ($p < 0.01$) lower than the local rice, the colour of the parboiled rice is darker and more yellowish, the moisture content of parboiled rice is significantly ($p < 0.01$) lower than local rice, the carbohydrate is significantly ($p < 0.01$) higher in parboiled rice, the cooking time of Pusa King is significantly ($p < 0.001$) lower than local rice and the water uptake ratio of parboiled rice is significantly ($p < 0.0001$) higher than local rice. Overall, the brand Pusa King is the best choice compared to Sari due to its high-amylose content with low-glycemic index content. In conclusion, this study can be a guide or reference for consumers' preferences according to their health conditions and preferences.

Keywords: *Oryza sativa*, parboiled rice, physicochemical properties, proximate composition, cooking qualities

Influence of Sorghum (*Sorghum Bicolor*) flour in cookies

Anis Nur Syazleen Binti Shaari¹ and Nurhanan Binti Abdul Rahman¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli, Kelantan, Malaysia

First Author: syazleen.f18a0018@siswa.umk.edu.my

ABSTRACT

This study aims to assess the addition of sorghum, millet, and golden flaxseed in cookie formulation, composition, and acceptability. For the cookie formulations, the following ratios between wheat flour and the other treatment such as sorghum, millet, and golden flaxseed in form of flour were used; 250:0, and 200:50 for treatment respectively. The formulation utilized in this study was adapted from earlier research with minor changes. The simple formulation used from common ingredients for baking cookies were butter, sugar, and corn flour. The sensorial evaluation was carried out using a hedonic test. Sensory testing demonstrated that these cereal grains and wheat flour can be successfully combined to create gluten-free cookies with a pleasing flavor and taste. Sorghum, golden flaxseed, and millet have beneficial nutritional qualities that could be used to boost the value of baked foods. Golden flaxseed cookies considerably topped the other two types of samples in terms of hardness, crispiness, elasticity, gumminess, and chewiness, according to textural measurement ($p > 0.05$). In terms of sensory evaluation, golden flaxseed cookies had significant ($p > 0.05$) in terms of flavor, aroma, and overall acceptability. The finest flavor, taste, and acceptability were found in golden flaxseed cookies. All gluten-free cookies exhibited increased nutritional content when compared to control cookies, and panel members judged them to be acceptable.

Keywords: cookies, gluten-free, sorghum, golden flaxseed, millet, sensory properties

Methylene Blue Adsorption Capacity and Capability by Various Biomass Sample

Muhammad Amirull Fadzli Mohd Yunus*¹, Palsan Sannasi Abdullah¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

First Author: amirull.f18a0082@siswa.umk.edu.my

ABSTRACT

From the experiment it can be generally relate that the amount of Methylene Blue (MB) dye adsorbs by the active carbon in biomass samples correspond increase with the increase amount of biomass sample being used and the time taken for the active carbon to adsorb the methylene blue (time exposure) in the methylene solution. It was discovered during the experiment, the biomass sample that surpasses a certain sieve size was able to adsorb the MB dye in the solution yet the absorbance value does not decrease due to the biomass sample has replace the MB as the solute in the solution.

Keywords: Methylene blue, active carbon, biomass

A Study of Effects of Cooking on Texture and Colour of Pasta Incorporated with Red Spinach

Ahmad Muzakker Aiman Ruziman^{1*}, Leony Tham Yew Seng¹

¹Faculty of Agro Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author : muzakker.f19a0008@siswa.umk.edu.my

ABSTRACT

The texture and flavour of pasta make it a good choice, and in some nations, it is frequently consumed as the primary daily meal. Investigating the viability of incorporating red spinach into pasta was the study's goal. This study's significance lies in understanding the impact of pasta's non-traditional ingredient addition on its cooking quality, colour, texture profile, and proximate analysis. At the amount of 2g–6g, red spinach was mixed and added to the pasta recipe. The control was pasta made entirely from wheat flour. Pasta spinach was first dried for 48 hours at 50 degrees. Analysis was done on the effects on the physical characteristics, including cooking time, cooking weight, cooking loss, swelling index, and water absorption. In comparison to the advertised product, adding more red spinach increased cooking time, cooking loss, and swelling index while lowering cooking weight and water absorption. The colour of the pasta spinach with cooked and uncooked pasta was then clearly different. Whether the sample was 2g or 6g in weight, cooked pasta shown a substantial difference in hardness, cohesiveness, springiness, and gumminess. To be clear, the results of this weight of sample are different for readings of 2g and 4g. Furthermore, a sample weight of 2g had a high value compared to a weight of 4g. The best formulation, F1, which comprises 2g of red spinach, was then employed for the proximate analysis of ash, carbohydrate, fat, and protein. The modern nutritional trend of seeking out functional foods and products made specifically for different customers serves as a motivation for manufacturers to create new goods. Pasta spinach is a good option for diet individuals with specific nutritional demands thanks to the attributes included in it.

Keyword: Pasta, Red spinach, cooking analysis, colour, texture profile analysis

Colour, Texture, Proximate & Sensory Evaluation of Tortilla Chips Formulated from Dried Powder of Sweet Corn and Baby Corn

Azlinda Binti Norazlan* and Seri Intan Binti Mokhtar

Faculty of Agro-Based Industry, Jeli Campus, University Malaysia

Kelantan, 17600 Jeli, Kelantan

First Author: azlinda.f19a0018@siswa.umk.edu.my

ABSTRACT

Baby Corn Cob (BCC) is a dietary fibre-rich vegetable that typically not consumed raw, prepared, or processed food as a meal through any types of goods. Moreover, scientific evidence on producing BCC on other products are rarely been studied and available in Malaysia. Tortilla chips are an ideal alternative for a healthy and tasty snack. It has a stronger alkaline-cooked flavour, a crispier texture and less energy dense because it absorbs less oil during frying. This study was carried out to formulate tortilla chips with substitution of dried, grind powder of BCC and sweet corn grain (SCG). The colour analysis, texture analysis, proximate analysis and sensory evaluation for 30 respondent preferences of fried formulated tortilla chips was studied and conducted. The result of colour analysis shows that SCG is significantly different for redness a^* (14.4 ± 0.92) and yellowness b^* (35.57 ± 1.35). The results of texture profile analysis indicated that partially substitution of BCC for SCG is significantly for hardness (2313 ± 137.57) and chewiness (1487 ± 108.68) of tortilla chips. The findings of the proximate analysis showed that BCC had higher moisture (73.73 ± 3.64), crude fat (25.8 ± 0.79), and crude fibre (6.89 ± 0.16) contents but lower amounts of ash (5.91 ± 0.12), crude protein (8.12 ± 0.18), and carbohydrate (52.71 ± 0.43) than SCG. The responders prefer SCG for the shape, colour, aroma, texture and taste. BCC provides more nutritional content but SCG has the better taste in customer preferences for tortilla chips.

Keywords: Baby Corn, Tortilla chips, proximate analysis, sensory evaluation.

Development and Quality Analysis of Fruit Leather from Crookneck Pumpkin (*Cucurbita moschata*)

Balqis Zaini¹ and Shamsul Muhamad¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

First Author: balqis.f19a0019@siswa.umk.edu.my

ABSTRACT

Fruit leather is a delicious fruit-based and fiber-rich snack. The objective of this study was to produce and analyze the quality of fruit leather from Crookneck Pumpkin (*Cucurbita moschata*). Three formulations of fruit leather that were made based on the amount of sugar, which were formulations A, B and C. Percentage of sugar in A, B and C was 0% (w/w), 5% (w/w) and 20% (w/w), respectively. Skin of fresh pumpkin was removed and blended into puree. The puree was mixed with the respective percentage of sugar and cooked on flame until the formation of thick slurry. The slurry was poured onto tray and dehydrated using food dehydrator at 50 °C for 15 hours. The leather was detached from tray and proceed for quality analysis. The water activity, colour and texture of fruit leather were analyzed using Paw kit water activity, Konica Minolta Chroma Meter CR-400 and Brookfield CT3 Texture Analyser, respectively. Results showed the water activity of pumpkin leather of formula A, B and C were 1.01, 1.04, and 1.04 respectively. The hardness of formula A (1516.67), B (527.17) and C (280.75). For adhesiveness of pumpkin leather of formula, A, B and C were 0.60 to 1.75. Then, results of gumminess for formula A (0.60), B (2611.50) and C (391.00). For total work of formula, A (26.30), B (20.54) and C (17.19). The lightness value (L^*) for colour analysis of pumpkin leather increased as the percentage of sugar increased. In addition, the redness value (a^*) decreased while the value of yellowness (b^*) decreased. Based on the statistical analysis, the quality of the formula C was the most satisfied. In conclusion, this study provided the basic information that fruit leather can be produced from pumpkin and sugar, and warranted further development before it can be commercialised.

Keywords: Colour analysis, pumpkin leather, sugar, texture, water activity.

The Synthesis and Potential Use of Granular Magnetic Carbon for the Adsorption of Liquid Printer Ink Waste

Chin Pei Ying¹ and Palsan Sannasi Bin Abdullah¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

First Author: peiying.f19a0026@siswa.umk.edu.my

ABSTRACT

Printing is a very common behavior in every industry, almost every household has a printer. Since printing is familiar to everyone, it is important to pay attention to the waste that is created by printing. The objectives of this study are to prepare granular magnetic carbon from coconut shell (CS), characterize the newly prepared granular magnetic carbon (GMC), and examine the adsorption of liquid printer ink waste by the GMC. A total of 43.61g GMC were produced. It is then separated into 3 sizes which are >250 μm , 250 μm , and 125 μm . The results obtained from this study were analyzed using kinetic study and adsorption study. This study showed the smaller size of GMC has higher adsorption due to it having more surface area. 7g of >250 μm CS-GMC able to adsorb 2.91% concentration of ink solution in a very short time. 1g of >250 μm CS-GMC able to adsorb 0.15% concentration of ink solution in 24 hours, but 1 g of 125 μm CS-GMC able to adsorb 0.15% concentration of ink solution in 10 hours only. For the recommendation of this study, the wastewater treatment industry should be more concerned in printer ink waste, especially ink that contains crystal violet dye. Besides, it is also important for the printing industry and every household to avoid wasting ink and only do necessary printing.

Keywords: Coconut Shell, magnetic carbon, printer ink waste, kinetic study, adsorption study.

Characterizing Coconut Shell Vinegar Through Low Cost Production Method and Its Potential Use in Product Development

Devven Rao^{1*} , Palsan Sannasi Bin Abdullah¹

¹Faculty of Agro Based Industry, University of Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

First Author: devven.f19a0030@siswa.umk.edu.my

ABSTRACT

Biomass is a renewable material source that has the potential to significantly improve our environment and economy. The primary focus of this research is on the production of vinegar and biochar from coconut shell. Traditional drums have been utilized in the vinegar production process to determine its potential application in product development. Coconut shell is one part of the agricultural product with high economic value. The raw vinegar collected from the traditional drum was purified using a simple distillation method. The goal of this research was to analyse the purified coconut shell vinegar and suggest its possible applications in product development. Purified coconut shell has been analysed using Gas Chromatography Mass Spectrometry (GCMS) and High Performance Liquid Chromatography (HPLC). Coconut shell vinegar contains 10% chemical component, which can be developed into a new product. The compound determined were N-Methyl-3-piperidinecarboxamide, Phenol, 2-Cyclopenten-1-one,3-hydroxy-2-methyl-, 3-Nonynoic acid, methyl ester, Phenol, 2-methoxy-, Methyl 3,4-tetradecadienoate, Catechol, 7-Azabicyclo [4.1.0] heptane, 2-methyl-5-(1-methylethyl)-, Benzene, 1-ethoxy-3-methoxy-, Phenol,2,6-dimethoxy, and acetic acid. These chemicals potentially used in food, chemical, pharmacy, cosmetics, and agricultural industrial products. The production of coconut shell vinegar and biochar has been successfully carried out using traditional drum method.

Keywords: Biomass, coconut shell, traditional drum, vinegar, biochar, chemical compound

Microbial Surveillance Study on Local Vinegars in Malaysia

Dharshinny A/P Murali Dasan^{1*}, Khomaizon Bt Abdul Kadir Pahirul Zaman¹

¹Faculty of Agro Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

First Author: dharshinny.f19a0031@siswa.umk.edu.my

ABSTRACT

Vinegar is a popular traditional cooking, pickling, and preserving ingredient. It is a result of alcoholic and acetic fermentation of sugar or starch. However, the consumption of vinegars may cause comparable effects on the body regardless of the sugar source. This research was carried out to isolate, identify, and determine the ability of microbes taken from local vinegars. The samples were isolated overnight after being diluted in 10ml. Mixed colonies from isolation plates were streaked many times with various nutrition agar until single colonies were formed. To identify the type of microbe acquired, several biochemical tests such as selective media, gram staining, catalase test, and TSI test were carried out. Microbes such *E.coli*, *Staphylococcus aureus*, and *Salmonella* were identified. All of these bacteria are commonly found in foods, including vinegars. Based on the result of this research, all local vinegars are safe to consume with CFU/ml levels less than 10⁶, as recommended by the World Health Organization (WHO). The existence of bacteria in vinegars was investigated and identified in this study.

Keywords: vinegars, isolate, biochemical tests

Investigating Hexavalent Chromium (VI) Removal in Aqueous Solution Using Modified Granular Magnetic Carbon

Gan Yeu Torng^a, Palsan Sannasi Bin Abdullah¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan Jeli Campus 17600 Jeli, Kelantan, Malaysia.

First Author: yeutorng.f19a0038@siswa.umk.edu.my

ABSTRACT

This study relates to the treatment technology in Malaysia for hexavalent chromium contamination in water. This study combines the advantages of modified granular magnetic carbon, put the altered granular magnetic carbon (GMC) into the aqueous solution containing hexavalent chromium, uses the modified granular magnetic carbon made of coconut husk (CH-GMC) to adsorb hexavalent chromium, Cr(VI) in the aqueous solution selectively and separate the adsorbent material with hexavalent chromium ions to remove Cr(VI) from the aqueous solution. Adsorption tests were carried out to investigate the removal behaviours and mechanisms of Cr(VI) by CH-GMC by modifying variables such as pH, adsorption time, CH-GMC dosages, and the characterisation of CH-GMC before and after Cr(VI) adsorption. CH-GMC was classified into 3 different particle sizes which were >250 μm , 250 μm and 125 μm . Results show CH-GMC has a good adsorption performance of Cr(VI) in an aqueous solution, as the colour of the solution turns from orange to yellow during the adsorption process. The higher the concentration of Cr(VI) in the solution, the higher the adsorption rate of Cr(VI) by CH-GMC. Adsorption was higher at low pH (pH 4-6) and lower at high pH (pH 7-12). The adsorption of Cr(VI) is affected by particle size and dosage. The adsorption rate was highest in 125 mesh. The more the amount of GMC used, the higher the adsorption rate. This study probably has the advantages of a simple process, high removal efficiency, low cost, good safety, reusable, does not cause secondary pollution, etc. It is vital to remove hexavalent chromium ions in water and has an extensive application prospect in the field of sewage treatment, purification of drinking water and other resources and the environment.

Keywords: Water pollution, Malaysia, granular magnetic carbon, hexavalent chromium, particle sizes

Surveillance Study on Microbial Diversity in Teaching Laboratories of UMK Jeli Campus

Jayashree Paramasivan¹, Khomaizon Bt Abdul Kadir Pahirul Zaman¹

¹Faculty of Agro Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

First Author : jayashree.f19a0050@siswa.umk.edu.my

ABSTRACT

Air can be considered one of the least hospitable environments for microbes because it holds fewer nutrients and thus supports relatively fewer microbes or organisms. Unlike soil and water microbes, which can be regarded as native to their environment, microbes found in the air only get there by being introduced from another source. Indeed, certain human activities, such as waste disposal, waste treatment, agriculture and industry, have the potential to release microbes into the air. So, the purpose of this study is to conduct a surveillance study to find the bacterial count of air microbial and identify types of bacteria isolated from the teaching laboratories at the UMK Jeli campus. The microbes were isolated from earlier prepared Nutrient Agar plates that left exposed overnight at laboratories. Aerobic plate counting is done to find bacterial count then mixed colonies from isolation plates were streaked on different nutrient agar multiple times until single colonies were obtained. Different biochemical tests such as selective media, gram staining, catalase test and TSI test were carried out to determine the type of microbes obtained. Gram positive bacteria from *Staphylococcaceae* family and gram negative bacteria from *Enterobacteriaceae* family were obtained from the conducted test. The result of this research can ensure the further improvement of safety precautions and cleanliness of laboratories.

Keywords: Microbes, agar plates, aerobic plate counting, gram staining

Computer-Aided Approach on The Development of Body Scrub from *Psidium Guajava* L. Leaves

Karmila Lahu^{1*}, Siti Nuurul Huda Mohammad Azmin¹

¹ Faculty of Agro-Based Industry, University Malaysia Kelantan Jeli Campus, 17600 Jeli Kelantan, Malaysia.

First Author: karmila.f19a0055@siswa.umk.edu.my

ABSTRACT

A body scrub is a body care cosmetic product used to help exfoliate the skin. The exfoliating process rids the dead skin cells to allow the skin to breathe. However, many chemical-based cosmetic products like body scrubs have been marketed despite showing adverse side effects. Therefore, the natural-based cosmetic industry should be strengthened so that more consumers will benefit from it. Plants like *Psidium Guajava* L. offer various benefits to the skin such as anti-ageing properties, skin lightening, antibacterial agents, treating hyperpigmentation and many more. *Psidium Guajava* L. could be incorporated into cosmetic products like body scrub to help improve skin appearance and texture. Thus, the research was conducted to develop a medicated herbal body scrub based on a guava (*Psidium guajava* L.) leaf using a computer-aided approach. This study used the optimisation method by Design Expert Software Version 12 to find the best scrub formulation where the ratio of ethanol to water and ratio of Carbopol to guava extract were set as factors. The software sets thirteen body scrub formulations. The body scrubs were tested for physicochemical properties, including pH, colour, water activity and spreadability. The ninth sample was the optimum formulation where the ratio of ethanol to water is 60:40 and the carbopol to guava extract ratio is 1:0.58. They present the best results among the criteria tested where the pH value is seven and the colour result is L*42.41, a*5.51, b*18.68, and dark brown. The water activity was 1.51 a_w , and 11.66 g cm/s value for the scrub spreadability. From the observations, the body scrub showed changes at different times and temperatures because of the degradation of the natural ingredients. This formulated body scrub from guava leaves could undoubtedly increase the selection of natural-based cosmetic products in the market.

Keywords: Body scrub, cosmetic, *Psidium Guajava* L., guava leaves, formulation.

Physicochemical Properties and Stability Studies of Hair Mask Incorporated with Sacha Inchi Oil

Khairulnisa binti Hazley, Akmal Adilah binti Idris and Nik Nur Azwanida binti Zakaria

Faculty of Agro-Based Industry, Jeli Campus, University Malaysia Kelantan, 17600, Jeli, Kelantan

First Author: khairulnisa.f19a0058@siswa.umk.edu.my

ABSTRACT

Plukenetia volubilis or also known as sachu inchi is relatively common to South America, specifically Peru and the Caribbean. It is a wealthy source of fatty acids such as omega-3 and omega-6 fatty acids, vitamins, proteins and antioxidants. These compounds, especially the fatty acids are important in promoting hair growth and reduce hair loss, as well as adding moisture to the hair. However, the application of sachu inchi in hair products development is very limited. Hence, this study aims to develop formulation of hair mask with incorporated with *Plukenetia volubilis* oil and to evaluate antimicrobial activity of the hair mask. Three hair mask were formulated with different volumes of sachu inchi oil (0%, 2.5%, 3.5% and 5%). The antimicrobial activity of hair mask formulated with sachu inchi oil were determined by agar well diffusion against *Escherichia coli* and *Staphylococcus aureus*. The results showed no antimicrobial activity against *E.coli* and *S.aureus* for all formulated hair masks as there was no inhibition zone detected. The physicochemical properties and stability studies of hair mask in terms of temperatures, viscosity analysis, texture analysis and pH showed no significant differences with increased volume of sachu inchi oil. As a conclusion, only colour analysis showed the significant difference ($p \leq 0.05$) for all formulated hair masks.

Keywords: *Plukenetia volubilis*, sachu inchi oil, hair mask, antimicrobial

Preparation and Quality Analysis of Coconut and Pineapple Mixture Fruit Leather

Mohamad Akmal bin Manaf¹ and Shamsul bin Muhamad¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

First Author: akmal.f19a0065@siswa.umk.edu.my

ABSTRACT

Fruit leather is a dried fruit snack made with fresh fruit. The objective of this study is to produce and analyze the quality of coconut and pineapple mixture fruit leather. In this study, four different mixture of coconut and pineapple were used, i.e., F1=25g + 175g, F2= 50g + 150g, F3= 75g + 125 g and F4 = 90g + 110g. Other ingredients consisted of pectin, jaggery and citric acid. Water activity, texture and color of fruit leather were analyzed with Pawkit, CT3 Texture Analyzer and Konica Minolta CR-400 Chromometer, respectively. Texture analysis of the fruit leathers indicated that the hardness were 435.00g to 1611.00g, adhesiveness were 0.50 mJ to 1.77 mJ, cohesiveness were 0.95 J/m² to 1.16 J/m², springiness were 2.88 mm to 3.59 mm, gumminess were 409.33 g to 1789.33 g, chewiness were 13.47 mJ to 57.50 mJ. For color analysis, the light value (L*) of coconut pineapple leather is decreasing. However, there was a decrease in redness (a*) and yellowness (b*) of coconut pineapple leather. The water activity of fruit leather was ranged from 0.95 to 1.20. Statistical analyses have revealed that fruit leather produced with the F3 formulation has respectable physical characteristics, appropriate colour and acceptable levels of water activity. In conclusion, this study showed that fruit leather produced from coconut pineapple and jaggery need further investigation and research for commercialization purposes.

Keywords: Coconut, pineapple, jaggery, texture profile analysis, colour analysis, water activity, a.

A Study of Effects of Cooking on Texture and Colour of Pasta Incorporated with Green Spinach

Muhamad Aqmal Bin Rozhan^{1*}, Leony Tham Yew Seng¹

¹ Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Malaysia.

First Author: aqmal.f19a0072@siswa.umk.edu.my

ABSTRACT

Pasta is a food that is often eaten in certain countries because of its texture and good taste. The objective of the study is to find the possibility of adding green spinach in pasta. The important thing in this research is to know the effect of cooking quality, color, texture profile and proximate analysis when adding non-conventional ingredients to pasta. Green spinach has been combined with pasta and incorporated into pasta formulations. Pasta prepared with 100% wheat flour served as a control. Spinach paste is first dried at a temperature of 50o for 5 hours. Effects on physical properties (cooking time, cooking weight, cooking loss, swelling index and water absorption) were analyzed. Also, cooking pasta at boiling point temperature causes every change to pasta formulation. In this case, C1 shows the same characteristics of pasta in the market because it is pasta without the addition of green spinach. The L* color coordinate value decreased after cooking indicating an increase in dimness. In addition, the color coordinate for a* slightly increased after cooking. For b* shows a slight increase in color after cooking except for F2, the color increases. Following this, the spinach pasta showed a markedly different color to the uncooked and cooked pasta. The cooked pasta showed significant differences in terms of hardness, cohesion, softness and stickiness either samples in 10g or 20g weight. This shows the difference in each pasta formulation in terms of different cooking weights. The best formulation is then used for the proximate analysis of energy (kcal), energy (kJ), carbohydrates, fat and protein which F1ie it contains 20g of spinach puree. The modern nutritional trend of finding several functional foods and specific products for different customers is a source of inspiration for manufacturers to develop new products. These characteristics of spaghetti spinach make it a good choice for people on diets that have special nutritional requests.

Keywords: Pasta, Green spinach, Cooking analysis, Color, Texture profile analysis

Effect of Retort Processing on Microbial, Proximate Analysis, and Market Survey of Ready to Eat Marinated Lamb

Muhammad Izzan Bin Mohd Said^{1*}, Hasnita Che Harun¹, Noor Hafizoh Saidan¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli, Kelantan, Malaysia

First Author: izzan.f19a0094@siswa.umk.edu.my

ABSTRACT

Ready to Eat food have become a trend for persons who are limited on time or cannot adequately cook their meals. Due to this reason, this study has focus to improve marinated lamb using retort process. The objective of this study was to study the effect of retort processing on microbial, physicochemical analysis and market survey of marinated lamb. The product was improve based on three different ratios lamb to paste (500g:150g, 450g:200g, 400g:250g). The microbial analysis was performed for a period of three months using streaking method. The fact that retort processed ready-to-eat marinated lamb was commercially sterile and acceptable for consumption was determined by microbial analysis. The physical and microbial analysis before and after processing were performed for three months under ambient conditions rated the lamb with excellent and good condition. In the proximate analysis, retort process was shown to have a non-significant effect on the proximate components of marinated lamb ($P > 0.05$). After retort processing, the total protein, and fibre content rose while fat, ash and moisture decreased. The textural profile analysis in comparison to before the retort process, the textural qualities of marinated lamb acquire hardness, cohesiveness, springiness, and chewiness. In pH, the treatments had a substantial ($P > 0.05$) impact on the pH readings. Using a Chroma meter, Colour analysis was performed for the sample before and after retort, including L* (darkness to lightness), a* (redness to greenness), and b* (blue to yellowness). A small increase in yellowness (b*) was noticed in raw lamb mixed with paste when the amount of paste was increased before retort process. The acceptance of people towards different ratio of lamb to paste was 450g:200g ratio. The effect of retort process on physicochemical properties of lamb to paste show that the increasing trend in proximate analysis, colour test, pH and the texture and lastly, the ability of retort processing in eliminating microbes in lamb to paste are efficient as it helps to provide longer shelf life to the product.

Keywords: Lamb, retort processing, physicochemical properties, proximate analysis, microbial analysis

Identification of Microbes Isolated from Fomites in the Teaching Laboratories and Lecture Rooms of Universiti Malaysia Kelantan

Nisalini Nair Devendran Nair^{*}, Khomaizon Bt Abdul Kadir Pahirul Zaman[†]

[†]Faculty of Agro Based Industry, Jeli Campus, University Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

First Author: nisalini.f19a0109@siswa.umk.edu.my

ABSTRACT

Fomites are inanimate object which can harbour microbes and act as possible conduits for disease transmission to humans. Viruses, bacteria, protists, fungus, and archaea can be found in all of our living environment and buildings, where one is capable of transferring microbes into the air and onto fomites. Touching can physically transfer microbes between fomites and people, although the effectiveness of the transmission relies on the surface's composition, the hand coverings utilised, the hydrophobicity of the material, and the moisture content of the surfaces in contact. This study was carried out to isolate, identify and to determine the ability of microbes obtained from fomites that were collected from door handles of teaching laboratories and lecture rooms around Universiti Malaysia Kelantan. The microbes were isolated from fomites by swabbing the cotton swab that was used to swab the door handles earlier onto prepared nutrient agar. Mixed colonies from isolation plates were streaked on different nutrient agar multiple times until single colonies were obtained. Different biochemical tests such as selective media, gram staining, catalase test and TSI test were carried out to determine the type of microbe obtained. Microbes such as *Escherichia sp.*, *Klebsiella so.*, and *Salmonella sp.* were obtained. From this research, it is proved that door handles are potential fomites that can be easily contaminate its users and it is important to regularly disinfect door handles and follow proper hand hygiene practices.

Keywords: Microbes, fomite, door handle, isolate, biochemical tests

Physicochemical and Study of Facial Soap Incorporated with *Zingiber zerumbet*

Nor Shahuda Binti Zawahid*, Nurul Amira Binti Buslima

Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus 17600, Jeli, Kelantan, Malaysia

First Author: shahuda.f19a0118@siswa.umk.edu.my

ABSTRACT

Skincare products and routines, particularly face soap, are not new in the culture. People are willing to spend money to have clean, appealing skin. There is currently a scarcity of knowledge available on this plant, including its crucial pharmacological qualities on the skin and downstream processing applications. Some people, however, are unaware of the herbal plants that have a wonderful composition for making face soap. Plants include a component that is ideal for manufacturing face soap. The herb plant with ethnomedicinal claims was a valuable pharmacological on skin and applications of downstream processing. This study aims to (1) produce extracted rhizomes of *Zingiber zerumbet* using hexane to manufacture a facial soap. (2) The viscosity analysis, skin pH analysis, texture profile, washability, and colour analysis were performed on face soap combined with *Z. zerumbet* at three different concentrations, which are control, 1%, 3%, and 5% extract of *Z. zerumbet*. On the other hand, (3) the face soap's loss and stability are being checked as part of the stability test. Furthermore, the facial soap was created by macerating zerumbone and filtering excess hexane from the extraction using a rotary evaporator. The extraction of *Z. zerumbet* was then carried to the freeze drying process for 3 days, and the facial soap was moulded with the use of a chipped glycerine recipe for the soap to be a solid mould. Therefore, the 3% of *Z. zerumbet* concentration was superior than other concentrations, indicating that the significant value of physicochemical attributes studied was good. In a conclusion, there are substantial changes in the physicochemical characteristics of control, 1%, 3%, and 5% solid soap mixed with *Z. zerumbet*, which has the potential to illuminate the advantages that can be manufactured on medicinal herbs on a face.

Keywords: *Zingiber zerumbet*, physicochemicals, ethnomedicinal herb, facial soap.

The Comparison of Physicochemical Properties, Proximate Composition and Cooking Qualities of Malaysian and Thai Rice

Nur Dieyana Mat Hassan¹, Mohd Shaiful Azman bin Abdul Rahim¹

¹Faculty of Agro based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

First Author: dieyana.f19a0137@siswa.umk.edu.my

ABSTRACT

In the global market, rice is a staple food, particularly in Asia. Shape, grade, and size of rice will vary from country to country. In Malaysia, the consumer preferences on Thai rice consumption is increasing. This study was aimed to compare the physicochemical properties, proximate composition, and cooking qualities of selected varieties of Malaysian and Thai rice. For physicochemical properties, the differences were determined on the elongation ratio of the grain before and after cooking. The weight of the grain was taken before and after cooking for both Malaysian and Thai rice. The pH and water activity of the rice sample was obtained via pH meter and Paw kit respectively. For proximate composition, the standards from AOAC methods were applied. Meanwhile, for the cooking qualities, the rice sample was cooked to identify the ratio of water absorption and minimum cooking time. The Rambutan brand had a higher protein content (11.73%), a lower ash content (0.39%), a lower fat content (0.17%), and a lower carbohydrate content (74.25%). However, Jati Malaysia has the highest moisture content (14.44%). The elongation ratio mm/mm varied between Malaysian rice brands, ranging from 1.17 to 1.23. However, the elongation ratio of Thai rice brands was higher at range 1.37 to 1.39. Both Malaysia brands recorded higher water activity in both before and after cooking, 0.97 a_w and 1.66 to 1.68 a_w, respectively. There is no significant difference in pH and colour between Malaysian rice brands and Thai rice brands. Amylose content was found to be the highest in Jati Malaysia and lowest in Bird of Paradise Thailand. Bird of Paradise Thailand required the lowest cooking time, with a minimum cooking time of 22 minutes. Among all samples, the water absorption ratio ranged from 72% to 126%, and the lowest was in Bird of Paradise Thailand (72%). In conclusion, this study would be significant for local rice producers to improve the quality of their production to compete with other imported rice, thus, increasing economic outcome.

Keywords: Malaysian and Thai rice, physicochemical properties, proximate composition, cooking qualities.

Computer-Aided Approach on the Development of Hair Dye from *Lawsonia inermis* incorporated with *Clitoria ternatea*

Nur Farahani binti Abdul Rahman^{1*}, Siti Nuurul Huda Mohammad Azmin¹

¹Faculty Of Agro-Based Industry, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli Kelantan, Malaysia.

First Author: farahani.f19a0139@siswa.umk.edu.my

ABSTRACT

Hair dye is part of the cosmetic where it is known for its vibrant and long-lasting colour. Today, hair dye is widely practised in addition to assembling an individual look more fashionable. *Lawsonia inermis* (henna) and *Clitoria Ternatea* (butterfly pea flower) presented beneficial effects on hair, like antioxidant and anti-inflammatory, apart from giving an exciting colour. Regular use of natural hair dyeing can develop various hair conditions, including the loss of hair strength, reduced hair thickness, and an increase in the roughness of hair follicles. Therefore, this study aims to develop a systematic and generic computer-aided approach to designing hair dye added with henna leaves incorporated with butterfly pea flowers. Thirty hair dye paste formulations with different amounts of butterfly pea flower and organic ingredients have been developed using Design Expert Software version 12. Physicochemical properties were tested, including colour, viscosity, stereo-microscopic evaluation, and pH. This study found that the henna hair dye paste showed acidic pH ranging from 3.8 to 5.6. The colour of the henna dye changed from greenish to red-brown with an L* value of 59.16, a* value of 30.37 and a b* value is 28.67. The viscosity of the henna dye paste ranged from 1.10 to 9.55. The optimized viscosity of the dye paste was recorded at 7.70 Pa.s. The formulation of dye adhered to the hair shaft and coated well. Viscosity is a parameter utilized to measure the product quality of hair dye. The plant-based organic hair dye developed in this study contains antimicrobial and antioxidant properties. This research suggested that these findings could be an initial step for the future development towards the production of organic hair dye. Further studies should be conducted to improve the functionality of the dye.

Keywords: Hair dye, organic product, *Lawsonia inermis*, *Clitoria ternatea*, physicochemical properties, optimization.

Characterizing Corn Cob Waste Vinegar from Low Cost Technique and Its Potential Use in Industries of Product Development

Nur Izzati binti Md Akil^{1*}, Palsan Sannasi bin Abdullah¹

¹Faculty Of Agro-Based Industry, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli Kelantan, Malaysia.

First Author: izzati.f19a0144@siswa.umk.edu.my

ABSTRACT

Biomass is any material from a biological source that has many uses to environment and improve economy. The objective of this research is to create vinegar from corn cob waste and use it as insecticide, food vinegar and others. The corn cob is used as firewood, however using the residual corn cobs to make biochar will be more valuable. Farmers typically burn this waste outside to get rid of them. The goal of this research is to develop a more environmentally friendly waste disposal technique by converting corn wastes to biochar and vinegar. The objective of this study is was to find out the potential products from corn cob vinegar. The compound determined in this research is N-Methyl-3-piperidinecarboxamide, Phenol, 2-Cyclopenten-1-one, 3-hydroxy-2-methyl-, 1,6-Cyclodecanediol, Catechol, Phenol, 2-methoxy-, Octa siloxane, 1,1,3,3,5,5,7,7,9,9,11,11,13,13,15,15-hexadecamethyl- and acetic acid. This compound is very important especially in pharmacy, cosmetics, food, and other development product in industries. Distilled vinegar can be derived from corn cob. Acetic acid concentrations in vinegar can range from 5% to 20%. Acetic acid, along with water, is one of vinegar's primary ingredients and what gives it its sour flavor. Traditional drum has been used in the process of producing vinegar and vinegar also can produce through pyrolysis process. The acetic acid in natural vinegar is always obtained in organic source. Acetic acid in vinegar has a good value in industries. The height of acetic acid HPLC result is 189.4751.

Keywords: Biomass, Corn Cob Waste, Acetic Acid, Vinegar, Chemical Compound.

Computer-Aided Approach on The Development of Acne Cream from *Annona muricata* Lin.

Nur Syafiqah Subahaki^{1*}, Siti Nuurul Huda Mohammad Azmin¹

¹Faculty Of Agro-Based Industry, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli Kelantan, Malaysia.

First Author: syafiqah.f19a0149@siswa.umk.edu.my

ABSTRACT

Acne cream is an effective and safe treatment solution used for treating acne. The botanical extract in acne cream has shown an additional benefit due to its composition of possible active components. Some researchers assume that botanicals may lessen antibiotic resistance when applied as alternatives to or in combination with antibiotics. However, plant extract like *Annona muricata* Lin., commonly known as soursop leaves extract works well for treating inflammation. Thus, this study aims to develop a systematic and generic computer-aided approach for designing acne cream added with soursop leaves. Thirteen acne creams formulations were set by Design Expert software 12, with different concentrations of soursop leaves with a weight of 0.01g to 0.05g and ethanol volume of 0.5 ml to 1 ml for extraction. The optimum acne cream was obtained based on tested properties, including pH, viscosity, spreading ability, water activity and texture analysis. The formulated acne cream with soursop leaves showed the ideal viscosity as a commercial product of 3.88 Pa.s. The viscosity of the cream increased by lowering the temperature and increasing the fat content like stearic acid. The cream was not too viscous, exhibiting thixotropic properties. This study found that the formulated acne cream exhibited significant variations depending on the temperature because of high water content and alkaline pH (7.91-8.28). The cream showed a slightly acidic property with a pH of 5.5. The spreading ability test of acne cream with formulation 13 was 39 s which showed that the cream spread quickly in less than a minute, while water activity was 1.53 a. However, the regular water activity of the cream must be below one to prevent bacterial growth, whereas the optimum formulation presented less than one water activity. For texture analysis, acne cream with formulation 10 gave the highest hardness (34.00 g) and cohesiveness (1.14). This formulated acne cream is comparable for its physicochemical properties to commercial products, even though it uses all-natural ingredients.

Keywords: Acne cream, botanical extract, *Annona muricata* Lin., soursop leaves, physicochemical properties, natural ingredients.

Effects Of Roselle Extract on Cooking Characteristics, Textural and Colour Properties of Beef Patties

Nurul Aina binti Wahab* and Nurhanan Abdul Rahman

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan. Malaysia.

*First Author: aina.f19a0158@siswa.umk.edu.my

ABSTRACT

The red Roselle flower known as a *Hibiscus Sabdariffa* is used in some parts of the world to gain benefits in foods and health. This study is conducted to study the effects of Roselle extract in beef patties on cooking characteristics, textural and colour properties. The beef patties were incorporated with 0.25g/10ml and 0.50/10ml of Roselle extract. The cooking characteristics assessed including cooking yield and diameter reduction of the uncooked and cooked patties. Textural analysis was conducted using Textural Profile Analyzer to determine hardness, cohesiveness, gumminess, springiness and chewiness of the patties. The lightness, redness and yellowness attributes were determined using a chromameter. The results showed that cooking yield of patties with Roselle extract was lower (53.54 ± 1.82 and 59.73 ± 1.19) than control patties which is (65.92 ± 1.87). The hardness, gumminess and chewiness were lower in patties incorporated with roselle extract for uncooked beef patties differ than the cooked patties. The cohesiveness and springiness were not significantly different in the cooked beef patties. The lightness, redness and yellowness of the patties containing the Roselle extract were lower than the patties without any substitution of Roselle extract. To summarize, the Roselle extract has affected the texture, colour and cooking characteristics of beef patties.

Keywords: roselle extract, beef patties, cooking characteristics, color and textural characteristics.

Development and Quality Analysis of Fruit Leather from Berangan Banana (*Musa acuminata* var. Barangan)

Nurul Dinie Mohd Yusoff^{1*} and Shamsul Muhamamd¹

¹ Faculty of Agro Based Industry, Universiti Malaysia Kelantan Jeli, Kelantan, Malaysia

First author: dinie.f19a0162@siswa.umk.edu.my

ABSTRACT

Fruit leather is an edible fruit product that made from fresh fruit that dried at specific temperature. The objective of this study was to determine the effect of sugar on the qualities of berangan banana leather. In this study, three different formulations of fruit leather with different sugar concentration which were formulation A, B and C. The banana pulp was blended into puree and added with sugar according percentage of sugar in A, B and C which was 0 % w/w, 5% w/w and 20%. w/w, respectively. It was cooked until thick slurry was formed. Then, the slurry was poured onto tray and dried in food dehydrator at 45°C for 20 hours. Quality analysis was performed after the leather was dried. Water activity, texture and colour of fruit leather were analysed with Pawkit, CT3 Texture Analyzer and Konica Minolta CR-400 Chromameter, respectively. Texture profile analysis of the fruit leathers indicated that the hardness of formula A, B and C were 534.50 g, 811.83 g and 86.75 g respectively. The total work of formula A, B and C were 8.60 mJ, 11.22 mJ, 1.64 mJ respectively. The adhesiveness of formula A, B and C were 1.38 mJ, 1.55 mJ and 0.4 mJ while the gumminess was 511.83 g, 1013.50 g and 95.00 g respectively. The water activity of formula A, B and C were 0.93, 0.99 and 1.03 respectively. The lightness value (L*) for colour analysis decreases when sugar concentration increase. Result for colour a* and b* indicates the redness increases when yellowness increases. Based on the statistical analysis, the quality of the formula B was the most satisfied. In conclusion, this study provided the basic information that fruit leather can be produced from banana and sugar, and needed further development before it can be commercialised.

Keywords: banana leather, colour, sugar, texture analysis, water activity, a_w

Improvement of The Pineapple Vinegar Fermentation of Acetic Acid Bacteria Isolates

Nurul Izzah binti Yusof^{1*}, Seri Intan Bt Mokhtar²

¹ Faculty of Agro-based Industry, Universiti Malaysia Kelantan, Jeli Campus, Malaysia.

² Institute of Food Security and Sustainable Agriculture, Universiti Malaysia Kelantan

Email: izzah.f19a0166@siswa.umk.edu.my

ABSTRACT

Malaysian pineapple production increased from 2013 to 2015 due to increased demand. However, due to the high production, there have been huge postharvest losses which frequently resulted in the discarding of overripe pineapple. This study was conducted to measure the physicochemical properties of different pineapple maturity stages to assess its suitability for pineapple vinegar production and to measure the physicochemical properties of the pineapple vinegar during fermentation. 2ml of 3 different maturity stages pineapple juice was collected for pH, Total Soluble Solid (TSS), Total Acid (TA), and alcohol content measurements. Pineapple samples from the selected stages of maturity were fermented, and then 15 ml samples were taken from a 5L vinegar fermentation container every day for 12 days to measure pH, TSS, TA, alcohol content, Optical Density (OD), colorimeter, GCMS, and HPLC. The data of the experimental design was analysed using ANOVA based on the p-value with a 95 % of confidence level. Compared to the 50% and 75% pineapple maturity stages, the 100% maturity showed an increase in pH (4.33), TSS (18.50°Brix), TA (3.00), and alcohol content (2.47%). Higher TSS (°Brix) levels were required throughout the fermentation process because they reflect the sugar concentration, which determines the alcoholic grade that can be obtained during alcoholic fermentation. In this study, there was a statistically highly significant difference between the physicochemical parameters ($p < .001$) over time (12 days) with four different vinegar samples (control pineapple, pineapple with strains, control pineapple with rambutan, and pineapple and rambutan with strains). The results indicate that 100% mature pineapple, the discarded overripe pineapple was implied as suitable for vinegar production. Hence, turning it into a by-product is crucial to prevent postharvest loss.

Keywords: Pineapple vinegar, rambutan, postharvest loss, pH, Brix

Formulation and Stability Study of Lip Tint Enriched With Red Dragon Fruit (*Hylocereus polyrhizus*) Extract

Nurul Nadzirah Desa¹, Nik Nur Azwanida Zakaria¹

¹Faculty of Agro Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

First Author: nadzirah.f19a0168@siswa.umk.edu.my

ABSTRACT

Increasing trend in lip cosmetics has developed a variety of lip products such as lip tint, a water-based lip cosmetics. Natural pigment such as betacyanin has been studied intensively because of its important role in human health with various pharmacological activities such as antioxidant, anti-cancer, anti-lipidemic, and antimicrobial (Gengatharan et al., 2016). Betacyanin in the red dragon fruit (*H. polyrhizus*) extract can be used as a lip moisturizer and can overcome dry skin problems effectively when used regularly. The objectives in the study are to formulate different formulations of lip tint enriched with red fruit (*Hylocereus polyrhizus*) extract, to determine the color stability of the red dragon fruit (*Hylocereus polyrhizus*) lip tint during the storage period, and to compare the stability of lip tint with vs without red dragon fruit (*Hylocereus polyrhizus*) extract. This present study investigates the stability of the extracts in terms of change in the intensity of the red dragon fruit extract in a lip tint formulation. Three lip tints were formulated with different percentage of red dragon fruit extracts (F0, F1 and F2) were evaluated for pH, color stability, spreadability, surface anomalies, and texture profile analysis in light and dark conditions for 28 days. For days 0 to 28, the mean changes in L* values were 28.87±0.13, 24.20±0.70, 24.02±0.02, 23.45±0.36, and 19.79±0.79 respectively for the replacement of 10% red dragon fruit extract. The pH of the base lip tint (F0) was slightly lower than the desired pH which is at pH 5, but it was still acceptable since the normal acidic skin pH shifted towards alkaline pH with aging. The pH test resulted in F0 showing a significantly higher pH value compared to F1 and F2. The average spreadability test for the lip tint was very good as there was no fragment, smooth, and uniform surface application without deformation of lip tint was observed while spreading (F1 and F2). Overall, the results show that betalain has the potential to be used as an alternative to synthetic dyes in the cosmetics industry.

Keywords: Lip dye, betacyanin pigment, red dragon fruit, *Hylocereus polyrhizus*, preparation, intensity, Cosmeceutical.

Physicochemical Properties of Jams Added with Treated Orange Peels

Siiti Nur Aishah Binti Abdullah¹ and Nurhanan Binti Abdul Rahman¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli, Kelantan, Malaysia

First Author: aishah.f19a0180@siswa.umk.edu.my

ABSTRACT

Oranges are abundant in nutrients and phytochemical compounds. however, by-products are usually discarded. In this study, we examined how adding orange peel (OP) to orange jam affects physiochemistry and pectin. four jam formulations with various levels of OP have been described: OP manage, sparkling orange upload clean orange peel (OPF), sparkling orange orange peel powder (OPP) and clean orange plus steamed orange peel (OPS) and 12%, respectively. Pectin recognition and physiochemistry were evaluated in all samples. The inclusion of 12% orange peel in the jam reduced acceptability ($p < 0.05$) for all attributes evaluated, in addition to average recognition and purchase intent. OP intake, again, improved ($p < 0.05$) the significance range of water, dissolved solids, titratable acidity, pectin and sugar. In all delivered OP jams, the acidity ratio of soluble/titratable solids, brightness (L^*), and yellow content material (b^*) decreased, while purple content material (a^*) increased. After the addition of OP, there is no trade-off in pH or moisture content of the product. Texture evaluation revealed that the addition of OP reduced stickiness while increasing rubberises, springiness and elasticity. We concluded that up to 8% orange peel in jam retained sensory acceptability comparable to the same old product. Addition of OP is a possible alternative to improve some physicochemical and nutritional products.

Keywords: by-products, citrus; jam, orange, pectin, bioactive compounds, orange peel

Development and Quality Analysis of Fruit Leather from *Carica papaya* L. var. Eksotika

Siti Amira Zaharuddin* and Shamsul Muhamad¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

First Author: amira.f19a0183@siswa.umk.edu.my

ABSTRACT

Fruit leather is a chewy snack that has a sweet flavour made with fresh fruit. The objective of this study was to produce and analyze the quality of fruit leather from *Carica papaya* L. var. Eksotika. Three formulations of fruit leather were made based on the amount of sugar, which were formulations A, B and C. Percentage of sugar in A, B and C was 0% (w/w), 5% (w/w) and 20% (w/w), respectively. The papaya fruit was blended into puree. The puree was mixed with the respective percentage of sugar and cooked on flame until the formation of thick slurry. The slurry was poured onto a tray and dehydrated using food dehydrator at 50° C for 15 hours. The leather was detached from tray and proceed for quality analysis. The water activity, colour and texture of fruit leather were analyzed using Paw kit water activity, Konica Minolta Chroma Meter CR-400 and Brookfield CT3 Texture Analyser, respectively. Results showed the water activity of fruit leather of formula A, B and C were 1.01, 0.91, 0.86 respectively. The hardness of A (1063.42), B (647.25), C (337.08). The total work of A (17.60), B (14.32), C (13.04). The adhesiveness of A (0.67), B (1.63), C (2.42). The gumminess of A (411.00), B (605.83), C (1014.00). The lightness value (L*) for colour analysis of papaya leather increased as the percentage of sugar increased. In addition, the redness value (a*) decreased while the value of yellowness (b*) increased. Based on the statistical analysis, the quality of formula C was the most satisfactory. In conclusion, this study provided the basic information that fruit leather can be produced from papaya and sugar, and warranted further development before it can be commercialised.

Keywords: colour analysis , papaya, physical properties, sugar, water activity

Physicochemical Properties, Proximate Composition and Cooking Qualities of Brown Rice Available in Malaysia

Turga Tarshini.Ramesh¹, Mohd Shaiful Azman Bin Abdul Rahim¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

First Author: turga.f19a0195@siswa.umk.edu.my

ABSTRACT

Malaysians prefer white rice over brown rice because it tastes better, cooks faster, and is cheaper. Brown rice has a slight advantage over other varieties in that it contains more fiber, antioxidants, and minerals. Three brands of brown rice that are sold in Malaysia—Eco Browns Original Unpolished Brown, Jasmine Sun Brown Original, and Pusa Brown Premium Basmati—were examined in this study for their proximate composition, physicochemical characteristics, and cooking capabilities in order to compare them to the country's native rice, Jati Padi Malaysia. In this study, methods such as cooking rice, oven drying, Soxhlet's and Kjeldahl's, burning in a muffle furnace, and amylose-iodine colorimetry were used. The Pusa Brown Premium Basmati brand had a higher protein content (24.23%), a higher ash content (0.82%), a lower fat content (0.02%), and a lower carbohydrate content (63.61%). However, Jati Padi Malaysia has the highest moisture content (14.44%). The elongation ratio mm/mm varied between brown rice brands, ranging from 1.1 to 1.8. The Pusa Brown Premium Basmati brand recorded high water activity both before and after cooking, 1.63 AW and 1.54 AW, respectively. There is no significant difference in pH between brown rice brands and Jati Padi Malaysia. Brown rice brands have lower lightness, higher redness, and higher yellowness when compared to Jati Padi Malaysia. Amylose content was found to be highest in Jati Padi Malaysia and lowest in brown rice brands. The Pusa Brown Premium Basmati Brown brand required the most time to cook, with a minimum cooking time of 38 minutes. Among all samples, the water uptake ratio ranged from 89% to 211% and was lowest in Jati Padi Malaysia (89.04%). So, rice consumption by consumers is influenced by its cooking qualities and physicochemical properties. This research provides important information about various brands of brown rice based on their proximate composition, physicochemical properties, and cooking qualities.

Keywords: Brown rice, physicochemical properties, proximate composition, cooking qualities

Colour, Texture, Proximate and Sensory Evaluation of Dried Coconut Chips Between Three Varieties of Coconut (*Cocos nucifera L.*)

Wan Nor Dalila Binti W Idris*,¹ Seri Intan Binti Mokhtar²

¹ Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan,

17600 Jeli, Kelantan

First Author: dalilati.f19a0198@siswa.umk.edu.my

ABSTRACT

Coconut chips is a snack that can be a healthy snack. Malaysia has many different varieties of coconut which are Malayan Tall, Matag, Mawa, Pandan, MYD and MRD coconut. Besides that, in Malaysia dried coconut chips already available in market but the comparison of different varieties of coconut to produce chips has not been studied for colour, texture, proximate and sensory. Therefore, this study focused on producing the dried coconut chips from three varieties of coconut which are Malayan Tall, Matag and Pandan. Physical properties and nutrient content in fresh coconut pulp (FCP) and dried coconut chips (DCC) of the coconut chips were investigated. Moreover, the sensory evaluation based on 36 respondent preferences was conducted. Dehydrator was used to dry the coconut chips product. There was no significant difference for colour and texture analysis between three types of dried coconut chips but moisture content has significant different. Fresh Matag coconut pulp significantly higher in moisture content ($63.43 \pm 1.66\%$) than Malayan tall ($54.69 \pm 4.20\%$) and Pandan ($37.85 \pm 2.97\%$). Colour analysis in Malayan tall dried coconut chips has a higher in lightness (65.50 ± 3.75) but lower in redness (-1.43 ± 0.10) and yellowness (9.38 ± 1.25). For texture, Malayan tall coconut chips has the higher in hardness (2298.67 ± 1263.06 g), Matag coconut chips has the higher in fracturability (625.33 ± 355.89 g) while Pandan coconut chips has highest in cohesiveness (1.26 ± 0.63). Nutrient content analysis showed that dried Matag coconut chips higher in ash content ($0.03 \pm 0.39\%$) and crude fiber ($37.68 \pm 1.99\%$) while dried Pandan coconut chips highest in protein ($2.34 \pm 0.36\%$), fat ($1.41 \pm 0.09\%$) and carbohydrate ($58.35 \pm 3.18\%$). Since, result for all sensory attribute (aroma, colour, taste, crispiness, shape and overall acceptance) shows dried Pandan coconut chips had more acceptance than others coconut chips, Pandan coconut can be conclude to have potential to produce dried coconut chips.

Keywords: Coconut (*Cocos Nucifera L.*), coconut chips, physical properties, nutrition analysis, sensory analysis

Development and Quality Analysis of Fruit Leather from Seedless White Guava (*Psidium guava*)

Fatin Nabilah Zalani¹ and Shamsul Muhamad¹

¹Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan,

First Author: nabilah.f19a0210@siswa.umk.edu.my

ABSTRACT

Fruit leathers are delicious fruit snack rich in fibre. The objectives of this research were to produce and analyse the quality of fruit leather from Hence, three distinct percentage of sugar were used to make guava fruit leather, i.e., 0% (w/w), 5% (w/w) and 20% (w/w). The formulations were A, B, and C that consists of 0 g, 15 g, and 60 g of sugar with different amount of guava purees, which were 300 g, 285 g, and 240 g respectively. The fruit purees and sugar undergone heating process followed by a drying process. The samples were analysed for texture to observe the fruit leather based on hardness, total work cycle, gumminess, and adhesiveness by using Texture Analyzer CT3. Water activity, a_w was measured using Paw kit based on water loss during drying for different grades of composition, while the parameters for colour analysis L^* a^* b^* were determined using Chroma Meter Konica Minolta CR-400. Data collected were evaluated statistically by T-test to determine whether there were significant differences in comparing the parameters between two different formulations. Results showed physical properties for hardness (222.45 g to 4648.52 g), total work cycle (4.09 g to 36.50 g), gumminess (210.67 g to 4043.50 g), and adhesiveness (0.62 mJ to 2.58 mJ). For colour analysis, as the percentage of sugar used increased, the value of lightness (L^*) and redness (a^*) increased, while the value of yellowness (b^*) decreased. The water activity of formula A, B and C was 0.93, 0.95 and 0.99 respectively. In conclusion, fruit leather made from the formulation C has the acceptable quality this study proved that the fruit leather produced from guava and sugar necessary for research development for commercialisation purposes.

Keywords: Colour analysis, guava, sugar, texture analysis, water activity, a_w

Effect of Extraction Method on Marker Compound Level and Antioxidant Activity in *Mitragyna speciosa* Leaves

Ain Amirah Ahmad¹ and Nurul Amira Buslima¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia.

First Author: amirah.f19a0229@siswa.umk.edu.my

ABSTRACT

Due to its analgesic properties and prospective application in opioid drug replacement therapy, mitragynine, an isolated compound from *Mitragyna speciosa*, has recently attracted attention. To dig further its therapeutic potential, a significant amount of mitragynine is needed. However, there is limited information on how extraction procedures affect the extraction efficiency of mitragynine, which is crucial for raising mitragynine production. Based on previous studies reported, there are various methods in extracting mitragynine, both conventional and renewable technology for enriching and purifying mitragynine from *Mitragyna speciosa*. This study aims to compare the conventional (maceration) and industry (ultrasonication) method in yielding better metabolite values from host plant and to determine the antioxidant activity of *Mitragyna speciosa* extracts by using DPPH, FRAP and ABTS assay. The mitragynine content in 1 mg extract from juice extract and UAE method were 29.53 ± 1.98 $\mu\text{g}/\text{mg}$ extract or 2.95 ± 0.2 % and 33.19 ± 0.67 $\mu\text{g}/\text{mg}$ extract or 3.32 ± 0.66 % respectively. Mitragynine demonstrate high antioxidant value in juice extract and UAE with DPPH assay ($\text{IC}_{50} = 4.93 \pm 0.12$ mg/mL for ascorbic acid as positive control and, $\text{IC}_{50} = 24.83 \pm 0.29$ mg/mL and 10.67 ± 1.15 mg/mL respectively), FRAP (990.42 ± 46.30 μg Trolox equivalence/mg Juice extract and 128.73 ± 29.87 μg Trolox equivalence/mgUAE extract) and ABTS assay (614.93 ± 52.34 μg Trolox equivalence/mg Juice extract and 820.88 ± 9.49 μg Trolox equivalence/mgUAE extract). These findings show comparison among the various methods in extracting mitragynine and point out the facts that different methods produced varying yields of compound.

Keywords: *Mitragyna speciosa*, mitragynine, antioxidant activity

Physicochemical Properties of Fresh Coconut Sap and Biological Activities of Its Fractions

Jivashree A/P Ganasan¹ and Noor Hafizoh Saidan¹

¹Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli, Kelantan, Malaysia.

First Author: jivashree.f19a0248@siswa.umk.edu.my

ABSTRACT

Coconut (*Cocos nucifera* L.) is a popular, economically crucial palm in humid tropical regions. One of the compensable products from the coconut palm is the coconut sap. It is tapped from the enclosed immature coconut spathe. It can be used as a nutritional health drink and raw material to manufacture many value-added products. The contents of coconut sap have many vital properties due to rich in sources of minerals, amino acids, vitamins, microbial, and antioxidant properties. This study was carried out to determine the physicochemical properties of fresh coconut sap and biological activities of its fractions. The fresh coconut sap was evaluated for physicochemical properties (pH, total soluble solids, colour, and viscosity). The fresh coconut sap was fractionated with three different solvents namely hexane, ethyl acetate and ethanol. Gas chromatography–mass spectrometry (GC-MS) was carried out to determine the volatile organic compounds (VOCs) of the fractions. The fractions were performed for antioxidant activity using 2,2-diphenyl-1-picrylhydrazyl-hydrate (DPPH) method and compared with ascorbic acid as a standard, followed by the total plate count method for microbial analysis. Based on the result, the pH value of fresh coconut sap was 6.3 while the total soluble solid was 10.7 °Brix. Colour was analysed based on the lightness (L^*) which was 50.41 ± 1.94 . The viscosity was low for fresh coconut sap. Seven of VOCs were found in the fractions of coconut sap. The antioxidant activity of fractions were calculated using percentage of radical scavenging activity (%RSA). Among the fractions, hexane had the highest activity ($IC_{50} = 2.40 \mu\text{g/ml}$) while ethyl acetate has the lowest activity ($IC_{50} = 39.35 \mu\text{g/ml}$) while ethanol fraction was ($IC_{50} = 6.59 \mu\text{g/ml}$) that were with standard ($IC_{50} = 5.82 \mu\text{g/ml}$). For microbial analysis, total plate count of hexane fraction had more colonies ($2.8 \times 10^3 - 2.0 \times 10^8$ CFU/ml) followed by ethanol fraction ($2.0 \times 10^3 - 1.0 \times 10^7$) and ethyl acetate fraction had the lowest colonies ($1.0 \times 10^3 - 2.0 \times 10^7$ CFU/ml). In conclusion, the fraction of hexane showed good biological properties compared to other fractions.

Keywords: Coconut sap, physicochemical properties, GCMS, antioxidant, microbial analysis.

Comparison Study of Coconut Sap Vinegar and Nipa Sap Vinegar towards Physicochemical Properties, Biological Activities and Acetic Acid Content

Mohamad Adib Bakarudin.^{1*}, Noor Hafizoh Saidan¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli, Kelantan, Malaysia

First Author: adib.f19a0253@siswa.umk.edu.my

ABSTRACT

A coconut tree produces inflorescence throughout the year, and coconut sap is collected from unopened spadix of the coconut tree. Fresh coconut sap contains a small amount of protein, fat, minerals, and vitamins as well as sugar components. These could possibly interact during heat processing and form some of the volatile components and non-enzymatic browning intermediates as well as Maillard products. Nipa yields abundant sap from the cut stalks of fully developed inflorescences or young inflorescences after the fruit heads have been removed. Hence, this study was conducted to compare the physicochemical properties, biological activities (antioxidant and microbial analysis) and acetic acid content of coconut and nipa sap vinegars. Physicochemical analysis were performed to analyse the total fat, fiber, ash content, total dry matter, total protein, pH, total suspended solid (TSS), titratable acidity and colour. Gas chromatography–mass spectrometry (GC-MS) analysis showed that both coconut (Jeli and Bachok) and nipa sap vinegar had acetic acid of $4.97 \pm 1.35\%$, $4.9 \pm 1.13\%$ and $7.54 \pm 1.08\%$, respectively. Total antioxidant activities were conducted including 2,2-diphenyl-1-picrylhydrazyl (DPPH) scavenging assay, total phenolic content (TPC) and total flavonoid content (TFC). For DPPH scavenging activity, coconut sap vinegar had $30.75 \pm 0.34\%$ and $32.76 \pm 1.34\%$ while for nipa sap vinegar was $40.89 \pm 1.77\%$. TPC showed that coconut sap vinegar has higher phenolic content compared to nipa sap vinegar. TFC also revealed that coconut sap vinegar exhibited higher flavonoid contents compared to nipa sap vinegar. Microbial properties for coconut sap vinegar were 0.3×10^3 CFU/mL and for nipa sap vinegar was 0.04×10^3 CFU/mL. Acetic acid content of coconut and nipa vinegars was showed as $4.97 \pm 1.35\%$ and $7.54 \pm 1.08\%$ for coconut sap vinegar while nipa sap vinegar was $4.90 \pm 1.13\%$. The findings of this work provided fundamental scientific evidence of physicochemical properties, biological activities (antioxidant and microbial) and acetic acid content of coconut and nipa sap vinegars that could be utilized by consumers.

Keywords: coconut and nipa sap vinegars, physicochemical, antioxidant, microbial properties

A study on microbial distribution in wastewater at Jeli, Kelantan

Mohd Azreeq Haqimi Mukrim, Khomaizon Abdul Kadir Pahirul Zaman, Leony Tham Yew Seng

Faculty of Agro Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

First Author: azreeq.f190256@siswa.umk.edu.my

ABSTRACT

Wastewater is water that has been contaminated from home, commercial use and industries that can be diluted with storm water, groundwater and surface water. The composition of wastewater constantly changing and extremely variable. Wastewater effluents are released into a variety of environments such as lakes, streams, ponds, estuaries and oceans. Wastewater also includes storm, as wastewater may contain hazardous materials and requires special treatment or disposal of harmful substances and also contaminated with a lot of species of bacteria. The study was carried out to evaluate the microbial count in wastewater and also to identify the microbial isolated from the wastewater around Jeli, Kelantan. The wastewater samples were taken in five different areas in Lakota, Gemang, Dataran Jeli, the industrial area and resident area. The bacteria were isolated with centrifuge tubes by collecting samples and used onto prepared on nutrient agar. Various types of colonies from isolation plates were streaked on different nutrient agar many times until single colonies were found. To identify the type of bacteria, there different biochemical tests including gram staining, selective media, catalase test and triple sugar ion test were obtained. There were several types of bacteria that had been found including *Salmonella spp.*, *Escherichia spp.*, *Shigella spp.*, *Yersinia spp.*, *Vibrio cholerae*, *Aeromonas hydrophila*, *Legionella pneumophila* and *Mycobacterium spp.* From the study, it was proved that wastewater in Jeli is very higher potential for contamination and may have heavy metals, toxic chemicals, grease, organic compound and inorganic compounds and hazards for humans, animals and the environment.

Keyword: bacteria, microbial count, biochemical test, contamination, microbial isolated

Physicochemical and Proximate Analysis of Biscuit Product Incorporated with *Zingiber zerumbet*

Nor Azimah Nordin^{1*}, Nurul Amira Buslima¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia.

First Author: azimah.f19a0271@siswa.umk.edu.my

ABSTRACT

Culinary herbs are plants that have been used for culinary purposes for centuries. Biscuits incorporated with herbs are the best food product development recommendations for all groups. However, the application of herbs in food products development is very limited. Thus, this study aimed to compare the physicochemical properties and the proximate analysis of biscuits incorporated with *Zingiber zerumbet* at three different concentrations. The biscuit formulations (F0, F1, F2, F3 with 0%, 1%, 3% and 5% *Zingiber zerumbet*) were evaluated for various physicochemical (pH, colour, texture and stability analysis) and the proximate composition (carbohydrate, protein, fat, ash, moisture and fibre content). The stability test was carried out for weeks 0, 1, 2 and 4. The colour test for stability showed F1 lightness reduction compared to F0, F1 and F3 with 45.94 ± 0.217 , 45.84 ± 0.094 , 44.91 ± 0.160 , 44.29 ± 0.158 respectively. The texture was good in storage condition until 4 weeks of stability test. Meanwhile, the proximate analysis in terms of moisture, ash, fat, protein and fiber shows a significant difference with an increased percentage of *Zingiber zerumbet*. However, there was a decrease in carbohydrate value for each formulation. This study provides the potential application of *zingiber zerumbet* as a product combined with herbs that can increase consumer awareness of the use and benefits of herbal plants.

Keywords: *Zingiber zerumbet*, biscuits incorporated with herb, physicochemical properties, proximate analysis.

Formulation and Evaluation of Physicochemical Properties of Lip Scrub Enhanced with Red Dragon Fruit (*Hylocereus polyrhizus*) Extract

Nur Alis Nazihah and Nik Nur Azwanida¹

¹Faculty Of Agro-Based Industry, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli Kelantan, Malaysia.

First Author: alis.f19a0279@siswa.umk.edu.my

ABSTRACT

Natural cosmetics are increasing in demand from both men and women as they are believed to be safe and have the least negative impact to humans, animals and the earth. *H. polyrhizus* which is commonly known as dragon fruit is originally grown in southern Mexico and South and Central America, which later spread to Southeast Asia. The application of this fruit extract onto the skin has been shown to prevent free radicals because dragon fruit contains Vitamin C which can protect skin against dullness and leave the skin looking fresh and rejuvenated. Red dragon fruit extract is also a natural moisturizer as it contains high water content and comes with skin-essential vitamins and antioxidants. Hence, the aim of this study was to formulate and prepare different formulations of lip scrub enriched with red dragon fruit (*H. polyrhizus*) extract, to evaluate the physicochemical properties of lip scrub and to compare the physicochemical properties of lip scrub with and without red dragon fruit (*H. polyrhizus*) extract. The developed lip scrubs with red dragon fruit (*H. polyrhizus*) extract (F0, F1, F2 and F3 with 0%, 10%, 20% and 30% red dragon fruit extract respectively) were evaluated for various physicochemical such as pH value, color analysis, texture, sensory properties and spreadability. The physicochemical properties of lip scrubs with red dragon fruit (*H. polyrhizus*) extracts and the lip scrub without red dragon fruit (*H. polyrhizus*) extract showed significant difference ($p \leq 0.05$) in terms of pH value, color analysis and texture analysis. The results of spreadability test also showed significant difference ($p \leq 0.05$) between lip scrub enhanced with red dragon fruit (*H. polyrhizus*) extract and lip scrub without red dragon fruit (*H. polyrhizus*) extract. As a conclusion, lip scrub with red dragon fruit (*H. polyrhizus*) extract have good physicochemical properties compared to lip scrub without red dragon fruit (*H. polyrhizus*) extract.

Keywords: Lip scrub, *Hylocereus polyrhizus*, red dragon fruit, Vitamin C, physicochemical properties, organoleptic properties.

Effect of Extraction Method of *Mitragyna speciosa* Leaves on Inhibition of Cyp2E1 Enzyme Activity in Rat Liver Microsome

Nursabrina Auni Mohammad^{1*}, Nurul Amira Buslima¹

¹ Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia

First Author: sabrina.f19a0300@siswa.umk.edu.my

ABSTRACT

Mitragyna speciosa has been used for both medical and non-medical purposes. However, preparing a high-quality *Mitragyna speciosa* extract is a challenge in terms of improving the quality of extract production for downstream applications. This study highlights the comparison of the yield of *Mitragyna speciosa* extracts using maceration and ultrasonication method and comparison of inhibition of Cyp2E1 enzyme activity in rat liver microsome by different extracts of *Mitragyna speciosa*. *Mitragyna speciosa* juice and ultrasonication assisted extraction (UAE) extracts produced a percentage of yield of 12.74% and 10.98% respectively. Both type of extracts was incubated with rat liver microsome with the addition of NADPH to initiate the reaction. Working concentrations of juice and UAE extracts ranged from 20 µg/mL to 100 µg/mL respectively. IC₅₀ was determined by monitoring the decrement of enzyme activity with the increment of juice and UAE extracts concentrations. Juice extracts inhibited rat liver microsome with IC₅₀ of 161.6 µg/mL. Finally, *Mitragyna speciosa* juice extract was found to be capable of interfering with Cyp2E1 enzyme activity in rat liver microsomes.

Keywords: *Mitragyna speciosa*, maceration, ultrasonication assisted extraction (UAE), rat liver microsome, Cyp2E1

Quality of Pasta Prepared with Green Spinach (*Spinacia oleracea*) and Dragon Fruit (*Hylocereus polyrhizus*)

Christie Uyang John¹, and Nurhanan binti Abdul Rahman¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli, Kelantan, Malaysia

First Author: christie.f19a0311@siswa.umk.edu.my

ABSTRACT

Pasta is a basic cuisine that is enjoyed on a daily basis in many parts of the world. Pasta frequently served as main meal in western countries because of its carbohydrate-based food. Green spinach and dragon fruit are both high in fibre, which is important for daily diets. A lack of dietary in fibre can result in a variety of health complications. The aims of the study were to determine nutritional value, cooking characteristics and physicochemical properties of pasta enriched with green spinach and dragon fruit. Pasta made with 100% of flour was prepared as a control. The flour and water is substituted with each 30 g and 50 g of spinach and dragon fruit puree. All pasta samples were subjected for cooking characteristic, colour analysis using Chroma Meter and textural profile analysis (TPA). Proximate analysis was conducted according to Association of Official Analytical Chemists (AOAC) methods. The optimum cooking time was observed by boiling pasta for 5, 10, and 15 minutes and analyzing the hardness of each optimum time. The texture characteristics of cooked pasta include hardness, cohesiveness, springiness, and chewiness as compared to the textural profile before cooking. The samples subjected to colour analysis before and after cooking, determining the L* (darkness to lightness), a* (redness to greenness), and b* (blueness to blueness) (blue to yellowness). Significant findings were determined using the data from statistical analysis of paired test samples (T-Test), with gathered value indicating ($P > 0.05$). The crude fat, moisture, and fibre contents used to complete the proximate analysis. Pasta prepared with 50 g dragon fruit has become more well accepted than other types of prepared pasta. The addition of dragon fruit to the formulation for making pasta has a significant impact on consumer acceptance, high trend values in proximate, colour, sensory analyses, and customer satisfaction.

Keywords: Pasta, Green Spinach, Dragon Fruit, Cooking Characteristic

Physicochemical Properties, Proximate Composition, and Cooking Qualities of Imported Basmati Rice available in Malaysia

Anis Farzana Ahmad Jamaidi*, Mohd Shaiful Azman Bin Abdul Rahim¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

First Author: farzana.f19b0016@siswa.umk.edu.my

ABSTRACT

Basmati rice originally from India, is a staple in many Asian nations. Basmati rice is an excellent energy source with numerous health benefits. The research aimed to analyse physicochemical properties, proximate composition, and cooking qualities in different varieties of basmati rice available in Malaysia. The methods of Kjeldahl's, Soxhlet's, amylose iodine colorimetry, burning muffle furnace, cooking rice and oven drying were conducted. Based on the results, the local rice has been compared with three brands of basmati rice. Among three brands of Basmati rice, Indra Valley showed significant higher ($P < 0.0001$) compared to other two brands (Maharaja and Faiza) in terms of elongation ratio, pH value, color, water activity before and after cooking, water absorption ratio, and carbohydrate. Indra Valle revealed the highest carbohydrate content (83.95%), elongation ratio (1.58), moisture content (14.56%), lightness (74.44) and yellowness (24.96), while it showed the lowest redness (0.45) in color, lowest fat content (0.28%) and lowest ash content (0.51). Indra Valley recorded the lowest water activity for both uncooked and cooked rice, which is 0.91 a_w and 1.39 a_w , respectively. There is no significant in ash, fat, and moisture content between Jati Malaysia and all three brands of Basmati rice. However, Jati Malaysia had a higher amylose content compared to Basmati rice while Maharaja had the highest fat content (0.45%). In comparison to Jati Malaysia, Faiza brands had the highest ash content (0.75%) and water absorption ratio (155.5. Meanwhile, Jati Malaysia had the highest for pH value (6.4), minimum cooking time (32mins), protein content (10.97%) and water activity after cooking (1.68 a_w) compared to Basmati rice. In conclusion, Indra Valley brand showed the superior qualities in term of physicochemical properties, proximate composition, and cooking qualities, thus provide a good choice for consumption.

Keywords: Basmati Rice, Physicochemical Properties, Proximate Composition, Cooking Qualities

Proximate analysis and shelf-life assessment of brown rice (*Oryza sativa*) milk

Mohd Shahril Bin Hairal Anam, Norshahida Binti Abu Samah

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First author: shahril.f19b0069@siswa.umk.edu.my

ABSTRACT

Brown rice (*Oryza sativa*) is processed as an alternative milk for consumption because has many benefits for human health. Recommended for consumers who are allergic to other plant-based and vegan which is suitable especially for children and the elderly. The objective of this study is to develop plant-based milk from brown rice that used as alternative milk, determine the nutritional content of the brown rice milk and access the shelf-life of brown rice milk. In this research, brown rice was prepared to be processed into an alternative milk. Brown rice milk manufacturing has two types which is pasteurized, unpasteurized and it is stored at difference temperatures. The nutritional content of brown rice was analyzed using proximate analysis in terms of crude protein, moisture, ash and crude fat. The chemical composition analysis by using the Association of Official Agricultural Chemists (AOAC) method. The test of microbiological analysis shelf-life for brown rice milk was conducted with 2 types of samples with 3-7 days. The sample were left at 2 different temperatures, refrigerator temperature and room temperature. Nutrient agar (NA) was prepared to process in serial dilution, the sample was about 1ml and spread technique was used to spread it on the agar surface. The results showed that the moisture content is 95.18 0.350, the result of ash content is 0.422 0.213, the result of crude fat is 0.507 0.180 and the result of crude protein is 0.117 0.050. The result showed that a sample of brown rice milk had been pasteurised with no microbial growth. Meanwhile, sample of brown rice milk unpasteurised showed there are microbial growth. In conclusion, brown rice milk is a plant-based milk is a good alternative because it is allergen free, low in sugar and has better nutritional value than regular milk.

Keywords: *Oryza sativa*, Nutrient agar (NA), Association of Official Agricultural Chemists (AOAC), Pasteurised, Unpasteurised.

Characterization of Microorganisms Isolated from Abandoned Pond in UMK Jeli Campus

Muhammad Fathiyuddin Bin Mat Napi* and Khomaizon Binti Abdul Rahman Pahirul Zaman

Department of Agriculture Sciences, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

***First Author:** fathiy.f19b0086@siswa.umk.edu.my

ABSTRACT

There are several abandoned ponds located around the UMK JELI campus and some activities such as fishing are still being carried out by the students. There is no microbial identification has ever been carried out, thus the type of microbes and the microbial count for the abandoned pond are still unknown. This study is important for public health concerns to avoid spreading diseases such as diarrhea, normally caused by *Escherichia coli*, *Staphylococcus aureus*, and *Salmonella*. In this study, the microbes that inhabit in the abandoned pond water were evaluated and identified. The research has been made on three abandoned ponds in the UMK JELI campus and the result was recorded. The main objective of this research is to identify the type of microbes and its characteristic as well as to determine the microbial count. The test that was carried out for the pond water samples such as growth media that is selective media, biochemical tests such as gram staining, and catalase test. In general, it is generally considered safe for drinking water to have an APC of less than 100 CFU/mL (colony-forming units per milliliter). However, higher levels of APC may be acceptable for other uses, such as irrigation or recreational water. It is important to note that the presence of bacteria in water does not necessarily pose a health risk. Many types of bacteria are actually beneficial and play important roles in the ecosystem. As a result, the bacteria that had been identified might be *Salmonella* and *Shigella* as they grow colorless on McConkey agar. However, the levels of aerobic plate count for the pond water samples are still at an acceptable level and considered safe for other uses, such as irrigation or recreational water activities.

Keywords: Microbial count, Selective media, Biochemical test, Microbial identification

Physicochemical Properties, Antioxidant Activity and Sensory Evaluation of Dried Crackers Derived from Underutilized Banana Peels

Nur Hannany Muhammad Halili¹ and Noor Hafizoh Saidan¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli, Kelantan, Malaysia

First Author: hannany.f19b0141@siswa.umk.edu.my

ABSTRACT

Dried crackers are widely consumed snack foods and there is an increasing trend in adding functional ingredients to their composition. However, based on the latest fruit crop statistics 2020, the estimate of yield production of bananas is 313,811 tons which is the top three in the list of fruit crop statistics in the Peninsula Malaysia. In previous research, many alternative products are produced from banana waste including worms compost, fodder, banana flour and rope from banana fiber. In present work, three underutilized banana peels namely *Musa sapientum* cv. *Tanduk* (Horn plantain), *Musa paradisiaca* cv. *Abu* (Dwarf orinoco) and *Musa sapientum* cv. *Nangka* (Jackfruit Banana) were used to developed dried crackers. Physicochemical properties of each underutilized banana peels were performed including color, texture, water content activity (a_w), linear expansion, oil absorption analysis, moisture, protein, fat, fiber and ash contents. Antioxidant activity of selected banana peels extract (Jackfruit Banana) was performed using DPPH (2,2-diphenyl-1-picrylhydrazyl) method and the result showed that IC_{50} was 198 $\mu\text{g/ml}$ compared to standard ($IC_{50} = 5.82 \mu\text{g/ml}$). The antimicrobial activity was carried out on selected banana peel extracts (Jackfruit Banana) using disc diffusion method to measure the zone of inhibition against food borne pathogenic microbes including *Bacillus cereus*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, positive control antibiotic (*Kanamycin*) and negative control (water). Based on the results obtained there were no significant difference between ethanolic extract banana peels concentration of 10 mg/mL, 25 mg/mL and 50 mg/mL. The sensory evaluation was also performed to evaluate the appearance, colour, texture, aroma, and the taste of the crackers. In conclusion., based on the result above, it is showed that the underutilized banana peels can be develop as a high value product in food industry.

Keywords: *Musa sapientum*, *Musa paradisiaca*, *Musa sapientum*, physicochemical analysis, antioxidant, antimicrobial properties

Physicochemical Properties and Proximate Analysis of Rice Cracker Incorporated with *Zingiber zerumbet*

Wan Nur Syafiqah Binti Wan Ya'acob, Nurul Amira Buslima

Universiti Malaysia Kelantan, Campus Jeli, 17600 Jeli, Kelantan

First Author: syafiqah.f19b0200@siswa.umk.edu.my

ABSTRACT

In Malaysia, the use of herbal plants, particularly *Zingiber zerumbet*, in food, particularly snacks, is still uncommon and hardly commercialized. In this study, Physicochemical properties test (pH value, colour, and texture analysis) and proximate composition (crude protein content, crude fat content, crude fiber content, ash content, moisture content) were carried out at different concentrations (1%, 3%, 5%) of *Z. zerumbet*. Overall texture analysis that was conducted by using texture analyzer can be concluded by saying that hardness and fracturability of cracker showed increasing progression with increasing concentration of *Z. zerumbet*. Chromatic parameters (L^* , a^* , b^*) of colour properties that was conducted using chromameter showed decreasing progression with increasing percentage of *Z. zerumbet*. The finding of proximate analysis research indicated that there were no significant ($P>0.05$) differences on protein, ash, moisture and fat except ash content for rice cracker incorporated with *Z. zerumbet*. Optimistically, this study could contribute to the future development of cracker food industry in Malaysia.

Keywords: Proximate analysis, physicochemical analysis, rice cracker Incorporated with herb, *Zingiber zerumbet*.

Formulation And Quality Assessments of Topical Cream Incorporated with Sacha Inchi Oil

Muhammad Azril Bin Mohd Azmi, Ikarastika Rahayu Bt Abdul Wahab

Universiti Malaysia Kelantan, Campus Jeli, 17600 Jeli, Kelantan

First Author: azril.f19b0260@siswa.umk.edu.my

ABSTRACT

The increase use of botanical oils, including polyunsaturated fatty acids (PUFA), monounsaturated fatty acids (MUFA), as well as saturated fats, as a cosmetic ingredient has become a major concern recently when issues such as ingredients will damage the skin and act harmful in relation to skin and hair care has arisen. Sacha Inchi oil, derived from Sacha Inchi seeds, is prevalent in cosmetics industries which are high in Omega-3, Omega-6, and Omega-9; it can help keep the outermost layer of our skin firm and healthy, preventing moisture from coming out and smoothing the skin surface. Hence, this research mainly emphasised on the formulation of cream incorporated with Sacha Inchi Oil to be used topically. An optimized cream was created by a Design Expert version 13 software and was further assessed for its quality. Parameters used in the assessment optimized cream included organoleptic and physicochemical properties, stability, and antimicrobial assay using agar well diffusion method. The stability study conducted for 21 days showed that topical cream was considered unstable in texture, colour, viscosity, and pH under cold storage (5°C), room temperature (25°C), and high temperature (40°C) with no significant results ($p > 0.05$). However, topical cream does not have any proof of the separation phase and odour after it was observed until 21 days at 5°C and 25°C. Next, antimicrobial activity was tested using Ecoli, and s aureus showed no significance ($p > 0.05$) in all temperatures that are 5°C, 25°C, and 40°C. However, positive control shows a different result than the topical cream whereby it has a significant value ($p < 0.05$) in all temperatures. Optimistically, this study could contribute to the future development of creams in the cosmetic industry in Malaysia.

Keywords: Sacha Inchi Oil, Topical Cream, Optimized Cream, Quality Assessments

Proximates analysis, Antioxidant and Antimicrobial Activities of *Pleurotus ostreatus* Grown with Different Substrates

Muhammad Haikal Bin Ishak*, Nik Nur Azwanida Binti Zakaria.

Faculty of Agro Based Industry

University Malaysia Kelantan, 17600 jeli, Kelantan, malaysia

First Author: haikal.f19b0261@siswa.umk.edu.my

ABSTRACT

Pleurotus ostreatus (*P. ostreatus*) is the most common mushroom cultivated in Malaysia. Usually, the substrates used for *P. ostreatus* cultivation are from wheat straw, rice straw, rice bran, pulp, corncobs, cocoa shell waste, cotton waste, spent grain, sawdust, maize husks, and cassava. Although there has been a lot of studies performed on the antimicrobial activities of this species, limited information is present on the comparison of antimicrobial activities of *P. ostreatus* cultivated with different substrates. The aim of this research is to compare the antimicrobial activities of *Pleurotus ostreatus* extracts cultivated with saw dust and pineapple waste. *P. ostreatus* cultivated with two different substrates (saw dust and pineapple waste) were investigated for nutrient content using proximate analysis including crude protein (CP), crude fat (CP), crude fibre (FB), moisture and ash content. The finding of research indicated that there were no significant ($P>0.05$) differences on protein, ash, moisture and fat except ash content for the mushroom cultivated with sawdust and pineapple waste. Ash content from pineapple waste substrate was significantly higher than saw dust substrate. In this research, four types of bacteria, *E-coli*, *Bacillus subtilis*, *Streptococcus aureus* and *Pseudomonas aeruginosa*, in which *Pleurotus ostreatus* extracts from both substrates showed significant activities against bacteria from *Bacillus subtilis* ($P<0.05$). Meanwhile, no significant difference were observed for other bacteria *E-coli*, *Streptococcus aureus* and *Pseudomonas aeruginosa*. Based on this study, it can be concluded that *Pleurotus ostreatus* cultivated with pineapple substrate could result in bigger mushrooms based on significantly higher ash content. Additionally, mushrooms cultivated using both substrates possess antimicrobial and antioxidant activities.

Keywords: *Pleurotus ostreatus*, proximate analysis, antioxidant, antimicrobial

Computer-Aided Approach on the Development of Moisturizer from *Murraya koenigii*

Nur Asyikhen Bt Mohd Nor^{1*}, Siti Nuurul Huda Mohammad Azmin¹

¹Faculty Of Agro-Based Industry, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli Kelantan, Malaysia.

Email: asyikhen.f19b02821@siswa.umk.edu.my

ABSTRACT

Moisturizer is one of the most crucial essential skincare products. Both genders can obtain the benefits of daily use of moisturizer. The moisturizer has a variety of functions for the skin. Skincare products are demanded because they realize the importance of the product's routine application. Chemical and synthetic ingredients used in skin care products can cause undesirable side effects, especially for people with sensitive skin and potential allergic reactions. The development of natural skin care products is increasing daily; natural products are a new trend in which the ingredients have been used in general skincare products for millennia across the globe. Therefore, this study aims to develop a systematic, generic, computer-aided approach for designing moisturizer gel added with *M.koenigii*, curry leaves. An optimization method was conducted to find the best moisturizer formulation. Thirteen moisturizers with different concentrations of curry leave weight (0.01g to 0.05g) and ethanol volume (0.5ml to 1ml) were formulated and tested for their physicochemical properties (pH, spreadability, water activity, and texture analysis). Moisturizer with the ratio of 0.01g:0.5ml, curry leaves to ethanol was the highest in adhesiveness force, while the ratio of 0.05g:0.5ml, curry leaves to ethanol was the highest in adhesiveness. In addition, moisturizer, with a ratio of 0.03g:0.75ml, curry leaves to ethanol, was the highest in cohesiveness and hardness. From the observations, moisturizers showed changes at different temperatures because of high-water activity and acidic pH. The comparison of the formulated moisturizer with the commercial product showed an identical and acceptable physicochemical value. Besides, the formulated moisturizers were predicted as stable formulations because they showed no separation after a month.

Keywords: Moisturizer, *M. koenigii*, physicochemical properties, product formulation, texture analysis.

Textural and Chemical Properties of Noodle Incorporated with Oat (*Avena sativa*), Millet (*Panicum miliaceum*) and Sweet Corn (*Zea mays convar. saccharata var. rugosa*)

Halimatun Aisyah Mohamad¹ and Nurhanan Abdul Rahman¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli, Kelantan, Malaysia

First Author: aisyah.f19b0318@siswa.umk.edu.my

ABSTRACT

Wheat noodles are popular with consumers because of their ease of preparation, distinct taste, aroma, and inexpensive. Recently, consumers have increased expectations for nutritional quality, texture, taste, and flavour of noodle products, and are becoming more health-conscious. Oats, millets, and sweet corn are among the few grains with higher fibre content. The aim of the research was to determine whether the incorporation of oats, millets and sweet corns might be employed in production of noodles. The sensory attributes, cooking qualities, physical and proximate composition of grain-based noodles were analysed. The addition of 50 g of oats, millets, and sweet corns in the formulation of 450 g wheat flour enhanced the production of noodles. The cooking qualities of the integrated noodles were tested by assessing the optimum cooking time, cooking yield, and cooking loss. The physical properties of the developed noodles containing oats, millets, and sweet corns were assessed using textural profile analysis (TPA) and colour analysis. In compared to the textural profile before cooking, the textural attributes of cooked noodles produce hardness, cohesiveness, springiness, and chewiness. Color analysis was performed on the sample before and after cooking using a Chroma metre, comprising L* (darkness to lightness), a* (redness to greenness), and b* (blueness to yellowness). The data obtained from the statistical analysis of paired test samples (T-Test) revealed all significant results, with the gathered value indicating ($P > 0.05$). The proximate analysis was performed using crude fat, moisture, and fibre content. The noodles prepared with the inclusion of sweet corns have become more broadly acknowledged than the other types of developed noodles. Customer acceptability, high trend values in proximate, colour, and sensory analysis, have all been significantly impacted by the inclusion of powdered sweet corns to the formulation in producing noodles.

Keywords: Noodles, oats, millets, sweet corns, cooking characteristics

Comparison of Physicochemical Properties, Proximate Composition, and Cooking Qualities of Selected Basmati Rice, Parboiled Rice and Brown Rice Available in Malaysia

Deveniya Sandran^{1*}, Mohd Shaiful Azman Bin Abdul Rahim¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

First Author: deveniya.j19a0112@siswa.umk.edu.my

ABSTRACT

In many countries, rice is a staple grain that gives billions of people access to a cheap and nourishing source of energy. Different types of rice offer varying nutritional values and benefits. In the present study, the selected basmati, parboiled and brown rice were evaluated for physicochemical properties, proximate compositions, and cooking qualities. The AOAC method was used to calculate proximate composition. Overall, basmati rice has the highest moisture (14.77%) and the lowest ash (0.3%) and lowest carbohydrate content (71.06%) compared to control and other varieties. Next, parboiled rice has the highest ash (1.35%), fat (0.63%), and carbohydrate content (75.49%). In addition, brown rice has the highest protein content which is 15.9% compared to control (Jati Malaysia) which is 10.97%. Besides, for physicochemical properties there was no significance difference ($p>0.05$) in amylose content, pH value and elongation ratio in all varieties of rice. For water activity, Jati Malaysia rice showed highest value for both uncooked (0.95AW) and cooked (1.65AW), while uncooked parboiled rice showed (0.91%) and brown rice has the lowest value for cooked rice (1.26%). Moving onto colour, basmati rice has the lightest (L^*) value which is 74.18%, while brown rice has the highest value for both redness (a^*) and yellowness (b^*) which is 3.33% and 25.34% respectively. Next, Jati Malaysia has the highest cooking time (32 minutes) and basmati rice has the lowest cooking time (16 minutes). The water uptake ratio of Jati Malaysia and basmati rice did not show significant difference, whereas the water uptake ratio Jati Malaysia and parboiled rice as well as Jati Malaysia and brown rice differ significantly. In conclusion, this study can serve as a reference or guidance for customers choice based on their preferences and health problems.

Keywords: *Oryza sativa*, physicochemical properties, proximate composition, cooking qualities

Growth Performance of Freshwater Blue Claw Crayfish (*Cherax quadricarinatus*) Fed with Various Doses of Silver Nanoparticles (AgNPs) Lactose

Ahmad Idris bin Ikhran* and Lee Seong Wei

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

***First Author:** idris.f19a0006@siswa.umk.edu.my

ABSTRACT

The farming of freshwater Blue Claw Crayfish species, *Cherax quadricarinatus* has become one of the most important sectors in Malaysia. However, the price to produce the feed was very expensive. Hence, this project was aim to determine the effectiveness of enhanced feed to the growth of blue claw crayfish. The feed is enhanced by using different doses of Lactose silver nanoparticles (AgNPs), which were 0% control, 0.25% L1, 0.50% L2 and 0.75% L3. The uniform weight of *C. quadricarinatus* used in the present study are from 0.16g to 9.13g. The samples were reared for 8 weeks and their weight was measured once every week by using analytical balance in Aquaculture laboratory at UMK. The study shown that the right amount of silver nanoparticles (AgNPs) can promote growth rate of Blue Claw Crayfish, however too many or less amount can affect their survivability. Growth rate of crayfish from L2 group had achieved highest growth rate compared to Control, L1 and L3 group. The highest survival rate was from L2 and Control group. Finding from this study provide additional knowledge on the effect of Lactose Silver Nanoparticles (AgNPs) to the growth rate of freshwater crayfish.

Keywords: Blue Claw Crayfish, Lactose, silver nanoparticle, growth rate.

Effect of Pellet with Inclusion of *Asystasia gangetica* Leaf on Intake, Digestibility and Growth Performance of Muscovy Duck

Ahmad Syahmi A.R.Y.* and Mohammad Mijanur Rahman

Department of Agricultural Sciences, Faculty of Agro-Based Industry ,Universiti Malaysia Kelantan, Jeli Campus ,17600 Jeli, Kelantan, Malaysia.

***First Author:** syahmi.f19a0009@siswa.umk.edu.my

ABSTRACT

Feed cost is one of the major constraints for poultry production. One alternative way is to reduce the cost using local feed ingredients. *Asystasia gangetica* is a weed, which contains high nutritional value especially crude protein (22%). Compared to other poultry, duck can utilise more fibrous materials. The aim of this study was to determine the effect of pellet with inclusion of *A. gangetica* leaf on intake, digestibility and growth performance of Muscovy duck. Pellet was prepared from *A. gangetica* and other feed ingredients based on duck's nutrient requirement. A total of 30 ducks with approximate age of 30 days and average initial body weight (BW) of 900 g were used. The ducks were divided into two dietary groups with 3 replications (5 ducks/replication) for each group: control (without *A. gangetica*) and treatment (with *A. gangetica*). Both groups were fed their respective diets *ad libitum* for 28 days. Parameters were observed on the nutritional value of pellet, intake, digestibility and growth performance of ducks. Results showed that the ducks fed treatment diet showed higher ($P < 0.05$) intakes of dry matter (DM), crude protein (CP), crude fibre (CF), ether extract (EE), ash and organic matter (OM) than the ducks fed control diet. Similarly, ducks fed treatment diet showed higher ($p < 0.05$) digestibility of DM, CF, EE, ash and OM except CP ($p > 0.05$). However, no effects ($p > 0.05$) were observed in the growth performance and feed conversion ratio (FCR) between the control and treatment groups. Daily body weight gain and FCR for treatment group were slightly higher (46.8 g vs. 2.93) than the control group (46.4 g vs. 2.42), respectively. It is concluded that *A. gangetica* can replace partially the imported feed ingredients in duck diet, because no change was observed in growth performance and FCR; inclusion of *A. gangetica* enhanced the intake and digestibility.

Keywords: *Asystasia gangetica*, feed intake, body weight, digestibility, growth performance

The Effect of Sexual Resting on Rabbit Bucks Towards its Physical Characteristics and Quality of Semen

Anis Nazira Mohamed Azhaza*, Mohammad Mijanur Rahman and Raja Ili Airina Raja Khalif

Department of Agricultural Sciences, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

***First Author:** nazira.f19a0017@siswa.umk.edu.my

ABSTRACT

Nowadays, farmers are relying on others' experiences to frequently mate the rabbit bucks without scientific assurance and explanation. Increasing ejaculation frequency can cause sexual exhaustion towards the buck. Thus, this study aimed to determine the different periods of sexual resting in rabbit bucks toward the physical characteristics of the semen and the quality of semen. In this study, a total of 9 bucks were divided equally into 3 groups for semen collection: Control group (6 days of sexual resting), Group A (3 days of sexual resting) and Group B (no sexual resting, every day). The semen collection was done 3 times with 3 replications by using an artificial vagina and stored as in the state of raw semen and in an extender (tris-citric-fructose-yolk). The semen parameters were semen pH and semen volume as the physical characteristics, and concentration, motility, viability, and abnormalities of the sperm as the qualities of semen. The results showed that sperm concentration ($\times 10^6/\text{ml}$) for Control, Group A and Group B were 87.56, 149.23 and 58.54, respectively, and it varied significantly ($P < 0.05$) among the treatments. Furthermore, the sperm motility as in static (%) for Control, Group A and Group B were 39.44, 32.11, and 59.22, respectively, and it varied significantly ($P < 0.05$) among the treatments. The sperm abnormalities (%) for Control (39.89) was lower than Group A (48.56), while Group B (48.0) showed equivalent results with Control and Group A. It is concluded that proper sexual mating schedule for the rabbit is important as it can impact the semen quality and ensure the effectiveness of breeding.

Keywords: rabbit, semen collection, sexual resting, physical characteristic of semen, semen quality

Effects of Different Energy and Protein Level on Village Chicken's Intestinal Morphology and Gut Microbiota

Bavani Visha Doraisamy^{1*}, Nor Dini Rusli¹, Muhammad Hakim Mohd Ali Hanafiah²

¹Faculty of Agro Based Industry, Jeli Campus, University Malaysia Kelantan, 17600 Jeli, Kelantan.

²Faculty of Agriculture and Forestry Science, Department of Animal Science and Fisheries, University Putra Malaysia Bintulu Campus Sarawak, Nyabau Road, 97008 Bintulu, Sarawak.

***First Author:** bavani.f19a0021@siswa.umk.edu.my

ABSTRACT

Farmers choose commercial-type chickens over village chickens due to their low performance. Their growth is slow also their requirement is according to their weight, age, and genetics, which is their breed. They are considered to be low - performance breeds. Village chickens are usually easy to handle as they can quickly adapt to a new environment. As years passed, village chicken became the leading choice for many people. Because this generation is health freaks and to take care of their body, they prefer village chicken since it is organic and not given any kind of antibiotic growth promoter. Even though village chickens are getting recognition, experiments and thesis work on village chickens are still small-scale compared to commercial chickens. The presence of microbes in the small intestine was identified in this experiment of feeding different energy and protein levels to the Akar Putra breed which is a village chicken. The presence of microbes was identified by spreading methods on selective media, following the calculation of the total number of colonies (CFU) that grew on the agar. Based on the result, all treatment showed a balanced population. Nevertheless, the better treatment was Normal Energy Normal Protein (NN) and Low Energy Normal Protein (LN). The lactobacillus population in cecum segment showed no significant ($p > 0.05$) and Enterobacteriaceae's population showed significant ($p < 0.05$). As for the ileum segment both bacteria showed no significant ($p > 0.05$). Following, intestinal morphology, the height and depth measurement of normal energy low protein treatment showed an effective result. This treatment's jejunum segment showed ($p < 0.05$) which proved that it is significant. Also, the ileum segment showed slightly significant ($p = 0.084$). Duodenum segment resulted as ($p > 0.05$). The following highest measurement was for Low Energy, Protein (LL) where there is no significant different ($p > 0.05$). As a result of feeding different level of energy and protein, the village chicken's gut microbes and histomeasurements shows no greater differences. There were only slight differences between the treatments given to the Akar Putra village chicken.

Keywords: Village chicken, Microbes, Intestinal Morphology, CFU, Height & Depth

Effect of Storage Time on Chemical Analysis of Total Mixed Ration Pellet for Post-Weaning Goats

Cheah Wen Ni* and Nor Dini Rusli

Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

***First Author:** wenni.f19a0025@siswa.umk.edu.my

ABSTRACT

The higher moisture content is the main issue in the conventional total mixed ration (TMR). The mould and yeast growth at the pellet will be facilitated by the high moisture content of TMR. It can also result in feeding waste because many nutrients are broken down into unwanted substances during the overheating phase. To overcome these problems, the proximate analysis and shelf life of TMR were investigated in the current study. Therefore, the objectives of this study are to evaluate the chemical composition of raw materials for formulating TMR pellet formulation for post-weaning goats as well as to investigate the shelf life of TMR pellets from week 1 until week 6. The chemical composition of the pellet in a different time-points from week 1 to 6 were determined using proximate analysis. The data was analysed using One-way analysis of variance (ANOVA). The independent T-test showed that there was no significant difference in all proximate analyses ($p>0.05$) between TMR mash and TMR pellet, except for crude protein (CP) and crude fibre (CF) analysis. The heat, moisture and mechanical pressure applied during the conditioning and pelleting process have the potential to cause chemical and physical changes that could have either positive or negative impacts. Since the pelleting process is not required in TMR mash, this may be the reason for the higher CP content and CF content in TMR mash than in TMR pellet. The EE and Ash analysis had no significant difference ($p>0.05$) in the chemical composition of TMR pellet from week 1 to week 6. However, DM, CP and CF contents were significantly different ($p<0.05$) in the TMR pellet from week 1 to week 6. In conclusion, it is recommended to emphasise the error that occurs, such as technical problem.

Keywords: TMR pellet, feed formulating, shelf life, chemical composition

Assessment of Fish Consumption Pattern in Residents of Keningau

Darheman Bin Darial* and Lee Seong Wei

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan.

***First Author:** darheman.f19a0028@siswa.umk.edu.my

ABSTRACT

This research aimed to study the relationship between the factors of fish product selection and the types of fish products consumed by residents of Keningau, Malaysia. A survey was conducted with 70 respondents and the data was analysed using descriptive statistics, normality tests, and Spearman's rank correlation analysis. The results showed that there was a positive correlation between the reasons for buying fish products and the types of fish products consumed, indicating that the reasons for buying fish products do influence the types of fish products consumed by residents of Keningau. These findings have practical implications for fish product retailers and marketers in Keningau, as they can consider these factors when promoting and selling different types of fish product.

Keywords: Fish consumption, Keningau

Effects of Different Inclusion Rates of Black Soldier Fly Larvae (BSFL) on Physicochemical Properties of *Macrobrachium rosenbergii* Juvenile

Hazwani Binti Ismail* and Hasnita Binti Che Harun

Department of Agriculture, Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600, Kelantan, Malaysia

***First Author:** hazwani.f19a0043@siswa.umk.edu.my

ABSTRACT

Nowadays, demand for *M. rosenbergii* juvenile has increased by 20 to 25 % in both domestic and international markets. Giant freshwater prawn, or *Macrobrachium rosenbergii*, is an economically important crustacean species. Black soldier fly larvae (BSFL), *Hermetia illucens* larvae has gain popularity in aquaculture industry. Due to cost-effective and high nutrient suitable as animal feed ingredient to substitute protein resources. Therefore, this research aims to investigate the physicochemical properties of *M. rosenbergii* juvenile using BSFL as a feed. A total of five treatment group (0 %, 10 %, 20 %, 30 %, and 40 % BSFL) were used to feed *M. rosenbergii* juvenile. Physical analysis which were colouration, pH and Texture Profile Analysis (TPA) and proximate analysis were conducted to determine the physicochemical of *M. rosenbergii* meat fed with different percentage of BSFL. The present study showed that different percentage of BSFL had effect on the physicochemical properties of the meat of *M. rosenbergii*. Based on these results on physical properties, all the treatments showed no significant differences ($P > 0.05$) on colour, pH, and texture analysis. Chemical composition showed that the highest crude protein is in Treatment II (83.74 ± 0.39), crude fiber in Treatment IV (13.80 ± 0.63), moisture in Treatment I (12.24 ± 0.33), crude fat in Treatment III (18.65 ± 2.41) and ash in Treatment II (8.00 ± 1.00). The results for proximate analysis were significant for crude protein, crude fat, and ash, but not for crude fibre and moisture. The present study suggests that BSFL has potential to be applied as a partial replacement for current imported protein sources.

Keywords: *M. rosenbergii* juvenile, Black Soldier Fly Larvae (BSFL), Physicochemical Properties, Proximate Analysis, Physical Analysis

The Effect of Clove Oil Silver Nanoparticle (AgNPs) on The Growth performance of Fresh Water Blue Claw Crayfish, *Cherax quadricarinatus*

Jacquinna Monalysa Binti Edward Millos*, Dr Lee Seong Wei

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan.

***First Author:** jacquinna.f19a0049@siswa.umk.edu.my

ABSTRACT

The farming of freshwater blue claw crayfish, *Cherax quadricarinatus* with high stocking substance leads to slow freshwater blue claw crayfish growth performance. There was an alternative procedure to improve the growth performance freshwater blue claw crayfish by using Clove Oil Silver Nanoparticle (Ag-NPs). This study was carried out to evaluate the efficiency of clove oil silver nanoparticles throughout commercialized feed to improve the growth performance of freshwater blue claw crayfish. *C. quadricarinatus* were trained with commercial feed that was complemented with clove oil. This research involved of four treatments that known as treatment (A) 0.25%; (B) 0.50%; (C) 0.70% and control (without prebiotic). The average weight of the initial crayfish was 0.25g. The crayfish was reared for 2 months and the weight was measured weekly using Analytical Balance in the aquaculture laboratory at Universiti Malaysia Kelantan. The result of this study specify that clove oil does not have the ability to promote the growth performance of blue claw crayfish compared to the normal feed because commonly, the clove oil was used to euthanase aquatic animal. Treatment Control group shows the higher growth rate compared to treatment A, B and C groups. As shown in the result, clove oil silver nanoparticle was not compatible with crayfish, and the additive dose is not good for the blue claw crayfish's health that cause death.

Key word: Freshwater blue claw crayfish, *Cherax quadricarinatus*, Clove oil, Silver nanoparticle (Ag-NPs), growth performance.

**Proximate Analysis and Physical Properties of Newly Formulated
Macrobrachium rosenbergii Diet with Different Inclusion Rates of Potassium
Bicarbonate-Treated Rubber Seed**

Mohammad Fahman Aliman Bin Mohd Fadhli, and Hazreen Nita Mohd Khalid

Department of Agriculture Sciences, Faculty of Agro-Based Industry, University Malaysia Kelantan, 17600
Jeli, Kelantan

First Author: fahman.f19a0066@siswa.umk.edu.my

ABSTRACT

In this study, alternative prawn diets were formulated using different inclusion rates of potassium bicarbonate-treated rubber seed (PBRS) to improve feed formulation that could potentially, enhance the prawn growth performance and health. Due to current scarcity, high prices, and erratic availability of fish meal, seeking for alternative protein sources is an option to overcome these problems. Rubber seed is one of the agriculture by-products that is locally available, and has been used as an alternative ingredient in prawn diets to reduce feed production cost. This objectives of study were (1) to formulate rubber seed meal (RSM) using different inclusion rates (10%, 20%, 30% and 40%) of PBRS as partial replacement to fish meal in the prawn diets and, (2) to evaluate the proximate compositions as well as sensory acceptability of newly formulated RSM through proximate and physical properties analysis. In this study, RSM without inclusion of PBRS was used as control and each of the analyses was conducted in triplicates. The proximate analysis evaluated nutrient content in the newly formulated RSM based on six components such as moisture, ash, crude protein, crude fat, crude fibre, and nitrogen-free extract (NFE). The proximate analysis showed that the inclusion of potassium bicarbonate-treated rubber seed meal in the formulated diets significantly affected the levels of protein, fat, and ash ($p < 0.05$). The physical properties of the formulated diet were also affected by the inclusion of potassium bicarbonate-treated rubber seed meal, with the bulk density decreasing as the inclusion rate increased ($p < 0.05$). Overall, RSM with 20% inclusion of PBRS was found to be most suitable RSM that satisfies the nutritional needs of juvenile. Perhaps, with the optimal nutrient content and suitable physical properties of potassium treated-RSM, this prawn diet shall be used for juvenile as cost effective alternative feed.

Keywords: *prawn diet, rubber seed meal (RSM), nutrient composition, sensory acceptability, potassium bicarbonate-treated rubber seed*

Effect of Different Inclusion Rates of Black Soldier Fly Larvae (BSFL) on Haepatopancreas, Intestine and Blood Haematology of *Macrobrachium rosenbergii* Juvenile

Muhamad Irfan bin Faudzi* and Hasnita binti Che Harun

Department of Agriculture Sciences, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

***First Author:** irfan.f19a0077@siswa.umk.edu.my

ABSTRACT

The continuous expansion of aquaculture industry has increased the demand for aquaculture feed. *Macrobrachium rosenbergii* is one of the most commercially important crustacean species that significantly contribute to the economy of many countries and becoming a focus in aquaculture industry in Malaysia. However, imported feed resources for feed industry has limits the growing of aquaculture industry especially in Malaysia. The alternative is to find a partial or replacement of imported feed resources especially locally available protein resources. Recent studies have showed the potential use of Black Soldier Fly Larvae (BSFL) to partially replaced protein source in aquaculture feed. BSFL has a high feed conversion rate, high nutritional value, and a short life cycle that can be optimized for prawn feed. This research aims to determine the optimum inclusion rate of BSFL in feed for the production of fast grow and healthy prawns and to investigate the effects of different inclusion rates (0%, 10%, 20%, 30% and 40% BSFL) on hepatopancreas, intestine and blood haematology of *M. rosenbergii* juvenile. Outcomes from this study showed that Treatment II showed the highest white blood count, phosphorus and total protein where all the others blood parameters showed no significance different from all treatments. Hepatopancreas and intestine from Treatment III, IV and V exhibit morphological changes compared to Treatment I. These findings suggest that BSFL has potential to partially replaced protein in diet for *M. rosenbergii* juvenile.

Keywords: *Macrobrachium rosenbergii*, Black Soldier Fly Larvae (BSFL), Hepatopancreas, Haematology, juvenile

The Effect of Silver Nanoparticle (Ag-NP) Vinegar on The Growth Performance of Freshwater Blue Claw Crayfish, *Cherax Quadricarinatus*

Muhamad Izzuddin Bin Naser*, Lee Seong Wei

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan.

***First Author:** izzuddin.f19a0078@siswa.umk.edu.my

ABSTRACT

The farming of freshwater blue claw crayfish, *Cherax quadricarinatus* is increasing in Malaysia and has the highest demand in the market. However, the increase in crayfish feed prices and the dependence on crayfish products from foreign countries have caused production costs to increase and caused an increase in the price of aqua products in the market. Therefore, this study was conducted to determine the effectiveness of silver nanoparticles (Ag-NPs) vinegar on the growth performance of freshwater blue claw crayfish. This study was conducted with 4 types of treatment with different doses (V1) 0.25%, (V2) 0.50%, (V3) 0.75%, and a control sample (C) for blue claw crayfish was prepared. The uniform weight of *C. quadricarinatus* used in this study is from 0.015g to 4.6g. Blue claw crayfish, *C. quadricarinatus* were rearing for 2 months and fed according to the prescribed treatment sample. Every week the weight of the crayfish was measured using analytical balance in Aquaculture Laboratory at UMK. At the end of this study, treatment V2 had the highest growth rate which is 0.0206 ± 0.0380 in mean and standard deviation compared to Control, V1 and V3 treatment. The highest survival rate was from the Control group with 100% survival rate. The right amount of silver nanoparticles (Ag-NPs) vinegar show the effectiveness in crayfish growth even though not in a big growth value, but it can also affect the survivability of crayfish. In the conclusion, study was give many new knowledge about the effect of silver nanoparticle (Ag-NP) vinegar on the growth performance of freshwater Blue Claw Crayfish, *Cherax quadricarinatus* either in a good effect or bad effect.

Keywords: Blue Claw crayfish, Vinegar, Silver Nanoparticles, Growth Performance.

Effect of Chicken Feather Meal on Texture Quality and Colour Evaluation of African Catfish (*Clarias gariepinus*)

Muhamad Zainolhasan Rosli*, Zulhisyam Abdul Kari and Suniza Anis Mohamad Sukri

Department of Agricultural Sciences, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

***First Author:** zainolhasan.f19a0081@siswa.umk.edu.my

ABSTRACT

Chicken feather is a waste product in the poultry industry that can be reduced by using it as animal feed in the future while also producing a good texture for producers and consumers. This study was carried out to evaluate the effect of chicken feather meal on texture quality and colour evaluation of African catfish (*Clarias gariepinus*) fingerlings. Texture profile analysis (TPA) were evaluated for hardness, cohesiveness, chewiness, springiness and gumminess. While the colour evaluation was determined for values for L^* , a^* , and b^* . African Catfish (*Clarias gariepinus*) fingerlings were raised in 12 tanks with 20 fish/tank with initial weight 12 ± 1.0 g for eight weeks and were fed ad libitum with four different levels of chicken feather meal containing 0%, 5%, 15% and 30% in Treatment 1 (Control), Treatment 2, Treatment 3, and Treatment 4 respectively. Based on the results, Treatment 1 (Control) showed the highest value of chewiness with 105.52 ± 54.12^a of the catfish fillet compared to other treatments. However, Treatment 4 showed significant differences ($p < 0.05$) in hardness with 5553.11 ± 993.20^b and gumminess with 2492.56 ± 351.07^b . Treatment 1 (Control) and Treatment 2 have the same highest value of cohesiveness which is 0.56 ± 0.05^a respectively, while Treatment 1 (Control) has the highest value of springiness (5.11 ± 2.12^a) of catfish fillet compared to other treatments. Besides, for colour evaluation, Treatment 3 gave higher value of lightness L^* with 38.03 ± 1.05^a , while Treatment 4 (3.63 ± 0.68^b) and Treatment 3 (2.28 ± 0.16^b) have the highest value of a^* which represent the redness of fish fillets and yellowness (b^*) respectively. In conclusion, different levels of chicken feather meal were not really affected on texture quality and colour evaluation of African catfish (*Clarias gariepinus*). For recommendation, the experiment of texture quality should proceed to further study for sensory evaluation for collection of consumer acceptance of the fish.

Keywords: Chicken feather meal, African catfish, Texture Profile Analysis (TPA), texture quality, colour evaluation.

Potential of Canola Oil in Semen Extender to Enhance Fresh Semen Quality and Lengthen the Shelf Life of Goat Semen in Room Temperature

Muhammad Faris Iszuddin Jainordin^{1*}, Zulhisyam Abdul Kari¹, Dr Raja Ili Airina Raja Khalif¹ and Abu Bakar Wakil²

¹Department of Animal Husbandry Science, Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia.

²Faculty of Veterinary Medicine, Pengkalan Chepa 16100 Kota Bharu, Kelantan, Malaysia.

***First Author:** iszuddin.f19a0085@siswa.umk.edu.my

ABSTRACT

Since the 19th century, Assisted Reproductive Technology (ART) has been widely used in Malaysia's goat industry. Semen preservation is essential to maintain the semen quality in the goat industry, however it might cause stressors and lead to lethality. Extender act to preserve sperm from numerous stressors throughout the preservation process and extend their viability. The inclusion of antioxidants and phospholipids in the semen extender may assist in protecting sperm from oxidative stress and also maintain sperm quality and motility. Therefore, Canola oil (CO) which contains more antioxidants and phospholipids, both of which have significant health advantages, are suitable to replace egg yolk in an extender. The objectives of this study are to determine the efficiency of different concentrations of canola oil for goat semen quality and to evaluate the effect of the shelf life on goat semen quality. Semen collection was carried out in Boer goat (*Capra aegagrus hircus*) breed and added to Tris citric fructose egg yolk extender (TCFY, Control: 2ml egg yolk) and Tris extender with various canola oil concentrations (C1; 2ml, C2; 4ml, C3; 6ml). After storing these groups at room temperature ($\leq 20^{\circ}\text{C}$), semen was analyzed for varying hours, which is 0h, 1h, and 2h, to evaluate the sperm characteristics using a microscope. The results showed that a significant distinction between TCFY extender and C3 extender, with the latter showing superior sperm preservation in terms of motility ($46.33 \pm 4.72\%$), viability ($71.17 \pm 0.23\%$), and morphological ($71.84 \pm 1.18\%$) characteristics after 2 hours preservation time in room temperature. In conclusion, Tris based extender with canola oil can be considered as a cheaper alternative to commercial extender as it is cost effective to the small scale breeders to enhance goat fresh semen quality and lengthen the semen shelf life before performing artificial insemination.

Keywords: semen collection, extender, canola oil, chilling, sperm quality, motility, viability, morphology.

The Study of Chemical Analysis of Fish Feed Formulated by Ground Coffee Waste (GWC) and Effect on Growth Performances of African Catfish (*Clarias gariepinus*)

Muhammad Hazim Afiq Mohd Sidek*, Suniza Anis Mohammad Sukri and Zulhisyam Abdul Kari

Department of Animal Husbandry Science, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Malaysia.

***First Author:** hazim.f19a0090@siswa.umk.edu.my

ABSTRACT

Fish farmers may be indirectly impacted by the aquaculture industry's underlying fundamental problem like the rise in the price of essential component used to make fish feed, such as fish meal. The replacement of ground coffee waste in feed ingredient can cut off the feed cost. Ground coffee waste (GCW) contain the nutrient composition that meets the requirement of fish feed. This experiment was done in order to find an alternative for fish meal with five isonitrogenous diets were made with varying amounts of GCW used as FM replacement (0% T1), (10% T2), (20% T3), (40% T4), (80% T5) all with 31% crude protein. The proximate analysis was used following AOAC method to determine the moisture content, crude fiber, crude fat, crude protein, ash and carbohydrate for each treatment. Based on the proximate analysis made, the mean values (%) for the entire treatment for crude fiber is ($3.06 \pm 0.05\%$), ($4.56 \pm 0.23\%$) for crude fat, ($31.48 \pm 0.23\%$) for crude protein, ($6.58 \pm 0.36\%$) for moisture, ($6.94 \pm 0.39\%$) for ash and ($47.38 \pm 0.80\%$) for carbohydrate. In total, 300 *C.gariepinus* fingerlings were used with 20 fingerlings were placed in each tank. The designed diet was fed to the experimental fish for 11 weeks. At the end of the feeding trial, the fish were evaluated using a growth performance scale. Specific growth rate (SGR), net weight gain (NWG), weight gain (WG), intraperitoneal fat (IPF), feed conversion ratio (FCR), hepatosomatic index (HSI), and protein efficiency rate (PER) were among these scales. The results of this research showed that the experimental fish feed with the T2 diet grew substantially higher ($p < 0.05$). In conclusion, substituting 10% FM for 10% GCW in aquafeed may improve the growth and overall health of *C.gariepinus*.

Keywords: Ground Coffee Waste, Fish Meal, African Catfish, Proximate Analysis, Growth Performance, Sustainable Aquaculture

The physical properties of fish feed substitution with Ground Coffee Waste (GCW) and its growth performance on African catfish, *Clarias gariepinus*

Muhammad Roshidi Samsurijan*, Suniza Anis Mohamad Sukri, and Zulhisyam Abdul Kari

Department of Agricultural Sciences, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

***First Author:** roshidi.f19a0098@siswa.umk.edu.my

ABSTRACT

Feed costs are important since they typically contribute 30–70% of total operating expenses and have an impact on aquaculture investment profitability. Five isonitrogenous feeds (31% crude protein) were produced with 0% (T1), 10% (T2), 20% (T3), 40% (T4), and 80% (T5) ground coffee waste (GCW) as fish meal (FM) replacement. The fish were tested with formulated diets for 11 weeks. The technique of substituting GCW with FM for fish feed was used in this study to assess the physical properties of GCW replacing experimental diets as well as the growth performance of African catfish, *Clarias gariepinus*. The physical properties of fish feed substitution with GCW in terms of bulk density, pallet durability index (PDI), floatability, and water stability were significant ($p < 0.05$) among the experimental diets except expansion ratio ($P > 0.05$). In addition, along with the increasing percentages of GCW substitution with fish meal, the colour and odour of the feed became more blackish brown and had a stronger coffee odour. Furthermore, the palatability of all experimental feed showed a comparable pattern among the diets of 0%, 10%, and 20% GCW substitution with fish meal, which consumed less than 100% of the given feed in 5 minutes. The parameters of the growth performance of fish in terms of final weight, weight gain (%), specific growth rate (SGR), net weight gain (NWG), feed conversion rate (FCR), intraperitoneal fat (IPF), hepatosomatic index (HSI), and protein efficiency ratio (PER), were significant difference ($p < 0.05$) higher in T2. In conclusion, replacing 10% of GCW with FM can enhance efficiency in generating low-cost, growth performance and healthy aquafeed globally for African catfish.

Keywords: physical properties, African catfish, waste coffee ground, growth performance, sustainable aquaculture

Effect of Chicken Feather Meal Diet on The Physical Properties of Pellet for Catfish (*Clarias gariepinus*)

Muhammad Syarifuddin Mohamad Nor*, Zulhisyam Abdul Kari and Suniza Anis Mohamad Sukri

Department of Animal Husbandry Science, Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Malaysia

***First Author:** syarifuddin.f19a0099@siswa.umk.edu.my

ABSTRACT

An artificial diet or pellet using a compressed coating technique was employed in this study to assess the physical properties of chicken feather meal (CFM) diets and additionally, to evaluate the potency of fish feed pellets and the growth performance of African catfish (*Clarias gariepinus*). CFM was designated as a model edible coating material on fish feed pellets for inclusion levels of Treatment 1 (0% CFM), Treatment 2 (5% CFM), Treatment 3 (15% CFM) and Treatment (30% CFM) to deliver the nutrient to the fish gut. CFM pellets were produced using an extruder with a die size of 3 mm. The physical properties of CFM pellets were evaluated based on pellet diameter, expansion rate (ER), bulk density (BD), pellet durability index (PDI), floatability and water stability (PDI). All of the parameters investigated were found to be significant (P 0.05). With increased CFM, the pellet colour and odour became more yellowish black, with a stronger flavour. Furthermore, the palatability of all experimental feed showed a comparable pattern time among the diets of 0 %, 5 %, 15 % and 30 % CFM which consumed 100% of the given feed in 5 minutes. BD (483.607.80%), WS (366.6733.34 %), PDI (99.160.28 %), ER (18.404.77 %), and floatability (100.000.00 %) were higher in Treatment 2. These findings showed that CFM pellets are suitable for African catfish and are more efficient in generating low-cost and healthy feed.

Keywords: Pellet, chicken feather meal, physical properties, African catfish

Effect Of Storage Time on Chemical Analysis of Total Mixed Ration (TMR) Pellet for Lactating Goats

Noor Mardhiah Binti Mat Rasid* and Nor Dini Binti Rusli

Department of Agriculture Sciences, Faculty of Agro-Based Industry University Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia

First Author: mardhiah.f19a0111@siswa.umk.edu.my

ABSTRACT

Most dairy goats were poorly managed due to a lack of understanding and information related to the basic management of lactating dairy goats. Higher feed costs hit many small-scale farmers, making it difficult to prepare feed in sufficient quantities and nutrients throughout the year. Poor performance of dairy goats in terms of growth, feed consumption, disease resistance, and milk production are associated with poor husbandry protocols. The used of Total Mixed Ration (TMR) feed had been recommended by animal nutritionists to compensate for insufficient daily food nutrients. However, the physical form of TMR was influenced by the moisture resulting from Napier grass which had about 60-80% moisture. Therefore, this current study aimed to convert TMR into TMR pellet of lactating goats and to evaluate its shelf-life. The chemical composition was analysed by comparing TMR pellets with TMR mash and the shelf life of TMR was observed according to pellet storage for 3 weeks. Data were statistically analysed using a one-way analysis of variance. (ANOVA). Based on the proximate data, there was no significant difference ($P<0.05$) of TMR mash and TMR pellet in weeks 1, 2 and 3 except for crude fibre in week 1, ash in week 2 and crude protein in week 3 ($P>0.05$). It was suggested that there was a dry matter loss following a few weeks, though it was not a significant difference. The crude fibre content was reduced 20% in TMR pellet because the pelleting may disrupt the lignin-hemicellulose linkages. In conclusion, pelleting the TMR is considered a good choice for improving the quality of TMR of lactating goats and increasing its shelf-life.

Keywords: Lactating dairy goat, TMR, chemical composition, shelf life

Effect of Storage Period on Chemical Composition of Rabbit's Pellet Made from Pineapple Leaves

Nur Aina Shakirah Bt Awang Kechik*, Raimi Bt Mohammed and Mohammad Mijanur Rahman

Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

***First Author:** shakirah.f19a0126@siswa.umk.edu.my

ABSTRACT

Pineapple leaves are a by-product of pineapple production that is commonly abandoned and pollutes the environment. One potential method for managing pineapple field wastes is to convert them into animal feed. The aim of this study was to investigate the effect of storage period on the chemical composition of rabbit pellets with inclusion of pineapple leaves. A total of 24.0 kg pellet was made using pineapple leaves and other feed ingredients. To meet the nutritional needs of rabbits, 40% of pineapple leaves were combined with other feed ingredients (broken corn, soybean meal, rice bran, vitamin premix, molasses, limestone, and salt). The nutritional value of a novel rabbit pellet was compared to three treatments: 0 days (T1), 15 days (T2) and 30 days (T3). Results showed that dry matter (DM), crude protein (CP), crude fibre (CF), ash and ether extract (EE) contents of pellet did not significantly ($p>0.05$) change during the storage periods. However, T1 pellet contained the largest amount of DM (86.53%) and CP content (16.08%), whereas T3 pellet contained the lowest amounts of DM (72.68%) and CP content (21.79%). In contrast, T3 pellet showed the highest EE content, while T1 pellet showed the lowest. No consistent trend was observed on CF and ash contents among the treatments. In conclusion, pellet made from pineapple leaves can be stored up to 1 month without any deleterious effects on its chemical composition. However, further study is required to store pellet for longer duration of time, since the nutritional value decreases with the advancement of storage period.

Keywords: Pineapple Leaves, Pellet, Rabbit, Chemical analysis, Storage Period

Effect of Low Concentration of Ammonium Sulfate Saturation on Purification of Pregnancy Specific Protein B from Cattle Placenta.

Nur Hazirah Mohd Zarki*and Hazreen Nita Mohd Khalid

Department of Agricultural Sciences, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia

***First Author:** hazirah.f19a0142@siswa.umk.edu.my

ABSTRACT

Pregnancy-specific protein B (PSPB) is a protein that can be used to detect early pregnancy in cattle which crucial to reduce breeding interval and allowing breeders to identify animals for breeding program. Although several approaches have been established, those methods are lacking of accurate results and the tests such as radioimmunoassay (RIA) and enzyme-linked immunosorbent assay (ELISA), are expensive. In order to investigate the potential of PSPB as a pregnancy marker for rapid detection kit development, purification of PSPB shall be carried out. Therefore, this study was conducted (1) to evaluate the effect of low concentration of ammonium sulfate saturation on the PSPB purification from cattle placenta and (2) to determine the amount of purified crude PSPB using Nanodrop Spectrometer and SDS-PAGE technique. The extraction of placental crude protein was done using RIPA lysis buffer with a ratio of 1:1 to the placenta cotyledon tissues. The purification of crude PSPB was carried out using low concentration of ammonium sulfate of 20% and 30%. Meanwhile, the second saturation phases were performed through addition of ammonium sulfate concentration such as 30%, 40%, 50%, 60%, 70% and 80% into the purified pellet and supernatant respectively. The protein quantification analysis showed that 20% saturation can yield the highest amount of crude placental protein of 51.8 mg/ml and 68.8 mg/ml in supernatant and pellet respectively. In contrast, 30% saturation only resulted to lower amount of protein between 9.4 mg/ml and 26.3 mg/ml. The PSPB protein band can be visualized on SDS gel at a size of 60 kDa. In conclusion, this study has highlighted 20% ammonium sulfate saturation as the lowest concentration to be used for PSPB purification from cattle placenta. The results obtained in this study shall assist in future research in developing pregnancy kit that would be more practical to the cattle breeders.

Keywords: Kedah- Kelantan cattle, Pregnancy specific protein B (PSPB), cattle placenta, ammonium sulfate saturation, SDS – PAGE.

Effect of Chicken Feather Meal Diet on Liver and Intestine of African Catfish (*Clarias gariepinus*)

Nur Shulaiha Rosli*, Zulhisyam Abdul Kari and Suniza Anis Mohamad Sukri

Department of Animal Husbandry Science, Faculty of Agro-Based Industry, Jeli Campus, Universiti
Malaysia Kelantan, 17600 Jeli, Kelantan.

***First Author:** shulaiha.f19a0148@siswa.umk.edu.my

ABSTRACT

Due to the ever-increasing global output in the aquaculture industry, basic fish feed ingredients such as fish meal (FM) and fish oil should be evaluated for replacement in diets with less expensive basic materials. Fish diets could be replaced with a less expensive animal-based ingredient, such as chicken feather meal. This study is to determine the effect of chicken feather meal diet on the intestine and liver of African catfish (*Clarias gariepinus*). Histological analysis of the liver and intestine was done purposefully to determine the African catfish's digestion and absorption of nutrients in the CFM diet. In this study, a total of 240 African catfish juveniles with an average size of 12 ± 1.0 g were fed ad libitum throughout the 80 days of the experiment. Each aquarium had 20 fish and three replicates. The total of four diets were formulated with chicken feather meals (CFM) at levels of 0 % CFM (Treatment 1), 5 % CFM (Treatment 2), 15 % CFM (Treatment 3), and 30% CFM (Treatment 4). The result showed a favourable effect on the intestinal and liver morphology of *C. gariepinus* fed on the Treatment 2 diet. The histological examination of the intestine showed that the intestine from the Treatment 2 diet had an intact epithelial barrier with goblet cell arrangement and a very well-organized tunica muscularis in comparison to other treatments. Meanwhile, the liver cells of the fish fed Treatment 2 had better nuclei and cytoplasmic structure than the other groups of feed treatment. In conclusion, adding 5 % of CFM to aquafeed may benefit *C. gariepinus*'s hepatic and intestinal health.

Keywords: Chicken feather meal diet, African catfish, *Clarias gariepinus*, intestinal and liver histology

Effect of Pellet with Inclusion of *Asystasia gangetica* Leaf as Functional Feed on Carcass Composition and Meat Quality of Muscovy Duck

Nuramami Idris*, Mohammad Mijanur Rahman

Department of Agricultural Sciences, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

***First Author:** amami.f19a0154@siswa.umk.edu.my

ABSTRACT

In Malaysia, feed shortage is the major constraints for poultry production. To overcome this problem, utilisation of local feed resources is one of the options. Compared to other poultry species, ducks can utilise more fibre efficiently. *Asystasia gangetica* is a plant that contains high nutrients including crude protein, metabolisable energy and antioxidant properties. The objective of this study was to investigate the effects of pellet with inclusion of *A. gangetica* leaf on carcass composition and meat quality of Muscovy duck. A total of 30 Muscovy duck was reared and divided into two dietary groups, namely control diet and treatment diet with 3 replications (5 ducks/replication) for each treatment. Ducks received respective diet for 28 days and were slaughtered on the 29th day to evaluate carcass composition and meat quality (proximate components, colour and pH). For carcass composition, every part of duck was weighed and categorized into edible and non-edible parts. Results showed that there were no significant ($p > 0.05$) differences on the carcass composition except dressing percentage ($p < 0.05$). The ducks fed control diet showed higher dressing percentage (57.7%) than the ducks fed treatment diet (57.5%). Similarly, no significant ($p > 0.05$) differences were observed on the chemical composition (dry matter, crude protein, ash and ether extract) of meat. However, ducks fed control diet showed significantly ($p < 0.05$) lower meat pH (5.93) than the ducks fed treatment diet (6.05), while there was no significant ($p > 0.05$) difference on meat colour between the ducks fed control and treatment diets. It is concluded that *A. gangetica* can be replaced partially with other feed ingredients without any detrimental effects on carcass composition and meat quality of duck. However, further study is required to find out the optimum level of *A. gangetica* that can be included in the duck diet.

Keywords: *Asystasia gangetica*, Muscovy duck, carcass composition, meat quality, Nutritive value

Effect of Storage Period on Fermentation Characteristics and Nutritional Value of Dwarf Napier Grass Silage

Nurqistina Nasuha Binti Hasmawee* and Mohammad Mijanur Rahman

Department of Agricultural Sciences, Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia.

***First Author:** qistina.f19a0156@siswa.umk.edu.my

ABSTRACT

Napier grass (*Pennisetum purpureum*) is widely used for ruminant feeding. However, the nutrient composition in Napier grass is still low and it is necessary to increase the nutritional value using additives that can meet the nutrient requirements of ruminants. Therefore, the objective of this study was to evaluate the effect of *Aspergillus niger* on the fermentation characteristics and nutritional value of Napier grass silage. Dwarf Napier grass was harvested at 2 months of plant maturity and chopped into 2-3 cm in length. Chopped Napier grass was mixed with 5% molasses and *A. niger* (10 ml/kg silage; 10^6 spores/ml). Mixed silage was kept in plastic bags, compacted, airtight and then stored anaerobically for 0, 15 and 30 days. The pH value, lactic acid content, $\text{NH}_3\text{-N}$, dry matter (DM), crude protein (CP), ether extract (EE), crude fibre (CF), ash and nitrogen free extract (NFE) of the silages were evaluated. There were significant ($p < 0.05$) differences in pH values among treatments. The pH values were with a range of 3.80 to 5.30. Silage T1 showed higher (5.23) pH value compared to T2 (3.8). No significant ($p > 0.05$) difference was observed in the lactic acid content among treatments. The DM, CP, EE, CF and NFE contents in silage were significantly ($p < 0.05$) different among treatments, while ash content was not significantly ($p > 0.05$) different. T1 silage showed the highest content of DM (22.88%), CP (14.89%), CF (18.72%) and ash content (9.19%), while T3 silage showed the lowest DM (14.51%), CP (13%), CF (24.24%) and ash content (11.72%). Silage T3 showed the highest EE content (1.85%), while T1 showed the lowest (1.29%). Results of this study suggest that silage pH and EE content of Napier grass can be improved with increasing fermentation period, while the contents of other parameters may not be changed.

Keywords: *Aspergillus niger*, fermentation characteristics, nutritive value, fermentation period, lactic acid

Proximate Analysis and Physical Properties of Newly Formulated Prawn, *Macrobrachium rosenbergii* Diet with Different Inclusion Rates of Sodium Bicarbonate Treated-Rubber Seed

Nurul Amiliyana binti Jafri*, Hasnita Binti Che Harun and Hazreen Nita Mohd Khalid

Department of Agricultural Sciences, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia

***First Author:** amiliyana.f19a0159@siswa.umk.edu.my

ABSTRACT

The present study was conducted to investigate the potential of rubber seed as an alternative ingredient partial inclusion with improved nutritional value and inexpensive freshwater prawn feed. Rubber seeds are proven to have nutritional composition such as protein suitable in animal feed. In this study, rubber seed meals (RSM) were formulated using different inclusion rates of 10%, 20%, 30% and 40% sodium bicarbonate treated-rubber seed (SBRS) as partial replacement to fish meal in prawn diets, while feed without SBRS as control. The objectives of the study were to evaluate the chemical composition and sensory acceptability of the newly formulated RSM through proximate analysis, physical properties analysis and textural profile analysis (TPA). Each of the analyses were performed in triplicates. The preliminary proximate analysis revealed raw rubber seed powder contained a higher amount of crude protein (19.63%), crude fat (40.00%), crude fibre (7.20%) and metabolizable energy (4961 Kcal/kg) as compared to the SBRS powder. Among all treatments, RSM with 40% inclusion of SBRS showed the highest value of crude fat of 40.80% while with 0% SBRS has the lowest value of 27.22%. In conclusion, RSM with 20% inclusion of SBRS was found to be the most suitable RSM that satisfies the nutritional needs of juvenile *M. rosenbergii*; due to its acceptable content of crude protein (32.70%), crude fat (31.88%), crude fibre (5.33%) and ash content (4.50%). Final findings showed RSM with 20% inclusion of SBRS as the potential alternative prawn feed by having suitable physical properties with bulk density (0.57 g/mL) and sinking velocity (0.09 s/cm). In addition, values for hardness of the pellet was 1073g and for cohesiveness and springiness were 1.15 and 8.46, respectively.

Keywords: Rubber seed meal (RSM), sodium bicarbonate treated-rubber seed (SBRS), textural profile analysis (TPA), proximate analysis, prawn feed

Effect of Napier grass-based Total Mixed Ration on Average Daily Gain and Body Condition Score of Lactating Dairy Goats

Nurul Atiqah binti Shamsuri* and Nor Dini Rusli

Department of Agricultural Sciences, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

***First Author:** atiqah.f19a0161@siswa.umk.edu.my

ABSTRACT

Dairy goats are reared under a variety of environments and feeding management. The primary cause of the costs associated with producing milk is animal nutrition. Improvements in feed conversion to milk nutrients are necessary for feeding cost reduction. Therefore, TMR using local feed resources can provide a complete, nutritionally balanced diet for all lactating dairy goats with lower cost. However, TMR was suggested to be pelleting for reducing the moisture content in conventional TMR. This study aims to determine the chemical composition of raw material for TMR formulation as well as to evaluate the effect of TMR pellet on the body weight change (BWC), average daily gain (ADG), and body condition score (BCS) of lactating dairy goats. Twenty-one (21) lactating dairy goats were used to study the effect of a physical pre-treated total mixed ration on growth performance. Lactating dairy goats were randomly divided into three groups: (i) Control Group, (ii) Treatment 1, and (iii) Treatment 2; T1 was fed with TMR mash, and T2 was fed with TMR pellet. TMR was produced using the pelleting method. Raw materials and TMR were analyzed to identify the chemical composition of crude protein, ether extract, crude fibre, ash, and dry matter. Based on the finding, no significant difference ($p > 0.05$) was observed on BWC, ADG, and BCS. Treatment 1 and Treatment 2 presented a higher value of BWC and ADG than the control group. However, the control group was significantly higher in BCS compared to treatments 1 and 2. This is because TMR is a completely balanced ratio for goats. TMR is also high in dry matter content and provides more nutrients to lactating dairy goats. In conclusion, feeding TMR can improve the growth performance of lactating dairy goats more than other pellets. From an economic perspective, local farmers may make a profit by feeding Guinea and Napier grass to their animals.

Keywords: Total mixed ration (TMR), lactating dairy goats, Napier grass, body weight change, body condition score

Effects of Different Vitamin and Mineral Premix Level Impact on Village Chicken's Carcass and Meat Quality

Nurul Nazihah Baharuddin^{1*}, Muhamad Hakim Mohd Ali Hanafiah² and Khairiyah Mat¹

¹Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli Kelantan.

²Faculty of Agricultural and Forestry Science, University Putra Malaysia Bintulu Campus Sarawak, Nyabau Road, 97008 Bintulu, Sarawak.

***First Author:** nazihah.f19a0170@siswa.umk.edu.my

ABSTRACT

The poultry industry has developed into a strong and well-established industry. Adequate mineral and vitamin supply in the diet is essential for good poultry production. The inclusion of vitamins and minerals in poultry diets can help reduce a variety of health issues for chicks, including death in some cases. A study was carried out to determine the effect of various vitamin and mineral levels on carcass performance and meat quality of physicochemical properties and crude protein analysis of village chicken. 81 one-day-old male Akar Putra Village Chicken were reared and divided into three treatments: Control, treatment 1: 50% Vitamin Mineral (T1), and treatment 2: 0% Vitamin Mineral (T2). On day 52, three birds were slaughtered per pen. The samples were then analysed for carcass performance, physicochemical properties, and crude protein (CP) content. The carcass performance analysis, which included carcass body weight, external parts, and internal organs, revealed that all parameters had significant differences ($P < 0.05$). Meanwhile, there was no statistically significant difference ($p > 0.05$) in the physicochemical properties of village chicken meat. Same goes to crude protein analysis which there is no significance difference ($P > 0.05$). The result %CP, control : 20.62%, T1 : 20.83%, T2 : 20.18%. To summarise, the vitamin and mineral premix level contained in T1 can be recommended as a suitable range level in poultry diet. This is because, treatment 50% Vitamin Mineral has the highest weight of carcass and external parts. Despite the fact that the pH level is slightly higher, ranging from 6.13 to 6.17. However, there was no significance different ($P > 0.50$) compare with another two treatments. It is also believed that the slightly elevated pH value resulted from the pre-slaughter process rather than the feeding trial.

Keywords : Akar Putra Village Chicken, meat quality, carcass quality, vitamin and mineral level

Preliminary Study of Total Mixed Ration Pellet on the Health Performance of Lactating Cross-Bred Saanen Goats

Syarifah Abdul Ghafar* and Nor Dini Rusli

¹Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan.

***First Author:** syarifahiti.f19a0192@siswa.umk.edu.my

ABSTRACT

Total Mixed Ration (TMR) is well known as nutritionally balanced diet feed providing sufficient nutrients that fulfil animal demands. However, TMR poor nutrition may induce goat stomach issues. Smallholders seldom feed dairy goat's entire mixed ration. Poor goat feed might cause gastrointestinal disease. The nematode egg's restricted digestion. Thus, gastrointestinal parasites may endanger goats. This issue contributes to animal health and causes dead. Hence, this study aims to evaluate the effect of Napier grass based TMR pellet on parasite infestation and blood metabolite. For animal feeding trial, twenty-one goats (21) were separated into three groups, the control group (CG) fed fresh Napier grass with commercial goat pellet, Treatment 1 (T1) and Treatment 2 (T2) fed with TMR pellet and TMR mash respectively. The faecal samples were collected through the rectum for McMaster test procedure. The blood samples were collected around 4 ml for Ethylenediaminetetraacetic acid tube (EDTA). Based on faecal egg count (FEC) data, there was no significant difference between before and post 2-week feeding trial for strongyle and oocyst eggs. The level of gastrointestinal parasite infections based on FEC was in a similar trend, ranging from 60 to 80 EPG for Strongyles and 100-170 for Oocyst eggs. The low EPG results indicate light infection only, and there were no symptoms or clinical signs of weight loss, fever, and diarrhoea. For blood metabolite analysis, in general, all the goats showed a similar trend of haematological profiles. However, red blood cells (RBC) seemed a bit lower than the reference value ($8-18 \times 10^6/\mu\text{l}$). RBC deficiency may indicate the animals were having a nutrient deficiency. There was no complete blood count result following the 2-week feeding trial. In conclusion, the results from 2-week feeding trial demonstrated that the TMR pellet did not give any adverse effect to the animals. Nevertheless, the feeding trial should continue until 90 days.

Keywords: total mixed ration, faecal samples, McMaster Test, blood metabolite, haematology.

Effect of Feeding Anchovy By-Product and Budu Waste on the Growth Performance and Carcass Composition of Japanese Quail (*Coturnix japonica*)

Thanendran. B*, Mat, K.B.

Department of Agriculture Science, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan.

***First Author:** thanendran.f19a0194@siswa.umk.edu.my

ABSTRACT

A bird species belonging to the genus *Coturnix* and species *japonica* of the order Galiformes is the Japanese quail (*Coturnix japonica*). As the increase in the feed production the raw materials are becoming more mainly for protein type of source unlike soybean meal, fishmeal, cornmeal and bone meal. The objective is to study the effects of feeding the budu waste and the anchovy-by-product on the growth performance of the Japanese quail (*Coturnix japonica*). The birds were divided to 4 groups, that consist feeding preference (C), and three were treatments group, treatments 1 (T1), treatments 2 (T2), treatments 3 (T3) and treatment 4 (T4). The growth performance including body weight, average daily weight gain, feed intake and feed conversion ratio were recorded. Animals were slaughtered at the age of 6 weeks for the measurement of carcass composition. The result indicated that body weight have no significant different during the starter and grower stages. It seems the significance occurred in the average daily weigh gain for the week 6 ($P \leq 0.05$, 0.034), feed intake during week 5 ($P \leq 0.05$, 0.039). The feed conversion ratio had recorded during week 5 and 6 shown a significant different with 0.036 ($P \leq 0.05$) and 0.003 ($P \leq 0.05$) respectively. The carcass composition indicates the carcass weight, 0.044 ($P \leq 0.05$), breast ($P \leq 0.05$, 0.064), through drumstick ($P \leq 0.05$, 0.029) and lung ($P \leq 0.05$, 0.028) had significance different. In conclusion, for starter stage formulation feed is suited as in Treatment 3(75% protein level) formulation for the protein level the anchovy by-product (20%) and budu waste (10%) and for Grower stage the Treatment 1 formulation should be improvised in its protein level because it has the significance of feed formulation to the commercial feed.

Keywords: Feed Formulation, Growth performance, Carcass Composition.

Effect of Oral Administration of Royal Jelly Towards Fertility Performance of Rabbit Through Artificial Insemination

Yuki Tan Yi Jing^{1*}, Suniza Anis Binti Mohamad Sukri¹, Abubakar Muhammad Wakil² and Raja Ili Airina Binti Raja Khalif¹

¹Department of Agriculture Sciences, Faculty of Agro Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan.

²Department of Veterinary Medicine, Faculty of Veterinary Medicine, Kota Campus, Universiti Malaysia Kelantan, 16100 Kota Bharu, Kelantan.

*First Author: yuki.f19a0202@siswa.umk.edu.my

ABSTRACT

The rabbit livestock industry is rising rapidly due to the demand for rabbit meat products as an alternative to beef and mutton in Malaysia. In 2022, the world population reached approximately 7.9 billion and is still constantly rising. Hence, an alternative food source like rabbit-based products is significant to meet the human demand for livestock products. Optimisation of rabbit production relies on reproductive technology. Assisted Reproduction Technologies (ART) like Artificial Insemination (AI) are being introduced to the farmer to maximise the production of the rabbit industry. However, local livestock farmers still need to improve their knowledge and technique. Thus, this study aims (1) to investigate the fertility rate of does using artificial insemination compared to natural mating and (2) to determine the effect of different concentrations of oral administration of royal jelly (RJ) towards the semen fertility ability. A total of 12 bucks and 20 does of American White rabbit (*Oryctolagus cuniculus*) were involved. The bucks were assigned to 4 treatment groups for oral administration: (a) control group A, 0 mg/kg of royal jelly; (b) control group B, 0 mg/kg of royal jelly; (c) treatment 1, 100 mg/kg of royal jelly; (d) treatment 2, 50 mg/kg of royal jelly. Control group A rabbits were mated naturally, while the other groups were mated using AI. The sperm quality was evaluated through physical criteria: volume, colour, pH, odour, and viscosity. Pregnancy diagnosis (manual abdominal palpation, real-time ultrasound) was performed to evaluate the conception rate of the doe. The result has shown that the fertility rate of Natural Mating (83.33 %) was higher compared to Artificial Insemination (16.13 %). Moreover, the effect of royal jelly showed a negative effect on the fertility rate of doe, where: 0 mg/kg of royal jelly showed 36.36 %, 100 mg/kg with 0 %, and 50 mg/kg with 10 % of fertility rate.

Keywords: Rabbit, Royal Jelly, Fertility Performance, Artificial Insemination, Pregnancy diagnosis.

Effects Of Different Energy and Protein Leven on Village Chicken's Growth Performance and Economic Efficiency

Alia Nur Najwa Roslly^{1*}, Nor Dini Rusli¹, Muhamad Hakim Mohd Ali Hanafiah²

¹Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan.

²Faculty of Agriculture and Forestry Science, Department of Animal Science and Fisheries, University Putra Malaysia Bintulu Campus Sarawak, Nyabau Road, 97008 Bintulu, Sarawak.

***First Author:** alia.f19a0207@siswa.umk.edu.my

ABSTRACT

There is limited data on the effects of different energy and protein levels on village chicken growth performance and economic efficiency, especially on Akar Putra breed. The information about the breed is still scarce in poultry industry. Thus, this study was conducted to determine the optimum level of energy and protein in Akar Putra's feed diets to formulate feeds that give the best growth performance and economic efficiency. The diets were formulated into four different treatments of energy and protein level namely, Normal Energy Normal Protein (NENP), Normal Energy Low Protein (NELP), Low Energy Normal Protein (LENP) and Low Energy Low Protein (LELP). The diet treatments were fed to Akar Putra village chickens for a period of 49 days with each treatment receiving three replicates and 9 chickens each, making up a total of one hundred and eight (108) male Akar Putra village chickens reared in this experiment. The result showed that the feed intake decreases when low-energy and protein diets were fed compared to other diets. The Feed Conversion Ratio (FCR) of the groups also decreased when low protein diets were fed compared to the normal level. Protein level was significantly ($P < 0.05$) on grower phase feed intake and starter phase FCR. Meanwhile, energy level was significantly ($P < 0.05$) on starter FCR. In conclusion, the growth performance especially the lowest FCR value and mortality makes LELP diet the optimum energy and protein level for village chicken in Malaysia's tropics. LELP diet also showed the least cost for rearing it making the diet most cost efficient in rearing compared to other diets.

Keywords: Akar Putra village chicken, growth performance, economic efficiency, energy, protein

Effect of Retort Processing on Physicochemical and Microbial Activities of Marinated Free-Range Chicken

Khairil Azri Bin Che Khalid^{1*} and Hasnita Binti Che Harun^{1,2}

¹Department of Agriculture, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

²Institute of Food Security and Sustainable Agriculture, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

***First Author:** khairil.f19a0211@siswa.umk.edu.my

ABSTRACT

An increased concern towards food safety together with a hectic lifestyle has increased community acceptance towards Ready-To-Eat Food (RTE). Globally, demand for RTE is continuously increasing which urge the need to diversify RTE product. On the other hand, free-range chicken is known for its better nutrition composition compared to broiler chicken. Thus, this research aims to study the customers' acceptance towards three different ratios of the retorted free-range chicken and paste which were 500 g of chicken flesh to 150 g, 175 g, and 200 g of paste respectively, and to determine the effect of retort processing on the physicochemical and shelf life of RTE marinated free-range chicken. A market survey was carried out to determine the most preferred ratio of paste: chicken flesh, followed by physicochemical, and microbial tests on the most preferred ratio chicken: paste. The ratio of chicken: paste (500:175) was subjected to the physicochemical and microbial test. The physicochemical test consists of proximate analysis, texture profile analysis, pH determination, and colorimeter test. The microbial test was carried out once a month for 90 days. No significant results showed for all proximate analysis except for moisture. Next, the texture profile analysis, pH determination, and colorimeter test also show no significant results. As for the microbial test, the bacteria presence was only detected before the retort processing samples. Outcomes from the present study are in line with previous studies that used retort processing. In conclusion, retort processing did not significantly affect the physicochemical properties and significantly improved the shelf life of RTE marinated free-range chicken.

Keywords: Ready-to-eat, free-range chicken, retort processing, physicochemical, microbial activity

Effect of Feeding *Budu* Waste and Anchovy By-Product on Physicochemical Properties and Chemical Compositions of Quail Meat

Muhamad Syabil Adham Suhardi* and Khairiyah Mat

Department of Agricultural Sciences, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia

First Author: syabil.f19a0212@siswa.umk.edu.my

ABSTRACT

The recent years have been tough for farmers with the increase in production cost in the quail industry due to the high price of common feedstuffs. Since these feedstuffs are not locally produced, they need to be imported from other countries, and, due to the high volatility in the market, the price of the feedstuffs is constantly increasing. *Budu* waste and anchovy by-products are locally produced waste and have often been thrown away since they have no further use. This study aims to determine the effects of feeding *budu* waste and anchovy by-products on physicochemical properties and chemical compositions of quail meat. A total of 100 5 weeks-old quails were used and reared in battery cages. The quails are divided into four groups which are one control (C) and three treatments (T1, T2, T3), with each group having three replicates (R1, R2, R3), and each replicate of the group will consist of 6 to 7 quails. The parameters that were observed including the physicochemical properties of the meat, such as pH, water holding capacity, colourimetric analysis and tenderness and, the chemical composition of the meat, such as dry matter, crude protein, ether extract, and ash. The result from physicochemical properties shows significant differences ($p < 0.05$) for all parameters. Correlation between pH and water holding capacity shows meat with higher pH tends to have lower water holding capacity. The colour of meat also become darker across the treatment due to colour of the feed. Chemical composition also shows significant differences for crude protein, crude fat, and ash except for dry matter ($p > 0.05$). Crude protein and ash are related as meat with higher crude protein has lower ash percentage. There is no significant difference in parameter of physicochemical properties and chemical composition for quail meat.

Keywords: *Budu* waste, anchovy by-products, quail meat, physicochemical properties, chemical compositions

The Effect of Ginger (*Zingiber officinale*) as An Extender on Male Goat Semen Qualities at Different Storage Times of Chilling

Nur Najiha Balqis Pawanchik^{1*}, Zulhisyam Abdul Kari¹, Abu Bakar Muhammad Wakil² and Raja Ili Airina Raja Khalif¹

¹Department of Animal Husbandry Science, Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia.

²Department of Veterinary Medicine, Faculty of Veterinary Medicine, Pengkalan Chepa Campus, Universiti Malaysia Kelantan, 16100 Kota Bharu, Kelantan, Malaysia.

***First Author:** najiha.f19a0217@siswa.umk.edu.my

ABSTRACT

Conservation of sperm quality depends on the suitable extender. However, the problem is that sperm quality decreases depending on the extender's constituent, which can go on for days, weeks, and months and depends on the temperature storage time. Thus, establishing an effective extender is vital to prolonging sperm quality. This study aims to examine the sperm quality of male goats with extender supplements with different concentrations of ginger as supplementation in semen extenders and to compare the effect on different storage times after chilling in sperm qualities in extenders supplemented with ginger. Semen collection will be carried out on adult mixed-breed Boer (n=2) and Jamnapari (n=1) goats by using an artificial vagina (AV) once a week for three weeks. In this experiment, fresh semen was collected and evaluated in the meantime. The different concentrations of ginger were divided into 4 groups, namely (T1 control: no ginger), (T2: 5µl ginger), (T3:10µl ginger) and (T4:15µl ginger). The semen collected was transferred into each extender and evaluated after 0, 24, 48, and 72 hours at 4°C. Sperm parameters such as progressive motility, viability and membrane integrity were analysed manually using a few techniques. The experiment revealed a significant difference (P<0.05) between T1 and T2, giving the value 45.97% and 58.25%, respectively, in preserving sperm viability regardless of time. Compared to 0 hours after preservation, the results showed a significant difference (P<0.05) between T2(65.8%) and T3(54.11%) to preserve the membrane integrity in chilling storage. In conclusion, an extender supplemented with 5µl ginger can be recommended as an alternative to conserve semen in chilling storage.

Keywords: semen collection, extender, ginger, chilling, sperm quality

The Effect of Different Concentrations of Coconut (*Cocos nucifera L.*) Milk Extender on Semen Quality of Goat at Different Storage Times of Chilling

Nurizzah Zahid*, Mohammad Mijanur Rahman and Raja Ili Airina Raja Khalif

Department of Agricultural Sciences, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

***First Author:** izzah.f19a0219@siswa.umk.edu.my

ABSTRACT

Extender plays a crucial part in preserving the sperm cell from various shocks throughout the preservation process before conducting the artificial insemination (AI) process. The coconut milk extender has been detected to provide significant sperm cell motility and fertility with a reasonable conception rate post-breeding. The objectives of this research were 1) to determine the semen qualities of the goat, and preserve it in different concentrations (0%, 5%, 10% and 15%) of coconut milk extender and 2) to examine the effect of chilling at different storage periods (0, 24, 48 and 72 hours) on semen quality in coconut milk extender. As an extender, processed coconut milk (KARA coconut milk extract) was used in this experiment. The semen was collected from three mixed breed bucks, where the semen was pooled before putting into an extender. The semen was divided into four groups: tris-citrate-fructose 20% egg yolk extender as a control, and substitution of whole egg yolk with 5, 10 and 15% coconut milk. The semen was then chilled at 4°C for a specific storage period of 0, 24, 48 and 72 hours. The semen parameters analyzed were progressive motility, viability and abnormality. Results showed that the control extender resulted in significantly ($P < 0.05$) higher sperm progressive motility and viability compared to other coconut milk treatments regardless of storage period. While for sperm abnormalities, there was no significant ($P > 0.05$) difference among all treatments regardless of storage time. Meanwhile, at 24 hours of preservation, the control treatment showed higher ($P < 0.05$) progressive motility than other coconut milk treatments. In conclusion, this study showed that a coconut milk extender may not be suitable as an extender in preserving buck semen at different chilling storage periods compared to a tris-citrate-fructose 20% egg yolk extender.

Keywords: semen extender, coconut milk, goat, chilled storage, semen analysis

The Effect of Dextrose Silver Nanoparticles (AgNPs) on The Growth Performance of Freshwater Blue Claw Crayfish, *Cherax quadricarinatus*

Wan Amirah Zahiah Binti Wan Abdul Aziz*, Lee Seong Wei

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

***First Author:** amirah.f19a0223@siswa.umk.edu.my

ABSTRACT

This study is aimed to evaluate the ability to improve and promote the growth of the blue claw crayfish by feeding them enhanced feed. The feed is enhanced with Dextrose silver nanoparticles (AgNPs). This study consists of four different dosages of treatment, which are 0% (control), 0.25% (D1), 0.50% (D2) and 0.75% (D3). The average weight of the initial crayfish is 0.1g. The samples were reared for 3 months (9 weeks) and their weight was measured weekly using Analytical Balance in the Aquaculture laboratory at UMK. At the end of the study, we gained information on the effectiveness of dextrose silver nanoparticles (AgNPs) as an additive in the crayfish diet. The result shows that the feed additive doesn't have the ability to improve or promote the growth rate of blue claw crayfish compared to the normal feed for the crayfish. The growth rate of crayfish under the control (C) group has a higher growth rate compared to all other crayfish with feed additives (D1, D2 and D3). The reason for this result could be that the dextrose silver nanoparticle is not compatible with crayfish, and probably, the additive dose is not good for the blue claw crayfish's health.

Keywords: Blue Claw Crayfish, Dextrose, silver nanoparticle, growth rate, enhanced feed.

Effect of Storage Time on Chemical Analysis of Total Mixed Ration Pellet of Pre-Weaning Dairy Goats

Alan Lee Jun Xian*, Nor Dini Rusli

Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan

***First Author:** alan.f19a0234@siswa.umk.edu.my

ABSTRACT

The major issue commonly encountered by local dairy farmers is the high mortality rate during the kidding stage and slow rate of growth when it reaches post-weaning stage. The factors affecting the performance of goats to be reduced are the insufficient intake of dry matter, and the imbalance of dietary supplementation during creep feeding. Conventional total mixed ration (TMR) can easily be overheated and spoiled; hence the animals tend to sort the feed components. Thus, the current study aims to develop the newly formulated total mixed ration (TMR) for pre-weaning stage of dairy goat and to evaluate the storage time of TMR pellet on its proximate composition from week 1 to week 6. . The current study formulated the TMR feeding or creep feeding based on pre-weaning stage of dairy goats. The TMR then underwent pelleting process prior to the proximate analysis which consisted of dry matter (DM), crude protein (CP), ether extract (EE), crude fibre (CF) and ash. The data were analysed using unpaired Student t-test for TMR mash and TMR pellet, while the shelf-life evaluation was analysed by One Way ANOVA. The DM content of pellets with Napier grass-based ingredients was 94.3% and conventional TMR or TMR mash was only 88%. This is probably due to the effect of hydrolysis processing, resulting in the heating process and starch gelatinization during pellet formation. For CP content, although the results between TMR mash and TMR pellet had a slight difference, there is no significant difference ($p>0.05$). The difference may be influenced by the age of cutting Napier grass. The harvesting time of plant can affect the quality and quantity of grass. In addition to that, it was shown that there were no significant differences between different time points of storage time in the TMR pellet, except for DM loss at week 4 ($p<0.05$). The DM was reduced from 92% into 89% DM. In conclusion, pelleting will increase the stability of Napier grass-based TMR for pre-weaning dairy goats.

Keywords: storage time, total mixed ration, pre-weaning

Effect of Fish Meal Substitution with Ground Coffee Waste (GCW) on Growth Performances and Chemical Analysis of Intestine, Liver and Muscle of African catfish (*Clarias gariepinus*) Production

Mohamad Faheem Aqeel Mad Fadzil^{1*}, Leony Tham Yew Seng¹, Zulhisyam Abdul Kari² and Suniza Anis Mohammad Sukri²

¹Department of Agro-based Industry, Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Malaysia.

²Department of Agricultural Sciences, Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Malaysia.

First Author: aqeel.f19a0254@siswa.umk.edu.my

ABSTRACT

This study was aimed to identify the effect of fish meal substitution with Ground coffee waste (GCW) on growth performances and chemical analysis of intestine, liver and muscle of African Catfish, (*Clarias gariepinus*). The increase in the cost of basic ingredients in the manufacture of fish feed such as fish meal are a real major problem in the aquaculture sector and this can indirectly burden fish farmers and can increase the cost of living for the people. By replacing fish meal with plant-based protein sources such as Ground coffee waste, it is possible to reduce the cost of fish feed. The viability of incorporating used ground coffee waste (GCW) as a potential feed element for African catfish was investigated during 11 weeks feeding trial. Evaluations were made of growth performance, feed consumption, and chemical analysis for intestine, liver and muscle. Five diets that substituted GCW for fish meal at ratios of 0% GCW (T1), 10% GCW (T2), 20% GCW (T3), 40% GCW (T4), and 80% GCW (T5) were constructed with the T1 diet a control in this experiment. The tank was supplied with 300 hundred African catfish fingerlings and filled up 20 fingerlings each tank. The highest weight gain, specific growth rate was occurred in the Treatment 2 which equivalent to 10% of CGW inclusion with mean and standard deviation values of 854.49 ± 172.19 %, 136.50 ± 23.37 %, and 0.86 ± 0.06 , respectively, in comparison with other treatments. The outcome revealed a significant difference in the growth parameters for the fish fed the treatment 2 diet ($p < 0.05$). When compared to the other treatments, the chemical analysis research of the treatment 2 diet's intestinal, liver, and muscular tissues showed substantial modifications. In conclusion, the 10% FM replacement with CGW in aqua feed was effective for the growth and effects on the health of African catfish.

Keywords: Growth Performance, Chemical Analysis, African Catfish, Ground Coffee Waste, Sustainable Aquaculture

Effect of Feeding Budu Waste and Anchovy Waste on Egg Production and Quality of Japanese Quail

Mohammad Hanissyafiq Bin Jamsari

Department of Agriculture Sciences, Faculty of Agro Based Industry, University Malaysia Kelantan, 17600 Jeli Kelantan

First Author: hanis.f19a0255@siswa.umk.edu.my

ABSTRACT

The cost of feed for poultry production including Japanese quail is the crucial issue in Malaysia recently. To keep up with demand, producer must keep up the cost at a reasonable level. The alternative is to use the budu waste and anchovy waste to partially or total replacement of protein sources available in Malaysia. This research aims to determine the optimum effect on the egg production and egg quality of Japanese Quail by feeding the budu waste and anchovy waste. The Japanese quail were divided into 3 separated groups which is feeding preferences (C), Treatment 1 (T1), and Treatment 2 (T2). After 34 days, the quails started laying eggs and the data gains and recorded for the experiment. The egg production, cost benefits and the proximate analysis were recorded during this experiment. The result showed for the egg production in 5 week for Treatment 2 (29 eggs), for Treatment 1 (18 eggs) and for the commercial (47 eggs). The quails lay more eggs for treatment 2 reaching the exact same amount for the commercial feed. The ratio for the cost benefits showed for commercial, Treatment 1 and Treatment 2 (2.06 : 1.188 : 1.94). The result showed for albumen, most of them indicates that there is no significant different accept for the moisture part where the significant occurred ($P \leq 0.05, 0.96$). For the yolk, the data showed no significant different except for the protein ($P \leq 0.05, 0.14$) and moisture where the data showed ($P \leq 0.05, 0.39$). In conclusion, for finisher starter group the most suitable formulation feed as in Treatment 2 (50% protein level) and the formulation for the budu waste (3%) and the anchovy by-product (14%) and for Treatment 1 in the finisher stage it has to improved in its fat level because the results showed higher than the feed formulation of the commercial feed.

Keywords: Budu Waste, Anchovy Waste, Japanese Quail, Proximate Analysis,

Effect of Chicken Feather Meal Diet on Blood Haematology Of African catfish (*Clarias gariepinus*)

Nor Ayu Syahziera Nordin*, Zulhisyam Abdul Kari and Suniza Anis Mohamad Sukri

Faculty of Agro Based Industry, University Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*First Author: syahziera.f19a0270@siswa.umk.edu.my

ABSTRACT

African catfish (*Clarias gariepinus*) is a widely used aquaculture species due to its ease of reproduction, maintenance, fast growth rate, high tolerance to densities in the environment, and capacity to accept a range of diets. Besides the cost-effectiveness of feather meal, it is one of the alternatives to reduce the feed cost for African catfish (*C. gariepinus*) in order to get a protein source. The purpose of this study is to determine the effects of chicken feathers meal (CFM) diet on blood haematology of African catfish. An experiment was conducted using 240 African catfish (*C. gariepinus*) fingerlings with an initial weight of 12 ± 1.0 g and an initial length of 13 ± 1.0 cm were divided into 12 tanks (3 replicates/treatment) to assess the effect of a chicken feather meal diet on blood parameters and blood biochemical cell. All the treatments were formulated with different levels of chicken feather meal. The levels of inclusion for treatment are Treatment 1 (control (0% CFM), Treatment 2 (5% CFM), Treatment 3 (15% CFM) and Treatment 4 (30% CFM). The result in Treatment 2 shows a significant difference ($p < 0.05$) in blood parameters with a mean value of white blood cell (WBC) and red blood cell (RBC). The values of white blood cell (WBC) with 125.27 ± 2.40^b , lymphocytes (LYM) with 102.47 ± 5.59^a , red blood cell (RBC) 3.85 ± 0.73^b , mean corpuscular volume (MVC) with 130.00 ± 3.39^b and platelet distribution width (PDW) 9.07 ± 0.51^c were significantly higher ($p < 0.05$) compared to the other experimental diet. The value of albumin (ALB) with 0.73 ± 0.06^c , creatine (CREA) with 0.13 ± 0.06^c , gamma-glutamyl transferase (GGT) with 0.9 ± 0.06^c and total bilirubin (TBIL) with 0.10 ± 0.00^a showed a significant lower ($p < 0.05$) in Treatment 1 (Control) compared to other experimental diet. In conclusion, the replacement of 5% fish meal with chicken feather meal could be used in the aquafeed industry for a better health status of African Catfish and possibly for other freshwater species.

Keywords: African catfish (*Clarias gariepinus*), Chicken Feather Meal (CFM), formulated fish, feed, blood haematology, biochemical blood cell.

Development of Recombinant Plasmid Containing Betanodavirus Capsid Protein Gene

Nor Hidayah Binti Abdul Ghoni^{1*}, Aina Nabila Abdul Rahman², Azila Abdullah² and Hazreen Nita Mohd Khalid¹

¹Department of Agricultural Sciences, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

²Pusat Penyelidikan Kesihatan Ikan Kebangsaan (NaFisH), 19600 Batu Maung, Pulau Pinang.

*First Author: hidayah.f19a0272@siswa.umk.edu.my

ABSTRACT

One of the infectious diseases for marine fish is viral nervous necrosis (VNN) which is caused by betanodavirus from the *Nodaviridae* family. The VNN disease outbreaks often occur in the larvae stage, however mortalities were also detected in older fish. This study was conducted with aims to amplify the capsid protein gene of betanodavirus isolated from local fish and to develop a recombinant plasmid containing the capsid protein gene through molecular cloning techniques. Prior to recombinant plasmid development, a set of primers was designed and PCR amplification of 1017 bp amplicon was optimized at 55°C. The amplicon was ligated into pCR 2.1-TOPO vector following TOPO TA cloning procedure by a heat shock technique into a TOP10 *Escherichia coli* competent cell. The positive transformants were screened through colony PCR approach, which revealed an amplicon of 1219 bp indicating the size of the vector with insert while vector without insert size was detected at 202 bp. Amplicons of positive transformants were sent for sequencing and sequence alignment of the recombinant capsid gene was performed using MEGA-X Software that revealed the identity of betanodavirus used in this study as RGNNV genotype. The analysis also showed that the local capsid gene was clustered together with other RGNNV isolates having 98.44% similarity to 10 sequences from GeneBank. In conclusion, this study has successfully amplified capsid protein gene at an optimal annealing temperature of 55°C that resulted to a 1017 bp PCR product. In addition, a recombinant plasmid containing betanodavirus capsid protein was successfully developed through molecular cloning techniques. The findings of the study showed that PCR techniques have the ability to isolate protein of interest and through molecular cloning, a recombinant DNA can be produced which is essential to be used as a positive control in a PCR detection of betanodavirus.

Keywords: betanodavirus, capsid protein, *Nodarividae*, RGNNV, recombinant plasmid

Effect of Fish Meal Substitution with Ground Coffee Waste on Growth Performance and Blood Haematology of African Catfish, *Clarias gariepinus* Production

Rabiatul Adawiyah Binti Rozlan*, Zulhisyam Bin Abdul Kari and Suniza Anis Mohamad Sukri

Department of Animal Husbandry Science Faculty of Agro-Based Industry of Universiti Malaysia Kelantan

First Author: adawiyah.f19a0306@siswa.umk.edu.my

ABSTRACT

Fish feed is one of the important elements in the aquaculture industry. Normally, the fish feed produced commercially in the industry is more expensive because the ingredients of the feed are not easily found in Malaysia. Even so, there is plenty of food and beverage industrial waste that we can utilize as an alternative for ingredients in fish feed which is ground coffee waste. Therefore, the aim of this experiment is to observe the effect of substituting fish meal (FM) with different dietary levels of ground coffee waste (GCW) on the growth performance and the haematological quality of African catfish. The GCW pellet was formulated by mixing the GCW with tapioca flour and other ingredients. Three hundred catfish fingerlings were separated into five dietary treatment groups with five isonitrogenous (31 % crude protein) which are 0 % GCW (T1), 10 % GCW (T2), 20 % GCW (T3), 40 % GCW (T4), and 80 % GCW (T5). A significant difference ($p < 0.05$) in growth parameters where the fish fed T2 diet presented the highest net weight gain (NWG), survival rate (SR), weight gain (WG), specific growth rate (SGR), protein efficiency ratio (PER), feed conversion ratio (FCR), hepatosomatic index (HSI), and intraperitoneal fat index (PFI). The mean values of Red Blood Cell (RBC) and Lymphocytosis (LYM) were significantly highest ($p < 0.05$) in fish fed with T2 diet. Compared to the experimental diets, the Albumin (ALB), Globulin (GLOB), and Total Protein (TP) were significantly lower ($p < 0.05$) in the control diets. In conclusion, the substitution of FM with 20 % of GCW can be a future alternative in fish feed production as it promotes sustainable aquaculture feed and better growth and health parameter of African catfish.

Keywords: African Catfish, Ground Coffee Waste, Growth Performance, Blood Haematology, Sustainable Aquaculture

The Effect of Fish Meal Substitution with Ground Coffee Waste (GCW) on Growth Performances and Liver Histology of African Catfish (*Clarias Gariepinus*)

Siti Qibtiyah Binti Rushdan*, Zulhisyam Abdul Kari and Suniza Anis Mohamad Sukri

Department of Agricultural Sciences, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia

***First Author:** qibtiyahf19a0309@siswa.umk.edu.my

ABSTRACT

The development of plant ingredients as an alternative to fish meal (FM) has received sustained interest in the aquaculture sector. The study investigated the replacement of FM with different percentages of dietary ground coffee waste (GCW) to assess the growth performance, liver of African catfish. Five isonitrogenous (31.7 % crude protein) diets were prepared with GCW by replacing 0 % GCW (T1), 10 % GCW (T2), 20 % GCW (T3), 40 % GCW (T4) and 80 % GCW (T5) of FM component of the diets. The results showed a significant difference ($p < 0.05$) in growth parameters where the fish fed T2 diet showed the highest weight gain (854.49172.19g), net weight gain (107.3022.07g), feed conversion ratio (2.630.60g) and hepatosomatic index (1.650.14g) compared with other diets. There were a significant difference in the weight gain, net weight gain, feed conversion ratio, hepatosomatic index and condition factor meanwhile there were no significant difference in survival rate and intraperitoneal fat index. GCW as a protein replacement of the FM had a significant effect ($p < 0.05$) on Sinusoid (S), Vacuole (V), Nucleus (N) and Erythrocytes (E) in fish's anterior and posterior liver. In conclusion, the replacement of 10 % FM with GCW could be used in the aquafeed industry for better growth performance and health status of African catfish and possibly for freshwater species.

Keywords: Ground Coffee Waste (GCW), Fish Meal, Growth Performance, African Catfish (*Clarias gariepinus*), Liver Histology.

Effect of High Concentration of Ammonium Sulfate Saturation on Purification of Pregnancy Specific Protein B (PSPB) From Cattle Placenta

Fatin Nurazlyeen Mohd Zain* and Hazreen Nita Mohd Khalid

Department of Agricultural Sciences, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

***First Author:** azlyeen.f19b0035@siswa.umk.edu.my

ABSTRACT

Pregnancy specific protein B (PSPB) in cattle is an important protein that can be detected during cattle pregnancy and crucial as a pregnancy marker. Previously, this protein can be detected using tests such as radioimmunoassay (RIA) and enzyme-linked immunosorbent assay (ELISA), however these tests are costly and not practical for the local cattle breeder. The objective of this study were (1) to evaluate the effect of high concentration of ammonium sulfate saturation on PSPB purification from cattle placenta and (2) to determine the amount of crude PSPB protein purified from cattle placenta through Nanodrop spectrometer and SDS-PAGE electrophoresis techniques. The extraction of this placental protein was conducted using RIPA lysis solution at 1:1 ratio to placenta cotyledon tissue and followed by purification technique with different ammonium sulfate saturation of 40% and 50%. A second ammonium sulfate saturation such as 50%, 55%, 60%, 65%, 70%, 75%, 80% and 85% were performed to investigate the presence of PSPB residues in the purified supernatant sample of the first saturation. Based on the quantification analysis, the ammonium saturation of 50-80% recorded the highest amount of crude placental protein with 13.56 mg/mL while saturation of 40-80% showed the lowest crude placental protein yield of 7.9 mg/mL. The size of PSPB can be visualised through SDS-PAGE technique at 60 kDa, which was detected as a prominent protein in the purified sample of 50-85% ammonium sulfate saturation. In conclusion, high concentration of ammonium sulfate at 50% - 80% saturation has successfully purified higher amounts of crude placental protein where PSPB can be detected as prominent protein through SDS-PAGE protein profiling analysis. Therefore, this study has provided an improved technique for purification of PSPB protein from bovine placenta.

Keywords: Pregnancy specific protein B (PSPB), cattle placenta, ammonium sulfate saturation, RIPA lysis buffer, SDS-PAGE

Effects of Different Concentrations of *Aspergillus niger* on Fermentation Characteristics and Nutritive Value of Napier Grass Silage

Hireshaa Asogan*, Mst Laila Naher and Mohammad Mijanur Rahman

Department of Agricultural Sciences, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia

First Author: hireshaa.f19b0044@siswa.umk.edu.my

ABSTRACT

Napier grass (*Pennisetum purpureum*) is gaining popularity among farmers as it produces high yield. However, it is considered as low-quality grass due to its low nutritional value. The aim of this study was to investigate the effect of different concentrations of *Aspergillus niger* on fermentation characteristics and nutritive value of dwarf Napier grass silage. Napier grass was harvested and chopped into small pieces. Chopped Napier grass was mixed with molasses and *A. niger* as follows: (i) Napier grass with 7% molasses (T0), (ii) Napier grass with 7% molasses and *A. niger* (10.7 ml/kg of mixtures; 10⁶ spores/ml) (T1) and Napier grass with 7% molasses and *A. niger* (10.7 ml/kg of mixtures; 10⁷ spores/ml) (T2). The mixture was compacted and stored in plastic bag for anaerobic fermentation at room temperature. After 45 days of fermentation, results showed that the addition of *A. niger* partially affected the fermentation characteristics and nutritive values of silage. The pH decreased with increasing concentrations of *A. niger* in silages (from 6.00 to 4.53), while the lactic acid content increased (from 3.72% to 6.41%). However, non-significant changes ($p > 0.05$) were found in the pH and lactic acid content. T1 silage showed significantly ($p < 0.05$) lower ash content (10.12%) followed by T0 (11.77%) and T2 (12.59%) silages. However, non-significant ($p > 0.05$) differences were observed on dry matter (DM), crude protein (CP), ether extract (EE), crude fibre (CF) and nitrogen free extract (NFE) contents among the treatments. There was an increasing trend on CP content (from 11.51% to 14.09%) with increasing concentrations of *A. niger* in silages, while no consistent trend was observed on CF content. In conclusion, *A. niger* could be used as additives to enhance the quality and nutritive value of silage, but more research is needed to clarify the mode of action of *A. niger* treated silages.

Keywords: Napier grass, silage, *Aspergillus niger*, fermentation characteristics, nutritive value

Effect of Different Inclusion Rates of BSFL on Growth Performance, Survival Rate and Physical Properties of *Macrobrachium rosenbergii* Juvenile

Nor Atiq Atiqah Binti Najmuddin*, Hazreen Nita Mohd Khalid and Hasnita Binti Che Harun

Department of Agriculture Sciences, Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600, Kelantan, Malaysia

***First Author:** atiqah.f19b0114@siswa.umk.edu.my

ABSTRACT

Animal feed industry has rapidly grown alongside aquaculture industry including giant freshwater prawn, *Macrobrachium rosenbergii*. This has urged the needs to find alternative protein resources that is cheap, safe, and mass available. Among others, Black Soldier Fly Larvae (BSFL) has become a focus of many studies and showed potential application as partial protein replacement especially in aquaculture feed. Thus, this study aims to determine the effects of different inclusion rates of BSFL (Treatment I (0%), Treatment II (10%), Treatment III (20%), Treatment IV (30%), and Treatment V (40%) of BSFL) on physical properties of the newly produced pellet and on the growth and survivability of *M. rosenbergii* juveniles. The results showed that there was no significant difference on growth performance and for survivability that also no significant. Physical properties results (bulk density, expansion ratio, sinking and sinking time) were significantly difference ($p < 0.05$). Treatment V had the highest value for bulk density and expansion ratio which was 0.423 ± 0.0251^a and 0.3040 ± 0.3050^a respectively. The highest value for sinking time and pellet durability was found in Treatment I, which was 19.076 ± 0.0251^a and 99.600 ± 0.8944^a respectively. Lastly, Treatment III has the best value for water stability, which is 40.228 ± 5.7678 . In conclusion, the difference inclusion rates of BSFL have significant differences on physical properties, but growth performance and survivability did not significant.

Keywords: *Macrobrachium rosenbergii*, Black Soldier Fly Larvae (BSFL), growth, survivability, physicochemical

Replacement of Fish Meal by Ground Coffee Waste (GCW) on Growth Performances and Gut Morphology of African Catfish (*Clarias gariepinus*)

Nur Nadia Zawawi*, Suniza Anis Mohammad Sukri and Zulhisyam Abdul Kari

Department of Agricultural Sciences, Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

***First Author:** nadia.f19b0145@siswa.umk.edu.my

ABSTRACT

This study was aimed to identify the fish meal substitution with ground coffee waste (GCW) on growth performance and gut morphology of African catfish (*Clarias gariepinus*). Five isonitrogenous diets (31 % crude protein) were prepared with five different levels of GCW as FM replacement, namely 0 % GCW (T1), 10 % GCW (T2), 20 % GCW (T3), 40 % GCW (T4) and 80% GCW (T5). Three hundred African catfish fingerlings were stocked in the aquarium. Weight gain (WG), specific growth rate (SGR), net weight gain (NWG), feed conversion rate (FCR), intraperitoneal fat (IPF), hepatosomatic index (HSI) and protein efficiency rate (PER) were determined. The experimental fish was given the formulated diet for 11 weeks. At the end of the feeding trial, the fish were subjected to growth performance and gut morphology. The study findings demonstrated that the experimental fish that received the T2 diet exhibited significantly higher ($p < 0.05$) growth performance parameters. Experimental fish that received diet T2 gut morphology of the intestinal revealed the gut of T2 diet had an intact epithelial structure compared with the other treatment. In conclusion, replacing 10% GCW with FM in aquafeed could improve *C. gariepinus* growth performance and health conditions.

Keywords: Ground Waste Coffee, African catfish, Gut histology, Growth performance, and Sustainable aquaculture.

Effect of Chicken Feather Meal Diet on Growth Performance of African Catfish (*Clarias Gariepinus*)

Ainnur Wahidah Suhaimi*, Zulhisyam Abdullah@Abdul Kari and Suniza Anis Mohamad Sukri

Department of Animal Husbandry Science, Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia

***First Author:** wahidah.f19b0232@siswa.umk.edu.my

ABSTRACT

An experiment was conducted with 240 African catfish (*Clarias gariepinus*) fingerlings with an initial weight of 12 ± 1.0 g and an initial length of 13 ± 1.0 cm were divided into 12 tanks to assess the effect of a chicken feather meal diet on the fish's growth performance. There are four different levels of chicken feather meal (CFM). Treatment 1 (Control) contains 0% of CFM, Treatment 2 (5% CFM), Treatment 3 (15% CFM) and Treatment 4 (30% CFM). The fish were reared for 8 weeks under similar conditions and were fed ad libitum for twice daily. Water quality was measured everyday to maintain water quality. Body weight and length were taken weekly on 5 fish in all the tanks and the respective length-weight relationship and condition factor (K), weight gain, specific growth rate (SGR), survival rate, intraperitoneal fat index (IFI), weighted feed consumption for FCR were evaluated and computed. Results showed that all parameters studied except survival rate were significantly ($P < 0.05$). Treatment 2 showed higher value for weight gain with 76.83 ± 4.54^a g, SGR with 95.92 ± 5.13^a %, IFI with 0.14 ± 0.51^a %, FCR 1.77 ± 0.08^a and K value were 493.02 ± 82.67^a . However, survival rate showed a similar percentage on Treatment 1, Treatment 2 and Treatment 4 with 96.67%. African fish (*C. gariepinus*) fed with 5% CFM in Treatment 2 showed the best result for the effect of CFM on African catfish diet.

Keywords: Chicken feather meal, African catfish (*Clarias gariepinus*), growth performance

Effect of Vitamin and Mineral Removal from Village Chickens Diet on Growth Performance, Foot Pad Dermatitis and the Bone Strength

Isnairrah Najiah Ibrahim^{1*}, Muhammad Hakim Mohd Ali Hanafiah² and Khairiyah Mat³

¹Faculty of Agro Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan.

²Department of Animal Science and Fisheries, Faculty of Agricultural and Forestry Science, Universiti Putra Malaysia Bintulu Campus Sarawak, Nyabau Road, 97008 Bintulu, Sarawak.

***First Author:** isnairrah.f19b0247@siswa.umk.edu.my

ABSTRACT

This study was conducted to assess the effect of vitamin and mineral removal from the starter and grower diet on growth performance, foot pad dermatitis and the bone strength of male Akar Putra chicken. Commencing from day 1, a total of 81 male Akar putra D.O.C were allocated into three treatment group with 3 replicates per treatment and 9 birds per replicate were evaluated in this finding. The male Akar Putra was provided with 3 different treatments (i) control (no withdrawal), (ii) 50% vitamin and mineral removal (iii) 0% vitamin and mineral removal for starter period from day 1 till 21 and for grower period from day 22 till 56. In comparison to the to the control group, only 0% vitamin and mineral removal were affected under the parameter growth performance in part of BWG ($p < 0.05$) because their BWG is the lesser compared to control and 50% vitamin and mineral removal. In addition, the FI ($p > 0.05$) of all treatment were not significantly different by the vitamin and mineral removal. Meanwhile the FCR do significant ($p < 0.05$) where the 50% vitamin and. mineral is the best compared to control. Moreover, the removal of vitamin and mineral not adversely effected the incidence of FPD ($p > 0.05$). However, the male Akar Putra of 0% vitamin and mineral removal had a higher bone breaking strength ($p < 0.05$) compared to control and 50 % vitamin and mineral removal treatment. In conclusion, vitamin and mineral can be removed from the male Akar Putra diet without any adverse effect on growth performance and incidence of foot pad dermatitis FPD but unfortunately the bone strength was adversely affected by the vitamin and mineral removal.

Keywords: Akar Putra, Growth performance, Footpad Dermatitis, Bone strength

Comparison Study of Raw Meat Quality Between Broiler Chicken and Native Village Chicken

Muhammad 'Afifi Bin Hairulazam*, Mohammad Mijanur Rahman and Noor Hafizoh Binti Saidan

Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600 jeli, Kelantan, Malaysia

*First Author: afifi.f19b0259@siswa.umk.edu.my

ABSTRACT

The study was aimed to identify the comparison of raw meat quality between broilers chicken and village chicken. This study has been proposed due to lack of information in term of meat quality among public. A study was conducted to determine the differences in the quality of broilers raw meat and village chicken after the chicken is slaughtered. Broiler and village chickens are available in Malaysia. A total of six broilers and village chickens were analysed for total protein (TP), total fat (TF), total fibre (TFB), moisture, ash content, pH and colour analysis. Total plate count (TPC) was also performed to determine the microbial present in the meat of six broilers and village chickens. The findings of the research indicated that there were no significant differences ($P>0.05$) on carcass composition (feather, feet, carcass weight, neck with skin, wing with skin, leg, breast muscle, bone yield, liver, gizzard proventriculus, kidney, lung, intestine pancreas, and gastrointestinal) except body weight, slaughter weight, head, skin with fat, heart, and spleen. Body weight of broiler chicken was significantly higher than village chicken. There were no significant differences ($P>0.05$) on physicochemical properties (total protein, fiber, ash content and moisture balance) except total fat only. Total fat of broiler chicken was significantly higher than village chicken. Next, there were no significant differences ($P>0.05$) on pH and colour analysis of village chicken. On total plate count, there was no significant difference ($P>0.05$) between broiler chicken and village chicken. In conclusion, this study finalized the broiler chicken was preferable than village chicken as the result significantly higher.

Keywords: Chickens, meat quality, carcass composition, physicochemical properties, microbial

The Effects of Different Energy and Protein Levels of Corn-Soy Feed on Village Chicken's Blood Biochemistry and Hematology

Nur Aqilah binti Abdullah^{1*}, Nor Dini Rusli¹ and Muhammad Hakim Mohd Ali Hanafiah²

¹Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Faculty of Agriculture and Forestry Science, Department of Animal Science and Fisheries, University Putra Malaysia Bintulu Campus Sarawak, Nyabau Road, 97008 Bintulu, Sarawak

***First Author:** aqilah.f19b0280@siswa.umk.edu.my

ABSTRACT

The study was conducted to evaluate the effect of different energy and protein levels of corn-soy feed on village chicken blood biochemistry and haematology. A total of 192 one-day-old male village chickens were randomly divided into four treatments. Each treatment consisted of 3 replicates with 12 hens each. For the starter period, from day 1 to 21, an equal number of birds were fed with one of the following diets: (1) diet with 3060 kcal/kg and 22% CP, (2) diet with 3060 kcal/kg and 20% CP, (3) diet with 2860 kcal/kg and 22% CP, and (4) diet with 2860 kcal/kg and 20% CP. Whereas for the grower period, from day 22 to 56, each dietary group proceeded with the following treatment accordingly: (1) diet with 3200 kcal/kg and 19.5% CP, (2) diet with 3200 kcal/kg and 17.5% CP, (3) diet with 3000 kcal/kg and 19.5% CP, and (4) diet with 3000 kcal/kg and 17.5% CP. There was a significant interaction effect between energy and protein on a haematological parameter such as WBC, RBC, MON, GRA, HGB, and PLT ($p < 0.005$). Meanwhile, as for biochemistry, the significant interaction effect between energy and protein on TP (total protein) and cholesterol can be observed ($p < 0.001$). Results indicated that birds fed with the lowest energy and lowest protein feed have the most significant effect on the haematological. Hence, using the corn-soy feed from LELP treatment must be avoided to make sure the blood biochemistry and haematology of village chicken would not be negatively affected.

Keywords: Red jungle fowl (*Gallus gallus*), corn-soy feed, blood parameter, hematology and biochemistry, energy and protein level

The Effect of Different Pre-Emergence Herbicides Application on Weed Population Density and Pineapple Vegetative Growth (*Ananas Cosmos*)

Abdul Rahim Bin Mat Sari*, Raimi Mohamed Binti Redwan

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli Kelantan

First author: rahim.f19a0002@siswa.umk.edu.my

ABSTRACT

Pineapple (*Annanas comosus*) is a perennial plant of to the botanical family Bromeliaceae that is native to the tropics of North and South America and the Caribbean. It is a resilient tropical fruit that may be found in all tropical and subtropical regions of the world. It is also one of the famous fruit in Malaysia because of a high potential for generating cash for farmers and countries. The objective of this study was evaluate the effectiveness of pre-emergence herbicide on reducing weed density populations on pineapple bed prior to planting and to evaluate the effect of its application on the vegetative growth of pineapple. The experimental design of this study using four different types of treatments which is Diuron, Atrazine, Ametryn and Control on 10 replicate of pineapple tree per bed. Data for weed density per quadrant of bed collected for 90 days for the effectiveness of herbicide application and vegetative growth of pineapple, data of the height of tree (cm), number of leaves and D leaf (cm) were collected monthly. The weed density populations result shows the pre-emergence herbicide Ametryn were lowest at 30th day of planting, followed by Diuron, Atrazine and lastly Control. By the 90th day, the weed density is really high for all treatment most likely due continuous rain during the experiment. Overall, all samples showed good developmental growth by the 90th after planting. Pineapple bed with Ametryn herbicide application shows the best vegetative growth with p-value 0 due to lack of competition with weeds compared to other pineapple bed. Therefore, the application of pre-emergence herbicide of Ametryn can reduce the weed density populations and its application does not affect the vegetative growth of pineapple as indicated by the results.

Keywords: pineapple, weed density populations, vegetative growth, pre-emergence herbicides

The Effect of The Garlic (*Allium sativum*) as Natural Seed Treatment Toward Seed Germination and Vegetative Plant Growth On Red Chili (*Capsicum annuum* L.)

Bay Hui Yi^{1*} and Nur Karimah Binti Mukhtar

Faculty of Agro-based Industry, Universiti Malaysia Kelantan, Jeli Campus, Kelantan, Malaysia

First author: huiyi.f19a0022@siswa.umk.edu.my

ABSTRACT

Seeds are the passive carriers of several major seed-borne illnesses caused by fungi, bacteria, and viruses. This typically impacts seed germination and plant growth performance. Hence, seed treatments are essential to prevent the seeds from infection. This study aims to determine the effectiveness of garlic (*Allium sativum*) extract as a natural seed treatment toward fungal growth, seed germination and vegetative plant growth on red chili (*Capsicum annuum* L.). Thiram and different concentrations of garlic extract (10%, 20%, 30%, and 40%) + 1 % alginate were applied for the treatment of chilli seeds. Treated seeds with garlic extract are germinated on filter paper prior to being transplanted into a polybag. The results suggest that garlic extract had a significant effect on fungal growth inhibition, seed germination, and plant growth performance. 40 % concentration of garlic extract + 1 % alginate had the highest fungal growth inhibition of *Colletotrichum capsici* (85 %) and seed germination (98.67 %). The red chili plant height, shoot, root and weight were also greatest in 40 % garlic extract + 1 % alginate. Thus, it can be concluded that garlic extract can be used as a natural fungicide for treating red chilli seeds to reduce seed-borne fungal pathogens and increase red chilli seed germination and plant growth.

Keywords: Seed Treatment, Garlic, Red Chili, *Colletotrichum capsici*

Enhancing the Stability Dragon Fruit Peels Extract using Different Types of Additives

Brenwin Goh Eng Chian, Zuharlida Tuan Harith

Faculty of Agro-Based Industry, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

First author: brenwin.f19a0023@siswa.umk.edu.my

ABSTRACT

Today, people are increasingly hostile to the use of artificial colors because they are concerned about the various negative health effects of consuming them. In order to increase the selectivity of more natural pigments, this study will revolve around the extraction of betacyanins which are the pigments from dragon fruit peel and investigate its stability. Betacyanins and betaxanthins are composed of betalains, which provide red-violet and yellow-orange colors, respectively, that are commonly found in dragon fruit. In this study, the pigments in the dragon fruit peel were extracted using hot water extraction, and the observation of the change of colour, pH value, total phenolic content, total flavonoid content, and antioxidant activity for 4 weeks. The objectives of the project are to do the determination of the current extract of the betacyanin and use the additives which are ascorbic acid and citric acid to enhance the stability of betacyanins. In the study, the changes of colour were similar for three kinds of the samples including the pure samples and the two samples with additives. The pH value of the samples with citric acid (6.33 ± 0.15) were closer to the neutral compare to the pure samples (5.93 ± 0.06) and the samples with ascorbic acid (5.73 ± 0.40) at the 28th day. The samples with ascorbic acid had the highest reading from three of the sample at the 28th day for the TPC reading (3.91 mg GAE/g) and DPPH assay (18.69 mg AAE/g). And the reading of pure samples had the highest reading for TFC analyses (7.82 mg QE/g). Both additives are able to enhance different parts of content in betacyanins due to their different chemical structure. The additives bring effect on the TPC, TFC, and antioxidant activity but not in the colour.

Keywords: Dragon fruit peels, pigment, stability, hot water extraction, betacyanins

The Effect of Natural Antifungal Turmeric (*Curcuma longa* L.) and Garlic (*Allium sativum* L.) in Psyllium-based Seed Coating toward Seed Germination Rate, Fungus Growth Inhibition and Vegetative Growth of Seedling of Chilli (*Capsicum annuum* L.)

Chan Yin Jing^{1*}, Nur Karimah binti Mukhtar²

¹Faculty of Agro-based Industry, Universiti Malaysia Kelantan, Malaysia.

First author: yinjing.f19a0024@siswa.umk.edu.my

ABSTRACT

The chilli (*Capsicum annuum* L.) is one of Malaysia's most economically significant vegetable crops. The anthracnose caused by *Colletotrichum* spp. in chilli has long become the main issue in the chilli industry. This disease causes losses in both the yield and quality of the seeds and fruits of chilli. This study aimed to investigate the different concentrations of natural antifungal turmeric (*Curcuma longa* L.) and garlic (*Allium sativum* L.) in psyllium-based seed coating toward seed germination rate, *Colletotrichum* spp. growth inhibition and vegetative growth of seedlings of chilli. The different concentrations (10 %, 20 %, 30 %, 40 % and 50 %) of ethanolic extract of turmeric and garlic were incorporated in Psyllium-based seed coating for its application on the chilli seeds. Data were recorded on germination rate, *Colletotrichum* spp. growth inhibition, growth promotion of seedlings, and seedling vigour of chilli. The laboratory experiments were established under a completely randomized design. The means of the variables were compared using the Tukey test ($\alpha=0.05$). Results showed that 50 % turmeric extract incorporated in Psyllium-based seed coating had the highest germination rate (100 %), followed by the 40 % turmeric extract (98.67 %). At the same time, the positive control, turmeric (40 and 50 %) and garlic (30, 40 and 50 %) extracts incorporated Psyllium-based seed coating in chilli seeds 100 % inhibited the growth of *Colletotrichum* spp.. The presence of the antifungal compound, alliin and curcumin in the garlic and turmeric extract can explain these results. The 50 % turmeric extracts incorporated in Psyllium-based seed coating showed the highest root growth promotion and seedling vigour index, which were 26.47 % and 983, respectively. Meanwhile, the positive control showed the highest shoot growth promotion (17.50 %), followed by 50 % turmeric (6.35 %). These results indicated that 50 % turmeric-incorporated Psyllium-based seed coating helped in chilli seedling growth due to the presence of acetic acid in turmeric extract. 50 % turmeric-incorporated Psyllium-based seed coating was the most effective treatment in inhibiting the *Colletotrichum* spp. and promoting the seed germination rate and seedling growth.

Keywords: turmeric (*Curcuma longa* L.), garlic (*Allium sativum* L.), Psyllium-based seed coating, antifungal, germination

Effects of Protease-Treated Madre De Agua (*Trichanthera gigantea*) Leaf Meal as An Alternative Protein Source on The Growth Performance and Texture Analysis of Hybrid Chickens (*Akar Putra*).

Fong Pui Xian^{1*}, Syed M. Al-Amsyar^{1,2}

¹Faculty of Agro-based Industry, Universiti Malaysia Kelantan, Jeli Campus, Malaysia.

²Institute of Food Security and Sustainable Agriculture, Universiti Malaysia Kelantan, Malaysia

First author: puixian.f19a0037@siswa.umk.edu.my

ABSTRACT

Poultry feed availability, high price, and low quality are the most significant problems faced by the poultry industry nowadays, thus restricting sustainable poultry production. Madre de Agua (*Trichanthera gigantea*) is a potentially good source of alternative protein ingredients for poultry feed. This study aims to evaluate the growth performance and texture analysis of hybrid chickens (*Akar Putra*) by utilising the protease-treated Madre de Agua (*Trichanthera gigantea*) leaf meal as an alternative protein source. Besides, the treatment feed cost per weight gain was compared with the control feeds. Protein hydrolysis using UV-visible spectroscopy was used to determine the feed sample's protein concentration. After a four-week-feeding trial, the growth performance of 36 heads of hybrid chickens (*Akar Putra*) in the finisher growth stage consuming treated feed (protease-treated *Trichanthera gigantea* leaf meals) were compared to chickens consuming control feed (untreated *Trichanthera gigantea* leaf meals), followed by texture analysis. There is a significant difference ($p < 0.05$) between the control and treatment feed intake by the chickens ($p < .001$) but no significant difference ($p > 0.05$) in the chickens' body weight change ($p = 0.105$). The feed conversion ratio ($p < .001$) has a significant difference ($p < 0.05$). This result can be explained by the protein analysis where the protein concentration of protease-treated *Trichanthera gigantea* leaf meal increases linearly with hydrolysis time. Zero mortality rate was observed in these two groups. The feed cost per weight gain per chicken consumed treatment feed is 25.66% less than the control feed. The hardness ($p = 0.022$) and chewiness ($p = 0.030$) of chicken meat are significantly correlated ($p < 0.05$). Meanwhile, cohesiveness ($p = 0.747$) and adhesiveness ($p = 0.898$) are not significantly correlated ($p < 0.05$). Protease has a significant function in improving *Trichanthera gigantea* leaf meals. The chickens consuming treated feed have higher feed efficiency and are more cost-effective than control feed. Furthermore, the treated feed makes the chicken breasts and thighs firm but less chewy.

Keywords: protease, Madre de agua (*Trichanthera gigantea*) leaf meal, protein hydrolysis, growth performance, texture analysis.

Identification of Secondary Metabolite Compounds on Leaves of *Bambusa beecheyana* using Different Polarity of Solvents

Ghayatri a/p Vijayan^{1,*}, Maryana Mohd Nor¹

¹ Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus 17600, Kelantan, Malaysia

First Author: ghayatri.f19a0039@siswa.umk.edu.my

ABSTRACT

Bamboo leaves contain a variety of bioactive compounds. The compounds in *Bambusa beecheyana* leaves may have many benefits in terms of food and pharmaceuticals, but studies on the bamboo species' leaves are little known to the public. The purpose of this study was to extract secondary metabolite compounds from *Bambusa beecheyana* leaves using different solvent polarities. Water, ethanol, and toluene are used as solvents. Extraction methods used were maceration for water and Soxhlet extraction for ethanol and toluene. The leaves dissolve a lot in polar solvents, as calculated by the yield of extraction obtained for water and ethanol, which is more than toluene, which is a non-polar solvent. The three leaf extracts were tested for secondary metabolite contents by phytochemical screening tests. Phytochemical screening was the first stage to detect secondary metabolite compounds in plants. Secondary metabolite compound screening included phenols, flavonoids, tannins, alkaloids, and saponins. Based on the secondary metabolite compound screening tests, water and ethanol can change colours according to the tests, which proved *Bambusa beecheyana* leaves contain alkaloids, saponins, phenols, flavonoids, and tannins, while toluene changes colour in alkaloids, phenols, and tannins. All three crude extracts were analysed for total phenolic content (TPC) and total flavonoid content (TFC). Both tests show that the leaves of *Bambusa beecheyana* contain high concentrations of phenols and flavonoids, especially with an average concentration of 266.8 GAE/mg in ethanol and toluene. The results indicate that the leaves of *Bambusa beecheyana* are rich in secondary metabolite compounds and can be well used in the food and pharmaceutical industries.

Keywords: *Bambusa beecheyana*, Secondary Metabolite Compounds, Ethanol, Toluene, Water

Development and Physicochemical Properties of Herbal Drink Made from Bamboo (*Bambusa Beecheyana*) Leaves

Joyce Savariamal A/P George*, Dr. Maryana Mohamad Nor

¹Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus 17600, Kelantan, Malaysia

First Author: joyce.f19a0051@siswa.umk.edu.my

ABSTRACT

Bamboo leaves are often used to make various food products, including herbal drinks because of its numerous health benefits including pharmaceutical applications, especially stomach pain. Herbal drinks developed from *Bambusa beecheyana* species are rarely made since this particular species can only be found in China. Hence, the purpose of this study is to develop a new functional food with antioxidant properties as well as to conduct physicochemical properties of herbal drink to obtain the best formulation of bamboo based herbal drink. In this study, the sample preparation was done by drying method and 5 formulations of bamboo leaves incorporated with orange peel and pandan leaves ratio were experimented. Physicochemical properties, namely pH, colour, and total soluble solids (TSS) were tested for the 5 developed formulations including the commercially available bamboo tea to compare the respective properties as well. The antioxidant activity was tested based on the 2 formulations shortlisted from the market survey conducted which are formulation 1 and formulation 4 using 2,2-diphenyl-2-picrylhydrazyl radical scavenging activity assay (DPPH) and ferric reducing antioxidant power (FRAP) assays and total phenolic content (TPC). Based on the results obtained, formulation 4 of the herbal drink was selected as the best formulation since the antioxidant activity along with the physicochemical properties were the closest with the commercially available herbal drink. The findings of this research can be extended to assess the potential of *Bambusa beecheyana* leaves in the development of other beverages.

Keywords: *Bambusa beecheyana*, bamboo leaves, herbal drink, physicochemical, antioxidant activity

Development of Herbs and Spices Based Food Seasoning

Kang Wern Khai¹, Zuharlida Tuan Harith¹

Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

***First author:** wernkhai.f19a0054@siswa.umk.edu.my

ABSTRACT

Herbs and spices are important in modern cuisine as they have been employed in many food preparations. They are gaining popularity in many countries due to the potential medical and nutritional benefits of their natural antioxidant capabilities. *Cosmos caudatus* (Ulam Raja), *Zingiber officinale* (Halia), and *Centella asiatica* (Pegaga) are chosen as the sample in this research to identify the bioactive compounds that can contribute to food seasoning. The objectives of this study are to determine the bioactive compounds from samples for analysis, to prepare freeze dried seasoning powder of herbs and spices by using freeze drying method, and to formulate the herbs and spices based food seasoning by using different types of ingredients followed by the determination of consumer acceptance in sensory analysis. *Cosmos caudatus*, *Zingiber officinale*, and *Centella asiatica* were blanched for 8 minutes at 80°C with the addition of 1 teaspoon of sodium metabisulphite. The samples were then blot dried and stored at -80°C freezer for 24 hours. Freeze drying process was carried out for 36 hours at -50°C. The food seasoning mixtures were then formulated by using various powdered samples and were tested for consumer acceptance by using 30 non-trained panellists from among Universiti Malaysia Kelantan's students. Then, the results showed that the value of overall acceptability of sample coded 244 was the highest (6.57 2.33) while the sample coded 214 and 274 got the similar value (4.3 2.18) and (4.3 2.05). 73% of panellists tasted the sample coded 244 as bland. Freeze drying process of *Cosmos caudatus* possessed higher total flavonoid content which was 15.03 mg QE/g as compared with the oven drying process (5.53 mg QE/g). New developed food seasoning powder may provide another choice for the consumer in creating a dish with natural flavour.

Keywords : *Cosmos caudatus*, *Zingiber officinale*, *Centella asiatica*, freeze drying, consumer acceptance.

Effects of Different Types of Planting Media on Growth Performance of *Halia Pijat* (*Elletariopsis Curtisii*) Cultivation

Mohd Walafuddin Maliq Bin Ahmad¹, Lukman Bin Ismail, Muhammad Nurfaiz Bin Abd. Karim

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: Walafuddin.f19a0070@siswa.umk.edu.my

ABSTRACT

Elletariopsis Curtisii, often known as "*Halia Pijat*", is a tiny plant group in the Zingiberaceae family. Indigenous people have always utilized it because it grows beneath enormous trees in the forest to get high humidity which is favorable for its development. The impact of varying intensities of light and the growth effect of *Elletariopsis Curtisii* is determined by utilizing several kinds of media such as cocopeat, rice husk, and peat moss under varied settings such as beneath the sunshade and otherwise. A total of 40 polybags were constructed in order to properly carry out this experiment and gather sufficient data. Each form of media, including the control, will be put into 10 polybags, which will then be divided into two groups. Those that will be shaded by a sunshade and those that will not. The height of the plant, the number of leaves and tillers, the size of the leaves, the diameter of the stem, the average weight of the rhizomes per medium, and the chlorophyll content were all assessed in this research. Despite significant differences in growth performance, the study shows that all plant samples are well-grown 10 weeks after planting. This is true even if there are significant differences between the plant samples. By using XlsSTAT (ANOVA) analysis, under comparison to M0 (control), M1 (cocopeat), and M3, the growth of M2 (rice husk) in a sunshade was relatively optimum in terms of average overall yield weight as well as plant morphology such as tree height, leaf width, and stem diameter. M2 had the greatest average total yield weight as well. When compared to plants that are not under the protection of a sunshade, M2 is still the ideal medium for the cultivation of "*Halia Pijat*". However, it has drawbacks such as the leaves turning yellow and dry due to the unpredictability of hot weather.

Keywords: *Elletariopsis Curtisii*, rhizomes, Zingiberaceae, growth, media.

The Effect of Cinnamon (*Cinnamomum verum*) as a Natural Seed Dressing toward Seed Germination on Brinjal (*Solanum melongena L.*)

Muhammad Hafiz bin Ramli, Nur Karimah binti Mukhtar

¹ Faculty of Agro-based Industry, Universiti Malaysia Kelantan, Jeli Campus, Malaysia.

² Institute of Food Security and Sustainable Agriculture,
Universiti Malaysia Kelantan

First Author: hafiz.f19a0087@siswa.umk.edu.my

ABSTRACT

Brinjal (*Solanum melongena L.*) is an important solanaceous vegetable in many countries such as Asia and Africa. Brinjal is a substitute for carbohydrate in daily meal, because brinjal are high in fibre and low in calories. Brinjal also popular as tropical diets because brinjal have good source of nutrients and vitamins. This study aims to provide an alternative seed dressing using cinnamon (*Cinnamomum verum*) as a fungicide to protect the brinjal seed and accelerate the rate of germination. *Phomopsis blight* is a common disease on brinjal caused by *Phomopsis vexans*. The seed were treated by cinnamon and alginate act as a binder to coated the seed with four different, 5% cinnamon, 10% cinnamon, 15% cinnamon and 20% cinnamon. The effectiveness of seed dressing was determined by number of seeds that germinate from day 1 to day 14. Control, have the lowest germination rate (67.78%) compared to seeds with 15% coating (92.22%). While, 20% concentration result to lower germination rate (60%), due to the thickness of the binder, which harden the seed to sprout. Then, the seed dressing was compared with chemical seed dressing, Thiram 80. Seed germination rate with Thiram 80 treatment was a bit higher compared to control (78.89%), which indicates that cinnamon seed dressing with 15% concentration have the highest germination rate. Referring to fungi analysis, prove that cinnamon seed dressing is better seed dressing due to the number of seeds that can germinate. In five days, observation, 21 seeds were not germinated without seed treatment, while 15% cinnamon concentration, have the lowest (6) number of seeds that do not germinate. Thus, this showed that cinnamon is a good seed treatment.

Keywords: brinjal, cinnamon, seed dressing, germination rate, fungicide

Utilization of Eco-Enzyme from Pineapple (*Ananas Comosus*), Key Lime (*Citrus x Aurantiifolia*), and Mandarin Orange (*Citrus Reticular*) Waste for Application as Organic Stain Remover

Muhammad Hanif bin Sallehuddin^{1,*}, Zuharlida Binti Tuan Harith¹

¹Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Kampus Jeli, 17600 Jeli, Kelantan, Malaysia

First Author: hanif.f19a0089@siswa.umk.edu.my

ABSTRACT

Annually, there is a lot of waste dumped from fruits mainly from the agriculture industry and households including fruit peels, seeds, stems, and leaves. However, there are many beneficial components that can be found in fruit waste such as cellulose, sugars, lignin, and enzymes that can be utilized for other beneficial purpose. This study was conducted to evaluate the potential of using fruit byproducts as eco-enzyme. Three different types of fruit peels were used in this study including pineapple (*Ananas comosus*), key lime (*Citrus x aurantiifolia*), and Mandarin orange (*Citrus reticulata*). Furthermore, the protease activity assay was performed to determine the protease activity in the eco-enzyme produced. Besides that, the effectiveness of eco-enzyme based on fruit by-products as organic stain remover was evaluated using the washing cloth method. The effectiveness of eco-enzyme was tested using the immersion technique for 30 minutes before rinsing with tap water. Results showed that protease activity for Formulation A, B, and C were 1321 U/ml, 1481 U/ml, and 1228 U/ml, respectively. For the effectiveness of the eco-enzyme test, Formulation B which uses 50 % of lime waste is able to clean stains more effectively than Formulation A and Formulation C. Results in this study showed that, by using agricultural waste as a disinfectant for clothing, kitchens, and floors, this may minimize the amount of agricultural waste dumped. Furthermore, employing eco-enzyme as a naturally safe cleaning agent can also lower the price and risk associated with the hazardous chemicals included in commercial stain removers.

Keywords: Protease, Eco-enzyme, agriculture, stain remover

Screening of Antimicrobial Activity of *Piper Sarmentosum* Leaf Extract

Norazliana Mohd Azman^{1,*}, Kharul Azmi Mu'azzam Abdul Rahman¹

Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus 17600, Kelantan, Malaysia

Email: azliana.f19a0120@siswa.umk.edu.my

ABSTRACT

Herbal plants have been used for medicinal purposes because most of them have therapeutic value that can be used to treat various infectious diseases. The current study was conducted to prepare the extract of *P. sarmentosum* by using the consecutive solvent extraction method with the intention to investigate the antibacterial potential of different extracts of *P. sarmentosum* leaf on the selected Gram-positive (*Staphylococcus aureus*, and *Bacillus cereus*, *Bacillus subtilis*) and Gram-negative (*Klebsiella pneumoniae*, *Escherichia coli*, and *Pseudomonas aeruginosa*) bacteria using disc diffusion assay. *P. sarmentosum* leaf extract was prepared through successive chemical extraction according to increasing solvent polarity using hexane, ethyl acetate, acetone, ethanol, and methanol. The results indicated that all six used microorganisms were sensitive to the plant extracts. The result revealed that the five extracts exhibit more inhibitory activities towards Gram-negative bacteria compared to Gram-positive bacteria. The highest percentage of the inhibitory potential of extract which showed the most promising antibacterial activity are ethyl acetate, acetone, ethanol, and methanol as they can inhibit all the test bacteria used in this study. In conclusion, the screening method of antimicrobial activity in leaf extract of *P. sarmentosum* can lead to the development of novel antimicrobial agents as medicinal plants have been acknowledged to harbour diverse bioactive compounds. Data from this study serves as a reference for further exploration and development of new antibacterial agents from natural sources to improve human health in the future.

Keywords: *P. sarmentosum*¹, leaf extract², bacteria³, solvent polarity⁴, disc diffusion assay⁵.

Effects of Different Percentages of Binders in the Formulation of Herbal Tea Cubes

Norfazliana binti Md Zaki¹, Zuharlida binti Tuan Harith¹

Faculty of Agro Based Industry, Univerity Malaysia Kelantan Kampus Jeli, 17600 Jeli, Kelantan

Email: fazliana.f19a0121@siswa.umk.edu.my

ABSTRACT

Brown sugar is a viscous organic material that burns easily. Scholars are currently conducting a considerable study on brown sugar as binders for sticking the cube herbal tea. This study was conducted to make herbal tea cubes with partial substitution of binders, which is brown sugar in various percentages. Project aim to formulate of different formulation of herbal tea cube used different binder percentages. Physical and textural properties of herbal tea cube produced was determined using texture analyser. After that, the consumer acceptance of herbal tea cube using different binders percentage were evaluated through sensory analysis procedures. Result showed that intensities of L* were increased while a* and b* decrease in colour tea cube when increased in the percentage of binders used. Partial substitution of binders for the formulation of tea cubes resulted in increasing the hardness of the tea cube but had no effect on the springiness qualities. Further evaluation the consumer acceptance showed that tea cubes using formulation 1 are preffered most among panellist. As a conclusion, this study shows that formulation 1 using 1% brown sugar is the best in term of its physical properties as well as consumer preference compared to other formulation. However, as for colour, tea cubes with formulation 1 is not appealing as the colour intensity is higher compared to formulation tested. This tea cubes has the potential to be commercialised subjected to detail investigation on its nutrional properties. In term of colour, the cube with 1% solution is not preferable because the colour are light compare to other formulations but does not include with control sample colour.

Keywords: Brown sugar, binders, cinnamon, tea cubes and sensory analysis.

Function Treatment of Plant Protein *Trichanthera gigantea* with Acidic Salt for Hybrid Chicken (Akar Putra)

Nur Ain Nabihah binti Ramli¹, Syed M. Al-Amsyar¹

¹Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan

Email: nabihah.f19a0125@siswa.umk.edu.my

ABSTRACT

The fact that chicken meat was important source of animal protein for human growth and development. This study was conducted to focus on the problem of increased poultry feed prices. For any kind of poultry, protein source such as soybean was critical component of their daily diet. Thus, the used of local ingredient *Trichanthera gigantea* as alternative source. The objectives of this research were to produce treated *Trichanthera gigantea* with monosodium phosphate, to analyse the growth performance of hybrid chicken, and to determine the feed cost per weight with newly developed chicken feed. This research, used 36 hybrid chickens and divided into two group samples which were untreated and treated. The *Trichanthera gigantea* leaves had been prepared used a natural source of drying technique (sunlight) before begin formulated with monosodium phosphate (NaH_2PO_4) and *Trichanthera gigantea*. Hybrid chickens were fed twice a day. This experiment was measured the ADG, FCR, and feed cost. All the result was not significant ($p > 0.250$) ADG, ($p > 0.905$) FCR, and ($p > 0.529$) feed cost. Otherwise, the sample texture analyzer was used breast and thigh. The chewiness (-51.43 % and -52 %) and hardness (-31.51 % and -38.18 %). The sample meat was used a texture analyzer showed that the treatment better than the control. Lastly, the local ingredient *Trichanthera gigantea* can improved the FCR and can be used as a commercial feed.

Keywords: *Trichanthera gigantea*, hybrid chicken, monosodium phosphate (NaH_2PO_4)

Determination of Antimicrobial Potential of *Oenanthe javanica* Leaf Extract against Foodborne Pathogens

Nur Amirah Alias^{1,*}, Kharul Azmi Mu'azzam Abdul Rahman¹

¹ Faculty of Agro-Based Industry, University Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan

First Author: amirah.f19a0129@siswa.umk.edu.my

ABSTRACT

Since ancient times, medicinal plants have been used widely by people to cure numerous diseases and infections. Medicinal plants have many antimicrobial and antioxidant abilities because they contain many phytochemical components such as flavonoids, tannins, terpenoids, and alkaloids. Therefore, this study aims to examine the antimicrobial potential of *Oenanthe javanica* leaf extract extracted from sequential solvent extracts according to the increasing polarity, viz., hexane, ethylacetate, chloroform, acetone, ethanol, and methanol. The crude extracts of *O.javanica* were then screened for antimicrobial activity against selected Gram-positive (*Bacillus cereus*, *Staphylococcus epidermidis*, *Staphylococcus aureus*, and *Enterococcus faecalis*) and Gram-negative bacteria (*Escherichia coli*, *Klebsiella pneumoniae*, *Salmonella typhimurium*, and *Shigella boydii*). The results showed that Gram-positive bacteria were more susceptible to the extract compared to Gram-negative bacteria. The extracts with the highest inhibitory potential were ethyl acetate, acetone, and ethanol extracts as they can inhibit all eight bacteria used in this study. In conclusion, the determination of antimicrobial properties of *O. javanica* leaf extract can lead to the development of natural antimicrobial agents that are safer and have less adverse effects compared to synthetic antimicrobial agents.

Keywords: Medicinal plants, antimicrobial potential, *Oenanthe javanica*, crude extracts, antimicrobial activity.

Determination Of Heavy Metal Residue Comparison and Health Risk Assessment in Processed Canned Tomato Paste and Fresh Tomatoes by Using Atomic Absorption Spectrometry (AAS)

Nur Awatif Binti Mohd Fauzi¹, Krishna Veni Veloo¹

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan,

17600 Jeli, Kelantan

First Author: awatif.f19a0136@siswa.umk.edu.my

ABSTRACT

Tomatoes are an important part of a well-balanced diet. The goal of this study is to use Atomic Absorption Spectrometry (AAS) to extract the heavy metal residues comparison in processed canned tomato paste fresh tomato samples purchased from Jeli market. Next, to analyse heavy metal residues (Cd, Cr, Cu, Pb, Zn) comparison in processed canned tomato paste and fresh tomato by using Atomic Absorption Spectrometry (AAS). Lastly, to assess human health risk assessment in consumption of tomato at Kelantan. A process known as wet acid digestion was used to extract the selected samples. The results that obtained from this study, the average heavy metals concentration in four different brands of canned tomato paste respectively were arranged in the increasing order, which was Cr > Cd > Cu > Pb > Zn. The results for concentration in fresh tomato also show the same as canned tomato which were arranged in increasing order was Cr > Cd > Cu > Pb > Zn. Assessed metal levels in four brands canned tomato were below the WHO/FAO permissible levels except for chromium and zinc. While, for fresh tomato, the levels of investigated metals in the analysed fresh tomato were below the permissible limit set by World Health Organization WHO/FAO of heavy metals recommended as dietary intake in tomato. The hazard index values for canned tomato paste recorded slightly exceeded the HI values at 1.71 by WHO/FAO which is more than 1, it is considered unsafe for human consumption. But in fresh tomato it is safe to consume for human because of the hazard index value are less than 1 which is 0.06. The information and insight gained from the studies will help to better understand the heavy metal residue found in food sources such as canned fruits and vegetables

Keywords: Heavy metals, Tomato, Health risk assessment, Atomic Absorption Spectrometry.

The Investigation of Antibacterial Activity of Leaf Extract of *Cosmos caudatus* Against Foodborne Bacteria

Nur Dinie binti Mat Yasin¹, Dr. Kharul Azmi Mu'azzam binti Abdul Rahman²

Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

Email: dinie.f19a0138@siswa.umk.edu.my

ABSTRACT

This study is mainly about preparation of the leaves extract using the sequential solvent extraction method and determination of the antibacterial activity of the leaf extracts against selected foodborne bacteria by using disc diffusion assay. In this study, the *Cosmos caudatus* plant was chosen to investigate its potential as an antibacterial agent against foodborne pathogens. The extract of *C. caudatus* is reported to have antioxidant activity and antibacterial activity that can be further developed as an antimicrobial agent. The sequence chemical solutions that are used are hexane, ethyl acetate, chloroform, acetone, ethanol and methanol according to polarity starting from non-polar solvent until polar solvents. Biological screening of 6 extracts from the plant *C. caudatus* was performed against 8 pathogenic bacteria. Antibacterial screening results showed that ethyl acetate extract gave the largest inhibition zone diameter with 10.7 ± 2.1 mm against *S. Epidermidis* through disc diffusion method. The result indicated that not all used microorganisms were sensitive to the plant extracts. The highest percentage of the inhibitory potential of extract which showed the most promising antibacterial activity are ethyl acetate only as it can inhibit all the test bacteria used in this study. It is concluded that the plant extract possessed antibacterial activity against tested organisms. The zone of inhibition varied suggesting a varying degree of efficacy.

Keywords: *Cosmos caudatus*, extract, antibacterial agent, screening, inhibition zone

Antimicrobial Activity of Fungal Endophytes Isolated from *Piper betle* Leaves

Nur Sa'adah Binti Mohd Radzi^{1*}, Kharul Azmi Mu'azzam Binti Abdul Rahman¹

Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First author: saadah.f19a0146@siswa.umk.edu.my

ABSTRACT

Medicinal herbs have been used as therapeutic cures since prehistoric times. Today, medicinal herbs are major source for the development of novel medicines because they accommodate many phytochemical properties that contribute to the therapeutic power against numerous disease and infections. *Piper betle* L. or also known as Sirih leaf in Malaysia is widely used in alternative medical to treat diabetes and skin diseases. Isolation of endophytes from these medicinal herbs leads to the synthesizing many secondary metabolites that can be used as bio control agents capable of inhibiting to various types of pathogenic microbes and cure dangerous diseases. Therefore, the goal of the current study is to isolate fungal endophyte from the herb *Piper betle* L. at different leaf maturity stages (young, mature, old and senescent), determine the best isolation media and screen the antibacterial potential of the fungal endophyte isolates against Gram-positive (*staphylococcus aureus* and *staphylococcus epidermidis*) and Gram-negative (*E-coli* and *salmonella thypimurium*) bacteria. The number of fungal endophyte isolated from different maturity stage of *Piper betle* L. leaves were 48 isolates with the senescent leaf stage harboured the highest number of fungal endophyte isolates (14 isolates) and PDA supplemented with host plant extract was the best isolation media current. Out of a total of 48 isolates, only 15 isolates were shown remarkable antibacterial activity where they were able to inhibit all tested bacterial. As a conclusion, *Piper betle* L. harbour a large number of fungal endophytes that could be further explored for pharmacological applications.

Keywords: Medicinal herb¹, Piper betle L.², endophyte³, isolates⁴, antimicrobial activity⁵.

Determination of Heavy Metal Residue and Health Risk Consumption Comparison Between Brands of Canned Sweet Corn Cream and Fresh Corn using Atomic Absorption Spectrometer (AAS)

Nur Aifaa Binti Mohd Zin¹, Dr. Krishna Veni Veloo¹

¹Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan,

17600 Jeli, Kelantan

First author: aifaa.f19a0152@siswa.umk.edu.my

ABSTRACT

Processed canned sweet corn cream and fresh corn are important food products used in dishes to add the flavor of food. They are used by humans on a regular basis as source of nutrition and the human body gets benefit from their consumption. Heavy metal elements can collect and become polluted in processed canned sweet corn cream and fresh corn. As a result of industrialisation, agricultural and human activities may have effect on health of individuals. Therefore, the aim of this research is to evaluate heavy metal (Cd, Cr, Cu, Pb and Zn) concentrations in corn by using Atomic Absorption Spectrometry (AAS) and to evaluate human health risk by the consumption of corn by Kelantan residents. Human health risk was evaluated using target hazard (THQ) and hazard index (HI). Besides, the estimated weekly intake (EWI) for canned sweet corn cream was found while the average of THQ for Cd, Cr, Cu, Pb and Zn was 5.25×10^{-3} , 2.90×10^{-3} , 5.25×10^{-3} , 2.53×10^{-3} , and 3.64×10^{-3} respectively. While THQ Cd, Cu, Pb and Zn for fresh corn was 8.75×10^{-4} , 8.75×10^{-4} , 2.80×10^{-4} , and 8.90×10^{-3} respectively. The HI for canned sweet corn cream was 0.4718 while fresh corn was 0.0910 which is less than 1 and no risk of the five metals via the consumption of two types of corn. Corn samples from this research were found to be safe for consumption.

Keywords: Heavy metals, Corn, Health risk assessment, Atomic Absorption Spectrometry, Concentrations

Inclusion of Alkaline Salt-Treated *Trichantera Gigantea* as A New Alternative Protein Source in Hybrid Chicken Meal

Nurul Farina Natasya Binti Abd.Manaf^{1*}, Syed M. Al-Amsyar¹

¹ Faculty of Agro Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: farina.f19a0163@siswa.umk.edu.my

ABSTRACT

The poultry farming industry is vital to the economy of any country, including Malaysia. The chicken market is now the most valuable in the world, and by 2020, it will account for 94% of the world's chicken industry. Both the expansion of the population and the demand for chicken meat were expected to rise at some point. Because of the rise in the price of chicken on the market, there has been a disruption in the supply of feed for chickens, which has led to an increase in the cost of obtaining chicken. The leaves of the TG plant are a potential alternate source of protein for use in poultry feed. Nevertheless, the usage of leaves from the TG plant for chickens' results in a high fibre content. This study aims to produce TG as a substitute for protein feed sources for hybrid chicken, to examine the success of chicken development on feed containing TG that has been treated with alkaline salt and to view the cost applied to the new feed. *Trichantera Gigantea* leaves were made with natural ingredients by drying them in the sun and then, mixing them with NaHCO₃ and black soldier fly larvae (BSFL). The data showed that highly significant result which were ADG (P<0.00) and ADFI (P<0.22), while not significant FCR (P>0.143). However, the comparative percent value of FCR in the sodium bicarbonate treatment was 77.945% lower than the control treatment. The research demonstrates that chicken could adapt to a new nutritional diet to tolerate treatment with sodium bicarbonate in *Trichantera Gigantea*. In the future, *Trichantera Gigantea* usage can be commercialized in the poultry industry due to improved protein absorption and cost.

Keywords: *Trichantera gigantea*, Sodium bicarbonate, hybrid chicken, protein, poultry.

Determination of Heavy Metal Residue in Canned Fruits Using Atomic Absorption Spectrometer (AAS)

Raja Zafran Aiman Bin Raja Salleh, Krishna Veni Veloo

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan,

17600 Jeli, Kelantan

First author: zafran.f19a0176@siswa.umk.edu.my

ABSTRACT

Fruits can also be served as a dessert after a meal but many people do not know that maybe in the canned fruit may contain heavy metal that dangerous for human health. This contamination come from various source such as dispose of chemical waste in the river without any treatment. Four sample of canned fruit that were used in this study was purchased from market in Jeli. The aim of this study is to determine the heavy metal residue such as Copper (Cu), Lead (Pb), Zinc (Zn), Cadmium (Cd), and Chromium (Cr) in each canned fruit sample using wet digestion method and follow by Atomic Absorption Spectrometry (AAS) and then the result obtain was compare with the permissible level of heavy metal by WHO/FAO, EC and MFA. For the health risk assessment, a survey was conducted to determine health risk assessment of canned fruits consumption among residents in Kelantan with total 293 respondents. In this study, the concentration of heavy metal in canned fruit such as canned lychee, canned longan, canned pineapple and canned peach were determine and was arrange in order where $Cu > Pb > Zn > Cd > Cr$. Thus indicate that all canned fruits were safe to consume and have low potential causing health problems toward human.

Keywords: canned fruit, heavy metal, permissible level, Atomic Absorption Spectrometer (AAS)

Effectiveness of Madre De Agua Leaf Meal Treated with Sodium Chloride (NaCl) on The Growth Performance of Hybrid Chicken (Akar Putra)

Sarah Najwa Binti Mohamed Shukry^{1*}, Syed M. Al-Amsyar^{1,2}

¹Faculty of Agro Based Industry, University Malaysia Kelantan, Jeli Campus, Malaysia

²Institute of Food Security and Sustainable Agriculture, University Malaysia Kelantan, Malaysia

Email: sarah.f19a0178@siswa.umk.edu.my

ABSTRACT

Poultry is a cheap, low-fat animal protein source, and its trend of consumption has shown an increasing trend. TGLM, which is sourced locally, was used as an alternative source of protein as a result of the high price of protein. However, TG has a high fibre content. As a result, it has been treated with sodium chloride to meet the chicken's requirements. The objectives of this study are to formulate treated TG as a source of protein for chicken diets, study the growth rate of hybrid chickens (Akar Putra) fed with treated TG for chicken diets, and the newly developed chicken diet in terms of feed cost per weight gained. The experimental design with treatment is TG treated with NaCl, and the control is untreated TG. A total of 33 broiler hybrid chickens (finisher growth) were divided into two groups: 6 (control) and 5 (treatment) per replicate, with triplicates. This 4-week feeding trial was to observe the growth rate of a hybrid chicken broiler. The ADG, FCR, and feed cost per weight gain were all calculated in this experiment. A not significant of all results in this experiment which are ($p < 0.092$) of ADG, and ($p < 0.729$) of FCR than control despite an increase in the amount of food consumed, the weight did not significantly increase. Contrarily, ($p < 0.006$) of feed cost per weight gain is significant. The texture analysis of the sample breast and thigh from the treatment showed less hardness (-22.60% and -58.79%) and chewier (-25.71% and -70.00%) than the control, respectively. Thus, there is still a potential application of treated TGLM as an alternative source of protein for the chicken diet. This experiment was designed to reduce the cost of poultry feeds by using TGLM as an alternative protein source, as well as the market price of chicken meat.

Keywords: alternative source of protein, *Trichanthera Gigantea*, salt treatment, protein hydrolysis, growth performance

The Effects of Different Drying Methods on Drying Kinetics of Keranji Fruit

Wan Afzan Nuha Binti Wan Azhar^{1*}, Lukman Bin Ismail¹

Faculty of Agro-Based Industry, Universiti Malaysia Kelantan Jeli Campus, 16600 Jeli, Kelantan, Malaysia

First author: afzan.f19a0196@siswa.umk.edu.my

ABSTRACT

This research was aimed to investigate the drying kinetics of Keranji fruit according to the types of drying methods. However, there was insufficient information or research being studied on the effects of drying methods in terms of drying kinetics to the keranji fruit. This study was used open air sun-drying, oven drying and dehydrator methods to determine the drying rate curves of keranji fruits. Keranji fruit with rind and pulp only were dried by sun open-air drying, the oven drying were lead at 50°C, 60°C and 70°C and dehydrator with temperature 70°C. The drying conditions significantly influenced the time required to reduce the moisture content to any given level. Results indicated that dehydrator (70°) and oven drying (70°C) had the shortest drying time. The drying time was significantly affected by the different drying methods and temperatures ($p < 0.05$). The difference in rehydration ratio under different drying methods was well explained by the rehydration curves. The initial moisture content of the fruit were measured by drying curves and the effects of different drying methods on the fruits were determined. It can be concluded that among the different drying methods, the dehydrator (70°) has the shortest drying time. The sun open-air drying showed higher rehydration values than oven drying and dehydrator.

Keywords: open air sun-drying, oven drying, dehydrator, drying rate curve, moisture content, rehydration.

The Study of Stability Effect of Ready-To Eat-Dakgalbi Using Retort Technology

Muhammad Amin Najmi Azman¹, Siti Zubaidah Hamzah², Maryana Mohamad Nor^{1,2}

¹ Faculty of Agro-Based Industry, University Malaysia Kelantan, Jeli Campus 17600, Kelantan, Malaysia

² Institute of Food Security and Sustainable Agriculture, University Malaysia Kelantan, Jeli Campus 17600, Kelantan, Malaysia

First author: amin.f19a0213@siswa.umk.edu.my

Abstract

Korean spicy stir-fried chicken or Dakgalbi is a delicious and famous cuisine originated in Chuncheon, Korea. The main ingredient to make Dakgalbi are Korean chili paste (Gochujang), Korean chili powder (Gochugaru), Korean chili flakes and Korean curry powder. Dakgalbi are commonly eaten with vegetables and rice cakes. Retort processes are one of the effective ways to sterilize food products that had been going for decades after it was first invented in 1978 by the United States Army. The technology had been developed ever since to meet the demand of the human population that requested for ready-to-eat food. The aim of this research was to evaluate the effects of retort time and the stability of retort pouch packed Dakgalbi by investigating the physical observation, microbial analysis and determining its physicochemical properties. The result shows that the nutritional analysis of the cooking time of 35 minutes is the highest as such 168 kcal of energy content, 179 g of carbohydrate content, 15.8 g of protein content, 3.7 g of fat content and 414.2 mg of sodium content as compared to 15 or 25 minutes of cooking time. Increasing the cooking time shows a decreasing trend by the CIE L* and CIE b* levels and the pH value. Cooking for 35 minutes shows the best result of Dakgalbi to maintain its nutrients and color for commercial purposes. Further studies are required to further understand the demand and acceptance of the Dakgalbi in the market.

Keywords: Dakgalbi, retort, ready-to-eat food, stability

The Effect of Biochemical Treatment in *Trichanthera gigantea* on Hybrid Chicken Growth Performance

Nur Ain Nabila binti Kassim¹, Syed M. Al-Amsyar¹

¹Faculty of Agro Based Industry, Jeli Campus, University Malaysia Kelantan, 17600 Jeli, Kelantan

First author: nabila.f19a0278@siswa.umk.edu.my

ABSTRACT

The poultry farming sector became a big challenge due to the increase in the price of livestock feed which caused the cost of chicken production to increase drastically. This study was conducted to reduce the price of chicken feed by changed the source of local protein raw materials. The replacement plant was *Trichanthera gigantea*, a plant that having moderate percentage of protein. However, this plant has a high fiber content that must be handled that the chicken can absorb the protein efficiently. The biochemical treatment provided to the plant was sodium chloride and protease. The objective of this study was to formulate the NaCl and protease treated *Trichanthera Gigantea* as a source of chicken dietary protein and evaluated the effect of biochemical treatment on the growth performance of broilers. The comparison of feed cost per weight gain obtained control feed and newly formulated chicken diets. From the first to the fourth week, hybrid chickens were evaluated for average daily gain (ADG), feed conversion ratio (FCR), cost, and textural properties. The average weight gain of control chickens from week one to week four was 1400 g, an increase of 32.08%. Hybrid chicken treatment of 429.33 g increased by 85.41%. The weight gain was not significant ($p>0.645$). Weight gain occurs because the feed given had easily digestible protein, as corroborated by UV analysis. Between control and treated hybrid chicken, the feed conversion ratio decreased by 59.79%. This reduction indicates that the treatment was effective and significant ($p<0.042$). From texture analysis, treatment had decreased a hardness and chewiness for 40.41% and 48.51, respectively. It shows that the chicken meat was tender than the control group. In conclusion, ingredients in chicken feed improve the FCR and texture quality of hybrid chickens.

Keywords: *Trichanthera gigantea*, hybrid chicken, biochemical, protein, feed conversion ratio, average daily gain, texture analyzer.

The Potential of Endophytic Fungi Isolated from *Syzygium polyanthum* as Antibacterial Agent

Nurhamizah Fitri Binti Jefri Din^{1,*}, Kharul Azmi Mu'azzam Abdul Rahman¹

¹Department of Agricultural Sciences, Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

First author: hamizah.f19a0296@siswa.umk.edu.my

ABSTRACT

Syzygium polyanthum (Wight) Walp or locally known as "salam," "serai kayu," or "samak kelat" in Malaysia has been used as a cancer chemotherapeutic treatment and was efficiently capable of stopping cancer cells from growing. Surprisingly, the majority of therapeutic plants evaluated thus far consist of at least one endophytic. Endophytic fungal isolates obtained from medicinal plants have been found to synthesize a number of secondary metabolites that can be used as biocontrol agents to suppress and kill a variety of pathogenic bacteria and malignancies. The aim of the study was to isolate endophytic fungi from *S. polyanthum* at various stages (young, mature, old and mature), determine the best leaf age and growth media for isolation of endophytic fungi and screening the antibacterial activity of endophytic fungi isolated from *S. polyanthum* on various pathogenic bacteria. A total of 106 endophytic fungi were successfully isolated from different age maturity of leaves using six different isolation media; potato dextrose agar (PDA), potato dextrose agar with addition host plant powder (PHPP), potato dextrose agar with addition host plant extract (PHPE), malt extract agar (MEA), malt extract agar with addition host plant powder (MHPP), and malt extract agar with addition host plant extract (MHPE). The current result revealed that PHPE was the best isolation media. The endophytic fungal isolates were then tested for antibacterial activity using pathogenic Gram-positive (*Bacillus cereus* and *Enterococcus faecalis*) and Gram-negative (*Klebsiella pneumoniae* and *Salmonella typhimurium*) bacteria. Out of 106 isolates, only 22 isolates were further screened for antibacterial activity as they showed different morphologies of endophytic fungi with five endophytic fungi showing substantial antibacterial activity toward at least one test pathogen. As a conclusion, *S. polyanthum* harbours a large number of endophytic fungi that could be further explored for pharmacological applications.

Keywords: Medicinal herbs, endophytic fungi, *Syzygium polyanthum*, leaves age, isolation media, antibacterial activities.

Determination of Heavy Metal Residue and Health Risk Assessment in Different Brands of Canned Tuna by Using Atomic Absorption Spectrometry (AAS)

Nurul Nabila Binti Isham^{1*}, Krishna Veni Veloo¹

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan.

Email: nabila.f19a0304@siswa.umk.edu.my

ABSTRACT

Canned tuna is a high-protein food that also contains a variety of vitamins and minerals, including B-complex vitamins, Vitamins A and D, iron, selenium, and phosphorus. Tuna also contains the beneficial omega 3 fatty acids DHA and EPA. They are frequently consumed as a food source by humans in daily life and are nutritious to the human body. Despite the fact that canned tuna is a nutritious food source for humans, it may have collected and become polluted with heavy metal elements as a result of environmental and industrial factors, which can be hazardous to the human body and health. As a result, the goal of this research is to examine heavy metal residues (Pb, Cd, Cu, Zn, and Cr). Atomic Absorption Spectrometry (AAS) will be used to evaluate the heavy metal in four samples of canned tuna purchased from a local convenience store in Kelantan. Wet acid digestion was used to extract the selected samples. The concentration of heavy metal residues obtained was used to estimate the risk to human health when canned tuna is consumed in Kelantan. In addition, in this research, Zinc (Zn) has the highest heavy metal content, whereas Cadmium has the lowest (Cd). Next, the risk of human health was analysed. Estimated daily intake, estimated weekly intake and target hazard quotient has been recorded. The average levels of target hazard quotient for brand A, brand B, brand C, and brand D were 0.26, 0.03, 0.54, 0.15, and 3×10^{-4} . The total all-hazard quotient does not exceed 1 and is safe to consume. The findings will provide information and knowledge about heavy metal residues found in food sources such as canned tuna.

Keywords: Canned Product, Heavy Metal, Atomic Absorption Spectrometry, Health Risk Assessment

Determination of Heavy Metal Residue in Different Brands of Roasted Ground Coffee Using Atomic Absorption Spectrometry (AAS) and Health Risk Assessment of Coffee Consumption Among Kelantan Population

Nurul Nuha binti Bazlan^{1,*}, Dr. Krishna Veni Veloo¹

¹Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan,

17600 Jeli, Kelantan

First author: nuha.f19a0305@siswa.umk.edu.my

ABSTRACT

Coffee is one of the world's most popular beverages and a major source of caffeine for many individuals. Coffee in moderation may boost the immune system and protect against chronic disease, specifically Type 2 diabetes. However, heavy coffee consumption may lead to harmful effects especially when accumulated and contaminated with heavy metal residue as a result of industrialisation, agricultural and human actions. Contamination by heavy metal in processed ground coffee could be caused by equipment used in the grinding process of coffee beans as well as stabilisers and preservatives that might leach into the food particles. Consequently, the objectives of this study were to extract heavy metal residues from different brands of roasted ground coffee samples purchased from grocery stores around Kelantan using Atomic Absorption Spectrometry (AAS) and to compare with the permissible limit by WHO/FAO, MFA, and EC as well as to evaluate human health risk in the consumption of ground coffee by population in Kelantan. Results obtained from this study was the average mean concentration of heavy metal in different brands of ground coffee were arranged in increasing order which was Cd < Cr < Cu < Zn < Pb. Human health risk was assessed using target hazard quotient (THQ), and hazard index (HI). The average THQ for Cr, Cu, Zn, Pb, and Cd was 7.09×10^{-4} , 0.01, 4.71×10^{-3} , 6×10^{-5} , and 5.27×10^{-5} respectively. The HI readings reported for coffee samples selected around Kelantan are less than 1, indicating that there is no apparent risk in the consumption of the coffee analysed. Thus, to manage the daily consumption dose of these processed meals based on daily intake recommendations, it is critical to be aware of the heavy metal concentration in processed food products.

Keywords: Heavy metal, contamination, Atomic Absorption Spectrometry (AAS), roasted ground coffee, health risk assessment

An Optimization Formulation of Patty Mushroom (*Pleurotus Sajor-Caju*) using Different Types of Binders

Ahmad Syakir Bin Ahamad Azahari¹, Maryana Mohamad Nor^{1,2}

¹ Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus 17600, Kelantan, Malaysia

² Institute of Food Security and Sustainable Agriculture, Universiti Malaysia Kelantan, Jeli Campus 17600, Kelantan, Malaysia

First author: syakir.f19b0010@siswa.umk.edu.my

ABSTRACT

People often need to be more interested in plant-based diets, yet they are far healthier. Mushrooms are cholesterol-free and are low in calories, carbohydrates, salt, and fat. In addition, mushrooms have the taste and properties just like meat. This study mainly focuses on *Pleurotus Sajor-Caju* to produce a vegan patty and their suitable binders since mushroom is low in fat, causing the product not to bind together. The effect of different types of binders on physico-chemical and sensory evaluation on the mushroom patty was investigated. Commercialized patty has the highest protein value (20.8 ± 1.3000), slightly higher than the formulation containing dried tofu (19.3 ± 0.458). The formulations that contain soy pulp and dried tofu can declare as no-fat formulations because of the result through the soxhlet method (0.0 ± 0.0). The soy pulp formulation was significantly higher in yellowness (b^*) at 28.19 ± 1.85 than the developed formulations patty. There is a significantly different ($p < 0.05$) between the formulation patty, including the commercialized patty, for the texture profile analysis except for the cohesiveness (0.329). According to the sensory evaluation result, the formulation that contains vegetable oil is the highest score compared to other formulations, not including the commercialized patty. In conclusion, patty formulation made from mushrooms can compete with commercialized patty from the results that have been obtained.

Keywords: *Pleurotus Sajor-Caju*, Physico-chemical, formulation, binders, sensory, patty

Preliminary Effect of Adding Black Grass Jelly into the Quality of Sparkling Drink

Mohamad Aiman Syakir Mohamad Saity^{1,*}, Maryana Mohamad Nor¹

¹Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus 17600, Kelantan, Malaysia

First author: syakir.f19b0064@siswa.umk.edu.my

ABSTRACT

Black grass jelly is a herbal dessert produced from *Mesona Chinensis* plant leaf extracts. Black grass jelly agar and drink have gained popularity due to their unusually high fibre and carbohydrate content. When stored in the chiller at 4°C, commercial black grass jelly has a shorter shelf life than the harvest, resulting in a higher syneresis rate and irregular texture. Specific issues can diminish customer preferences and perceptions. This research examined the physicochemical composition of grass jelly incorporated with gelatin and carrageenan. This research aimed to find the optimal carrageenan concentration. This investigation to indicated the inclusion of gelatin and carrageenan on improvement the texture of grass jelly. The physicochemical analysis include pH, Brix, colour, texture, syneresis, and moisture content. The development of dried black grass jelly having various concentrations of carrageenan, 3%, 4%, 5%, and 6%, and the reduction of black grass jelly extract to 6%, 7%, 8%, and 9%, respectively. A physicochemical investigation revealed that grass jelly with 4% carrageenan is the optimal sample. The stability of black grass jelly was investigated by the addition of Co₂ and the evaluation of the floating and leaching rates. The floating time of the black grass jelly samples was measured by different pressure gauges, which are at 58 pSi and 72 pSi that inject (Co²)into the water. The results showed that the floating time of the black grass jelly samples was affected by the type and concentration of the thickening agent used, as well as the pressure of pSi. The carbonated samples had a longer floating time than the non-carbonated samples. In a future investigation, another thickening agent are suggested to substitute gelatine and carrageenan for another analysis, and the pressure of pSi can be adjusted to affect the time for floating grass jelly.

Keywords: Black grass jelly, gelatin, carrageenan, syneresis, psi, carbonation

The Effect of Turmeric (*Curcuma longa*) as a Natural Seed Treatment Towards Seed Germination and Vegetative Plant Growth on Maize

Farhah Hamizah Binti Md Baharuddin^{1,*}, Nur Karimah Binti Mokhtar¹

¹Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus 17600, Kelantan, Malaysia

First author: farhah.f19b0239@siswa.umk.edu.my

ABSTRACT

Maize (*Zea mays L.*) is one of the most essential cereal crops and was ranked in third place, after rice and wheat. Numerous diseases affect maize at the seedling stage, which are seed-borne illnesses. Seed treatments act as a protection for seedlings against soil and seedborne diseases and pests, enhance germination and promote seedling emergence during the critical first few weeks after planting. Turmeric naturally has antifungal properties that aid in extending shelf life of maize seeds for enhancement seed germination and vegetative growth. By that, this research aims to develop natural seed treatment from turmeric for maize seeds. Thus, experiments in the lab were conducted to study the effect of turmeric as a natural seed treatment towards germination; to investigate the application turmeric as a natural treatment in prolonging the shelf life of Maize (*Zea mays L.*) seed quality; to evaluate the vegetative growth of Maize (*Zea mays L.*). This research involves the preparation of sample Maize (*Zea mays L.*) seeds. Maize seeds were coated with four treatments (3%, 6%, 9% and 12%), using turmeric and sodium alginate, along with the un-treatment and thiram-based fungicide. Seed germination (%), vegetative growth parameters consisting of height and weight plant, number of leaves and fungus analysis were collected. Results showed that maximum value germination traits were found in maize seeds on day 7 which is coated in 3% treatment, followed by treatment of 12%, compared with control and thiram-based fungicide. The fungus growth was inhibited with coating in turmeric powder extract where 9% and 12% was the best treatment, followed by thiram-based fungicide which gave higher shielding on seeds. The results of a field experiment provided the optimum values for fungicide and treatments of 6%, 9% and 12% respectively. This suggests that coating in turmeric powder extract was a suitable treatment that can improve germination and vegetative growth in maize.

Keywords: Curcuma, maize, seed coating, germination, vegetative growth

Characterization of Infected Pineapple Plant & Its Causal Bacteria in Matured MD2 Pineapple Plant

Muhammad Muaz Meftahuddin^{1,*}, Raimi Mohamed Redwan¹

¹Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First author: muaz.f19b0265@siswa.umk.edu.my

ABSTRACT

Nowadays the agricultural sector faces several challenges in ensuring the excellent outcomes of the agriculture industry including risk of bacterial infection. In the pineapple industry, bacterial heart rot disease is massively disrupting the production of pineapple fruit. Bacteria associated diseases are among the common pineapple crop diseases affecting farmers nowadays which are the major problem as it causes high yield loss. The aim of this study is to isolate and identify the bacteria causing BHR from pineapple that shows the usual symptom of bacterial heart rot (BHR) disease. An infected MD2 pineapple plant showing the typical BHR signs was collected at the Agrotechno Park UMK in Jeli, Kelantan. The symptoms observed are blisters like lesions, brown streak on lamina & mesophyll and water soaked on centremost of the leaves. The samples were collected and brought to the Biology Laboratory at UMK Jeli Campus for isolation and confirmation of the disease's bacterial organism. The infected pineapple leaves were cut into small segments of 1 cm in length. Then the infected pineapple leaves proceed with the sterilise protocol and bacterium strain from pineapple heart rot disease was isolated using the serial dilution technique. Biochemical testing such as morphology and microscopic examination was performed to determine the appearance, morphology, and gram staining characteristics of the colony. The infected plant samples were confirmed using Koch's Postulates and the sample was submitted for DNA Barcoding testing for identification. The results show nearly similar morphology to *Dickeya* sp. that previously identified to cause BHR. However, the Koch's Postulates performed did not indicate pathogenicity of the bacteria isolated. The result indicated that bacteria isolated are not the cause of disease for the symptoms observed in samples collected. Further research is required to isolate the right bacteria that cause the symptoms by confirming Koch's postulates prior to sequencing.

Keywords: BHR, Pineapple, biochemical testing, sterilise protocol, pathogenicity test

Noraziera Binti Darus¹*, Nur Karimah Binti Mukhtar¹

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus 17600, Jeli, Kelantan, Malaysia

First author: aziera.f19b0274@siswa.umk.edu.my

ABSTRACT

Germination and seed quality are crucial to the growth and yield of every plant. A seed is a tiny, living plant that aims to protect and nourish the embryo. Consequently, it is important to pay attention to the seed quality. Infected seeds are one of the causes of decreased germination rate and vegetative growth. These infections can be prevented by treating seeds prior to sowing. This study aimed to use turmeric treatment as a seed coating due to turmeric's antifungal properties. The experiments aimed to determine how turmeric's natural seed coating affected the germination rate and vegetative growth of okra. Determine the effectiveness of a turmeric natural seed coating in controlling the number of fungi on okra seeds. This research uses okra seed as a sample along with varying concentrations of turmeric (1%, 3%, 5%, and 7%), 1% alginate, a control, and thiram as a commercial fungicide. The results reveal that different concentrations of turmeric can influence plant parameters by an average of 20.1 and control the number of fungi by an average of 3.33. The results indicate that varied concentrations of turmeric treatment can affect plant parameters and control the number of fungi. Future studies will be inspired to investigate the possibilities of treating okra with turmeric's natural seed coating. This study provides a comprehensive description of turmeric treatment's natural seed coating.

Keywords: Natural seed coating, germination, turmeric (*Curcuma longa*), okra (*Abelmoschus esculentus*), vegetative growth

Effect of Different Drying Method on Extracted Chemical Substance from *Clitoria ternatea* flower Using UV-VIS

Umi Maisarah Binti Musa¹, Lukman Ismail²

¹Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus 17600, Jeli, Kelantan, Malaysia

First author: maisarah.f19b0310@siswa.umk.edu.my

ABSTRACT

Clitoria ternatea is a plant that is commonly known as butterfly pea, is a fabaceae family perennial herbaceous plant. This study was conducted to study the effects of different drying methods on extracted chemical substances from *Clitoria ternatea* flower. The objectives are to determine the effect of different drying methods and solvent used. Three different solvent distilled water, ethanol and hexane were used as extraction solvents. The extract solution were analysed using UV-VIS Spectrophotometer and Konica-Minolta Color Meter. Aside from purple, butterfly pea flowers also feature blue and red due to the presence of anthocyanin chemicals. As for analyses, using UV-visible spectroscopy wavelengths of 400 nm to 700 nm were used. Whereas for colorimeter analyses the solid and liquid sample of the flower extract were examined. The result showed that using the dehydrator method and distilled water and ethanol as the solvent, higher absorbance value was observed with 2.113 and 1.994 for the wavelength of 523 nm and 573 nm. While for hexane as the solvent, sun drying methods have the higher absorbance with 0.598 and wavelength recorded at 400 nm. Color analyses for the solid and liquid sample of the flower also showed slightly different color and colorless for liquid sample that used hexane as solvent. It can be concluded that different drying methods and different solvent used had caused different chemicals to be extracted out from the flower. Using dehydrator and distilled water and ethanol as the polar solvent are the best methods to absorb the high value of chemical substances in *Clitoria ternatea* flower extract.

Keyword: *Clitoria ternatea* flower, drying method, chemical substance, UV-visible spectroscopy, Colorimeter

Effect of Different Type of Fertilizers on the Growth Performance of Sweet Potato (*Ipomoea batatas*)

Muhammad Farhan Mohd Adnan^{1*}, Fatimah Kayat¹, Lukman Ismail¹

¹Faculty of Agro Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

***First author** : farhan.f19b0320@siswa.umk.edu.my

ABSTRACT

Sweet potato (*Ipomoea batatas*) is one of the major food crops and staple for millions of people in developing countries. This experiment aimed to compare the effect of various fertilizers on the growth and yield of sweet potatoes at Agrotechnopark, UMK Jeli. The experiment was conducted using Randomized Completely Block Design (RCBD) with a total number of 160 plants. In this study, four types of organic fertilizers (chicken dung, goat manure, oil palm compost, and mushroom waste) and NPK Blue were tested along with a control treatment (without any fertilizers) to determine their effect on sweet potato plant growth performance based on the length of the shoot, number of shoots, and number of leaves. Meanwhile, the yield produced is based on the number of tubers, the size and weight of the largest tuber, and the total weight of tubers per plant. Data obtained was subjected to one-Way ANOVA and the mean was compared at 5% significant difference. Results showed that the number of shoots and the length of shoots were significantly affected by the type of fertilizer used with NPK producing the highest number of shoots (2.75 ± 1.18) while the chicken dung treatment produced the longest shoots at (192.2 ± 115.51 cm). However, the number of leaves was not significantly influenced by the type of fertilizer used. In terms of tuber production, there was a significant difference between total weight of the tuber per plant with NPK treatment producing the highest total weight (310.72 ± 159.68 g) followed by control treatment at (167.81 ± 76.94 g). In general, the NPK treatment produces the best growth performance followed by the control treatment.

Keywords : Keywords : ANOVA, sweet potato, organic fertilizer

The Effect of The Turmeric (*Curcuma Longa L.*) as Natural Seed Coating Treatment Towards Seed Germination and Vegetative Growth on Lada Solok (*Capsicum Annuum*)

Khairunlisa binti Moidin^{1*}, Nur Karimah binti Mukhtar¹

¹Faculty of Agro Based Industry, University Malaysia Kelantan, Jeli Campus 17600, Jeli, Kelantan, Malaysia

First author: lisa.f19b0329@siswa.umk.edu.my

ABSTRACT

Turmeric (*Curcuma Longa L.*) belongs to the family Zingiberaceae, containing compounds, such as curcumin, with high antifungal and antimicrobial activities. Factor that causes lowering germination rate and vegetative growth is infected seeds. Seed germination and quality are essential for plant growth and yield. Seed coating is the treatment to improve seed appearance and handling properties, as well as deliver active chemicals that can protect seeds from phytopathogens and boost germination and plant growth. Determine the effectiveness of turmeric as a natural seed treatment toward seed germination, vegetative and fungal growth on Lada Solok. The aim of this study is to determine the effect of turmeric natural seed coating treatment toward the seed germination and the vegetative growth of Lada Solok. This research used Lada Solok (*Capsicum annuum*) as sample of seed. The treatment used in this study is 4%, 8%, 12%, 16% of turmeric, control and thiram 80 as commercial fungicide. The embryo begins to swell by absorbing nutrients and water from the media on the third day of germination. The vegetative growth of Lada Solok was determined significantly different at ($p < 0.05$). The analysis of variance showed that Lada Solok increased on the growth of plant. The length of the chilli plant increased as the concentration of treatment increase. Showed the length of leaf increase from control to thiram 80, then decreased to treatment 1% of alginate with 4% of turmeric. The length of root increased from control to thiram 80, started decreased to treatment 1% of alginate with 4% of turmeric. There were significant differences ($p < 0.05$) in the growth rate of colony diameter of *Colletotrichum gloesporioides*. The result showed that the concentration of turmeric increased and the number of fungus decreased.

Keywords: Turmeric, seed germination, seed coating, natural seed treatment, vegetative growth, fungal growth, Lada Solok (*Capsicum Annuum*).

Awareness on Halal Beef in Muslim Household Consumers in Kota Bharu, Kelantan

Muhammad Adam Hafizuddin Bin Mohd Anuar^{1*} and Farah Adilah Binti Abdullah^{1,2}

¹ Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia

² Faculty of Plantation and Agrotechnology, Universiti Teknologi MARA, Jasin Campus, 77300 Merlimau, Melaka.

First Author: adam.f18a0260@siswa.umk.edu.my

ABSTRACT

Halal is an important aspect of food selection as it is one's part to obey religious obligations and commandments. Halal food is something that is obligated and has become the way of life that they have to be sure and aware of. However, as the era progresses, it has been causing the attitude of negligence toward the authenticity of halal products. The current study was therefore carried out to determine Muslim household's behavioral attitude, subjective norm and perceived behavioral control and how it relates towards their awareness of halal beef. A total of 208 respondents from Kota Bharu, Kelantan areas were selected by purposive sampling to be the target respondents in this study. The data obtained were analyzed using descriptive analysis and a correlation analysis. The results indicated that a significant number of the respondents in Kota Bharu, Kelantan areas were aware of halal beef. The findings also showed that gender, age, education level, and occupation had significant relationships with awareness of halal beef. Also showed the behavioral attitude, subjective norm and perceived behavioral control has significant correlation with the awareness of the Muslim household in Kota Bharu, Kelantan. Therefore, study recommended that more data is to be collected from other states of Malaysia to determine the correlation more clearly for future research data purposes.

Keywords: Awareness, Halal beef, Behavioural attitude, Subjective norms, Perceived behaviour

Consumer Preference on Local Beef Quality Among FELDA Residents in Kota Tinggi, Johor

Abdul Alif, Z. 1* and Farah Adila, A.^{1,2}

¹Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan.

²Faculty of Plantation and Agrotechnology, Universiti Teknologi MARA, Jasin Campus, 77300 Merlimau, Melaka.

*First author: alif.f19a0001@siswa.umk.edu.my

ABSTRACT

Nowadays, beef is easy to find in the market at any time. However, some of it is not guaranteed quality, and the price offered also exceeds the ceiling price set. Consumers often doubt the quality of beef when the supplier does not expect various issues. Specifically, this study aimed to examine consumer preferences for the quality of local beef among FELDA residents in Kota Tinggi, Johor. The independent variables are attitudes, subjective norms and perceived behavioural control used in this study. A total of 121 respondents were selected to answer the questionnaire through a simple random sampling technique. The results of this study show that attitude has the highest level compared to subjective norms and perceived behavioural control. In addition, subjective norm showed the highest relationship towards consumer preference for local beef quality among FELDA citizens. This study also indicates that FELDA residents in Kota Tinggi, Johor have a high level of awareness of the local beef quality. Consequently, it is hoped that future studies can expand the target scope for more accurate study results.

Keywords: beef, quality, FELDA, attitude, subjective norm, control of behaviour

The Perception of Indigenous People in Perak towards the Fertigation Technology

Haslizah Mat, Tengku Halimatun Sa'adiah T Abu Bakar

Faculty of Agro-Based Industry, University Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan.

First Author: haslizah.f19a0041@siswa.umk.edu.my

ABSTRACT

Fertigation technology is an effective method of nutrient application that can improve the quality and quantity of crop planting. Most farmers in Malaysia have been implement fertigation technology in their farm due to cost saving, easy to install and the operation handling is less complicated, unfortunately indigenous people still refuse to implement fertigation technology due to negative perception on fertigation technology. The purpose of this study is to determine the perception of indigenous people in Perak towards fertigation technology. This study has been employed a quantitative study and adapted based on Theory plan behaviour (TPB). The dependent variable is perception toward fertigation technology while the independent variables are attitude, subjective norm, and perceived behavioural control. 180 respondents have been chosen trough purposive sampling technique. To answering objectives of the study, reliability, descriptive, correlation analysis was employed. The result shows that there is low mean score for perception of fertigation technology ($M=1.787$, $SD=0.765$) among indigenous people and their attitude ($M=1.667$, $SD=0.774$), subjective norm ($M=1.41$, $SD=0.743$), and perceived behavioural control ($M=1.440$, $SD=0.755$). Next, there are significant relationship between attitude ($r=0.776$, $p=0.000$), subjective norm ($r=0.591$, $p=0.000$) and perceived behavioural control ($r=0.726$, $p=0.000$) with perception of indigenous people. However, there is insignificant relationship between education level ($r=0.287$, $p=0.000$) with perception towards fertigation technology among indigenous people in Perak. Hopefully, these empirical data useful to policy-maker to help indigenous people more adapted to modern technology and boost their economic growth.

Keywords: Indigenous people, Fertigation technology, TPB theory

Post-harvest Practices Adoption among Durian Farmers in Kedah

Ieka Natasha Mohamad Asri^{1*}, and Tengku Halimatun Sa'adiah T Abu Bakar¹

¹ Faculty of Agro-Based Industry, University Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan.

First author: ieka.f19a0045@siswa.umk.edu.my

ABSTRACT

Durian was tropical fruit that was grown commercially. Unfortunately, the shelf life of durian was short within 2-3 days after harvest. Consequently, post-harvest practice was important to maintain the quality of durian. Sadly, post-harvest practice adoption is still at an unsatisfactory level. Thus, this study aims to determine post-harvest practice adoption among durian farmers in Kedah. The dependent variable was the adoption of the post-harvest practice among durian farmers in Kedah while the independent variable had been attitudes, subjective norms, perceived behavioural control, and knowledge. The quantitative research had been employed, and through simple-random sampling 120 durian farmers in Kedah had been chosen as the sample size and population. Completed data had been employed reliability tests, descriptive and correlation analyses, through SPSS version 26.0 to answer all the objectives. The findings shown the high mean score for adoption ($M=3.9975$, $SD=0.43065$), subjective norm ($M=3.916$, $SD=0.45306$) and perceived behavioural control ($M=4.0275$, $SD=0.45132$). While knowledge had moderate mean score ($M=3.5333$, $SD=0.82943$). Besides, the correlation analysis results shown, there is significant relationship between attitude, subjective norm, perceived behavioral control and knowledge with the post-harvest practice among durian farmers in Kedah. This study was important for farmers because it would help them enhance productivity by minimising post-harvest losses, and it would also assist other researchers understand the amount of post-harvest technology acceptance.

Keywords: Postharvest practices adoption, durian farmers, Theory Planned Behaviour (TPB), Knowledge, Attitude and Practices (KAP)

The Awareness of Consuming Chickpea Tempeh Among Households in Selangor

Juny Elfyasyari Syarifuddin*, Dr. Ikarastika Rahayu Abdul Wahab

Faculty of Agro-based Industry, University Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan

First author: juny.f19a0053@siswa.umk.edu.my

ABSTRACT

Soybean tempeh is a fermented product that is generally recognised around the world as a source of protein from legumes. However, soybeans that are widely used in Malaysia as the basis of food production, not only for humans but also for livestock. Nowadays, many food product modifications are being carried out in order to improve the accessibility of healthy food in the country. This includes tempeh that are made from legumes other than soybeans, such as chickpeas. The objectives of this study are to determine the level of attitude, subjective norm, perceived behaviour control, and awareness of consuming chickpea tempeh among households, as well as to analyse the relationship between attitude, subjective norm, and perceived behaviour control on awareness of consuming chickpea tempeh among households in Selangor. A quantitative research design has been used, and the questionnaire are adapted based on the Theory of Planned Behaviour (TPB). A simple random sampling was used to select the 270 households in Selangor where the questionnaire has been distributed physically and virtually. SPSS version 26.0 was used to analyse the data using reliability tests, descriptive statistics, and correlation analysis. The study has resulted in there is a significant relationship between attitudes, subjective norms, and perceived behavioural control with the awareness of consuming chickpea tempeh among households in Selangor. A significant relationship was determined when $p < 0.01$ using a two-tailed test, and this study has obtained a significant value of 0.00. Finally, this study will contribute to the awareness of consuming chickpea tempeh among households in Selangor, and at the same time help consumers to make improvements in choosing healthy foods in their daily meals.

Keywords: Tempeh, Chickpea, Protein, Awareness, Theory Planned Behaviour (TPB)

The Intention of Consumers Towards the Production of Guava Product in Johor

Nik Nur Fati'ah binti Nik Daud*, Zul Ariff bin Abdul Latiff, Tengku Halimatun Sa'adiah binti T Abu Bakar

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600, Jeli, Kelantan

First Author: fatiah.f19a0107@siswa.umk.edu.my

ABSTRACT

This study was conducted to identify the intention of consumers towards the production of guava products in Johor. Considering Malaysia is a youthful nation, the government places a greater emphasis on preparation, processing, and procurement of guava products. Besides that, the government gives an overview of guava goods to guarantee the effective manufacture of guava products. However, how many individuals are aware of the ingredients in food? A lot of people only know about vitamins and minerals, but antioxidant content is still a mystery to the public. Hence this research focuses on consumers' intention towards guava production in Johor. The sample size in this research is 30 consumers towards guava products in Johor area. Then, this study carried out two objectives to identify the level of intention of consumers toward production of guava products in Johor and to identify the relationship of attitude, subjective norms, and perceived behavior that control the intention of consumers toward production of guava products in Johor. The methods used in this research is purposive sampling, self-administered survey through Google Forms was distributed among consumers' product guava by applying the Theory of Planned Behavior (TPB) model. This study uses Statistical Package for the Social Sciences (SPSS) software. Analysis that will be applied in this research are reliability test, normality test and Spearman's rho. The finding for this research study resulted in a high level of intention among consumers towards the production of guava products in Johor, and result shows there is a positive relationship between attitude, subjective norms, and perceived behavior control of consumers towards the production of guava products in Johor. Future study is this topic with larger respondents and areas enabled to get a better understanding of consumer intentions towards guava production.

Keywords: Guava Product, Intention, Consumers, Theory of Planned Behaviors, SPSS 21

Factors Affecting the Used of Inorganic Fertilizer among Smallholder Farmers in Pendang, Kedah

Noor 'Ain Mat Akhir, Jeng Young Liew

Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus 17600, Jeli, Kelantan, Malaysia

First Author: ain.f19a0110@siswa.umk.edu.my

ABSTRACT

Fertilizers consist of two types, namely organic fertilizer and inorganic fertilizer. The use of fertilizers in agriculture was a common thing to supply additional nutrients needed by plants. Organic fertilizers were fertilizers obtained from naturally decomposed materials. Meanwhile, inorganic fertilizers were obtained by using a chemical mixture. The chemical elements found in inorganic fertilizers were nitrogen (N), phosphorus (P), and potassium (K). The advantages of inorganic fertilizers were that they were easy to use, cheaper than organic fertilizers, showed effects on plants faster than organic fertilizers, had complete nutrients, were easy to obtain, and were able to increase soil fertility quickly. Although it showed an immediate positive effect, its use also harmed plants and soil. Uncontrolled or excessive use would cause the pH of the soil to become more acidic, affecting the plant's growth. This study was carried out to examine the factors that influenced the use of non-organic fertilizers among small farmers in Pendang, Kedah. A total of 376 smallholder farmers were selected as the target sample to answer the prepared survey. The reliability of this questionnaire was confirmed with Cronbach's Alpha method with a value of 0.868. The data obtained would be analysed using the Relative Importance Index (RII) method, and each factor would be labelled according to ranking order. The software used to calculate the Relative Importance Index and Cronbach's Alpha is SPSS version 22 and Microsoft Excel. In addition, each factor would be labelled based on the degree of effect, which was the little effect (LE), some effect (SE), average effect (AE), high effect (HE), and very high effect (VHE). This study's findings were that several factors made this non-organic fertilizer the choice of small farmers in the Pendang area.

Keywords: Survey, questionnaire, inorganic fertilizers, Relative Importance Index (RII), Cronbach's Alpha

Risk Assessment and Management of Urban Farms in Malaysia

Nur Ashimah binti Matsi*, Mohd bin Mahmud @ Mansor

Faculty of Agro-based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: ashimah.f19a0132@siswa.umk.edu.my

ABSTRACT

In recent years, rural dwellers have been attracted to urban areas due to the accessibility of career prospects and public utilities. This has led to a rapid increase in the population living in urban areas, resulting in a conversion of land previously used for agriculture into industrial facilities, homes, and city streets. To address the difficulty and expense of obtaining food in urban areas, urban communities or urban farmers have turned to the practice of urban agriculture. However, the implementation of urban farm projects is limited due to the risks involved. This study aims to evaluate and identify the risks commonly faced by urban farm operator, and to assess the most effective risk management strategies adopted by urban farmers in Malaysia. The type of sampling used in this study is convenience sampling with a quantitative methodology involving the distribution of questionnaires to 150 urban farmers. The results from descriptive analysis and risk assessment matrix showed that the respondents faced risks in all five categories, including production risk, marketing risk, financial risk, institutional risk, and personal risk, with medium and high rankings. A lack of agricultural land, high initial costs, and a lack of marketing infrastructure are the top risks with a value of 12. The most effective risk management strategies included the provision of a special reserve area for urban agriculture by stakeholders and the strengthening of existing skills and practices through more urban farming with mean 4.20. The findings of this study contribute to the understanding of urban agriculture in Malaysia and may inform urban planning policy in regard to the maintenance and continuation of agricultural activities in urban areas. Thus, future research on urban agriculture risks must be more comprehensive in order to adequately contribute academically to urban sustainability.

Keywords: urban agriculture, risk management, Malaysia, urban planning, agriculture policy.

Status and Growth of Malaysia Cattle Industry

Nur Athirah Binti Zainal Abidin^{1*}, Mohd Hafiz Bin Jamaludin² and Zulhisyam Bin Abdul Kari @ Abdullah³

¹ Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan.

First author: hanani.f19a0133@siswa.umk.edu.my

ABSTRACT

This research investigates and elaborates the status and growth of Malaysia's cattle industry. Nowadays Malaysia is having a hard time to achieve food security for several foods including cattle and its goods such as beef and dairy products. Currently Malaysian cattle production recorded a low in production of cattle and kept dependent on imported goods. However, the situation worsened due to the Malaysian population that kept growing ascendingly parallel to the demand for cattle and its goods. This research consists of 3 main objectives which firstly, to measure the Malaysia number cattle production growth, to forecast self-sustainability of cattle for the Malaysia population and to identify the issue faced by the smallholder in cattle production. Two different methodologies were used during the research to obtain data which is desktop survey and online survey. Desktop survey focused on achieving data from the Malaysian Department of Veterinary Service meanwhile the online survey focuses on a third objective which is to identify the issue and problem faced by smallholders in cattle production. From the online survey results show that the majority of cattle breeders do face problems with the feed cost that has skyrocketed recently. Escalating feed cost resulted in an increment in the production cost per cattle thus this situation urged the cattle breeder to reduce the number of their livestock.

Keywords: food security, cattle production, self-sustainability, Malaysian population,

Perception of Food Bank for Student in University Malaysia Kelantan, Campus Jeli

Nur Athirah Hanani binti Hafizan1*, Zul Ariff bin Abdul Latiff2

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First author: syamimi.f19a0134@siswa.umk.edu.my

ABSTRACT

This study was conducted to identify the perception of food banks for students in Universiti Malaysia Kelantan, campus Jeli. Sample size is 150 respondents of students and conducted in Universiti Malaysia Kelantan, campus Jeli. This study carried out three objectives: to determine the perception of food bank for students for Universiti Malaysia Kelantan, campus Jeli, to determine the relationship between knowledge, attitude, and practise toward the perception of food bank for students in Universiti Malaysia Kelantan, campus Jeli and to identify the most influential factor for the perception of food bank for student in Universiti Malaysia Kelantan, campus Jeli. Next, this study uses methods of purposive sampling, which is a distribution of survey questionnaires in person among students in Universiti Malaysia Kelantan Kampus Jeli by applying the Knowledge, Attitude, and Practice (KAP) model. Findings of research study resulted in perception of food banks for students, and results also show there is no relationship between knowledge, attitude, and practise for perception of food banks for students in Universiti Malaysia Kelantan, campus Jeli. Next, the most influential factor is the perception of food bank for student in Universiti Malaysia Kelantan, campus Jeli. Then, the confirmatory factory analysis also showed that it has an acceptable model fit where the SRMR value is less than 0.1. The value will be considered a good fit for this research study. In conclusion, first objective achieve because the result of perception of student from questionnaire, next objective achieved because of show there is no relationship of knowledge attitude and perception of food bank for student in Universiti Malaysia Kelantan, campus Jeli. Lastly, the result shows that the most influential factor for perception of food bank for student is attitude. The recommendation for next study is, to specifically the questions depend on variables and increase the number of sample size to get accurate data.

Keywords: Perception of Student, Foodbank, Societal Stigma, Knowledge, Attitude and Practice (KAP), SRMR

Eating Habits and Obesity Among Students of Universiti Malaysia Kelantan, Jeli Campus

Nur Syahidah Aqliah Binti Shafie, Zulhisyam Bin Abdullah, Mohd Hafiz Bin Jamaludin

Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus 17600, Jeli, Kelantan, Malaysia

First author: aqliah.f19a0150@siswa.umk.edu.my

ABSTRACT

Malaysia had one of the most significant numbers of obese or overweight among Asian countries. It was estimated around 40% of Malaysians are considered as physically inactive. Diabetes incidence among people aged 18 and above grew from 11.6 to 17.5 percent between 2006 and 2015. Obesity was associated with poor eating habits that includes overeating and taking unbalanced meals. Unbalanced eating habits amongst university students has been associated with being too busy and stress. The current study aims to identify eating habits of University Malaysia Kelantan, Jeli Campus students its relationship with obesity. Random sampling was used to collect 307 respondents by sharing a link to a series of online questions survey. The collected information was compiled and plotted using a spreadsheet, and qualitatively analysed. The majority of students ate regularly (64.2%), and most 63.5% had snacks in between meal. 23.8% of respondent consider themselves to be overweight while 6.2% consider to be obese. Foods which were easy to consume were preferred, while low price of food is prioritised over a food presumed health benefits, and these become more prevalent nearing assignments deadlines or during the examination week. Fast food is highly preferred because it is considered convenient, palatable, and affordable. University Malaysia Kelantan, Jeli Campus students must prioritize their health and raise awareness of the need for good eating habits and the quantity of nutrients required for a healthy body since good eating habits can prevent obesity.

Keywords: Eating habits, food preferences, obesity, University Malaysia Kelantan, Jeli Campus students, survey.

Acceptance of New Feed Formulation Among Independent Poultry Farmers in Malaysia.

Nurfatini binti Abdullah, Zulhisyam bin Abdullah, Mohd Hafiz bin Jamaludin

Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus 17600, Jeli, Kelantan, Malaysia

First Email: fatini.f19a0155@siswa.umk.edu.my

ABSTRACT

A wide variety of domesticated species are included under the umbrella term "poultry," including chickens, turkeys, ducks, geese, game birds (such as quails and pheasants), and ratites (emus and ostriches). The nutrition of all these species is not included in this overview, although concentrates on hens, which account for more than 90% of the market for poultry. However, other poultry species raised for meat and eggs can often use the nutritional management methods for chickens. This paper describes a study that was measure knowledge about the new feed among the farmers and was described the acceptance of new feed among the farmers. The method that been used in this paper qualitative and quantitative which it from the data that we had through the writing, text, and interaction. Then through the analysis data too, include the instrument such as survey, analysis data from percent of SPSS, min, and standard deviation, also from theory text analysis. From the results of the respondent, there was around 29.3 % of farmers are at the age of 20-30, and 20% at age of 50-60 years old. Then, they have academic education 45.3% at degree level, and 8% at others level. As a general, the farmers acceptance perception towards new feed was had some factor such as, halal factors, easy to get, affordable prices, testimony was goods and the protein ingredients of the feed have been revealed and the result of the research are encouraged factors too. Then, if the chicken feed was pricey, the component that important that attract to buy was majorities if the feed was efficient such eat some and big growth. New feed formulation would been accepted if the farmers referred the factor that relate to their farmers and what the main factor of the acceptance in the price of the new feed such as the feed for fat faster, food to resist disease, feed that have halal labels, feed that lasts a long time in storage. And feed was efficient like eat little perfect growth.

Keywords: Poultry, Knowledge, Data, Acceptance, Feed.

Entrepreneurial Intention on Commercial Poultry Farming Among Pre-Retirees in Malaysia

Nurul Jannah binti Soohaimi^{1*}, Mohd Hafiz bin Jamaludin² and Zulhisyam bin Abdul Kari @ Abdullah³

Faculty of Agro-Based Industry, University Malaysia Kelantan Jeli

First author: jannah.f19a0167@siswa.umk.edu.my

ABSTRACT

Malaysia is catching up with other ageing countries such as China and Japan as it is fast moving towards ageing nation. To mitigate with the rising issue, there is a pressing need to develop solutions to solve with the social and economic issues related to the ageing population. One of the possible alternatives is to encourage the retirees to become an entrepreneur themselves. Hence, the current study aims to assess the entrepreneurial intention among pre-retirees in Malaysia to venture in commercial poultry farming and to investigate the readiness among the pre-retirees in Malaysia to venture in commercial poultry farming. The sample and data collection were done by distributing an online survey created with Google Form to working individuals aged 45-59 years old through the social media platform. The data from 385 respondents obtained were analyzed and interpreted using Microsoft Excel and SPSS. The data from the study shown that most individuals from the private sector are thinking to start a business. This research can support the concept of Malaysian retirees in focusing on poultry farming to generate income for themselves and also contributes the country's economy.

Keywords: Malaysia, entrepreneurial intention, commercial poultry farming.

Chicken Meat Consumption Habits Among Students of University Malaysia Kelantan Jeli Campus

Nurul Syuhada Binti Ishak, Zulhisyam Bin Abdullah, Mohd Hafiz Bin Jamaludin

Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus 17600, Jeli, Kelantan, Malaysia

First Author: syuhada.f19a0173@siswa.umk.edu.my

ABSTRACT

Chicken consumption in Malaysia exceeded the OECD average in 2019. Most people in Malaysia said they were unwilling to give up or not consume meat in their diet. But chicken meat was considered cheap, readily available, easy to prepare, and is frequently chosen as a source of protein for a good balanced diet. The objective of this study was to identify the frequency of chicken consumption among University Malaysia Kelantan Jeli Campus students and to determine the factors that influenced University Malaysia Kelantan Jeli Campus students in consuming chicken meat. The questionnaire for this study was distributed randomly to the UMK Jeli Campus student population, and answered via an online survey platform. The data obtained for this study was about 300 respondents from UMK Jeli Campus students. The data was plotted using Microsoft excel and qualitatively analysed for the purpose of the study. The result of the study showed that the highest frequency of chicken consumption among UMK Jeli Campus students in a week was 3-4 times a week which was 156 (52%) respondents. The frequency of consumption of chicken meat was influenced by the expenses incurred by students for food. Meanwhile, the factor that most influenced the consumption of chicken meat among UMK Jeli Campus students was themselves, which was 265 (88.3%) respondents. However, the mass media factor also showed a high percentage in influencing the consumption of chicken meat because the media was one of the platforms that influenced a person's eating patterns and food choices. In conclusion, the consumption of chicken meat could change from time to time depending on factors that affected the individual. For future studies, it was necessary to focus more on factors or find other factors that influenced the consumption of chicken meat.

Keywords: Consumption of chicken meat, UMK Jeli Campus students, factors, survey, frequency.

Social-Demographic and Psychological Factors Affecting Eating Habits among Students of Universiti Malaysia Kelantan (UMK) Jeli Campus

Nurulain Ashikin Baharuddin*, Jeng Young Liew

Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus 17600, Jeli, Kelantan, Malaysia

First author: ashikin.f19a0174@siswa.umk.edu.my

ABSTRACT

One key determinant of health status is eating habits. Poor eating habits lead to lower nutritional value and inflate the risk of chronic diseases. Young generations, notably university students, are often considered nutritionally vulnerable to poor eating habits. This study aimed to (i) examine the patterns of eating habits among students and (ii) investigate the socio-demographic and psychological factors that affect eating habits among students. The students considered for the study were from Universiti Malaysia Kelantan (UMK) Jeli campus. This study used a survey method for the data collection. The questionnaire confirmed reliability by the test-retest reliability via a pilot test had been used to survey information on socio-demographics, eating habits, and psychological among the sampled students. The study used descriptive analysis to study the patterns of eating habits, where the mean score of eating habits was computed. Meanwhile, the hierarchical multiple linear regression was used to evaluate the socio-demographic and psychological factors that affected eating habits. Most students had healthy eating habits where they had regular daily meals every day (51.9%), ate breakfast, and took vegetables daily (35.4%). This result matched the findings of Adolphus in 2013, who claimed that regular breakfast consumption is a healthy eating habits since breakfast is the most important meal of the day. The results showed that most students consumed fast foods 1-2 times a week (40.9%). This result supported by a study from Subhalakshmi and Dhanasekar in 2018 who mentioned fast food has low nutrition and unhealthy to be consumed regularly. The mean score for eating habits was 4.78. The hierarchical multiple linear regression confirmed that exercise status was the single factor that significantly impacted eating habits in socio-demographics ($p < 0.05$). In contrast, no psychological factors substantially affected the students' eating habits. The study evidenced that majority of the students demonstrated healthy eating habits.

Keywords: Survey, questionnaire, eating habits, regression, pilot test

Awareness on Halal Cosmetic Products Among Muslim Female Students in Universiti Malaysia Kelantan, Jeli Campus

Rooba Segamany*, Farah Adila Abdullah[†], Norshahida Abu Samah[‡]

Faculty of Agro Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First author: rooba.f19a0177@siswa.umk.edu.my

ABSTRACT

The concept of halal not only applied to food but also on cosmetic products. Thus, awareness of halal cosmetics had become the main concern among Muslim consumer particularly, female youths. Therefore, it is vital having high level of halal cosmetic awareness in order to prevent them from procuring and consuming non-shariah compliance cosmetics. Whereas this awareness is more focus and adherent to Muslim colleague student as they are the most frequent cosmetic users. The aim of this study is to identify socio-demographic, level of awareness on halal cosmetic products, attitude, subjective norm and perceived behavioural control among Muslim female students in Universiti Malaysia Kelantan, Jeli Campus. Nowadays, halal cosmetic product is the main concern among young Muslim consumers. Thus, halal cosmetic products that are produced in line with halal prescriptions are readily acceptable by Muslim consumers as well as consumers from other religions. This study also conducted to analyse the relationship between attitude, subjective norm and perceived behavioural control towards awareness on halal cosmetic products among Muslim female students. The researcher prepared questionnaires based on Theory of Planned Behaviour (TPB). The reliability of instrument was run using 30 respondents before proceeding to 144 respondents. The data obtained were analysed using Spearman correlation via Statistical Package for Social Science (SPSS) Software version 26. The result shows that there is a significant relationship between perceived behavioural control towards awareness on halal cosmetic products, which the $P < 0.01$. It has been found that attitude and subjective norm are least efficient predictor in this study towards awareness on halal cosmetic products and has been founded as not compatible in other previous studies by several researchers.

Keywords: halal, cosmetic products, awareness, attitude, subjective norm, perceived behavioural control

The Adoption of Livestock Waste Management among Farmers in Southern Region of Peninsular Malaysia

Shahrul Aidil Sabarudin^{1*} and Farah Adila Abdullah²

¹Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan.

²Faculty of Plantation and Agrotechnology, Universiti Teknologi MARA, Jasin Campus, 77300 Merlimau, Melaka.

***First author:** aidil.f19a0179@siswa.umk.edu.my

ABSTRACT

Livestock waste implies animal excreta, bedding fabric, rain or other water, soil, hair, feathers or flotsam and jetsam ordinarily included in livestock waste taking care of operations. The early strategy of dealing with livestock wastes was exceptionally straightforward. The excrement droppings from livestock on the field were not indeed recuperated but cleared out to end up coordinates within the soil. The problems identified are a lack of knowledge, high management costs and the mentality of farmers who do not care about livestock management. This study aims to identify the use of livestock waste among farmers in the southern region of Peninsular Malaysia. There are three independent variables namely behavioural attitude, subjective norms and perceived behaviour control. A total of 100 respondents among farmers in the southern region of Peninsular Malaysia have been selected for this study through simple random sampling technique. Based on the findings, perceived behavioural control contributes the highest level among the other two independent variables which are subjective norms and behavioural attitude. In addition, behavioural attitude indicates the highest relationship towards adopting livestock waste management among farmers. Thus, this study concluded that farmers in the southern region of Peninsular Malaysia had good adoption of livestock waste management. Finally, this study should be expanded to the greater respondents in other livestock farming to get various findings.

Keywords: livestock waste management, behavioural attitude, subjective norm, perceived behavioural control, good adoption.

Malaysians' Willingness to Pay for Certified Musang King Durians

Nur Maisarah Binti Zainal Abidin^{1*}, Mohd Bin Mahmud @ Mansor^{1,2}

¹Faculty of Agro-based Industry, Universiti Malaysia Kelantan, Jeli Campus, Malaysia.

²Institute of Food Security and Sustainable Agriculture, Universiti Malaysia Kelantan, Malaysia

First author: maisarah.f19a0216@siswa.umk.edu.my

ABSTRACT

Durian is a tropical fruit with a strong, pungent fragrance and prickly skin. The Musang King durian is famous for its big size, creamy texture, and intense flavour. Counterfeiting is a potential issue in the durian market, particularly for the highly coveted Musang King variety. Because the Musang King durian is so valuable, other durian varieties have been misrepresented as Musang King to charge a greater price. As a result, various food certifications exist to assure consumers of the safety of their food and ensure that the authenticity of the durian they have paid is comparable to the price. This certification can ensure the quality, the authenticity and that the durian is not sold at unreasonable prices. However, the impact of this certification might be transferred to consumers. Hence, the objectives of this study were to determine the level of willingness Malaysians' to pay (WTP) for certified Musang King durians, to determine the relationship between attitude, social norm, and perceived behavioural control of Malaysians' willingness to pay for certified Musang King durians and to identify the most influencing factor of Malaysians' willingness to pay for certified Musang King durians. This study used quantitative research methodology to obtain information by distributing questions online to 409 respondents. The data was then analysed using conjoint analysis, Spearman correlation, and frequency statistics in SPSS. The results found that consumers are willing to pay around RM 2.16 more than the actual price for certified Musang King durians. It was also found that the attitude and the social norm were significant ($p = 0.00$ and $p = 0.04$, respectively), while perceived behavioral control was not significant ($p = 0.182$). Frequency analysis shows that attitude has the most relationship to WTP. For future studies, gathering more responses from public consumers is recommended to get a better picture of the situation regarding this topic.

Keywords: safety, high quality, certifications, Musang King durians, prices.

Malaysians' Willingness to Consume Alternative Meat

¹Zarin Nazira Binti Zahari*, ²Mohd Bin Mahmud @ Mansor^{1,2}

¹Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan

²Institute of Food Security and Sustainable Agriculture, Universiti Malaysia Kelantan, Malaysia

First author: zarin.f19a0224@siswa.umk.edu.my

ABSTRACT

The animal meat industry faces significant challenges, including welfare, negative environmental impact, and meeting the increasing demand for meat to feed the world's population. Despite these challenges, many consumers are hesitant to switch to alternative meat such as protein analogue, plant-based meat, and cultured meat. This study aims to investigate the level of willingness among Malaysians to consume alternative meat and to identify the factors influencing their decision. The study used a non-probability sampling method and a 5-point Likert scale questionnaire based on the Theory of Planned Behavior (TPB) to survey 385 Malaysians. The data were analyzed using SPSS, including descriptive statistics tests and Spearman correlation. About 32.1% of respondents are from Kelantan, 64.8% have a degree as the highest education level, 78.9% are Malay and 28.7% consume meat once a week. The results showed that the mean willingness to consume alternative meat among Malaysians is medium. There is a significant relationship between attitude, subjective norms, perceived behaviour control and willingness to consume. Subjective norms were identified as the most influential factor ($M=2.3634$), due to their positive effect on the desire to try alternative meat. Through this study, it can be seen that the willingness of Malaysians to consume alternative meat is not very high for now. This might be due to the lack of alternative meat markets in Malaysia. So hopefully, this study will increase awareness of the alternative meat industry in Malaysia. For future studies, researchers can use a different theoretical framework or specific Malaysian states to obtain a better context of this particular topic.

Keywords: alternative meat, willingness to consume, Theory of Planned Behavior, subjective norms

Consumer Preferences in Purchasing Organic Poultry Meat in Cheras

George Miller James* and Farah Adila Abdullah^{1,2}

¹Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan.

²Faculty of Plantation and Agrotechnology, Universiti Teknologi MARA, Jasin Campus, 77300 Merlimau, Melaka.

***Email:** george.f19a0243@siswa.umk.edu.my

ABSTRACT

The increasing demand for organic products has led to a rise in the production and availability of organic chicken meat. However, little is known about consumer preferences and decision-making processes in purchasing this type of meat. The theory of planned behaviour (TPB) suggests that individuals' intentions to engage in a particular behaviour are influenced by their attitudes, subjective norms, and perceived behavioural control. The purpose of this study is to investigate consumer preferences in purchasing organic chicken meat in Cheras, Malaysia, using the TPB as a theoretical framework. A survey was conducted with 140 respondents in the area using a structured questionnaire. The results showed that attitudes and perceived behavioural control towards organic poultry meat were significant predictors to purchase organic chicken meat. In addition, most respondents agreed that they could easily obtain organic chicken meat and that it was more guaranteed in terms of quality and safety. These findings suggest that producers and retailers of organic poultry meat in Cheras should focus on promoting the convenience and perceived quality and safety of their products to attract and retain customers. It may also be beneficial for these stakeholders to educate consumers about the benefits of consuming organic chicken meat.

Keyword: organic chicken meat, behavioural attitude, subjective norms, perceived behavioural control, quality and safety.

Farmers' Intention of Vanilla Cultivation for Agricultural Production in Kelantan

Nur Farhana Illani, Zul Ariff Abdul Latiff

Faculty of Agro-Based Industry, Jeli Campus, University Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: farhana.f19a0285@siswa.umk.edu.my

ABSTRACT

This study was conducted to identify the factors that influence farmers' intentions of planting vanilla in agricultural production among farmers in Kelantan because farmers lack acceptance, awareness, and knowledge about the benefits of planting vanilla for agricultural production in Kelantan. The main issues that arise in the agricultural sector are climate change, disease and illness, and low agricultural production. In addition, some farmers do not want to accept the cultivation of vanilla in their agriculture. The sample size is 150 farmer respondents and was conducted in the Kelantan area. Then, this study has implemented two objectives, To determine the level of farmers' desire for the potential of vanilla cultivation for agricultural production in Kelantan and To investigate the relationship between attitudes, subjective norms, and the perception of farmers' behavioural control towards vanilla cultivation in agricultural production in Kelantan. This study uses a purposive sampling method, which is the distribution of a "Google Forms" survey form among farmers in Kelantan by applying the Theory of Planned Behaviour (TPB). The findings of this research result in a high level of farmers' intention towards the potential of vanilla cultivation in production, and the results also show that there is a positive agricultural relationship between attitudes, subjective norms, and behavioural control perceived by farmers in Kelantan towards cultivation in agricultural production in Kelantan. Next, the most influential factor is the subjective norm of farmers in Kelantan for vanilla cultivation in agricultural production in Kelantan. Then, Confirmatory Factor Analysis also shows that it has an acceptable model in which the SRMR value is less than 0.10 or 0.08. This value will be considered appropriate for this research study.

Keywords : Farmers' Intention of Vanilla Cultivation for Agricultural Production in Kelantan

Malaysia Good Agricultural Practice (MyGAP) Adoption Among Durian Farmers in Kedah

Nur Fatin Md Fadzil^{1*}, and Tengku Halimatun Sa'adiah T. Abu Bakar¹

¹ Faculty of Agro-Based Industry, University Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan

First Author: fadzil.f19a0287@siswa.umk.edu.my

ABSTRACT

Nowadays, the majority of farmers in Malaysia are not aware about getting Malaysia Good Agricultural Practice (MyGAP) certification. Nevertheless, there are a few problems that the farmers face to apply and participate in MyGAP because of their certain trouble such as they are lacking knowledge, experiences and the major problem is a sort of financing to start up their basic application on MyGAP certification. Hence, this study aims to determine MyGAP adoption among durian farmers in Kedah. The dependent variable is the MyGAP adoption among durian farmers, while the independent variables in this study are attitude, perceived behavioural control, subjective norm, and knowledge. This study was employed quantitative research design and the questionnaire was adapted based on Theory Planned Behaviour (TPB) and Knowledge-Attitude-Practices (KAP) model. Through, 120 durian farmers in Kedah were chosen as sample size and population. SPSS version 26.0 was employed to analyse the data using reliability test, normality test, descriptive analysis, and correlation analysis. Based on the result, this study also explained that all the variables have a high mean score. Result also show that there is a significant relationship between attitude, subjective norm, perceived behavioral control and knowledge towards MyGAP adoption among durian farmers in Kedah. Hopefully, this study will increase the adoption of the durian farmers to get the MyGAP logo and certification even though the procedure is quite hard since it will improve country economic growth in the future.

Keywords: durian farmers, MyGAP, adoption, Theory Planned Behaviour (TPB), Knowledge, Attitude and Practices (KAP)

Study on the Preference of Village Chicken Dish Among Students in UMK Jeli Campus

Nur Adilah Binti Kamarudin, Zul Ariff Bin Abdul Latiff

Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

First Author: adilah.f19b0123@siswa.umk.edu.my

ABSTRACT

This study was conducted to determine the preference of village chicken dish among students in UMK Jeli Campus. The purpose of this study to determine preference in sensory quality characteristics among different types of village chicken dish, to determine level of attitude, subjective norms and perceived behavior control based on village chicken dish and to determine the relationship of between attitude, subjective norms and perceived behavior towards preference based on buying village chicken dish among student in UMK Jeli Campus. The sample size is 160 respondents of student Universiti Malaysia Kelantan (UMK) Jeli Campus. Next, this study uses the methods of purposive sampling, which is a distribution of survey questionnaires by Google Forms among students in UMK Jeli Campus by applying the Theory of Planned Behavior (TPB). The finding for this research study resulted there is a positive relationship between attitude, subjective norms, and perceived behavior control of students preference based on buying village chicken dish among students in UMK Jeli Campus. The finding was analyzed by using Package in Social Science Software (SPSS) 21th edition. Based on the finding, shows create exclusivity is the most elements of influencing factors determining the student's purchasing preference on the village chicken dish.

Keywords: Students in UMK Jeli Campus, Preference, Theory of Planned Behaviors.

Farmers' Intention Towards the Application of IR 4.0 & Drone-based Technology in Paddy Farming in Selangor

Nurshafira binti Zulkifli¹, Zul Ariff bin Abdul Latiff¹

¹ Faculty of Agro-Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600, Jeli, Kelantan

First Author: shafira.f19b0157@siswa.umk.edu.my

ABSTRACT

Paddy *Oryza Sativa L.* is the most leading cultivated in the world. One of the key foods used to satisfy human consumption needs is paddy. However, land use patterns have changed as a result of rapid urbanization. A few issues problem of intention towards the application of IR 4.0 & drone-based technology about paddy among farmers in Selangor due to using pesticides used in production as a result of this study and affect farmers such as small planting location and limited access facilities of drone. The independent variable were attitude, subjective norms and perceived behavior control, meanwhile the dependent variable is farmers intention towards the application of Industrial Revolution 4.0 & drone-based technology about paddy in Selangor. This study was used a quantitative researched and questionnaire was conducted by Theory of Planned Behavior (TPB). The sampling use 130 of respondent at Sekinchan and Sungai Besar, Selangor. The data was analyzed used SPSS 26.0 version. The result shown on level intention towards the application of IR 4.0 & drone-based technology in Selangor is raising both the standard of living and the level of output is more crucial for farmers involved in agriculture. Although used technology in agricultural activities is challenging, it is worthwhile because it can transform farmers' lifestyles and increase their income beyond what it was previously.

Keywords: TPB, Paddy Farmers, Sekinchan and Sungai Besar, Industrial Revolution, Drone-based Technology

Factors Influencing the Consumer Intention Toward Consumption of Instant Noodles in Kelantan

Syahidah Binti Abu Bakar*, Jeng Young Liew

Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus 17600, Jeli, Kelantan, Malaysia

Email: syahidah.f19b0190@siswa.umk.edu.my

ABSTRACT

Instant noodle is one of the processed food products that is popular across the world and is considered a staple food by most of the Asian region. Today, instant noodles are eaten in more than 100 countries as convenience, tasty food where more than 100 billion servings of instant noodle are consumed each year thus; it has grown into global food, supporting people's diets around the world. This research study was conducted to (i) explore the factors that influencing consumer intentions toward instant noodle consumption and (ii) study the demographic profile of respondents who consume instant noodle in Kelantan. Based on previous studies, the properties such as taste, price, quality, design, and brand are essential parameter for the selection attributes of instant noodle for consumer to consume the instant noodle product. The data source in this study was obtained from 320 respondents in Kelantan through the questionnaire. The questionnaires were confirmed reliable by Cronbach's Alpha reliability test based on the pilot test. The respondents were sampled by convenience sampling, and the descriptive analysis summarized respondents' demographic characteristics. The KMO and Bartlett's Test of Sphericity, tests under the exploratory factor analysis, were applied in this study to determine the factors influencing consumer intention toward instant noodle consumption. The exploratory factor analysis disclosed five underlying factors prompting consumer intention to consume instant noodle product. Those factors are "convenience and product attributes", "marketing and promotion", "advertisement and influences", "labelling and preference", and "packaging and branding". The findings of this study provide valuable insights into identifying and taking initiatives to improve the services, ambience, and needs of the consumer segment of the market in Malaysia.

Keywords: Instant noodle, factor, consumer, influencing, analysis

PERCEPTION OF MALAYSIAN ON DURIAN PEST

Abdul Hadi Abdul Karim*, Kumara Thevan

Faculty of Agro Based Industry, Jeli Campus, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan

*First author: hadi.F19b0226@siswa.umk.edu.my

ABSTRACT

“*Durio zibethinus*” or also known as durian is doubted as king of tropical fruits and one of southeast Asia’s most intriguing fruits. Due to the popular demand of durian in domestic and international scale the need of producing high quality durian is needed. The goal of this study is to determine the perception of Malaysians on Durian pests. Theory of Planned Behaviour (TPB), being utilized in a contributing questionnaire survey by conducting a non- probability purposive sampling method. The study findings show that there is a positive reaction toward the perception of Malaysians on Durian pests, and there is a positive relationship between attitude, subjective norms and perceived behaviour. In regard to the study perceived behavioural control being the most influential factor in determining the perception of Malaysian on Durian Pest. Perceived behavioural control being the most influential factor due to the KMO and Bartlett’s test that have the value of significant value of (Sig =0.000) which indicate a strong variable due to the value of the significant not less than (0.5), $p < 0.001$. KMO test also furthers prove perceived behavioural control being the most influential factor due to the value of Kaiser-Meyer-Olkin Measure which is 0.827 which is considered Meritorious due the fact that KMO in the region of $0.80 < 0.90$ which shows a strong correlation, that made it possible for a factor analysis to be conducted from the data that been tested.

Keywords : “*Durio zibethinus*”, Malaysian, Pest, Durian, Theory of Planned Behaviour

Associations between Intuitive Eating Behaviors and Fruit and Vegetable Intake among University Students: A Case Study of University Malaysia Kelantan, Jeli

NurFatin Aina Binti Mohd Supani*, Jeng Young Liew

Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus 17600, Jeli, Kelantan, Malaysia

First author: aina.f19b0295@siswa.umk.edu.my

ABSTRACT

Intuitive eating (non-dieting, based on hunger and satiety) has been popularized as an alternative way on healthy management, yet the research investigating intuitive eating and fruit and vegetable intake among university students is minimal. Therefore, the purpose of this study was to examine the associations between intuitive eating behavior and, fruit and vegetable intakes among university students. This survey study used a questionnaire that involved a large sample of 320 students in University Malaysia Kelantan, Jeli. Data analysis using SPSS 25.0 software involving descriptive analysis (percentage, mean and standard deviation) as well as inferential analysis (Spearman's correlation). The pilot study based on Cronbach Alpha analysis for internal consistency shows a reliability level of 0.8205, an acceptable value. The mean score found that the intuitive eating behavior among students was moderate and the level of fruit and vegetable intake was also moderate. The results of Spearman's correlation analysis showed that there were positive associations between intuitive eating behavior and fruit and vegetable intake among students. The findings of the study serve as an insight for university students and encourage fruit and vegetable consumption along with promoting a healthy lifestyle.

Keywords: Survey, questionnaire, intuitive eating behavior, pilot test, healthy lifestyle

A Survey of The Acceptance Fertigation System Among Farmers in Kelantan

Nurul Aine Mohd Nasir^{1*}, Farah Adila Abdullah ^{1,2}

¹Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan.

²Faculty of Plantation and Agrotechnology, Universiti Teknologi MARA, Jasin Campus, 77300 Merlimau, Melaka.

First author: aine.f19b0301@siswa.umk.edu.my

ABSTRACT

Agriculture is becoming the most critical industry in our country's economic development. The agricultural industry is evolving in tandem with the advancement of technology throughout the world, with fertigation technology making it easier for farmers to cultivate crops. As a result, this research aims to determine farmers' acceptance of fertigation techniques in the selected area in Kelantan. The dependent variable is farmer acceptance of the fertigation technology system in Kelantan while the independent variables used in this study include perceived usefulness, perceived ease of use, and attitudes. A quantitative study approach and a modified questionnaire based on the Theory of Acceptance Model (TAM) and the Theory of Planned Behavior (TPB) were used to gather the data among 100 farmers using simple random sampling technique. The study's findings indicate that perceived usefulness, perceived ease of use, and attitude are associated with the acceptance of fertigation technology in Kelantan. This study, hopefully, will increase farmers' acceptance towards the new technologies that make farming easier and more efficient in Malaysia.

Keywords: Agriculture, Theory Acceptance Model (TAM), Theory of Planned Behaviour (TPB), Fertigation, Technology

Factors Affecting Agricultural Productivity in Perak

Mai Noor Rabi'atul' Adawiyah binti Samsuddin, Jeng Young Liew

Faculty of Agro-Based Industry, Universiti Malaysia Kelantan, Jeli Campus 17600, Jeli, Kelantan, Malaysia

First Author: rabiatul.f19b0319@siswa.umk.edu.my

ABSTRACT

Agricultural productivity is very poor and a very sensitive topic in among farmers in Perak. Farmers face problems to maintain production capacity in agricultural productivity. The objective of this research is to identify the factors affecting agricultural productivity in Perak. In this research, the factors were collected from google form, previous relevant research, review, and revision in Perak area. These factors are grouped into 6 sections such as "Attitude, Knowledge, Climate Change, Technology, Soil and Manpower". In this study, 320 respondents of survey questionnaire were provided google forms, and the data was collected and discussed by IBM SPSS Statistics 26. A statistical analysis was done using SPSS and EXCEL PACKAGES. The data analysed using Relative Importance Index and Cronbach's Alpha. Based on the result showed, the factors affecting agricultural productivity in Perak can improve the production capacity in agricultural.

Keywords: Survey, questionnaire, agricultural productivity, SPSS, Perak.



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