ICAFT 2018

INTERNATIONAL CONFERENCE ON AGRICULTURE, ANIMAL SCIENCES & FOOD TECHNOLOGY

Agricultural Innovation to Nourish the World

30th -31st October 2018

Terengganu, Malaysia

BOOK OF ABSTRACTS

ORGANISED BY

FACULTY OF BIORESOURCES & FOOD INDUSTRY

UNIVERSITI SULTAN ZAINAL ABIDIN

CO-ORGANIZER:

GREEN WORLD GENETICS SDN. BHD.

SPONSORS:

PERMULA SDN. BHD.

APICAL SCIENTIFIC SDN. BHD.

AZRUL ENGINEERING

O&E TECHNOLOGIES SDN. BHD

BOOK OF ABSTRACTS

INTERNATIONAL CONFERENCE ON AGRICULTURE, ANIMAL SCIENCES & FOOD TECHNOLOGY 2018

(ICAFT 2018)

30th-31st October 2018, Terengganu, Malaysia

Edited by

Assoc. Prof. Dr. Md Sarwar Jahan
Noor Asidah Binti Mohamed

Terengganu, Malaysia

Published, 2018

SCIENTIFIC AND PROCEEDING COMMITTEE

Assoc. Prof. Dr. Md. Sarwar Jahan (Head)
Dr. Azman Bin Azid (Assistant)
Assoc. Prof. Dr. Khamsah Suryati
Assoc. Prof. Dr. John Tang Yew Huat
Assoc. Prof. Dr. Connie Fay Komilus
Assoc. Prof. Dr. Kamarul 'Ain Mustafa
Assoc. Prof. Dr. Nalini A/P Arumugam
Prof. Dr. Che Abdullah Abu Bakar
Dr. Nadiawati Binti Alias
Dr. Mohammad Moneruzzaman
Dr. Asmad Kari
Dr. Ha Hou Chew
Dr. Khairil Mahmud
Dr. Norshazila Shahidan
Dr. Wan Anwar Fahmi Wan Mohamad
Dr. Fathurrahman Lananan
Noor Asidah Binti Mohamed

CONFERENCE ORGANIZATION

Chairperson

Assoc. Prof. Dr. Khamsah Suryati Binti Mohd

Deputy Chairperson

Dr. Nadiawati Binti Alias

Director

Assoc. Prof. Dr. John Tang Yew Huat

Deputy Director

Assoc. Prof. Dr. Connie Fay Komilus

Secretary

Dr. Norlia Muhamad (Head)

Norhaslinda Binti Haron (Assistant)

Shafiyah Nabilah Binti Abdul Aziz

Treasury

Dr. Norshazila Shahidan (Head)

Athirah Hazwani Binti Ali (Assistant)

Nurul Akma Binti Mamat

Sharifah Amirah Husna Tuan Mazlam

Program Book, Souvenier, Certificates and Registration

Dr. Nornasuha Yusoff (Head)

Dr. Nor Hasima Mahmod (Assistant)

Pn. Rosliza Abdul Razak

Dr. Noroul Asyikeen Binti Zulkifli

Dr. Zalilawati Binti Mat Rashid

Fadlina Ismail

Wan Nur Amalina Wan Mamat

Zaleha Mat Ya'acob

Protocol and VIP Speech

Dr. Norshida Ismail (Head)

Rokiah Binti Zainuddin (Assistant)

Dr. Siti Mariam Zainal Arifin

Dr. Nguang Siew Ing

Mohd Zulfa Bin Awang

Mahani Mohamad

Mohamad Hailmi Sajili

Noor Aida Aini Binti Nawawi

Nur Nadhirah Binti Abdul Halim

Salmah Mohamed

Suziani Binti Muda

Zanariah Mohd Nor

Wan Nor Saidatul Aida Shazwa Wan Rosli

Technical, Logistics, Transportation and Accommodation

Dr Asmaliza Abd Ghani @ Yaacob (Head)

Tajul Afif Abdullah (Assistant)

Dr. Zarinah Zakaria

Mohd Aswandy Bin Mohamad

Raja Muhammad Raja Ali

Faris Ilyamuddin Hamzah

Mohd Fairul Bahere Jusoh

Mohd Faizam Ramli

Nur Fatihah Binti Hasan Nudin

Nurul Asma Hasliza Binti Zulkifly

Siti Husna Binti Zakaria

Mohd Faiz Mohamad

Nor Amatur Rahman Abd Razak

Mohd Sabri Sulaiman

Mohd Jusoh Omar

Ahmad Faizal Jaafar

Ahmad Risyamsyi Abdul Razak

Nuruddahri Alias

Mohd Hazrul Hashim

Sponsors and Exhibition

Dr. Nurul Zaizuliana Rois Anwar (Head)

Syaidatul Najiah Zakaria (Assistant)

Dr. Nadzifah Yaakub

Mohd Zulfazilan Bin Nawang

Nor Afiza Yusoff

Wan Nor Husniza Wan Husain

Mohd Naziruddin Zahari

Mohamad Hanafis Awang

Muhammad Zulhairi Mohd Nawi

Muhammad Aminudin Abdullah

Muhammad Faizal Mad Noor

Mohamad Nazarudin Abd Aziz

Mohd Suhaimi Mokhtar

Zanariah Mohd Nor@Abd. Halim

Mohd Hamidi Mohd Anizan

Normazlina Md. Nor

Promotion, Publicity, Montage, and Conference Website

Assoc. Prof. Dr. Nalini A/P Arumugam (Head)

Dr. Ho Lee Hoon (Assistant)

Assoc. Prof. Dr. Nurul Huda

Mohd Haziq Abdul Hamid

Nuruddahri Bin Alias

Nik Farid Nik Mohd

Robiah Arifin

Ahmad Muslim

Scientific, Proceeding and Speaker Invitation

Assoc. Prof. Dr. Md. Sarwar Jahan (Head)

Dr. Azman Bin Azid (Assistant)

Assoc. Prof. Dr. Khamsah Suryati

Assoc. Prof. Dr. John Tang Yew Huat

Assoc. Prof. Dr. Connie Fay Komilus

Assoc. Prof. Dr. Kamarul 'Ain Mustafa

Assoc. Prof. Dr. Nalini A/P Arumugam

Prof. Dr. Che Abdullah Abu Bakar

Dr. Nadiawati Binti Alias

Dr. Mohammad Moneruzzaman

Dr. Asmad Kari

Dr. Ha Hou Chew

Dr. Khairil Mahmud

Dr. Norshazila Shahidan

Dr. Wan Anwar Fahmi Wan Mohamad

Dr. Fathurrahman Lananan

Noor Asidah Binti Mohamed

Food and Beverages, and Conference Dinner

Dr Noor Afiza Badaluddin (Head)

Dr. Mohd Nizam Haron (Assistant)

Dr. Ahmad Syazni Kamarudin

Dr. Nurul Aini Kamaruddin

Dr. Saiful Iskandar Bin Khalit

Ahmad Zamri Bin Yusoh

Mohamad Hafizi Bin Mohamad Roni

Azizun Musa

Excursion

Dr. Norhayati Binti Ngah (Head)

Mohd Rohaizad Md. Rejab (Assistant)

Syahril Amin Bin Hashim

Dr. Abd. Jamil Zakaria

Roslan Arshad

WELCOME TO ICAFT 2018

On behalf of the organizing committee, we are pleased to announce that the International Conference on Agriculture, Animal Sciences & Food Technology 2018 (ICAFT 2018) is held from October 30th to 31st, 2018 in Terengganu, Malaysia. ICAFT 2018 provides an ideal academic platform for researchers to present the latest research findings and describe emerging agricultural Innovation to nourish the world. The conference seeks to contribute to presenting novel research results in all aspects of Agriculture, Animal Sciences & Food Technology. The conference aims to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and research results about all aspects of Agriculture, Animal Sciences & Food Technology. It also provides the premier interdisciplinary forum for scientists, engineers, and practitioners to present their latest research results, ideas, developments, and applications in all areas of Agriculture, Animal Sciences & Food Technology.

Best regards,

Assoc. Prof. Dr. Khamsah Suryati Binti Mohd
Chairperson, ICAFT2018

CONTENTS

KEYNOTE SPEAKERS

KEYNOTE 1

Insights into host-pathogen interactions for the *Colletotrichum* plant fungal pathogens

Paul WJ Taylor

Faculty of Veterinary and Agricultural Sciences, The University of Melbourne, Parkville, Victoria 3010, Australia

Abstract

Colletotrichum is one of the most frequently reported group of pathogenic fungi causing anthracnose disease in a wide range of crop plants throughout the world. Advances in fungal taxonomy using multigene phylogenetic analysis have identified around 220 *Colletotrichum* species in 14 species-complexes. For example, there are now 27 species identified to cause anthracnose in chili (*Capsicum* spp) and in *Citrus* spp, 18 *Colletotrichum* species have been reported globally. PCR-based detection methods are being developed for *Colletotrichum* spp. to enable fast identification of species. Quantitative PCR is the next generation of diagnostics that will be used to assist in crop biosecurity for detection of seed-borne fungal pathogens and measuring levels of inoculum in plant and soil samples.The life styles of *Colletotrichu*m species can be broadly categorised as necrotrophic, hemibiotrophic, latent or quiescent and endophytic; with most species having multiple life styles during their disease cycle. *Colletotrichum* spp. can infect seeds and cause pre- and post-emergence death of seedlings. Leaves can be infected with the pathogen entering a quiescent stage and as the leaves senesce they serve as a primary source of inoculum to infect fruit and leaves. *Colletotrichum* spp. cause significant post-harvest disease due to the pathogen's ability to develop a quiescent lifestyle in infected young fruit. *Colletotrichum* genomics is being used to better understand pathogenesis in host-pathogen interactions, particularly to identify pathogenicity and virulence genes such as secreted effectors, proteases, CAZymes and secondary metabolite biosynthetic genes. For many *Colletotrichum* species, initial infection is promoted by the aid of fungal cutinases, which hydrolyse the plant cuticle.Improved identification of *Colletotrichum* species, development of qPCR diagnostic techniques and knowledge of the host-pathogen interaction, will lead to improved integrated disease management practices and mitigation of incursion by exotic pathogens.

KEYNOTE 2

Planktonic phases of symbiotic copepods, with a special reference to Caligidae

Susumu Ohtsuka[a]

[a]*Takehara Station, Setouchi Field Science Center, Graduate School of Biosphere Science, Hiroshima University, Hiroshima 725-0024, Japan*

**Corresponding author: ohtsuka@hiroshima-u.ac.jp*

Abstract

In symbiotic/parasitic copepods, naupliar stages are typically planktonic, serving a primary role in dispersal, while the first copepodid represents the infective stage and commences symbiotic/parasitic mode of life. A typical example of such life cycle is provided by "*Saphirella*"- like copepods whose naupliar and first copepodid stages are frequently abundant in coastal waters. Their later copepodid stages are loosely associated with benthic animals. Peculiar exceptions are exemplified by the protelean life cycles of the families Monstrillidae and Thaumatopsyllidae, during which adults are truly planktonic and some pre-adult stages are endoparasitic. In the fish-parasitic Caligidae, the life cycle has been considered to follow the generalized pattern, but adults of some species such as *Caligus undulatus* seem to exhibit a dual mode of life involving host switching after completion of the chalimus stages on the intermediate hosts. During this process adults that leave the first host become temporarily planktonic before attaching to the final host. This modified mode of life seems to be limited to caligids occurring in fish farms in the world. Adults of some Ergasilidae also show the dual mode of life as in *C. undulatus*. Abbreviation of the life cycle, in particular the planktonic phase, is characteristic for some symbiotic/parasitic taxa, suggesting that they can easily locate new hosts without the need for long-distance dispersal. It is likely that symbiotic/parasitic copepods fluently utilize planktonic phases in their life cycle, maintaining the balance between dispersal, host location, reproduction, and anti-predation strategies.

***Keywords*:** Caligidae, copepods, life cycle, plankton, symbiosis

KEYNOTE 3

From Laboratory to Commercial Food Production

Jomduang, S.[1]

[1]*Asst. Prof. Dr., Faculty of Agro-Industry, Chiang Mai University, Chiang Mai,*50100, Thailand.

**Corresponding author:* somchai.j@cmu.ac.th

Abstract

Thailand is worldwide known as “Kitchen of the World”. Thailand has quite fertile land that can produce a lot of raw materials from fruits and vegetables. There are a lot of big food companies, but most of them are small organisation or SME. Some of them grow up from home industry level according to government “One Tambol One Product (OTOP) policy. Small ones do not have their own research and development departments. Some government agencies try to help them to find out the innovative food products. One strategy, government lunched the policy to support some seed funding to develop the food processes or products. Universities are the important sources for supporting academic and technology. From the factory problems, academic researchers start to find out the solutions in laboratory level and then transfer or scale up technology to commercial production. The co-funding for research were supported from both government and factory sides. During the laboratory scale development, factory staff had the chance to share the idea that could match for their own facilities. In these issues, some case studies about new food products from fruits and vegetables in the northern part of Thailand were shared and discussed such as sugar palm, honey, typical chilli paste, green mustard pickle, crispy silkworm from mulberry plants and mulberry fruit powder.

Keywords: food industry in Thailand, sugar palm, mulberry, silkworm, OTOP.

PLENARY SPEAKERS

PLENARY 1

Antileukemic pontential of Goniothalamin a cytotoxic compound from *Goniothalamus* spp

A. Manaf Ali [a,b]

[a] *Institute of Agropolis, Universiti Sultan Zainal Abidin, Campus Besut, Terengganu*
[b] *Natural Medicine Research Centre, Universiti Islam Malaysia, Cyberjaya, Selangor.*

* *Corresponding author: manaf@unisza.edu.my*

Abstract

Goniothalamin (5-hydroxy-7-phenylhepta-2,6-dienoic acid lactone) is a biologically active styrylpyrone derivative isolated from various *Goniothalamus* sp., belonging to the Annonacae family . The compound was reported to be cytotoxic towards several cancer cell lines such as pancreas carcinoma (PANC-1), gastric carcinoma (HGC-27), breast carcinoma (MCF-7) and leukemic cell lines (CEM-SS, HL-60 and WEHI-3B). However goniothalamin was found to be less cytotoxic when tested on normal cell lines.. Goniothalamin was cytotoxic and genotoxic to both HL-60 and CEM-SS leukemic cells by reducing cell viability and has the ability to induce early DNA damage after treatment. The genotoxicity effect had been seen in parallel with the cytotoxicity results and indicated GTN was more cytotoxic in CEMSS cells as compared to HL-60. The induction of apoptosis by goniothalamin was evident from the morphological examination of the treated cells stained with nucleoprotein/DNA-intercalating dyes acridine orange and propidium idodide. Furthermore, the formation of internucleosomal DNA fragments of the treated cells as DNA ladders were also observed on the agarose gels. Goniothalamin induced apoptosis occurred via activation of caspase-3/-7 and that the caspase inhibitor benzyloxycarbonyl-Val-Ala-Asp fluoromethyl ketone (Z-VAD.FMK) blocked the apoptosis process. Furthermore, the in-vivo anti-leukemic activity of goniothalamin was observed in leukemic BALB/c mice induced with WEHI 3B - mouse myelomoncytic leukemia cells. The mice groups treated with goniothalamin showed significant increasing in survival rate which was comparable with the mice group treated with vincristine. Results indicated that goniothalamin significantly decreased the weights of liver and spleen in treated mice groups compared to untreated mice group. The total white blood cells and percentage of blasts cell in the blood, bone marrow and spleen smears were significantly lower in treated mice groups than untreated group. From the results obtained, the treated mice with goniothalamin showed similar results as vincristine, which is a commercial drug leukemia treatment.

***Keywords*:** Antileukemic, Goniothalamin, *Goniothalamus* spp Cytotoxic, Vincristine, WEHI-3B

PLENARY 2

Halalan toyyiban food processing

Mohd Yazid Manap [a]

[a] *Halal Products Research Institute, Universiti Putra Malaysia*

Abstract

The Halal food industry in Malaysia has made tremendous progress since the introduction of the Halal Malaysia initiatives. However, the progress has not been satisfactory. The government want active participation from the SMI. Halal product industries such as food, pharmaceuticals, cosmetics and personal care products have shown some expansion but as its being lead by the MNCs, not by the home bred SMI. In general, Halal business related to Islamic finance, life insurance have shown some good progress although need to compete with other Islamic financial centers in the Gulf countries. Syariah compliance industries can be categorized according to three (3) syariah hazards that must be avoided at all times. Namely; Haram, Najs and Riba'. The food industry and the cosmetic and personal care industry players are required to fully avoid the Haram and Najs hazards. In syariah compliance business, the hazard is Rba' The discussion will focus on the three hazards

PLENARY 3

Biotechnological innovations for sustainable goat production and industry in Asian Region

Ramli Abdullah and Wan Khadijah Wan Embong

Faculty Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Terengganu, Malaysia

Abstract

Globally, livestock production is growing faster than any other sectors. By 2020, livestock is predicted to become the most important agriculture sector in terms of value-added commodity. Demand for livestock products is a function of income and sustained growth in per capita income, rising urban populations and changes in diet and lifestyle. The trend toward increase per capita demand for animal source foods is occurring primarily in developing countries. In ASEAN, animal protein per capita consumption is approximately 50 kg which is equivalent to 5.2 million tonnes of meat consumption per year. Foods of animal origin which include meat, milk, eggs and their products are the main sources of protein, fat and minerals which are important for human health. The ASEAN countries is the home to 2.6 billion chickens, 225 million ducks, 15 million head of buffaloes, 47 million head of cattle, 71 million head of pigs, 26 million head of sheep and 12 million head of goats to feed more than 650 million ASEAN populations. Although growing rapidly, average meat and milk consumption in ASEAN countries is still low when compared with industrialize countries. However, ASEAN countries have good potential to produce livestock and livestock products.

Using Malaysia as a representative of ASEAN countries, the population of goat in Malaysia is approximately 500,000 head of goats. Per capita consumptions of goat meat and goat milk are 0.5 kg and less than 1 liter respectively. The goat meat and cow's milk are imported annually with the annual values of 90% and 95%, respectively, with negligible quantity of imported goat milk. The heavy importations of goat meat and dairy products have forced the government to put a high priority to improve goat production in the country for food security and food safety. Similar trend is observed in the ASEAN countries. The major limitations of goat production and industry in the ASEAN countries among other things are lack of local breed, poor nutrition, poor disease management, low goat management practices and poor marketing mechanisms. Furthermore, goats are produced by small community farmers who are normally old and lack of education as well as without appropriate technologies and innovations in their farm management practices. Therefore, this presentation highlights the possible roles of biotechnologies as tools to innovate for the advancement of goat production and industry in the ASEAN countries. This biotechnologies include animal production improvement through reproductive technology, animal feed improvement from local resources and application of biotechnology in health management and production of biological reagent through recombinant DNA technology (vaccine, diagnosis system using vaccines delivery). A special focus will be made on how reproductive biotechnologies could enhance the goat production and industry in ASEAN countries. In addition, this presentation will emphasize on contributions of goat biotechnology which include implication of goat biotechnology in goat production as well as strategies to commercialize goat biotechnology using possible business models for viability and sustainability of goat production and industry in the ASEAN countries.

PLENARY 4

Recent developments in vegetable breeding

Mr. Sakthivel Poraya

GWG Genetics, Terengganu Malaysia

Abstract

Vegetables are important sources of micronutrients, including vitamins, minerals, antioxidants and fibre needed to conduct a healthy and productive life. Persistent of "Green Revolution Era Agricultural policies" are mostly biased towards improving staple food grain productivity, especially on Rice, Wheat and Maize. The paradigm shift required from Staple Food security to balanced nutrition is very slow in many countries. Research and policy discussions continue to focus on hunger and calorie deficiency rather than on the need for a balanced diets to address chronic micronutrient malnutrition and the emerging problems of overweight and obesity. Vegetable crops are recognized as the principal source of micronutrients, both macro and micro elements and loaded with Phyto-nutraceuticals. Today, neither the economic nor nutritional power of vegetables is sufficiently realized. This steered efforts of our Vegetable breeders around the world for improving nutritional quality, appearance, high yield, adaptation to different agro-climatic zones and production systems. Green World Genetics (GWG), is a total food value chain organization specialized in the research and development of tropical hybrid seeds. With a strong focus on the improvement of our agricultural produce, GWG is always pushing boundaries to be better. Well-integrated into our beliefs is the need to be innovative. Evolution is geared toward improving the adaptation of a population to the environment in which it is growing and reproducing through "Survival of the fittest". Plant breeding is an accelerated evolution guided by humans rather than nature. Plant breeding is the art and science of changing the traits of plants in order to produce desired characteristics. Plant breeding can be accomplished through many different techniques ranging from simply selecting plants with desirable characteristics for propagation, to more complex molecular techniques. Vegetable breeders develop either an improved open pollinated Variety or Hybrid. They use different methodologies and techniques to bring novel traits into a plant to address the specific market requirement. Classical plant breeding (CPB) uses deliberate interbreeding (crossing) of closely or distantly related individuals to produce new crop varieties or lines with desirable properties. Modern plant breeding (MPB) is applied genetics, but its scientific basis is broader. New Plant Breeding Tools (NPBT) are revolutionizing the way how we accelerate our breeding process; produce plant varieties in a similar – but more precise – manner compared to other plant breeding techniques, in a significantly shorter timeframe. New vegetable varieties is now breaking barriers of geographical location, climate, production systems and consumer preference. New innovative traits introduced into Solanaceae, Brassica, Cucurbits, Apiaceae, Amaranthaceae and Asteraceae are now driving vegetable markets all around the world.

AGRICULTURE

Agriculture - Biotechnology - Agribussines - Enviromental Science

AG-O-01 LLWUY

Adaptation of Knowledge from Traditional Fishing Gears in the Aquaculture Industry: A Case Study in Tampakan Village, Marudu Bay, Sabah, Malaysia

Nivasini Tamothran [a,*] & Rosazman Hussin [a]

[a] *Ethnography Research and Development Unit,Faculty of Humanities, Arts and Heritage, Universiti Malaysia Sabah*

* Corresponding author: nivas6272@gmail.com

Abstract

Aquaculture industry is practiced extensively throughout many parts of the world, and freshwater aquaculture for fish, crustaceans, and mollusks totaled nearly US$144.4 billion. Billions of people depend to varying degrees on seafood for dietary protein and it contributes to the livelihoods of 1.8% of the global population. Due to declining numbers of fish in the sea, artisanal fishers' involves in small-scale aquaculture which is a significant source of local food security, employment and income generation. Active traditional knowledge practices can be seen in the small-scale aquaculture industry. This paper highlights the journey of the adaptation of traditional artisanal fishers' knowledge in face of commercialization. It describes the technological change of capturing fish by using artisanal fishing gears into fish cage since the techniques used by artisanal fishers' reflect the characteristics of the fish around natural environment. Based on fieldwork that was conducted for three months from April 2015 at Kampung Tampakan, Kudat, information concerning the adaptation of traditional fishing gears covers that the aquaculture industry in the growing of hybrid grouper (*Epinephelus* sp). A major method used was that of in-depth interviewing and participant observation. The fish cage industry is a new form of livelihood however some methods that are practiced are considered by the people themselves as traditional
.

***Keywords*:** Adaptation; Traditional Fishing Gears, Artisanal and Aquaculture

AG-O-02 DEZND

Chemical Compositions of Five Varieties of Napier Grass (Pennisetum purpureum) at Different Harvesting Ages

Nurul Aini K.[a,*], Aiza Nadira Z.[a], Normala A.[a] , Aqilah S.[b] , Nurul A.[b]

[a] *School of Agricultural Science and Biotechnology, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia*
[b] *School of Animal Science, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia*

* Corresponding author: nurulkamaruddin@unisza.edu.my

Abstract

Napier grass (*Pennisetum purpureum*) has potential to be processed as livestock fodder due to high growth rate and good nutritive value. The objective of this study is to determine the chemical compositions of five Napier grass varieties at three different harvesting ages (45 days, 60 days and 75 days after sowing). The five Napier grass varieties that used in this study were Zanzibar Napier, Uganda Napier, Dwarf Napier, Red Napier and India Napier. The plant samples were planted and harvested at Pasir Akar Farm, Besut, Terengganu and were analyzed using Proximate Analysis and Dry Ashing Method. The chemical compositions were analyzed for moisture content, ash, crude protein (CP), crude fiber (CF), Magnesium (Mg), Potassium (K), Aluminium (Al), Phosphorus (P) and Calcium (Ca). Results showed that the chemical compositions of ash, moisture content and crude protein for all the five Napier varieties were decreased with the increased of harvesting ages. The crude protein in Dwarf Napier (25.51%) shows the highest percentage followed by India Napier (22.44%), Uganda Napier (18.45%), Red Napier (18.26%) and Zanzibar Napier (16.78%) respectively. Meanwhile, the crude fiber of all varieties decreased along the maturity. The results also showed the most chemical compositions were highest at the early stage which is at 45 days. It can be concluded that the growth stage of Napier grass at 45 days is the best age for harvesting, which is provides high nutritive value of animal feed. Thus, this study showed that the harvesting ages have an effect on the chemical composition of Napier grass.

***Keywords*:** Chemical compositions, fodder, Napier grass varieties, harvesting ages, nutritive value

AG-O-03 CVASA

Morphochemical variations in Stevia rebaudiana Bertoni population generated from random crosses

Halimaton Saadiah Othman [a,*], Mohamad Osman [b], Zarina Zainuddin[a]

[a] *Department of Plant Science, Kulliyyah of Science, International Islamic University Malaysia 25200 Kuantan Pahang Malaysia*
[b] *Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Johor, Malaysia*

* *Corresponding author: halimatonsaadiah@iium.edu.my*

Abstract

Stevia rebaudiana Bertoni is a small perennial herb which is considered as a natural non-caloric sweetener plant due to the sweet steviol glycosides available in the leaves. Stevia was first introduced into Malaysia as early as in 1970s. Lack of suitable local varieties in Malaysia is due to very little or no concerted breeding works available locally. Thus, this study was initiated to morphochemically characterise the developed stevia populations generated from random crosses towards selection of superior stevia genotypes to be used in the future stevia breeding programs. The F1 populations were morphologically and chemically evaluated. Both qualitative and quantitative morphological characters were recorded. Steviol glycosides content (stevioside and rebaudioside A) were also considered. Based from the data, a selection of seven promising plants was made. These plants were identified with stevioside content ranging from 8.19% to 17.42% and rebaudioside A content was found generally low with the highest recorded at 2.81%. One plant with rebaudioside A to stevioside ratio of 0.2 was also identified.

***Keywords*:** Stevia, morphology, stevioside, rebaudioside A

AG-O-04 EZAGK

Studying the Nutritional Properties of Two Accessions of Quince (*Cydonia oblonga* Miller) Grown in Rawalakot, Azad Jammu and Kashmir

N. Zahid[a,*], J.R. Khan[a], M. Maqbool[a], S.Z.A. Shah[a]

[a] *Department of Horticulture, Faculty of Agriculture, The University of Poonch, Rawalakot, Azad Jammu and Kashmir*

* *Corresponding author: noosheen.zahidl@upr.edu.pk*

Abstract

Quince (*Cydonia oblonga* Miller) fruit is attracting interest globally due to its health promoting properties. It grows successfully in temperate regions of Azad Jammu and Kashmir. Fruits of quince are mostly used to produce functional products. Recently, researches interest has been increased on nutritional properties of quince due to its demand as an industrial raw material. However, in Rawalakot most of the fruit is wasted every year due to lack of awareness and attention towards its proper harvesting, storage and utilization. Therefore, the present study aimed to evaluate two different accessions of quince (Apple shaped and Pear shaped) grown in Rawalakot. Fruit of these two accessions were analyzed for titratable acidity, total flavonoids, total phenols and total antioxidants activity. No significant differences were observed between these two accessions for parameters under observation. However, titratable acidity for Apple shaped quince (0.512 mg/100 g) was higher as compared to Pear shaped quince (0.448 mg/100 g). Similarly, the results showed that both the accessions possessed high amount of total flavonoids (3.19 and 2.96 m mol of quercetin/100 g FW), total phenols (1.26 and 1.32 µg gallic acid/g FW) and total antioxidants activity (3.50 and 3.14 activity of $FeSO_4$ mg/g FW) for Apple and Pear shaped quince, respectively. However, Apple shaped quince showed better yield and resistance against fruit fly attack. Based on these results it can be concluded that Apple shaped quince has better prospects when grown under Rawalakot conditions. Moreover, detailed studied are needed to explore their market potential and multiplication scope for distribution to the local growers.

***Keywords*:** Quince, Accessions, Industrial potential, Antioxidants, Total phenols

AG-O-05 GKSMH

Morphological and Physico-Chemical Attributes of Persimmon (*Diospyros kaki*) Fruits in Relation to Elevations of Rawalakot, Azad Jammu & Kashmir - Pakistan

M. Maqbool[a,*], N. Zahid[a], S.Z.A. Shah[a], A. Hamid[a], A. Yaqoob[a], S. Ahmed[a]

[a] *Department of Horticulture, Faculty of Agriculture, The University of Poonch, Rawalakot, Azad Jammu and Kashmir*

* *Corresponding author: mehdimaqbool@yahoo.com*

Abstract

Persimmon (*Diospyros kaki*) is fleshy fibrous, deciduous fruit belonging to family *Ebenaceae*. It is normally grown wild in few selected areas of Azad Jammu and Kashmir and Rawalakot has been the most suitable area for its cultivation. However, due to the lack of awareness, attention towards its proper harvesting, storage and utilisation, most of the fruit is wasted every year. In this regard, the present study was designed to evaluate the various characteristics of persimmon fruits harvested from five different locations [Drake (3378 ft), Jhiri (4358 ft), Rawalakot city (5374 ft), Dhamni (5431 ft), Khaigala (6628 ft)] of Rawalakot. Samples of persimmon fruits were collected, stored for 20 days at ambient temperature (25±2°C) and analysed for morphological parameters (no. of flowers per branch, no. of fruit per branch, no. of fruit drop per branch, change in fruit size, change in colour, insect pest, disease attack), physical parameters (fruit diameter, total weight of fruit, fruit colour, fruit firmness), chemical parameters (pH, acidity, total soluble solids, lycopene, vitamin C, total sugars) and antioxidant properties (total phenols, antioxidant activity). Results showed that persimmon fruits collected from Khaigala showed maximum no. of flowers per branch (43.67), whereas change in fruit size (34.45 mm) was observed in plants which were grown at Jhiri. Further, fruit drop per branch (9.0), insect pest and disease attack was minimum in fruits grown at Jhiri. Weight loss (%) increased in all the collected fruits during storage and change in colour was also observed. Moreover, titratable acidity (1.54%), vitamin C (29.33 mg/100g), crude fiber (2.94%), total antioxidant activity (37.26%) and total phenols (33.66 mg/100 g) also decreased during ambient storage. While an increase in total soluble solids (22.78°Brix), total sugars (23.13%), lycopene content (30.48µg/100 g) was observed in harvested fruits. Overall, the persimmon fruits grown at Jhiri location had larger size, less insect pest, disease attach and least flower and fruit drop percentage as comapred to other locations. Thus, based on the results obtained during this study, it can be concluded that Jhiri location is more suitable for growing persimmons as compared to others, which could be recommended for growing persimmon fruits on a commercial scale.

***Keywords*:** Indigenous fruits, Climatic conditions, Postharvest quality, Physiological characteristics

AG-O-06 NUYVL 2

Evaluation of Different Plant Extracts Againts Stripe Flea Beetle Of Pechay Grown Under Field Condition

Daisy S. Capon [a,*] and Marilyn G. Patricio [a]

[a] Visayas State University-Villaba, Leyte, Philippines and Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines

** Corresponding author: dscapon6611@gmail.com*

Abstract

Now a days crop production will not sustained without continuous application of synthetic pesticides. However, frequent and mistake use of this pesticides can result to changes of insects pest behavior, dispersal, development, fecundity which indicating resurgence and replacement. Farmers and growers are switching to a pesticide that is safer to the natural enemies or switching to a pesticide with different mode of action. They commonly integrate the new control techniques into their operations like using of plant organic compounds in controlling population of insect pests. The use of botanical pesticide is currently gaining an interest as a cheap and safe alternative to conventional pesticide. This study aimed to assess the percent incidence and damage severity of stripe flea beetle and to determine the yield of pechay in response to different formulated plant extracts. Different formulated plant extracts were sprayed to pechay at weekly interval until harvest. The data gathered were the population of the stripe flea beetle, severity of damage and yield of pechay. The different plant extracts had a significant effect on the population of the stripe flea beetle and percent damage. However, it was found out that pechay sprayed with turmeric extract has the lowest population of stripe flea beetle and lowest percentage of leaf damage compared to other plant extracts followed by organic herbal nutrient (OHN). Highest number and weight of marketable plants were harvested from plants sprayed with turmeric extract and synthetic pesticides. Results of this study indicate that turmeric extract and OHN were effective in controlling stripe flea beetle and could be useful as an alternative to synthetic pesticides.

Keywords: plant extract, pechay, stripe flea beetle**,** synthetic pesticides

AG-O-07 NUYVL

Soil Nutrient Availability And Plant Uptake Of Sweet Corn Under Different Fertilizer Management Schemes

Daisy S. Capon [a,*] and Nenita E. Dela Cruz [a]

[a] *Visayas State University-Villaba, Leyte, Philippines and Central Luzon State University, Science*

* *Corresponding author: dscapon6611@gmail.com*

Abstract

The experiment was laid out in split plot in RCBD (randomized complete block design) with three replications. Sweet corn variety was assigned in the mainplot while the fertilizer management schemes were assigned in the subplots. Result showed no differences in the soil parameter between Sweet Pearl and Sweet Grande. However, the different fertilizer management schemes significantly affected available P of the soil during the different growth stages of the test plants. Plants in plot applied with 4.5 tons ha^{-1} vermicompost + 75-30-30 kg ha^{-1} N, P_2O_5, K_2O (T_4) tended to have higher available P at 15 and 30 DAT although it was comparable to T_2, T_5 T_6. In addition, plots applied with pure inorganic fertilizer (150-60-60 kg ha^{-1} N, P_2O_5, K_2O) tended to have higher available P in the soil at 45 and 70 DAT (days after transplanting) although it was comparable to T_4.For the exchangeable K in the soil was not influenced by variety but was influenced by fertilizer management schemes at 30, 45 and 70 DAT. Application of the different fertilizer management schemes generally had comparable effects on exchangeable K content of the soil.N uptake was higher in Sweet Pearl than in Sweet Grande at 70 DAT. However, no differences were observed on the N uptake of the two varieties at 15, 30 and 45 DAT. Application of 150-60-60 kg ha^{-1} N, P_2O_5, K_2O (T_3) resulted in higher N uptake of sweet corn relative to the control.P uptake, results showed no differences between the two sweet corn varieties. In contrast, the different fertilizer management scheme treatments increased the P uptake of sweet corn at 15 and 30 DAT but not at 45 and 70 DAT. In terms of interaction effect, Sweet Grande applied with 150-60-60 kg ha^{-1} N, P_2O_5, K_2O (T_3) gave the highest P uptake. For Sweet Pearl, there were no differences among the different fertilizer management schemes. The differences in P uptake between the two varieties can be due to genetics. K uptake of sweet corn varieties as influenced by variety and fertilizer management schemes the different fertilizer management schemes did not influence the K uptake of sweet corn except at 30 DAT. At this growth stage (30 DAT) Sweet Grande applied with 150-60-60 kg ha^{-1} N, P_2O_5, K_2O (T_3) had the high K uptake. Sweet Grande on the other hand had comparable K uptake among the different fertilizer management schemes.

Keywords: soil nutrient availability, plant uptake, fertilizer management schemes

AG-O-09 BSMWJ

Economic Valuation of Landscape Trees in FRIM Selangor Forest Park.

Siti Aisyah Jabaruddin [a] and Rohana Abd Rahman [a]

[a] *Economic and Strategic Analysis Programme, Forest Research Institute Malaysia, 52109 Kuala Lumpur, Malaysia.*

* *Corresponding author: sitiaisyah@frim.gov.my*

Abstract

As a part of the effort towards in obtaining UNESCO World Heritage Site, a study was conducted to determine the economic value of the trees along the main road in the FRIM Selangor Forest Park. For this purpose, the Thyer's method was found to be the best method for this study. The method combines size, age, physical assesment and social benefit to establish a significance index for each tree. From November 2017 till February 2018, a total of 185 trees were measured comprising 78 dipterocarp and 107 non-dipterocarp trees. *Hopea helferi* had DBH of 120 cm and is categorised as endangered species according to IUCN redlist. Three species are vunerable namely, *Khaya ivorensis* with DBH of 152 cm, *Swietenia macrophylla* (DBH 84.2 cm, range 31-147 cm) and Hopea odorata (DBH 77.65 cm, range 20.7-140 cm). The value of the trees to FRIM and the environment is discussed.

***Keywords*:** Economic Value, Thyer's Method, Dipterocarp, Non-dipterocarp, Significance Index

AG-O-10 CSUGX

Expression and characterization of carbohydrate binding module (cbm) from *vibrio cholerae* non-o1 sialidase in *escherichia coli*

Shadariah Mamat [a] , Asmad Kari [b] and Nadiawati Alias [a,*]

[a] *School of Agriculture Sciences and Biotechnology, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia.*
[b] *School of Animal Science, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia.*

** Corresponding author: nadiawati@unisza.edu.my*

Abstract

Carbohydrate binding modules (CBMs) are discrete contiguous amino acid sequence within a carbohydrate-active enzyme which are non-catalytic modules that primarily exist to target parent enzyme to its substrate for efficient hydrolysis. Although many sialidase proteins have been identified from various pathogenic bacteria, only a few enzymes are commercially available which have been used for chemoenzymatic syntheses and therapeutics application. A gene encoding carbohydrate binding module (CBM) from *Vibrio cholerae* Non-O1 sialidase has been successfully cloned in *E. coli* BL21 (DE3). The CBM encodes for 174 amino acids from an open reading frame of 522 bp nucleotide sequences. The gene was successfully expressed solubly at 18˚C when induced with 1mM IPTG. Maximum protein expression was observed at 20 hours after post-induction time. For purification technique, an anionic denaturing detergent method was used using SDS and Sarkosyl with gradient affinity elution with imidazole. SDS-PAGE analysis showed that the purified CBM protein exhibited a single band with molecular weight of 40 kDa. Biochemical characterization of the protein displayed optimum pH at 5.5 in 100 mM citrate buffer with the highest T_m value of 45.5 ºC. The protein was showed stable between pH 5.5-6.2 and able to retain its activity from 27-56 ˚C**.** From the analysis of metal ions and reagents, addition of Mn^{2+}, Mg^{2+}, 1% SDS, 1 M urea and 1% Triton managed to increase protein melting temperature to 59 ºC and 58.5 ºC respectively.

Keywords: Carbohydrate Binding Module*, Vibrio cholerae* Non-O1, expression, characterization

AG-O-11 DPLXG

Anxiety like behaviour on Javanese medaka (*Oryzias javanicus*) and zebrafish (*Danio rerio*) after exposure to neurotoxicants

Nurul Farhana Ramlan [a], Syaizwan Zahmir Zulkifli [a], Shahrizad Yusof [a], Syahida Ahmad [b], Mohammad Noor Amal Azmai [a] and Wan Norhamidah Wan Ibrahim [a,c,*]

[a] *Department of Biology, Faculty of Science, Universiti Putra Malaysia 43400 Serdang, Selangor, Malaysia.*
[b] *Department of Biochemistry, Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia 43400 Serdang, Selangor Malaysia.*
[c] *Natural Product Laboratory (LHS),Institute of Bioscience (IBS),Universiti Putra Malaysia 43400 Serdang, Selangor, Malaysia.*

** Corresponding author: wnwi@upm.edu.my*

Abstract

Zebrafish is increasingly popular in neurotoxicology research due to their small size, low maintenance and efficient for high throughput testing. However, using non-native species may raise concern on ecological aspect as accidental introduction of foreign species to our local aquatic environment could cause ecosystem instability. Javanese medaka has been widely used in ecotoxicology and marine research but rarely used in biomedical research. Therefore, the applicability of using Javanese medaka in the neurotoxicology was assessed by using zebrafish as a reference model. To determine the potential of Javanese medaka as a model organism for neurotoxicology, anxiety like behaviour was measured by using aquatic Light/Dark Plus Maze. To generate fundamental knowledge about the behaviour of Javanese medaka, their behaviour without any neurotoxicant treatment was assessed in comparison to established model organism, zebrafish. Aquatic Light/Dark Plus Maze allow the fish to choose between white or black background when they are in anxiety state. In this study, Javanese medaka exhibited light preference while zebrafish showing light avoidance. Hence, it shows that Javanese medaka exhibited less anxious behaviour as compared to the zebrafish in aquatic Light/Dark Plus Maze. Exposure to anxiolytic substance, ethanol (1%), showed anxiolytic effect in both type of fishes and exposure to anxiogenic substance, caffeine (100 mg/L), showed anxiogenic effect in both type of fishes. Meanwhile, exposure to a neurotoxicant, endosulfan (1.6 µg/L), resulted increment in anxiety like behaviour on Javanese medaka, while no significant effect on zebrafish. Ethanol can induce anxiolytic response and caffeine can induce anxiogenic response in Javanese medaka as well as in zebrafish. Consequently, this showed that Javanese medaka has a complementary behaviour as zebrafish and it can also be a potential model organism for neurotoxicology research. More studies need to be conducted to further develop Javanese medaka as an ideal model organism for neurotoxicology research.

***Keywords*:** Javanese medaka, zebrafish, anxiety like behaviour, neurotoxicant, model organism

AG-O-12 DRHKR

Cytotoxic and apoptosis screening of *Heterotrigona itama* (Stingless bee) propolis ethanolic extract on human leiomyosarcoma cell (SK-UT-1)

Ammira Shafiqha Abdul Khadar [a], Aulia Rani Annisava [a], Nor Elani Mat Nafi [a], Nur Basyirah Md Zin [a], Norzilawati Pauzi [a], Ainur Awanis Mohd Badiazaman [a], Muhammad Muslim Mohd Rodi [b], Abdul Jamil Zakaria [a] and Khamsah Suryati Mohd[a,*]

[a] *School of Agriculture Sciences and Biotechnology, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia.*
[b] *Agriculture Production and Food Innovation Research Institute (AGROPOLIS), Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia.*

** Corresponding author: khamsahsuryati@unisza.edu.my*

Abstract

Propolis is a sticky resin like material collected by stingless bees from plants and used in the hive as building material and defensive substances. It has been recognized as beneficial properties in ancient medicinal culture due its versatile in pharmacological activities include anti-inflammation, anti-microbial and anti-cancer properties. The aim of this study is to determine the cytotoxic and apoptotic effect of propolis extract from Hetetrotrigona itama against human uterine leiomyosarcoma cell line (SK-UT-1). Cytotoxic effects were assessed using MTT assay after 72 hours of incubation of eight concentrations (0, 1.56, 3.13, 6.25, 12.50, 25.00, 50.00 and 100.00 µg/ml) of ethanolic propolis extract. Apoptotic analysis was carried out by determining cell death through Annexin V/PI double staining and analyzed by flow cytometer. The results revealed that six concentration of H.itama extract showed a positive cytotoxicity effect in the concentration dependent manner. The inhibition of concentration value at 50 % of cell population (IC_{50}) is 5 µg/mL and at the concentration of 25 µg/mL, more than 98 % of cell population were found to be dead through apoptosis (90%) and 8% through necrosis. This study has shown that the ethanolic extract of H.itama was cytotoxic towards SK-UT-1 cells and induced the cells into apoptotic cell death mode.

***Keywords*:** propolis, Hetetrotrigona itama, SK-UT-1, apoptosis, necrosis.

AG-O-13 EQEMP

Conventional Electrodialysis mediation for saline and wastewater: History, process, Future perspectives

A. Sajjad [a], R. Kanthasamy [a,*], A. Azoddein [a]

[a] *Faculty of Chemical and Natural Resources Engineering, University Malaysia Pahang-UMP, 26300 Gambang, Pahang, Malaysia*

* *Corresponding author: sajjad.hillawi@hotmail.com*

Abstract

Electrodialysis is an electro membrane that initially emerged more than 100 years ago. It introduced for sugar syrup demineralisation. Also, it showed the spectacular ability to be commercial treatment via high salt rejection, and significant water permeability. This mini review shows the history and the process of Electrodialysis (ED) for saline and wastewater. This literature review mentioned several reports of ED evolution and performance such as selective membrane, and EDR. This review has aimed to show an overview of ED method for water contamination treatment and saline as eco-friendly, and promising way.

***Keywords*:** Electrodialysis, wastewater, saline, brine, RO

AG-O-14 FSTSK

Utilization of mixed raw effluent from palm oil mill for the production of microbial biomass protein

Nor Faizah J.[a,*], Wan Hasamudin W.H.[a], Noorshamsiana A.W.[a], Astimar A.A.[a] and Kamarudin H.[a]

[a] *Engineering and Processing Research Division, Malaysian Palm Oil Board, 6, Persiaran Institusi , Bandar Baru Bangi, 43000 Kajang, Selangor, Malaysia*

** Corresponding author: norfaizah@mpob.gov.my*

Abstract

Mixed raw palm oil mill effluent (MRE) was produced from sterilizer condensate and oil clarification process. From the MRE, simple sugar could be recovered through various pre-treatment such as chemical and enzymatic method. This study is on the conversion of MRE into fermentable sugar using a commercial cellulase enzyme (Celluclast®). The hydrolysis was carried out at different enzyme dosages (1 to 5 ml/100 ml MRE), temperatures (45 to 55 °C), shaking speeds (100 to 200 rpm) and pH (4 to 5.5). The POME hydrolysate containing 40 g/L of reducing sugar and 56,000 mg/L chemical oxygen demand (COD) were produced when subjected to enzymatic hydrolysis at 50°C. The resulting glucose was utilized as a medium for the production of single cell protein. Fermentation of S. cerevisiae using undiluted POME hydrolysate as substrate was able to produce biomass up to 28.92 g/L with protein content of 24.79% and consequently reduced COD of effluent up to 79.12%. From the findings, it is suggested that POME can be utilized as substrate for microbial biomass protein production and also brought significant reduction in the COD of the effluent.

Keywords: mixed raw effluent, palm oil, enzymatic, biomass, protein

AG-O-15 GGAFQ

Phylogenetic analysis of *Labisia pumila* (Kacip Fatimah) varieties in Malaysia

Nur Afieqah Kaz Abdul Aziz [a,*], Baharuddin Sulaiman [a], Ahmad Sofiman Othman [a]

[a] *School of Biological Sciences, Universiti Sains Malaysia, 11800 Minden, Penang, Malaysia*

* *Corresponding author: afieqahkaz@student.usm.my*

Abstract

Labisia Lindl. (Primulaceae) is a small Malesia genus with only seven species of erect, decumbent and creeping undershrubs. One of its species, *Labisia pumila* Benth & Hook f. is a very well-known medicinal plant. In Malaysia, *L. pumila* or commonly known as Kacip Fatimah has been used traditionally to treat various elements of the women's health especially in post-partum medication in Malay community. For *L. pumila*, eight varieties have been recognised within the species namely *L. pumila* var. *alata, L. pumila* var. *pumila, L. pumila* var. *lanceolata, L. pumila* var. *gladiata, L. pumila* var. *discoplacenta, L. pumila* var. *malintangensis, L. pumila* var. *neriifolia and L. pumila* var*. sessilifolia* and out of those eight varieties, seven can be found in Malaysia. However, only *L. pumila* var. *alata, L. pumila* var. *pumila,* and *L. pumila* var. *lanceolate* are more commonly found in Malaysia and researches on its medicinal properties were done mainly on these varieties. Thus, the accurate determination of the correct *L. pumila* variety is importantly needed for the protection of the consumers and to safeguard the herbal industry. This study is embarked to utilize two plastid DNA genes (*mat*K and *trn*L-F) and the internal transcribed spacer (ITS) of a nuclear ribosomal DNA as DNA barcodes for *L. pumila* and its varieties. DNA extraction and polymerase chain reaction (PCR) amplification were done on a total of 30 individuals of different varieties collected from different states in Malaysia to perform molecular studies. Afterwards, phylogenetic trees were established from the generated sequences to elucidate the relationships between the *L. pumila* varieties.

Keywords**:** *Labisia pumila*, Primulaceae, Genetic relationship, Medicinal plant, DNA barcoding

AG-O-16 GQFUX

PFOS triggered apoptosis in the neural stem cell line C17.2 cells by inducing cytochrome *c* release and caspase activation

Wan Norhamidah Wan Ibrahim [a,b,c,*] and Sandra Ceccatelli [c]

[a] *Department of Biology, Faculty of Science, Universiti Putra Malaysia 43400, Serdang, Selangor Malaysia*
[b] *Institute of Bioscience (IBS), Universiti Putra Malaysia, 43400 Serdang, Selangor Malaysia*
[c] *Department of Neuroscience, Karolinska Institutet, S-17177 Stockholm, Sweden.*

* *Corresponding author: wnwi@upm.edu.my*

Abstract

Perfluorooctane sulfonate (PFOS) has been widely used as surfactants in various industries and consumer products because of their unique properties as repellents of dirt, water and oils. The wide use of PFOS has resulted in global distribution and detection in the environment and is considered a persistent environmental pollutant. It has high persistence in the environment, leading to bioaccumulation and biomagnification in the food chain and ecosystem through exposure and ingestion. To investigate the toxic effects of PFOS on brain cells, the neural stem cell line C17.2 was exposed to PFOS 150-250 µM for 24 h. At the end of exposure C17.2 cells exhibited abnormal morphological changes compared to control such as becoming shrunken, rounded, pyknosis and more loosely attached to the surface of cell culture dish. Nuclear staining of fixed cells with Hoechst 33342 after 24 h clearly exhibited the presence of chromatin condensation and nuclear fragmentation with intact cell membrane, which are considered as morphological hallmarks of apoptosis. Increasing amount of cells showing typical features of apoptosis could be detected in a dose dependent manner. Control cells showed co-localization between mitochondria and cytochrome *c,* while treated cells loose the co-localization of mitochondria and cytochrome *c* as it showed diffused cytosolic staining. Caspase analysis revealed that PFOS significantly increase DEVDase activity as compared to the control. Pre-incubation with the pan-caspase inhibitor z-VAD-fmk (20 µM) 30 min prior to exposure to PFOS significantly reduced the percentage of apoptotic nuclei. Thus, inhibition of caspase protected the cells, suggesting that the proteolysis due to caspase might be crucial in the process of cell death induced by PFOS. Overall, the results suggest that PFOS induced neurotoxicity effects in the neural stem cell line C17.2 cells by inducing cytochrome *c* release and caspase activation.

Keywords**:** PFOS, C17.2, apoptosis, neurotoxicology

AG-O- 17 KXVFA

Development of low pressure reverse osmosis membrane for water production via membrane desalination process

Sulaiman N.A. [a], Hassan A.R. [a,b,*], Safari N.H.M. [a] and Rozali S. [a]

[a] *East Coast Environmental Research Institute (ESERI), Universiti Sultan Zainal Abidin, Gong Badak Campus, 21300, Kuala Nerus, Terengganu, Malaysia*
[b] *Faculty of Industrial Design and Technology (FRIT), Universiti Sultan Zainal Abidin, Gong Badak Campus, 21300 Kuala Nerus, Terengganu, Malaysia*

* *Corresponding author: rahmanhassan@unisza.edu.my*

Abstract

Water shortage has become a real problem at global level and therefore, new and innovative technologies were established to provide sustainable solutions to water crisis. One of the effective approaches to resolve the global challenges is introducing the membrane-based desalination. Reverse Osmosis (RO) is a pressure driven membrane process which becoming increasingly popular and widely used for water purification applications that require high salt rejection such as brackish and seawater desalination. In this study, the influence of Sodium dodecyl sulphate (SDS) surfactant in producing the finest membrane for desalination were investigated in terms of performance, morphological structure and molecular orientation. From a polymer blending of Polysulfone (PSF)/N-Methyl-2-Pyrrolidone (NMP)/Polyvinylpyrrolidone (PVP)/ Sodium dodecyl sulphate were formulated for making of low pressure reverse osmosis surfactant (LPROS). In order to examine the influence of SDS surfactant, different concentration from 0 wt% to 3 wt% were employed for desalination application of 10 000 ppm (brackish water) and 50 000 ppm (seawater). Experimental data showed that the increasing of 0.5 wt% in surfactant produced higher pure water permeation (PWP) and flux. At 2.5 wt% of SDS, the LPROS membranes showed the highest PWP of about 60.42 L/m^{2}h and brackish water flux at 45.58 L/m^{2}h. Meanwhile, at 3.0 wt%, the highest flux of seawater at 39.37 L/m^{2}h was obtained. Moreover, the optimized LPROS (2 wt% of SDS) membrane performed high rejection ratio of 90.9 % for brackish water and 90.4 % for seawater concentration of 10 000 ppm and 50 000 ppm, respectively. Therefore, the findings revealed that the fabricated LPROS membrane having a good potential to be used as eco-efficient desalination process of brackish water and seawater technology.

Keywords: Low Pressure Reverse Osmosis, Surfactant, Desalination, Morphologies, Molecular Orientation

AG-O-18 SSSWH

Toxicity effects of nanomaterials (Quantum Dots) following sub-acute and sub-chronic exposure to zebrafish

Nur Atikah Saleh Hodin [a], Nurul Farhana Ramlan [a], Che Azurahanim Che Abdullah [b,c], Wan Norhamidah Wan Ibrahim [a,d,*]

[a] *Department of Biology, Faculty of Science, Universiti Putra Malaysia 43400, Serdang, Selangor Malaysia*
[b] *Department of Physics, Faculty of Science, Universiti Putra Malaysia 43400, Serdang, Selangor Malaysia*
[c] *Institute of Advanced Technology (ITMA), Seri Kembangan, 43400 Serdang, Selangor, Malaysia*
[d] *Institute of Bioscience (IBS), Universiti Putra Malaysia, 43400 Serdang, Selangor Malaysia*

[*] *Corresponding author: wnwi@upm.edu.my*

Abstract

Quantum Dots (QDs) are new versatile nanomaterials that the production has risen greatly nowadays. Great advantages promised by this nanomaterials to be used in biological and technological applications can be achieved only by altering the particle size. However, despite of its uniqueness, there are still lacks of research studying the adverse effects of QDs. Hence, the present study evaluated the disadvantages of QDs through the assessment of morphological and biochemical alterations on zebrafish as a model organism. Zebrafish are increasingly important in neurotoxicology research nowadays due to their physical and genetic features that are inexpensive, easy to handle and shares almost 70% homology with human. Two types of exposure regimen used in this study were sub-acute and sub-chronic exposure. Sub-acute exposure referred to the exposure where the fish received media renewal every 48 hours until it reached 96 hours. Meanwhile, sub-chronic exposure was subjected with only once exposure until 96 hours. Taken as a whole, sub-acute exposure to QDs was observed to be less toxic as compared to sub-chronic exposure. Emphasizing on the morphological effect, both regimens showed significant effects where high mortality rate, body discoloration and internal bleeding were observed. For further evaluation, Fourier Transform Infrared analysis (FTIR) was conducted only in three concentrations for sub-acute (0µg/L, 50µg/L and 100µg/L) and two concentrations for sub-chronic (0µg/L and 50µg) due to tremendous mortality rate recorded in 200µg/L for both exposure regimens. The analysis showed that biochemical alterations occurred in the gills of the fish in both treatments as the structure of lipid, protein, glycogen, carbohydrate and nucleic acid were altered.

Keywords: Nanomaterials, Quantum Dots, morphology, biochemical alterations, FTIR analysis

AG-O- 19 TFVPH

Comparison of Growth and Development of Oriental Fruit Fly, *Bactrocera dorsalis* Hendel (Diptera: Tephritidae) Reared on Sweet Potatoes (*Ipomea batatas* L.) and Wheat Germ Artificial Diet

MY. Nurul Fatihah [a], M. Salmah [a,*], MS. Hailmi [a], B. Noor Afiza [a], Y. Nornasuha [a], N. Norhayati [a]

[a] *School of Agriculture Science and Biotechnology, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia*

* *Corresponding author: salmahmohamed@unisza.edu.my*

Abstract

An oriental fruit fly, *Bactrocera dorsalis* (Hendel) is a global and economically important pest of agricultural food crops. However, basic life history information on this pest, which is vital for designing more effective control methods, currently still needs serious attention, particularly through the good rearing insect diet. Thus, this study aimed to determine and compare the growth and development of *B. dorsalis* reared on sweet potatoes (*Ipomea batatas* L.) and wheat germ based artificial diets under laboratory conditions. Four types of diets used were; orange sweet potato (OSP), purple sweet potato (PSP), white sweet potato (PSP) and wheat germ (WG) as a standard diet. Results showed that among the diets tested, the WG based diet displayed a significant difference ($P<0.05$) in the growth and development of *B.dorsalis* due to the higher nutritional value contained in the diet. Nonetheless, *B. dorsalis* growth and development on sweet potatoes based diet, particularly on OSP diet, showed similar results as WG based diet. There was a significant difference between a number of pupae obtained where WG recorded the highest number of pupae (17.33±0.33) followed by OSP (9.00±0.577), PSP (9.00 ±0.33) and WSP (8.00 ± 0.577). However, no significant difference was shown among the OSP, PSP and WSP based diets particularly on the number of pupae, the percentage of pupae, adult survival and duration from egg to adult. As a conclusion, this study showed that sweet potatoes can be used as an alternative economic source of artificial diets for *B. dorsalis* mass-rearing program in laboratory

Keywords: Artificial diet*, Bactrocera dorsalis*, *Ipomea batatas*

AG-O-20 TLVTG

Non-woven bag as an air root pruning pot improve growth quality of *Gomphrena haageana*

Husni Hayati Mohd. Rafdi[a,*], Siti Nur Shazwani Mohd Shukri[a] , Nor Idzwana Mohd Idris[a], Ramisah Mohd Shah[a]

[a] *Universiti Malaysia Terengganu, School of Food Science and Technology, Kuala Terengganu 21030, Terengganu, Malaysia.*

* *Corresponding author: husni@umt.edu.my*

Abstract

Air root pruning container has been promoted to increases the shelf life and quality of a plant material by preventing roots circling. In this study, non-woven bag was used as an alternative to air root pruning pots. *Gomphrena haageana* produces bright red colour globular flower that has high potential as fresh cut flower or dried flower. It was chosen as a model plant for this study for its rapid growth and has high ornamental values. This study was conducted by comparing growth quality of *G. haageana* planted in polybag versus non-woven bag. The plant growth quality measured were number of branches, stem height, stem diameter, flower diameter and dry root mass. Results indicate that *G. haageana* growth was affected by container design. Number of branches, stem height, stem diameter, and dry root mass from plant in air root pruning had better result than plants grown in polybag. Root spiraling was greater in the polybag containers. Air root pruning containers generally directed roots to grow downward when air pruning of root occurred and new healthy root produced. Non-woven bag therefore is suitable to be an alternative air root container which encouraging recycle of the bag and reduce pollution.

***Keywords*:** Goodies bag recycle, *Gomphrena haageana*, healthy root growth

AG-O-21 UWDTN

Cytotoxicity, antioxidant and phytochemical screening of propolis extracts from four different Malaysian stingless bee species

Nor Elani Mat Nafi [a], Nur Basyirah Md Zin [a], Norzilawati Pauzi [a], Ammira Shafiqha Abdul Khadar [a], Aulia Rani Aninisava [a], Ainur Awanis Mohd Badiazaman[a] and Khamsah Suryati Mohd [a,*]

[a] School of Agriculture Sciences and Biotechnology, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia

** Corresponding author: khamsahsuryati@unisza.edu.my*

Abstract

Propolis is a plant-derived substance collected by stingless bee's product from various sources, including plant resins with combination of their own saliva and wax. Propolis has been used to treat several diseases since ancient times, and is an important source of bioactive natural compound and drug derivatives. The aim of this study, to evaluate chemical and biological profile of ethanolic extracts from propolis produced by *Heterogona itama, Geniotrigona thoracica, Lepidotrigona terminata,* and *Tretrigona apicalis.* Phytochemical screening was analyzed using thin layer chromatography (TLC) and visualized by derivatives agents. It was revealed the presence of terpenoids, sterols, saponins, and phenol. Antioxidant activity was found that *H. itama* possess the lowest IC_{50} which is 30 were evaluated by (2,2-diphenyl-1-picryl-hydrazyl-hydrate) DPPH. Cytotoxicity activity were evaluated by using 3-(4,5-Dimethylthiazol-2-YI)-2,5-Diphenyltetrazolium Bromide (MTT) assay against three cancer cell lines,. *H. itama* extracts showed the highest cytotoxicity effect with IC_{50} of 5ug/mL, 4ug/mL and 8 ug/mL for MDA-MB-231, SK-UT-1 and HeLa, respectively. Other species only possess moderate to weak cytotoxicity activity. As a conclusion, it was found that *H. itama* produced the most active extract compare to other species. The data obtained from this study will be the basis for further investigation on therapeutic application of stingless bee propolis, especially for antitumour.

Keywords: propolis, stingless bee propolis, cytotoxicity, antioxidant

AG-O-22 VCUMA

The effect of ultraviolet light treatment in extend shelf life and preserve the quality of strawberry (*Fragaria x ananassa*)

Mohd Idris, N. I.[a], Khor, S.C.[a], Mohd Shah, R.[a] Mohd Nawi, I. H.[a]

[a] *School of Food Science and Technology, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia*

* *Corresponding author: idzwana@umt.edu.my*

Abstract

Strawberry (*Fragaria x ananassa*) is a highly perishable product and rarely to keep for 7 days. Ultraviolet light treatment proved to be effective in inhibit microbial loads and delay ripening process of fruit products where short wavelength (254 nm) ultraviolet-C was proved in keeping the freshness of fruits. The experiment is conducted to determine the effect of UV-C irradiation on extending shelf life and postharvest quality of strawberry. 399 of strawberries in maturity stage of 85-90% were exposed to different doses (0, 0.5, 0.6, 0.7, 0.8, 0.9 and 1.0 kJ/m2) of ultraviolet-C radiation. Treated strawberries randomly stored in the dark chilling room at -5Cº for 9 days. UV-C treated strawberries with the highest doses (1.0 kJ/mº) were significantly firmer (0.557N), higher total soluble solids content (7.5 ºBrix) and ascorbic acid concentration (0.518mg/ml) after day 9 ($p<0.05$). The application of UV-light treatment can prevent diseased, enhancing their shelf life and quality.

***Keywords*:** postharvest quality, UV light, shelf life, strawberry

AG-O- 23 WQWTG

Imputation methods of mean, nearest neighbour and expectation maximation based algorithm (EMB) on daily PM_{10} data (2010-2015)

N. L. A. Rani [a], A. Azid [c,*]

[a] *Faculty Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia*

* *Corresponding author: azmanazid@unisza.edu.my*

Abstract

Missing observation of air pollutants data obtained from the Malaysia's continuous air quality monitoring stations probably due to the failure of equipment, routine maintenance and human error. This inadequate data will cause noteworthy issues such as loss of data that can cause loss of efficiency, problems related to the data handling and data analysis that can create a problem to the network quality and also generate bias due to the dissimilarities between detected and undetected data mainly in developing the forecasting models. Missing data can create biased assessments of parameters when the missing data are treated improperly. To ensure the process done is precise, valid and trustworthy, this study suggested the reliable imputation methods to estimate the missing data of air pollutants in air quality study. There are numerous techniques to manage missing data. Some imputations methods together with simulation study are deliberated to compare three methods of imputation viz. mean substitution, nearest neighbour and expectation maximization based algorithm (EMB) using stimulation of 5%, 10%, 15%, 25%, and 40% proportion of missing data PM_{10} pollutant to evaluate the performance of imputation method. Coefficient of determination (R^2) and root mean square error (RMSE) were ascertained to portray the goodness of fit for all of the imputation methods. The results of R^2 (RMSE) obtained for 5%, 10%, 15%, 25% and 40% proportion of missing data using nearest neighbor imputation methods are 0.9318, 0.8126, 0.6546, 0.5458 and 0.3946 (7.47, 12.27, 16.68, 19.13, 21.76) respectively. Meanwhile, results of R^2 (RMSE) obtained for 5%, 10%, 15%, 25% and 40% proportion of missing data using mean imputation methods are 0.9274, 0.8117, 0.6484, 0.5400 and 0.3910 (7.47, 12.36, 16.90, 19.13, 22.07) respectively. In the meantime, the results of R^2 (RMSE) for EMB imputation method applied on 5%, 10%, 15%, 25% and 40% proportion of missing data are 0.9084, 0.8468, 0.7530, 0.5791 and 0.5004 (8.58, 11.18, 14.20, 18.53, 20.48) respectively. Measure of performances (R^2 and RMSE) for each imputation methods decreased and increase respectively as the percentages of simulated missing data increases. This demonstrates that the validity and performance of the assessments would be decreased when the number of missing values increased. The simulation study also showed that EMB imputation was the best imputation method in handling missing data compared with the nearest neighbor and mean substitution method for 10%, 15%, 25% and 40% proportion of missing data. Meanwhile, mean and nearest neighbor shows the best method in handling missing data for 5% proportion of missing data. From the results of the performance measures, EMB imputation method was selected as the most appropriate imputation method for filling in the missing values in air pollutants data especially the one with high proportion of missing data.

Keywords: Imputation methods, mean, nearest neighbour, expectation maximation based algorithm (EMB), PM_{10}

AG-O- 24 XMCPX

Investigation of active species in methanation reaction over cerium based loading

Salmiah Jamal Mat Rosid [a,], Wan Azelee Wan Abu Bakar [b] , Susilawati Toemen [b], Nurulhuda Mohamad Yusoff [a] , Azman Azid [c] and Wan Nur Aini Wan Mokhtar [d]

[a] *Unisza Science and Medicine Foundation Centre, Universiti Sultan Zainal Abidin, Kampus Gong Badak, 21300 Kuala Nerus, Terengganu, Malaysia.*
[b] *Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia, 81310 UTM Skudai, Johor, Malaysia*
[c] *Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia*
[d] *School of Chemical Sciences & Food Technology, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia*

* Corresponding author: salmiahjamal@unisza.edu.my

Abstract

A series of cerium oxide based catalyst has been studied by various cerium loading calcined at 1000°C using wet impregnation method. The potential Ru/Mn/Ce (5:35:60) /Al_2O_3 catalyst calcined at 1000°C were characterized using XRD, XPS, and BET analysis, As can be observed from the XRD analysis, at ratio of 55% and 65%, both revealed the presence of RuO_2 with tetragonal phase and the peaks was intense and sharper indicating high crystallinity as can be supported by lower surface area, 50.95 m^2/g in BET analysis. Meanwhile, CeO_2 (cubic phase) and MnO_2 (tetragonal phase) was also observed for 55%, 60%, and 65% respectively. However, the presence of Al_2O_3 with rhombohedral phase at 55% and 65% were revealed as an inhibitor which decrease the CO_2 conversion. The presence of active species on Ru/Mn/Ce (5:35:60) /Al_2O_3 catalyst has been confirmed using XPS analysis with the deconvolation peaks belonged to Ce^{4+} with the formation of CeO_2 compound, and Mn^{4+} for MnO_2. The product form in catalytic methanation was proposed to be H_2O and CH_3OH from GC and HPLC.

Keywords: Cerium; catalyst; carbon dioxide; methanation

AG-O-25 YQPQT

Breeding strategies of important herbal plant in Malaysia

M.A. Farah Fazwa[a,*], S.B. Samsul Bahari[a], S. Norhayati, A.R.[a] Siti Suhaila, A.R.[a] and A. Mohd Zaki[a]

[a] *Biotechnology Forestry Division, Forest Research Institute Malaysia, 52109, Kepong, Selangor, Malaysia*

* *Corresponding author: farah@frim.gov.my*

Abstract

Labisia pumila or locally known as Kacip Fatimah from the family of Primulaceae is one of the important herbal species in Malaysia. The leaves or the whole plant are being traditionally used to treat women internal problem and health. Other medicinal uses of the plant are as a treatment for dysentery, flatulence, dysmenorrhoea and gonorrhoea. The increasing demand of the plants for those usages has lead to the over-exploitation in the wild and might endanger the species if no conservation activities are being carried out. Beside the danger of extinction, the species also experience severe genetic loss and shortage of raw materials. Realizing to this, Plant Improvement Programme of Forest Research Institute Malaysia (FRIM) has taken an initiative to *ex-situ* conserve the species through the establishment of germplasm and development of breeding strategy. The purpose is to avoid extinction of the species and to produce high quality planting materials for commercial production. This paper discusses the collection, selection, propagation and establishment of clonal bank/germplasm of the species. It is anticipated that with the initiative, the sustainability of the species can be ensured to support the industries demand in the future.

Keywords: *Labisia pumila, over-exploitation, sustainable, germplasm, breeding strategy*

AG-O-26 YRJMH

Anxiety-like response of zebrafish larvae toward light-dark cycles upon embryonic arsenic exposure

Noraini Abu Bakar [a], Khozirah Shaari [a], and Wan Norhamidah Wan Ibrahim [a,b,*]

[a] *Natural Product Laboratory (LHS), Institute of Bioscience (IBS), Universiti Putra Malaysia 43400 Serdang, Selangor, Malaysia.*
[b] *Department of Biology, Faculty of Science, Universiti Putra Malaysia 43400 Serdang, Selangor, Malaysia.*

* *Corresponding author: wnwi@upm.edu.my*

Abstract

Arsenic trioxide (As_2O_3) is a heavy metal that is widely used for therapeutic purpose and is found ubiquitously in the environment. Currently, information about the adverse effects associated with exposure to low levels of inorganic arsenic on the developing organisms is limited. We examined the effects of embryonic exposure of As_2O_3 on motor and anxiety-like behaviors in 6 dpf zebrafish larvae. The embryos were exposed to 30 µM As_2O_3 starting from 5 hpf until 72 hpf (hatching) in a semi-static condition. Mobility changes under light-dark transitions able to indicate alterations of anxiety level in the zebrafish, thus useful for behavioral readout in neurotoxicology research. General locomotor activity and thigmotaxis behavior were analyzed under continuous illumination for normal condition or alternating light-dark cycles to induce stressful condition. Light-dark transitions increase the locomotor activity of zebrafish larvae upon As_2O_3 exposure. While, As_2O_3 exposed larvae spent longer durations in the outer ring of the tested arena, indicating thigmotaxis behaviors. The increment of thigmotaxis behavior demonstrates that As_2O_3 elevates anxiety in the larvae as compared to the control. This finding suggests that arsenic induced alterations in the locomotor and anxiety behavior in the larvae. However, the mechanisms related to the alterations of this behavior remains to be discovered.

***Keywords*:** Zebrafish; arsenic trioxide; anxiety; thigmotaxis; locomotor.

AG-O-27 ZXRUV

Determinants of Postharvest Losses of Fresh Tomato among Farmers in Cameron Highlands and Lojing Highlands, Malaysia

Lee Kwee Tiong[a,*], Ismail Abd Latif[a], Nitty Hirawaty Kamarulzaman[a] and Nolila Mohd Nawi[a]

[a] *Department of Agribusiness and Bioresource Economics, Faculty of Agriculture, Universiti Putra Malaysia, 43400, Serdang, Selangor, Malaysia*

* *Corresponding author: swjlandscape@gmail.com*

Abstract

Postharvest losses of horticultural crops are very common in developing countries. Highly perishable fruit and vegetables undergo the greatest proportion of postharvest losses in developing countries; almost half of all fruits and vegetables produced are lost and wasted along the agri-food supply chain. Tomato (*Solanum lycopersicum* L.) has been identified as one of the most important high-value highland vegetable crops with enormous potential for export in Malaysia. Quantitative evidence of postharvest losses of tomato is limited due to not much attention was given to study on postharvest losses of fruits and vegetables in Malaysia. Nevertheless, the postharvest loss of tomato is considerably high. Thus, this study was conducted to examine factors influencing postharvest losses of fresh tomato at the farm level in Cameron Highlands and Lojing Highlands, Malaysia. A multistage random sampling technique was used to select tomato farmers. Data were collected through personal interviews using structured questionnaire from 110 respondents. Descriptive statistics was used to summarize the demographic characteristics of the respondents and multiple linear regression analysis was used to determine the factors influencing the postharvest losses of tomato at the farm level. The findings revealed that estimated postharvest losses at the farm level was 5.42%. From the multiple regression analysis, farming experience, frequency of harvest, harvesting method, specific harvesting team and storage were among the five out of the nine determinants found to be significantly influenced the level of postharvest losses experienced by farmers. Farming experience and specific harvesting team were found to have inversed relationship with the total postharvest losses at the farm level. Frequency of harvest, harvesting method and storage were found to be positively associated with postharvest losses of tomato at farm. This study adds to the knowledge regarding the overview of tomato postharvest losses and factors influencing the postharvest losses of tomato at the farm level.

***Keywords*:** Postharvest losses; agrifood supply chain; tomato; regression

AG-O-28 GHGBD

Relationship between concentration and location of the herbal industry

Rohana Abd Rahman [a,*], Ariff Fahmi Abu Bakar [a], Mohamad Azwir Ali Usar [a]

[a] *Economic and Strategic Analysis Programme, Forest Research Institute Malaysia, 52109 Kepong, Selangor, Malaysia*

* *Corresponding author: rohanasr@frim.gov.my*

Abstract

Malaysia aspires to become developed and high income nation by year 2020. Under the Tenth Malaysia Plan, herbal industry was the first Entry Point Project for Agricultural National Key Economic Area in Economic Transformation Programme. To understand the current status of the herbal industry, Forest Research Institute Malaysia was conducted the survey on 6923 herbal chain players, consisted from upstream to downstream activities. A face-to-face interview was conducted using a structured questionnaire to gather the information. This paper highlighted the relationship between concentration of the herbal industry and urbanization's status of the areas. The finding shows that a statistically significant difference exists between category of herbal activities and status of the areas. The upstream activities are more concentrated in rural areas, while most of downstream activities in urban areas. It is in lined with central place of theory on how settlements and places are located in relation to one another and their functions. Therefore, to further develop the herbal industry, the government should consider strategic location by category of industrial activities in policies planning, programmes implementation and providing infrastructural support that needed by the industry.

Keywords**:** upstream, downstream, herbal industry, industrial location, central place theory

AG-O-29 PZYLZ

Consumers' Knowledge, Attitude and Practice Towards Medicinal Plants in East Coast Economic Region

Kamal Bahri N.I.[a,*] and Arumugam N.[b],

[a] *Faculty of Bioresource and Food Industry University of Sultan Zainal Abidin, 22200 Kampus Besut, Besut Terengganu, Malaysia*

* *Corresponding author: nalini@unisza.edu.my*

Abstract

Medicinal plants (MP) are commonly used by the local people as an alternative for health purpose, however the extent of consumer knowledge about the benefits of MP cannot be ascertained as there is lack of social research being carried out to access the level of knowledge and poor transmission of knowledge about MP by verbal from one generation to another. Besides that, there is lack of documentation of the traditional knowledge from regular consumer of MP and the consumption factors among people in this country. This study aims to assess the knowledge, attitude and practice of consumers towards MP and to classify the factors affecting the consumption. Furthermore, this research is conducted to determine the association between demographic profiles and MP consumption. A survey was carried out over 300 MP consumers at East Coast Economic Region (ECER) using self-administered questionnaire. The findings indicated that 52% of consumers are female, and most of the consumers are Islam and Malay in line with the major population of East Coast. The respondents consist of 67% from rural and urban (33%). The result from Chi Square analysis showed that only monthly income is significant correlate with the consumption of MP. There is also significant difference between the knowledge and attitude towards practice using Multiple Regression analysis. Pearson Correlation Analysis indicates moderate relationship of knowledge and practice whereas attitude and practice has a strong relationship. Factors of consumption are the medicinal properties, acknowledged by authority, natural and safe, recognized scientifically, method of consumption and professional consultation extracted from Factor Analysis.

Keywords: knowledge, attitude, practice, MP, ECER

AG-O-30 LHBRD

Impact of integrating rural producers into modern agricultural value chains and gender inequality: Lessons from Nestle's dairy project in Pakistan

Aneela Afzala [a] and Sisira Jayasuriya [b, *]

[a] *Arid Agriculture, University, Rawalpindi, Pakistan*
[b] *Monash University, Melbourne, Australia*

** Corresponding author: sisira.jayasuriya@monash.edu*

Abstract

Agricultural modernisation and development, involving the integration of rural producers into modern value chains, can facilitate poverty alleviation, improved food security, and better conditions for rural households. But though females contribute a high proportion of agricultural labour evidence from many developing countries show that benefits are not equitably distributed. Women from poorer households are particularly likely to experience inequitable distributional outcomes. Socio-cultural norms and practices, and legal and institutional structures restrict female mobility, land ownership, access to education,credit and other markets. Constraints on female participation indecision-making and market access also lower farm productivity and output. These issues are particularly acute in Pakistan that has very poor levels of gender equity. In this paper, we review the conditions of rural women in Pakistan, discuss the international experiences of gender outcomes in modern agricultural value chains in developing countries, and draw implications for gender outcomes with agricultural modernisation in Pakistan. We discuss the case of a programme implemented by the dairy multinational Nestle that links small dairy producers to a modern value chain, based on the concept of'Creating Shared Value' (CSV) incorporating corporate social responsibility and financial viability with developmental goals. The project has a special focus on rural women who have traditionally played an important role in livestock management. This project claims to have successfully raised farm incomes and has produced significant social and economic changes including gender outcomes, demonstrating that innovative approaches can at least partially overcome barriers to integrating females in modern value chains, without directly confronting deep rooted cultural norms and practices. Our paper analyses its performance, and using a case study approach critically explores some of the outcomes, identifies weaknesses and deficiencies, and discusses lessons of wider applicability.

Keywords: rural producers, dairy, agricultural value chains, gender, inequality

AG-O-31 AAAAA

The Implications of Security Challenges on Livestock Production in Northeastern Nigeria: An ICT Perspective

Isah Baba Ahmed [a, *], Lukman Abiola Oluodo [b], Meshach Dauda Bwala [c], Dauba Bema Damba [d] & Jibril Ibrahim Ali [e]

[a] *Faculty of Informatics and Computing, Universiti Sultan Zainal Abidin, 22300, Kuala Besut, Kuala Terengganu, Malaysia*
[b] *Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, 22300, Kuala Besut, Kuala Terengganu, Malaysia.*
[c] *Faculty of Agriculture, University of Maiduguri, 1069, Borno, Nigeria*
[d] *Department of Animal Health and Production, Federal College of Horticulture, Dadin Kowa, 108, Gombe State, Nigeria*
[e] *United Nations World Food Programme, 620233, Damaturu, Yobe, Nigeria*

** Corresponding author: kasuwa65@gmail.com*

Abstract

This paper aims to examine the security challenges and implications on Livestock production in Northeastern Nigeria. From the data collected by the Global Peace Index and a report that reinforce a long-term pattern, noted that there had been 5% drop in the level of peace since 2008. The assessment of the degree and measurement of insecurity relied on the empirical literature obtained. The authors suggested that the Government should start thinking of using technology tools in addressing this menace as done in developed Countries to solve this crisis. These new technologies include Closed Circuit Television (CCTV), the used of unmanned Drones and ICT Education.

Keywords: ICT, Insecurity, Livestock, Society, Production.

AG-O-32 JHPAC

Analysis of Multispectral UAV Imagery for Detection of *Ganoderma* Disease in Oil Palm

Anuar M. Izzuddin [a,*], Seman A. Idris [a], A. Hamzah [b] Noor M. Nisfariza[c]

[a] *GanoDROP Unit, Biological Research Division, Malaysian Palm Oil Board (MPOB), 43000 Kajang, Selangor, Malaysia*
[b] *Department of Electrical Engineering, Faculty of Engineering, Universiti of Malaya, 50603 Kuala Lumpur, Malaysia*
[b] *Department of Geography, Faculty of Arts and Social Sciences, Universiti of Malaya, 50603 Kuala Lumpur, Malaysia*

* *Corresponding author: mohamad.izzuddin@mpob.gov.my*

Abstract

Ganoderma disease in oil palm caused by *Ganoderma boninense* fungus has caused significant losses of Malaysia's economic income. An airborne-based *Ganoderma* disease detection technology needs to be developed to reduce cost, time and cover wider coverage of oil palm area. This study examines the performance of multispectral digital orthoimage acquired using multispectral imager mounted on the unmanned aerial vehicle (UAV) for aerial detection of *Ganoderma* disease in oil palm. The multispectral orthoimages consist of Green (G), Red (R), Near-infrared (NIR), Red Edge (RE) and Normalised Difference Vegetation Index (NDVI). The orthoimages, then were processed using two supervised image classifiers: Minimum Distance (MD), Parallelepiped (PP), Maximum Likelihood (ML), and Neural Networks. The classifiers were used to classify the *Ganoderma* disease severities Healthy (H) and Diseased (D). The classification outputs were then assessed using confusion matrix. These results suggested that supervised classification of multispectral orthoimage only provided low to moderate classification accuracy of *Ganoderma* disease detection in oil palm. Future works should look into band ratio and the utilization of hyperspectral orthoimages for *Ganoderma* disease detection in oil palm to increase the accuracy.

Keywords: Multispectral, UAV, *Ganoderma*, oil palm

AG-O-33 POIUY

Chemical Composition and Antioxidant Properties In Different Varieties of Pineapple Waste

Shi Ting, W [a]., and Ahmad, F.T.[a,*]

[a] *School of Food Science and Technology, Universiti Malaysia Terengganu, 21030, Kuala Terengganu, Terengganu, Malaysia*

* *Corresponding author: fauziah.tufail@umt.edu.my*

Abstract

In Malaysia, pineapple industry is an important agricultural sector with different varieties pineapples were planted in whole country. This study was aimed to obtain the proximate composition and antioxidant properties of Sarawak, Morris and Josaphine pineapple waste. The pineapple peels and cores were collected and evaluated at the commercial maturity stage ranged from stage 5 to 7 (50% to fully yellowish of fruit peel). In this study, AOAC method was employed for studying the proximate composition. Total phenolic content, DPPH and FRAP assay were done to determine the antioxidant properties using microplate spectrophotometer. Moisture content, fat and carbohydrate were found to be higher in pineapple core compared to peel. In contrary, ash, protein and fiber of pineapple peel were higher in pineapple corel. Besides, pineapple peel contained higher antioxidant properties compared to pineapple core. In conclusion, Morris pineapple waste has exhibited the highest value for most of the attributes in proximate compositions, while Josephine pineapple peel presented the highest value for most of the antioxidant properties along with high total phenolic compound, ascorbic acid and beta carotene. Therefore, further application of waste from both varieties will be beneficial in related industries.

***Keywords*:** Pineapple varieties, waste, peel, core, proximate composition and antioxidant

AG-O-34 BWVHX

Monetary Policy Shocks and Aquaculture Sector in Sabah

Hock-Ann Lee [a,*], Hock-Tsen Wong [b], Fadzilah Majid Cooke [c]

[a] *Labuan Faculty of International Finance, Universiti Malaysia Sabah, Labuan International Campus, Jalan Sungai Pagar, 87000 W.P. Labuan, Malaysia*
[b] *Faculty of Business, Economics and Accountancy, Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah, Malaysia*
[c] *Kenyir Research Institute, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia*

* *Corresponding author: hockann@ums.edu.my*

Abstract

This research aims to examine the effects of monetary policy shocks on the production of aquaculture sector in Sabah. The principal model used is Vector Autoregressive (VAR) and the period of observation spans from 1988 to 2014. This study employs annual series of money market rates (represent the stance of monetary policy), inflation, nominal effective exchange rates, and aquaculture production over the period 1988 – 2014. The findings show that while macroeconomic factors are important determinants affecting the production of aquaculture sector, the role of Bank Negara Malaysia's monetary policy cannot be ignored. This research provides deeper insight as to how the production of aquaculture sector in Sabah responds to the stance of central bank's monetary policy. This should help policymakers and industry players understand the consequences of interest rate decisions on aquaculture production.

***Keywords*:** monetary policy, aquaculture sector, Sabah

AG-O-35 CRMNB

The Use of Bokashi for Chinese Kale (*Brassica alboglabra*) and Celery (*Apium graveolens*) Cultivations in Jeli, Kelantan

Dwi Susanto [a,*], Nur Aqila Mohd. Azmi [a], Nurul Huda Hamdi [a]

[a] *Faculty of Agro Based Industry, Universiti Malaysia Kelantan, 17600 Jeli, Kelantan, Malaysia*

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

Abstract

There are many lands in Kelantan that are unutilized wisely due to soil fertility problem. Bokashi, one type of organic fertilizers, has a promising benefits for improving the soil fertility. This type of organic fertilizer has been applied in many countries and proved to increase the yield of several crops. The objective of the study is to improve the soil fertility by using organic fertilizer bokashi so the soil could support the growth and yield of two leafy vegetables: chinese kale (*Brassica alboglabra*) and celery (*Apium graveolens*). This work was conducted in Agropark Universiti Malaysia Kelantan, Jeli Campus. A randomized complete block design with six treatments and three replicates was used. Different dosages per hectare of bokashi (0 kg as negative control, 2000 kg, 4000 kg, 6000 kg and 8000 kg) and one dosage of free-peat compost (1000 kg as positive control) were compared to their effects on the growth and yield of these two leafy vegetable crops. Results show that for chinese kale bokashi could increase 41-82 % of yield compared to negative control and 19 – 53 % compared to positive control; while for celery it could increse 17 – 132 % compared to negative control and 8 – 112 % compared to positive control. Moreover, there are positive correlations between vegetative growth components and the yield of these two crops, as for the leafy vegetables, the yield depends strongly on the vegetative growth. Therefore the application of bokashi could support the growth and yield of chinese kale and celery in Kelantan condition.

Keywords: bokashi, chinese kale, celery, soil fertility

AG-O-36 EELHH

Automated Detection on Nitrogen Status of Plants: Performance of Image Processing Techniques

Siti Rahayu Md Amin [a], Siti Maryam Mohd Sharun [a], Roslan Che Awang [a], Ahmad Nazari Mohd Rose [b,*], Mohd Fadzil Abdul Kadir [b], Muhammad Khusairi Osman [c]

[a] *Faculty of Innovative Design and Technology, Universiti Sultan Zainal Abidin, Campus Gong Badak, 21300, Terengganu, Malaysia*
[b] *Faculty of Informatics and Computing, Universiti Sultan Zainal Abidin, Campus Besut, 22200, Terengganu, Malaysia*
[c] *Faculty of Electrical Engineering, Universiti Teknologi MARA, 13500, Pulau Pinang, Malaysia*

[*] *Corresponding author: anm@unisza.edu.my*

Abstract

The significant role of nitrogen element in plants growth resulting in increasing usage of nitrogen fertilizer in the agriculture field. With the aim to avoid improper use of nitrogen fertilization on plants, this paper presents an economical and non-destructive method in determining nitrogen status of plants using digital image processing approach. Three authentic techniques of image segmentation Otsu, K-means clustering, and watershed transformation were applied and compared to recognize the most accurate method for segmenting leaf pixel from its background. Otsu was discovered as the most efficient technique with less time-processing. Out of 14 features extracted from the segmented image, kurtosis, skewness and standard deviation of the blue color image were the most related features in classifying nitrogen status of the images. Classifiers like decision tree, KNN, and linear discriminant were used to classify the leaves image and nitrogen status accordingly. The accuracy of 100% was recorded in classifying the leaves image using decision tree and KNN classifier.

***Keywords*:** image processing, nitrogen status, image segmentation, classification

AG-O-37 YXJJL

Effect of Automobile Workshops nn The Soil Chemical Properties In Dutsin-Ma Town, Katsina State

Kabir Abdulkadir Gidado [a,*] and Salisu Ibrahim [b]

[a] East Coast Environmental Research Institute, 21300 Universiti Sultan Zainal Abidin, Kuala Terengganu Malaysia
[b] Kaduna State University, Department of Geography, Kaduna State, Nigeria

** Corresponding author: mkabeer05@gmail.com*

Abstract

Environmental contaminants are widely distributed in soils, thereby affecting agricultural land, trophic chain, plant, animals and man. In Nigeria, concern over the biological effect of increasing oil spillage on land, streams and fish ponds have mounted, and much emphasis has been on the aquatic environment as a result in the discharge of oil pollutants into the ecosystem. The article aims to examine the effects of automobile workshops on the soil chemical properties in Dutsin-Ma town, in Katsina state Nigeria. Soil analysis was conducted in soil laboratory for the total oil content (OL), organic carbon and organic matter content (O.C and OM), and ph and electrical conductivity (PH, and EC) determination. The result shows the total oil content of 10.8%, 9.55% and 1.06% in the soils around automobile workshop in use, abandoned, workshop and virgin soil respectively, which decreases along each soil profile. Also shows the same pattern of organic carbon content and the pH within the three sample class. Oil and lubricants from automobile workshops had a significant effect on the soil chemical properties in the study area. Good environmental education is recommended to automobile workshop operators is essential to protect the agricultural land, environmental quality and public health.

Keywords: Electrical conductivity, Environment, Organic Carbon, Organic Matter, Soil

AG-O-38 ABTSW

Contrasting Growth Responses to Al Addition Among Populations of The Al Hyper-Accumulator *M. malabathricum* L.

Khairil Mahmud [a,b,*] & David Burslem [b]

[a] *Faculty of Bioresources and Food Industry, Besut Campus, Universiti Sultan Zainal Abidin, 22300 Besut, Terengganu, Malaysia.*
[b] *School of Biological Sciences, University of Aberdeen, AB242UU Aberdeen, Scotland, United Kingdom.*

* Corresponding author: khairilmahmud@unisza.edu.my

Abstract

Al hyper-accumulation is a common trait among tropical woody plants growing on acidic soils. Studies on Al accumulators have suggested that Al addition may enhance plant growth rates, but the functional significance of the trait and the mechanistic basis of this growth response are uncertain. To test the differential responses to the presence of Al in the growth medium, we grew seedlings of the Al hyper-accumulator shrub Melastoma malabathricum collected from 18 populations across Peninsular Malaysia in hydroponic solutions containing either no Al or with the addition of 1.0 mM AlCl3. We measured relative growth rates and concentrations of foliar Al and other nutrients in response to these two treatments. Total dry mass and relative growth rates over 28 days were significantly greater for seedlings that had received Al in the growth medium than for seedlings that had received no Al. The growth response to Al addition varied among populations, and relative growth rate in response to Al addition was greater for populations that accumulated higher foliar Al concentrations. The increase in growth rate in response to Al addition occurred despite a reduction in dry mass allocation to leaves at the expense of higher allocation to roots and stems, but. Al addition increased foliar concentrations of Ca, K and Mg in M. malabathricum seedlings. We conclude that some populations of the Al hyper-accumulator M. malabathricum express a physiological response to Al addition which leads to a stimulation of growth. This growth stimulation was not caused by an increase in relative allocation to photosynthetic material, but may have been associated with enhanced uptake of the macro-nutrient cations Ca, K and Mg. Further research is required to determine the physiological basis of these relationships.

Keywords: Aluminium accumulation; populations; growth rate; Melastoma malabathricum; Peninsular Malaysia

AG-P-01 YRTWX

Chemical Composition of *Syzygium polyanthum* (Serai Kayu and Serai Kayu Hutan)

Mahmoud Dogara Abdulrahman, Abdul Manaf Ali [a], Mohammed Moneruzzaman Khandaker [a], Hasan Nudin Nur Fatihah [a], Nor Asiah Awang [a] and Nashriyah Mat [a,*]

[a] School of Agricultural Science and Biotechnology, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia

** Corresponding author: nashriyah@unisza.edu.my mailto:hasnah@kimia.fs.utm.my*

Abstract

Myrtaceae has been considered as the riches species genera with the genus *Syzygium* having approximately one thousand two hundreds to one thousand five hundreds plants species. The aerial part of *Syzygium polyanthum* is largely consumed as *ulam* with the aim of treating diverse ailments and enhancing appetite in Peninsular Malaysia. The richness of the species in the niche has resulted in the taxonomic misidentification which caused serious problem in biodiversity management and development of natural products. The study was aimed to discriminate the two cultivars of *S. Polyanthum* (Serai Kayu and Serai Kayu Hutan) based on the chemical composition of their essential oil. The volatile compounds were distilled from the aerial parts by using Hydrodistillation. Up to 0.4% and 1.6% (v/w) were percentages of the oil yield obtained from Serai Kayu and Serai Kayu Hutan leaves, respectively. The GC/MS analysis revealed the presence of 54 and 34 compounds amounting to 99.5% and 85% in Serai Kayu and Serai Kayu Hutan, respectively. Alpha-Pinene (38.46%), Octanal (21.01%) and (E)-Methyl-cinnamate (7.21%) were the main constituents of Serai Kayu while in Serai Kayu Hutan E-carryophyllene (39.18%), Terpinolane (23.63%) and Spathulenol (3.98%) were the major constituents, and all compounds below than 1% were considered to be minor constituents in both the species. The analysis of the chemical content has provided detailed information with regards to taxonomic identification, natural development and to avoid adulteration of the plants due its medicinal value.

***Keywords*:** Composition, *Syzygium polyanthum*, Serai Kayu, Serai Kayu Hutan

AG-P-02 GNYRQ

Development Progress of New Malaysian Drought Tolerance Rice Lines (F1 – BC2F1 Generation)

Mohd Shahril Firdaus Ab Razak [b], Rahiniza Kamaruzaman [a], Fauzi Jumat [c], Norlida Mohamed Hamim [c] and Shamsul Amri Saidon [a,*]

[a] *Rice Research Centre, MARDI Seberang Perai, 13200 Kepala Batas, Pulau Pinang*
[b] *Bank Gene & Germplasm Centre, MARDI Serdang, 43400 Serdang, Selangor*
[c] *Agrobiodiversity & Environment Research Centre, MARDI Serdang, 43400 Serdang, Selangor*

** Corresponding author: shamri@mardi.gov.my*

Abstract

Improvement of high-yielding rice variety with drought tolerance trait is important as drought become major abiotic stress to rice grain yield under unpredictable climate change scenarios. The present study was conducted to develop local drought tolerant rice variety by introgression of major-effect grain yield QTL under drought stress and other drought tolerance traits from several donor parents. Seven donor parents consist of Vandana ($qDTY_{6.1}$), Moroberekan ($qDTY_{3.2}$, $qDTY_{11.1}$), Dular ($qDTY_{12.1}$) and N22 ($qDTY_{1.1}$,$qDTY_{3.2}$), Aswina, Basmati 5854 and MR142 were crossed and qDTYs were introgressed individually and in combinations through marker assisted QTL pyramiding into the high-yielding Malaysian rice variety MARDI Siraj 297. Marker assisted breeding (MAB) and marker assisted selection (MAS) were utilized to assist breeding selection. Five qDTYs were successfully introgressed into MARDI Siraj 297and backcrossed to produce early breeding lines vary from F_1 to BC_2F_1. Newly identified drought tolerance trait donors (Aswina, Basmati 5854 and MR142) were crossed with MARDI Siraj 297 to produce F_1 generation. Furthermore, six markers consist of RM431, RM523, RM549, RM536, RM28166 and RM24393 were identified as peak marker and were used to perform foreground selection based on their relative position on $qDTY_{1.1}$, $qDTY_{3.2}$, $qDTY_{6.1}$, $qDTY_{11.1}$ and $qDTY_{12.1}$ respectively. Breeding for drought tolerant rice variety can be achieved through introgression of qDTYs and other genes related to drought tolerance and it is more promising with deployment of marker assisted tools.

Keywords: Drought tolerance, breeding, adaptation, QTL

AG-P-03 PDYUE

Effects of Hydrogen Peroxide and Methyl Eugenol (ME) on Fruit Growth and Fruit Fly Infestation of *Syzygium samarangense*

Siti Zuriani Ismail [a], Nurul Hafiza Al Abadiyah Ralmi, Rosnah Jamaludin, Nashriyah Mat [a] and Mohammad Moneruzzaman Khandaker [a,*]

[a] *School of Agricultural Science and Biotechnology, Faculty of Bioresource and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22000 Besut, Terengganu, Malaysia*

** Corresponding author: moneruzzaman@unisza.edu.my*

Abstract

A study was conducted to see the effects of hydrogen peroxide (H_2O_2) and methyl eugenol (ME) on fruit growth and fruit fly infestation of wax apple fruits, a widely cultivated fruit tree in South East Asia. The wax apple trees ((Syzygium samarangense, var. jambu madu) were spray treated with 0, 20 mM H_2O_2, 20 mM H_2O_2 plus methyl eugenol and methyl eugenol under field conditions. The results showed that combine treatment of $H_2O_2$and ME increased the net photosynthetic rate, CO_2 assimilation, stomatal conductance and internal CO_2 concentration of wax apple trees. In addition, fruit weight, fruit firmness and TSS content of wax apple fruits significantly improved with H_2O_2 and ME treatment. Methyl eugenol alone or combination with H_2O_2 reduced the number of reared fruit fly in wax apple fruits under lab condition. There was positive correlation between fruit fly infestation and fruit size and between fruit fly infestation and fruit sweetness (TSS content) in H_2O_2 and Methyl eugenol treated fruits. Besides, we recorded negative correlation between the fruit fly infestation and firmness of treated wax apple fruits. It is concluded that application of hydrogen peroxide and methyl eugenol once a week produced better fruit growth and reduced the fruit fly infestation of wax apply under field condition.

Keywords*: Hydrogen peroxide, Methyl eugenol, Wax apple, fruit growth, fruit fly infestation*

AG-P-04 CJDUY

Nutritional and Medicinal Importance of Indigenous Cucurbitaceous Crops

Nurfatin Liyana Ablah[a], Md. Amirul Alam[b], Kamarul Ain Mustafa[c], Nadiawati Alias[a], Nur Fatihah Hasan Nudin[a], Wan Nur Suzani Sazleen Wan Shafiin[a] and Md. Sarwar Jahan[a,*]

[a] *School of Agriculture Science and Biotechnology, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, Besut 22200, Terengganu, Malaysia.*
[b] *Faculty of Sustainable Agriculture, Horticulture and Landscaping Program, Universiti Malaysia Sabah, Sandakan Campus, Sandakan 90509, Sabah, Malaysia.*
[c] *School of Food Industry, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, Besut 22200, Terengganu, Malaysia.*

** Corresponding author: sarwarjahan@unisza.edu.my*

Abstract

Cucurbitaceae is among the biggest and most diverse plant families. They are native in most nations of the world, cultivated worldwide in a variety of environmental conditions. The Cucurbitaceae family is a good example with many species that are economically useful and worthwhile species of medicine. They contain most essential nutrients like, carbohydrate, protein, vitamins, minerals, sugar and other nutrients that humans needed for good health. Additionally, Cucurbitaceae family on top keeps an innumerable medicative property; however, they're not gain the importances within the field of medication as a result of the folks don't seem to be acknowledged the healing power of those vegetables. The Cucurbitaceae family is common for its medicinal usage of all portions of the plant, including seeds fruits, leaves, and roots that are wide study for their medicine activity. Cucurbitaceae fruits are eaten when immature or mature or leaves and young shoots. It also can be eaten as pickled, baked, candied, or consumed fresh in salads or dessert. Cucurbitaceae crops indirectly act as another source of healthful and simply obtainable medicine in natural surround and in wild forms. Cucurbitaceae crops were claimed can cure heart disease, night-blindness, anthelmintic, gonorrhea diseases, respiratory trouble, peptic haemoptysis, hemorrhoids, ulcer, dropsy, leprosy, splenitis, etc. This review will briefly describe the nutritional and medicinal potential of various indigenous cucurbitaceous crops.

Keywords: Cucurbits, malnutrition, medicinal value, indigenous crops and nutritional quality

AG-P-05 ABCDE

Characterization of Cadmium Tolerant Fungi from Dead Leaves and Stems in River System

Noor Afiza Badaluddin [a,*], Nur Aisyah Zin [a], Mohammad Hailmi Sajili [a], Saiful Iskandar Khalit [a]

[a] *School of Agriculture Science and Biotechnology, Faculty of Bioresources and Food Industry, University Sultan Zainal Abidin, Besut Campus, 22200, Besut, Terengganu, Malaysia*

[*] *Corresponding author: noorafiza@unisza.edu.my*

Abstract

Nowadays, the increasing environmental pollution caused by toxic concentration of cadmium is a critical issue as it will affect the living organisms surrounding it. Biological approach such as using fungi as bioabsorption agent would be the best way in controlling the toxic concentration of cadmium. Thus, this present study aimed to identify and characterize the fungi that have been isolated from dead leaves and stems in Kelantan river system and has tolerance toward cadmium. A total of 17 isolated fungi species have been screened in cadmium sulfate with different concentration up to 1000 µM. *Trichoderma hamatum, Trichoderma harzianum* and *Trichoderma atroviride* were identified via internal transcribed spacer (ITS) region as potential cadmium tolerant fungi among 17 species of isolated fungi. Here, the detection of cadmium absorption level in the fungi were analysed by using Atomic Absorption Spectroscopy (AAS) to determine whether it is potential as a bioabsorption agent or not. This study also determines the antagonistic characteristic of selected cadmium tolerant fungi towards some plant pathogenic fungi using dual culture assay. The study showed that fungi have potential as a bioagent to detoxify heavy metal based on the percentage of reduction level of cadmium concentration. In addition, the fungi can be developed as biopesticide since they showed high antagonist activity against the plant pathogenic fungi. Thus, the present obtained results would be useful to ensure stabilization of ecosystem as fungi is natural decomposer in food web chain that eventually can control the environmental pollution and pest.

***Keywords*:** Cadmium tolerant fungi, bioabsorption, antagonistic, biopesticide.

AG-P-06 QTAWZ

Lemna minor As Feed, Food & Feedstock: Manipulation of Starch Content in *L. minor*

Noor Nadia Kamarudin [a], Alya Naasiha [a], Siti Sorfina Sahidan [a], Farah Syazwina [a], Norfaizatun Akma Zainal Abidin [a], Eiza Fareeza Saipuddin [a], Shazrul Fazry [a], Babul Airianah Othman [a,*]

[a] *Centre for Biotechnology & Functional Food, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia*

* *Corresponding author: airianah@ukm.edu.my*

Abstract

A species of duckweed, *Lemna minor*, belongs to a family of floating aquatic plants (Lemnaceae). Plants of this family represent the smallest angiosperms and also the fastest growing flowering plants that produce tremendous biomass. The production of high amount of duckweed biomass in the areas that are unfit for traditional agriculture led to the idea of developing these plants not only as a new crop for animal feed and fodder but also as a feedstock for bioethanol production considering their high starch content which reportedly as high as 75% of dry mass depending on growing condition and species. Here, we summarised results obtain by our research group on several factors that may influence starch accumulation in local duckweed species, *Lemna minor*.

Keywords: *Lemna minor*, duckweed, starch, feedstock

AG-P-07 TFVPH

Growth and Development of Oriental Fruit Fly, *Bactrocera dorsalis* Hendel (Diptera: Tephritidae) Reared on Sweet Potatoes (*Ipomea batatas* L.) Based Artificial Diet

M.Y. Nurul Fatihah[a], M. Salmah[a,*]

[a] *School of Agriculture Science & Biotechnology, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia*

* *Corresponding author: salmahmohamed@unisza.edu.my*

Abstract

An oriental fruit fly, *Bactrocera dorsalis* (Hendel) is a global and economically important pest of agricultural food crops. However, basic life history information about this pest, which is vital for designing more effective control methods, currently still needs serious attention, particularly through the good rearing insect diet. Thus, this study aimed to determine and compare the growth and development of *B.dorsalis* on sweet potatoes (*Ipomea batatas* L.) based diets with wheat germ as standard diets. Four types of diets used were; orange sweet potato (OSP), purple sweet potato (PSP), white sweet potato (PSP) and wheat germ (WG) as a standard diet. Results showed that among the diets tested, the WG based diet displayed a significant difference ($P<0.05$) in growth and development of *B.dorsalis* due to the higher nutritional value contained in the diet. Nonetheless, *B. dorsalis* growth and development on sweet potatoes based diet, particularly on OSP diet, showed similar results as WG based diet. There was a significant difference between a number of pupae obtained where WG recorded the highest number of pupae (17.33±0.33) followed by OSP (9.00±0.577), PSP (9.00 ±0.33) and WSP (8.00 ± 0.577). However, no significant difference was shown among the OSP, PSP and WSP based diets particularly on the number of pupae, the percentage of pupae, adult survival and duration from egg to adult. As a conclusion, this study showed that sweet potatoes can be used as an alternative economic source of artificial diets for *B. dorsalis* mass-rearing program in laboratory

***Keywords*:** Artificial diet*, Bactrocera dorsalis*, *Ipomea batatas*

AG-P-08 VTAWJ

Variability of Morphological Characters and Dry Matter Content in Sweet Potato (*Ipomoea batatas* L.) Germplasm

Nurul Afza, K.[a], Nur Syuhada, M. R.[b], Natrah Amira, A.[b] and Muhammad Amjad, M. Z.[c]

[a] *Crop & Soils Science Research Centre, MARDI Bachok, 16400 Bachok, Kelantan.*
[b] *Faculty of Bioresources & Food Industry, UniSZA Campus Tembila, 22200 Besut, Terengganu.*
[c] *Kullyah of Sciences, IIUM Kuantan, 25200 Kuantan, Pahang.*

* *Corresponding author: nafza@mardi.gov.my*

Abstract

Characterization of sweet potato variety are the most valuable and essential materials in meeting the current and future needs of crop improvement program to satisfy the demand of human needed for sweet potatoes. A total of 46 genotypes were characterized for twenty five traits by assessing variations in the vine, leaf, storage root and dry matter content (DMC). The objective of study was to identify the morphological traits for sweet potatoes germplasm collected in MARDI Bachok, Kelantan. Out of 46 genotypes, 73% of genotypes was recorded the highest number of predominant vine color in green and the rest was illuminated with purple pigment color. The mature leaf outline shows cordate (19) was the highest and reniform (1) was the lowest. A total of 21 genotypes had semi-elliptic central leaf outline. For storage root trait, 22 genotypes having purple flesh color while the rest were illuminated with orange to pale yellow. About 38 of genotypes have above 30% of Dry Matter Content (DMC). Thus, this study suggested the genetic resources of sweet potato germplasm are needed for the improvement of varieties and the passport data will provide breeder to facilitate the selection of desired characteristics in their breeding programs.

Keywords: *Ipomoea batatas* L.; sweet potato; germplasm; morphological characters; dry matter content

AG-P-09 QDDJA

Recent Research Advancement on Nutritional Quality Improvement of Major Cucurbitaceous Crops

Wan Nur Suzani Sazleen Wan Shafiin [a], Md Amirul Alam [b], Rohayu Ma'arup [c], Kamarul Ain Mustafa[d], Nadiawati Alias [a], Nur Fatihah Hasan Nudin [a], Mohd Rafii Yusof [e], Fatin Liyana Ablah [a], and Md Sarwar Jahan [a,*]

[a] *School of Agriculture Science and Biotechnology, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, Besut 22200, Terengganu, Malaysia.*
[b] *Faculty of Sustainable Agriculture, Horticulture and Landscaping Program, Universiti Malaysia Sabah, Sandakan Campus, Sandakan 90509, Sabah, Malaysia.*
[c] *School of Food Science and Technology, Universiti Malaysia Terengganu, 21300, Kuala Terengganu, Terengganu.*
[d] *School of Food Industry, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, Besut 22200, Terengganu, Malaysia.*
[e] *Institute of Tropical Agriculture and Food Security, Universiti Putra Malaysia, UPM Serdang, 43400 DE, Selangor, Malaysia.*

** Corresponding author: sarwarjahan@unisza.edu.my*

Abstract

In recent decades, there have huge advances in plant breeding and the development of novel technologies for the manipulation of crop improvement. The application of classical breeding and selection method has made a rapid development of cereal production effectively and control starvation in under developed country. Most breeding and genetic effort has been directed to only few cucurbit crops which are claimed to relatively rich in vitamins, minerals and protein sources including squash, pumpkins, and melons. Uses of biotechnology in plant breeding through genomic approaches are capable to produce hybrids that possess desired traits. Despite of biotechnology approaches the use of agronomic and biological biofortification for target nutritional status of the fruit and high quality cultivar improvement are the latest demanding research. Therefore, manipulations of plant breeding methods employed in various crops and have good potential particularly on cucurbitaceae for nutritional improvement and quality characteristic receiving greater attention for genetic improvement. There is also an increasing interest in improving nutritional characteristics in cucurbitaceae with considerable interest in selecting lines enhanced for provitamin a, vitamin c and other nutraceuticals.

Keywords: Plant breeding, hybrids, nutritional improvement, biofortification

AG-P-10 QLRFF

Food Security Through Organic Procedures

Charissa Ragandap [a], Diana Rillera [a], Daniel Dave Carino [a], Jeremiah Carino [a] and Fernando Oringo [b]

[a] *Student Researchers, Lorma Colleges Senior High School*
[b] *Research Adviser, Lorma Colleges Senior High School*

* Corresponding author: *propertyofchachi@yahoo.com*

Abstract

Food plays very vital role in maintaining proper health and also helps in prevention and cure of diseases. Good nutritive food makes health, but at the same time bad or unhealthy food give rise to several diseases.(FAO 1996, Rome Declaration). According to 2015 World Hunger and Poverty Facts and Statistics, the most suffering countries are the Asia: with 525.6 million people starving, Sub-Saharan Africa with 214 million, and Latin America and the Caribbean with 37 million deprived of food ("Know Your World: Facts about Hunger and Poverty", 2015). This study aimed to answer the following: a) What are the effects of organic processes in farming on the quality of the resources and to its consumers; and b) How does vegetables scraps help in eradicating hunger? This action research made use of interview to the residents of Barangay Polipo, San Gabriel, La Union. As a result the researchers came up with an action plan on addressing the SDG number 2 which is entitled Zero Hunger that focuses on Food Security Through Organic Procedures. With the said program, animal manures and food waste will be fully used for food production for security. Philippines as being considered as an agricultural country providing alternatives that are convenient to the farmers will help aid the problems related to hunger.

***Keywords*:** Food security, vegetable scraps, Zero Hunger

AG-P-12 BSKDD

Chemical Fingerprint of Stingless Bee's Propolis From Different Extraction Methods

Nur Basyirah Md Zin [a], Azierah Azemin [a], Muhammad Muslim Mohd Rodi [a] and Khamsah Suryati Mohd [a,*]

[a] *School of Agriculture Sciences and Biotechnology, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia*

** Corresponding author: khamsah@yahoo.com*

Abstract

Stingless bee propolis is a mixture of resin collected by the bees to build their hive. These mixtures contain natural remedy and used to treat variety of health-related problems. Unlike honeybee propolis, the study of stingless bee propolis still lacking. The important part of propolis study is optimization of extraction procedures. This study aimed to compare chemical fingerprints of Malaysian stingless bee, *Heterotrigona itama* propolis yielded from different extraction methods, which were maceration, sonication and soxhlet. A 70% of ethanol were used in different time period. Chemical fingerprint was assessment through Fourier Transform Infrared (FTIR) and Thin Layer Chromatography (TLC). Principle component analysis (PCA) and hierarchical cluster analysis (HCA) were applied as pattern recognition methods for FTIR. TLC chromatograms were viewed under 254nm and 366nm. PCA of FTIR data for different extraction methods of stingless bee's propolis revealed that variability of PC1 and PC2 is 74.73%. Factor scores showed that extraction method of stingless bee's propolis by maceration (1, 3, 5 and 7 days) and sonication (30, 60, and 120 minutes) were classified into PC1 while extraction method by sonication (10 minutes) and soxhlet (2, 4, 6 and 8 hours) were classified into PC2. The FTIR fingerprint of HCA result of stingless bee's propolis were classified into three cluster (I, II and III) based on different extraction methods. TLC chromatograms revealed that propolis extracted by different extraction methods contained vary bioactive compounds. Taken together, these results showed that different extraction methods play important role in determination of chemical constituents in propolis of stingless bee.

***Keywords*:** Propolis, stingless bee, extraction method, FTIR, TLC

AG-P-13 DXUMQ

Orthosiphon stamineus Extracts Induce Cytotoxic and Apoptosis in Uterine Leiomyosarcoma Cell Lines

Norzilawati Pauzi [a], Norhidayah Halim [a], Khamsah Suryati Mohd [a,*] Zhari Ismail [b]

[a] *Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200, Besut, Terengganu, Malaysia*
[b] *Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Johor, Malaysia*

** Corresponding author: khamsahsuryati@unisza.edu.my*

Abstract

The effects of water and 50% ethanolic-water extracts of *Orthosiphon stamineus* Benth (OS) cytotoxic and apoptotic activity against uterine leiomyosarcoma (SK-UT-1) cells were investigated. Cytotoxicity effect was evaluated through MTT assay whereas apoptotic activity was determined via screening and quantifying using fluorescence microscopy and flow cytometric analysis, respectively. The effect of extracts on molecular mechanism was studied using real-time reverse transcription polymerase chain reaction and Western blotting. Flow cytometric analysis showed the induction of cell cycle arrests were behaves in a p53-independent manner. The examination using fluorescence microscopy and Annexin V flow cytometry revealed the presence of morphological features of apoptotic bodies. Downregulation of anti-apoptotic gene (Bcl-2) supports the apoptotic activity of OS extracts although poorly induce PARP-1 cleavage in western blot analysis. The extracts also inhibit the SK-UT-1 growth by suppressing VEGF-A, TGF-β1 and PCNA genes, which involved in angiogenesis and cell proliferation. This study demonstrates that *O. stamineus* extracts are able induced cytotoxicity and apoptosis of uterine fibroid cells and is worth further investigation.

Keywords**:** *Orthosiphon stamineus*, cytotoxic, apoptosis, uterine leiomyosarcoma

AG-P-14 EUAEN

Phytochemical Screening and Antioxidant Properties of Stingless Bee *Geniotrigona thoracica* Propolis

Ainur Awanis Mohd Badiazaman [a], Nur Basyirah Md Zin [a], Aulia Rani Annisava [a], Nor Elani Mat Nafi [a], and Khamsah Suryati Mohd [a,*]

[a] *School of Agriculture Sciences and Biotechnology, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22000 Besut, Terengganu, Malaysia*

* *Corresponding author: khamsahsuryati@unisza.edu.my*

Abstract

Propolis consists of mainly constituents like resin and volatiles which are substances that have been obtained from a various botanical process in different parts of plants and beeswax secreted by bee. The chemical composition of propolis is varied depend on various factors such as vegetation, season and environmental conditions of the sample collection. The aim of the study is to determine chemical profile and evaluate antioxidant properties of crude methanol extract of *Geniotrigona thoracica* propolis from five localities, namely Besut, Dungun, Lundang, Gua Musang and Tanah Merah. Phytochemical screening by thin layer chromatography (TLC) showed the presence of terpenoid, phenol, coumarins, unsaturated and aromatic compounds. The extracts displayed different characteristic of chemical profile and vary from each other. The antioxidant properties of extracts were evaluated based on total phenolic content, total flavonoid content and 1,1-diphenyl-2-picrylhydrazyl (DPPH) free radical-scavenging activity. Gua Musang (GM) exhibited the highest total phenolic content with 19.53 ± 0.01 mg GAE/g meanwhile Besut (BST) exhibited the highest total flavonoid content with 17.22 ± 0.01 mg QUE/g and showed highest percentage of inhibition with 84.40% for DPPH radical scavenging activities. As a result, *G*. *thoracica* from Besut is a good source of antioxidant due to its antioxidant properties.

Keywords: stingless bee propolis, phytochemical, TLC profiling, antioxidant

AG-P-15 FMHSZ

Modeling for Activity Recognition in Nigerian Palm Oil Tree Plantation

Hassan Birnin-Kudu [a,b,*]

[a] *School of Computing, Awang Saleh Graduate School of Arts and Science, University Utara Malaysia, 06010 Sintok, Kedah, Malaysia*
[b] *Department of Computer Science, Faculty of Science, Federal University Dutse, P.M.B. 7156 Jigawa State Dutse, Nigeria*

[*] *Corresponding author: chiroma1965@gmail.com*

Abstract

Activity recognition using topic modeling is location aware pervasive computing applications typically an experimental process, learnt from Palm oil tree Plantation domain knowledge. Meaningful explicit knowledge detection is challenging trial especially when targeting other dissimilar application domains. Many previous research studies have employed different approaches to monitor Palm Oil Tree Plantation activities. This research paper presents a qualitative method for value recovery by improving upon traditional policy. The approach determines the expected values that can be recovered from oil palm tree products via various options. For this situation main challenges are associated with capacity building management and research community engagement and investment style. Once latent topics and concepts are identified and removed, several irregularities are measured to reduce cost and improve resource performance. To demonstrate the effectiveness of this method, novel topic modelling Latent Dirichlet Allocation (LDA) is employed to distinguish topics learned from community engagement and investment in oil palm tree plantation without modifying the main LDA machinery. The primary method is based on Information retrieval approach using T-graph crawler and ensembled machine learning to extract similar latent patterns and concepts to form clusters and evaluated model performance. The result of latent patterns and concepts pooling was used as an input to LDA to overcome spam and sparsity problem. Ensembled machine learning method via Information retrieval and Latent Dirichlet Allocation (LDA) leads to an improvement in several methods for topic coherence compared to unimproved LDA baseline and many pooling schemes.

***Keywords*:** Palm Oil Tree, Palm Oil Tree Plantation, Capacity Building Management, LDA, T-graph Crawler

AG-P-16 FNZRC

Correlation of Herbs Plantation Location to Forest Area

Nor Atiqah M. F. [a,*], Mohamad Azwir A. U.[a], Rohana A. R.[a], Siti Noratiqah M. D.[a], Nur Fazreen Z.[a]

[a] *Economic and Strategic Analysis Programme, Forest Research Institute Malaysia, 52109 Kepong, Selangor, Malaysia*

* *Corresponding author: noratiqah@frim.gov.my*

Abstract

Positive development of herbs industry in Malaysia leads to an estimation of RM 2.2 billion contribution to Gross National Income (GNI) by 2020. This estimation was targeted in National Key Economic Areas (NKEA). One of the factors that mainly contribute to the rapid growth of herbs industry is the tropical climate possessed in Malaysia. Tropical rainforest is rich of nutrients derived from the cycle between plants and soil nutrients that enter an ecosystem through rain, dust and aerosols. This study aims to identify forests' influence on herbs agricultural area hence determine the productive area in terms of soil suitability for an expansion of agricultural activity. This study was conducted by performing a survey on 398 cultivator of herbs in Peninsular Malaysia from 2014 to 2015 and 2018. The findings showed that the closer forest area to herbs plantation location, the higher suitability of soil for herbs plantation. This will fulfill government's aim in increasing herbs plantation acreage from 1000ha in 2010 to 4000 ha by 2020. Hence, it is also recommended an extension of plantation into agroforestry activity in order to enhance biodiversity preservation.

***Keywords*:** Agriculture, forest, herbs, tropical rainforest

AG-P-17 GUBCC

Propagation of Thirty *Labisia pumila* Accessions With Potential of Uterus Contraction Activity At Five FRIM's Substation

S. Norhayati [a,*], M.A. Farah Fazwa [a] and S.N. Syafiqah Nabilah [a]

[a] *Forestry Biotechnology Division, Forest Research Institute Malaysia, 52109 Kepong, Selangor, Malaysia*

* *Corresponding author: norhayatisaffie@frim.gov.my*

Abstract

Labisia pumila or locally known as Kacip Fatimah is one of ten important herbal plants that have been listed under National Key Economic Area (NKEA). *Labisia pumila* has been reported to have several phytochemicals such as phenolics and flavonoids that make it effective against several illnesses such as anti-cancer, anti-inflammatory, anti-microbial and anti-obesity. The species also traditionally claimed can give contraction to the uterus after childbirth and to regain body strength. In addition, *L. pumila* has been acknowledged as herbal plant that have beneficial towards human reproductive system and can replace the inconvenience effect of oxytocin, prostaglandin and misoprostol. Due to its great advantages, demands for this herb are increasing every year. However supply of quality raw materials in the country is still uncertain and most of the raw materials are imported from China, India and Indonesia. The over-dependence on these import raw materials will lead to inconsistent supply, price instability and adulteration with low quality materials. Thus, researchers from Plant Improvement Programme, Forest Research Institute Malaysia (FRIM) have taken an effort by propagating thirty *L. pumila* accessions which already identified to have potential uterus contraction activity (from previous study). The leaf cutting propagation were conducted at five FRIM's Sub-stations, namely i) SPF Maran, Pahang; ii) SPF Setiu, Terengganu; iii) SPF Jengka, Pahang; iv) SPF Pasoh, Negeri Sembilan and v) SPF Mata Ayer, Perlis. The objective of the study is to evaluate the effects of different propagation location on survival and rooting responses of the thirty selected accessions. Leaves from each accession were cut into two possible parts of 30 cm^2. Each base of cutting was treated with commercial rooting hormone (Seradix™) containing 0.1% IBA (Indole Butyric Acid) to enhance the rooting formation before inserted into 5 cm depth of rooting medium. The cuttings were kept moist in planting bed for 3 months. Results showed that more than 80% of the cuttings survived and rooted after three months at all locations. SPF Mata Ayer, Perlis recorded highest number of rooted cuttings (4.80±0.55) followed by SPF Jengka, Pahang (1.84±0.29). For SPF Maran (Pahang), SPF Pasoh (Negeri Sembilan) and SPF Setiu (Terengganu), results on rooting were not significantly different and recorded the lowest. All rooted plants derived from this study were planted and maintained at FRIM's nursery for future planting stocks production.

Keywords**:** *Labisia pumila,* raw materials, cutting*,* rooting responses, planting stocks

AG-P-18 HWVWZ

Distribution, Isolation and Identification of Leaf Spot Disease Pathogen of *Carica papaya* in Peninsular Malaysia

Mohammad Hailmi Sajili [a,b,*], Dzarifah Zulperi [a], Kamaruzzaman Sijam [b], Mahmud Tengku Muda [b], Nor Afiza Badaluddin [a], and Zakry Fitri Abdul Aziz [c]

[a] *School of Agriculture Science and Biotechnology, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin (UniSZA), Besut Campus, 22200 Besut, Terengganu, Malaysia.*
[b] *Plant Protection Department, Faculty of Agriculture, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.*
[c] *Faculty of Agriculture and Food Sciences, Universiti Putra Malaysia Bintulu Sarawak Campus, 97008 Bintulu, Sarawak, Malaysia*

** Corresponding author: mhailmi@unisza.edu.my*

Abstract

The disease leaves that fulfilled the criteria as Corynespora Leaf Spot Disease (CLSD) of papaya collected from twelve places in Semenanjung Malaysia. Disease incidence (DI) and disease severity (DS) recorded and location were marked with Global Positioning System (GPS). Hundred percent of twelves sampling locations was confirmed infected with CLSD. The highest disease severity recorded at PR2 with 93.3% of DS followed by K1 with 71% of DS. The lowest DS recorded at PH1 with 61.67% of DS. Four fungi were consistently isolated that were *Corynespora sp.*, *Culvularia sp.*, *Colletetricum sp., Rhizoctonia sp*. and it was proven that *Corynespora sp.* was the causal agent of the disease (CLSD) by koch's postulate. Study on the morphology of *Corynespora sp.* colony, mycelium and conidia was done to identify the pathogen. The pathogenic fungi identified using molecular technique and it confirmed as *Corynespora cassiicola*. The amplicons approximately 600bp was amplified using the ITS primers.

Keywords**:** *Corynespora cassiicola*, Plant Disease, *Carica papaya*, Disease severity, Disease Incidence, Leaf Spot Disease

AG-P-19 JQRRZ

Effect of Hot Water Treatment and Calcium Dips on Tomato

M.N. Iffah Hazirah [a,*], W.J. Hao [a]

[a] *School of Food Science and Technology, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu*

* *Corresponding author: iffahhazirah@umt.edu.my*

Abstract

Tomato is fruit vegetables sustaining valuable benefits in economy and nutrition. Tomato is a good source of Vitamin C and lycopene. Being a climacteric fruit, tomato is perishable and has short shelf life. To improve the storage quality of tomato, effect of hot water treatment and calcium dips on tomato (*Solanum lycopersicum*) was studied. Various research had proven the benefits of hot water treatment and calcium dips on postharvest quality and shelf life of tomato. Tomato fruits were dipped in two temperatures (40℃ and 50℃) of hot water bath for 2 minutes prior to treatment of 2% calcium chloride for 2 minutes. The fruits were stored at 10℃ ± 2℃ in cold room at relative humidity of 80-95%. Changes in colour, weight loss, firmness, total soluble solids (TSS), ascorbic acid, pH, titratable acidity and lycopene content were observed and recorded on 0, 2, 4, 6, 8, 10, 12, 14 days of storage. Combined treatment of hot water treament at 50℃ with dipping in 2% of $CaCl_2$ was identified as an optimum treatment with better in improving the shelf life and maintaining the post harvest quality.
.

***Keywords*:** Tomato, Hot water treatment, calcium dips

AG-P-20 KDFGJ

GIS approach for Padddy Soil Fertility Mapping in KADA area

Shajarutulwardah M.Y. [a,*], Nurul Syakira S. [a], Shamsul Amri S. [a], Muhammad Naim F.A.R. [a], Muhamad Najib M.Y. [a], Mohd Zameri A. [a], Norhayati A. [a], Yusmizawati M.Y. [b]

[a] *Rice Research Centre, MARDI Seberang Perai, 13200 Kepala Batas, Penang*
[b] *Promotion and Business Development Centre, MARDI Alor Setar, 05710 Alor Setar, Kedah.*

* *Corresponding author: wardah@mardi.gov.my*

Abstract

This study was conducted to assess nutrient status of rice soils in three areas (Senor, Ladang Merdeka Ana and Meranti) at Kemubu Agricultural Development Authority (KADA), Kelantan using geostatistical and interpolation technique and the distribution maps were prepared on the basis of nutrients rating. Arc Map 10.3 with spatial analyst function of Arc GIS software was used to prepare soil fertility map. The soil samples were collected (0-20 cm) on the basis of GPS grid with 200m x 200m spacing. Soil samples were analysed for their fertility status as per standard procedure for assessing chemical properties and available N, P and K nutrient status. Results showed that pH of soil in Senor area varied from 4.9 to 6.3. The organic carbon and total nitrogen were varied from 1.21 to 2.56 % and 0.13 to 0.21 % respectively. The available Phosphorus ranged from 24.3 to 164.6 kg/mg, while CEC and Exchangeable K varied from 11.1 to 24.9 and 0.12 to 0.32 cmol(+)/kg respectively. For Ladang Merdeka Ana, results of pH in soil varied from 4.4 to 6.5 while organic carbon and total nitrogen (N) were varied from 1.66 to 6.04 % and 0.03 to 0.37 % respectively. The available Phosphorus ranged from 23.6 to 91.2 kg/mg, while CEC and Exchangeable K varied from 11.9 to 24.4 and 0.08 to 0.49 cmol(+)/kg respectively. However pH of soil in Meranti showed a little bit lower of pH value that varied from 5.1 to 5.8. The organic carbon and total nitrogen in soil were varied from 1.65 to 3.42 % and 0.16 to 0.37 % respectively. The available Phosphorus ranged from 43.4 to 109.6 kg/mg, while CEC and Exchageable K varied from 14.4 to 24.9 and 0.2 to 0.67 cmol(+)/kg respectively. The assessment of fertility status of the paddy soils enable the development of more effective agronomic recommendations to enhance productivity.

***Keywords*:** Geographic Information system, Global positioning system, Nutrient mapping, Soil fertility

AG-P-21 QMMYB

Economic Valuation of Timber Resources in FRIM Selangor Forest Park

Noor Hazmira M. [a,*], Rohana A.R.[a]

[a] *Economic and Strategic Analyses Pogramme, Research Planning Division, Forest Research Institute Malaysia, 52109 Kuala Lumpur, Malaysia*

* *Corresponding author: noorhazmira@frim.gov.my*

Abstract

The FRIM Selangor Forest Park (FRIM SFP) is renowned as man-made forest that is previously vegetable farming and mining activities. The restoration efforts were initiated back in the 1920s to restore this degraded landscape in Kepong. The park occupies 544.3 hectares and 87% of this area is covered with planted forest heritage. Stumpage valuation method was used to assess the ecosystem services value of timber resources. This paper will study tree composition and the stumpage value of two fields area; field 11 and 20 in this park. Tree composition according to family, species, diameter and tree volume will be descriptively analyzed. Based on data analysis, the total stumpage value for both fields with a total hectarage of 19.21 is RM 2.2 million. The average estimated stumpage for FRIM SFP area is RM 4,067/ ha. The finding shown estimated stumpage value is similar to other studies conducted in other hill dipterocarp forest in Pasoh Forest Reserve, Negeri Sembilan indicates that FRIM is comparable with those of other dipterocarp forest areas in Malaysia. This paper is hoped to support the effort of FRIM SFP to justify itself as a rich tropical man-made forest legacy as one of the outstanding universal values to be acknowledged for UNESCO world heritage site since the conservation of this area is crucial.

Keywords: Man-made forest, stumpage valuation, ecosystem services

AG-P-22 LMLQF

Sterilization and Micropropagation of *Lilaeopsis brasiliensis*

Nor Hasima Mahmod [a,b,*], Nur Farahanies Norazman [a], Roslina Mat Yazid [c], Tajul Afif Abdullah [a], Nguang siew Ing [a], Norhanizan Sahidin [d]

[a] *Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut Terengganu, Malaysia.*
[b] *AGROPOLIS, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut Terengganu, Malaysia*
[c] *Faculty of Science and Technology, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia*
[d] *Fisheries Research Institute, FRI Glami Lemi, Titi, Jelebu,N. Sembilan, Malaysia*

** Corresponding author email: norhasima@unisza.edu.my*

Abstract

Lilaeopsis brasiliensis or Brazilian microsword is a freshwater ornamental aquatic plant capable of inhibiting algae and phytoplankton growth by reducing nitrate content in water. This plant which grows natively in Brazil is rarely found in Malaysia due to difficulty in growing and maintaining the plant. Therefore, micropropagation is the most appropriate method to propagate this plant. However, the sterilization protocols for this plant and its micropropagation method are yet to be established. In the present study, the mother plant of *L. brasiliensis* was subjected to different protocols of sterilization by varying the concentration of Thiram, silver nitrate ($AgNO_3$), sodium hypochlorite (NaOCl) and mercuric chloride ($HgCl_2$). The full, half, quarter and half of quarter strength of Murashige and Skoog (MSO) media was used to determine the most suitable medium to propagate the *L. Brasiliensis*. Sterilization protocols wihich utilized 0.05 % of $HgCl_2$ with a combination of other sterilizing agents such as 0.01 % Thiram, 0.10 % $AgNO_3$ and 1.5 % NaOCl showed the highest survivability rate (100 %) and the lowest contamination of fungus (7 %) and bacteria (13 %). The full strength of MSO was the best medium for micropropagation of *L. brasiliensis* as it showed the highest spreadability (27.17 ±5.4 mm^2) and a greater shoot length (5.50 ±0.54 mm) of the explants, followed by quarter, half and half of quarter strength of MSO media for spreadability (mm^2) whereas half, quarter and half of quarter strength of MSO media for shoot length (mm). The findings provide a groundwork for *in vitro* culture and commercial micropropagation of *Lilaeopsis brasiliensis.*

Keywords*: *Lilaeopsis brasiliensis, aquatic plant, sterilization, micropropagation

AG-P-23 NNBER

Molecular Markers Development For Wood Formation Biosynthesis through Transcriptome Data of The Rubber Tree (*Hevea Brasiliensis*)

Mohd Fahmi Abu Bakar [a,b*], Siti Nurfazilah Abdul Rahman [b], Ahmad Sofiman Othman [b]

[a] *Faculty of Bioresources & Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia*
[b] *School of Biological Sciences, Universiti Sains Malaysia, 11800 Minden, Pulau Pinang, Malaysia*

[*] *Corresponding author: mohdfahmi@unisza.edu.my*

Abstract

Hevea brasiliensis, commonly known as rubber tree, is a well-known species with high economic value and it is the primary source of natural rubber in the world. The increasing demand for furniture and other purposes has made rubberwood production as important as latex production. However, the selection procedures usually times consuming and paid high price. Molecular markers technology such as SNPs and SSRs can reduce the time and cost required for selection process. The development of molecular markers was involved RNA sequencing (RNA-seq) of *H. brasiliensis* samples including bark, latex and leaf on the Illumina NextSeq 500, v2 platform, which generated 3,666,163,296 raw reads. A total of 101,269 contigs that were over 400 bp in size were obtained and subjected to further analyses. A similarity search against the non-redundant (nr) protein database returned 83,748 (83%) positive BLASTx hits. The transcriptome analysis was annotated using the gene ontology (GO), Kyoto Encyclopedia of Genes and Genomes (KEGG), and Pfam databases. A search for putative molecular marker was performed to identify single nucleotide polymorphisms (SNPs) on wood formation related genes. In total, about 3,210,629 SNPs and 14,956 SSRs were detected. A total of 1786 SNPs and 31 SSRs were found for wood formation biosynthesis of *H. brasiliensis from 11 lignin and cellulose gene toolbox*.

Keywords: Molecular Marker, Wood Biosynthesis, Transcriptome, Rubber tree, *Hevea brasiliensis*

AG-P-24 PCECD

Development of Single Nucleotide Polymorphism Markers For MVA And MEP Pathways From *Hevea Brasiliensis* Transcriptome

Siti Nurfazilah Abdul Rahman [a,*], Mohd Fahmi Abu Bakar [a,b], G. Veera Singham [c], Ahmad Sofiman Othman [a]

[a] *School of Biological Sciences, Universiti Sains Malaysia, 11800 Penang, Malaysia*
[b] *Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, 22200 Besut, Terengganu, Malaysia*
[c] *Centre for Chemical Biology, Universiti Sains Malaysia, 11900 Bayan Lepas, Penang, Malaysia*

** Corresponding author: snar86@gmail.com*

Abstract

Mevalonate (MVA) and 2-C-methyl-D-erythritol 4-phosphate (MEP) pathways are two important pathways in rubber biosynthesis. Natural rubber from *Hevea brasiliensis*, an indispensable biopolymer with isopentenyl diphosphate (IPP) as monomeric subunit is produced via these two biosynthetic pathways. The high performance properties of natural rubber cannot be replaced by synthetic rubber and other latex-producing plants for use in many industrial applications. However, the major hurdle for sustainable production of natural rubber is the absence of a quality diagnostic tool to screen the mother clones to ensure their performance in plantations. Therefore, molecular biological techniques were applied to facilitate the development of molecular markers that are directly related to economic traits for marker assisted selection. RNA sequencing of several *H. brasiliensis* tissues were performed on the Illumina platform to generate 29,862,548 raw reads. A total of 101,269 transcripts with sized between 424 bp to 10,503 bp were obtained and subjected to further analysis. A similarity search against the non-redundant (nr) protein databases presented 83,748 (83%) positive BLASTx hits. The transcriptome was annotated using gene ontology (GO), Kyoto Encyclopedia of Genes and Genomes (KEGG) and Pfam databases. A search for putative molecular marker was performed to identify single nucleotide polymorphisms (SNPs). Overall, 3,210,629 SNPs were detected. Finally, we selected SNPs that were associated to the genes involved in MVA and MEP pathways.

Keywords: *Hevea brasiliensis*, transcriptome, single nucleotide polymorphism, MVA and MEP pathways

AG-P-25 PDUYE

In Vitro Antioxidant and Alpha Glucosidase Inhibitory Activities of *Syzygium samarangense* Leaves at Different Maturity Stages

Nuruljannah Suhaida Idris [a], Zalilawati Mat Rashid [b], Nashriyah Mat [a] and Mohammad Moneruzzaman Khandaker [a,*]

[a] *School of Agriculture Science & Biotechnology, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia.*
[b] *School of Food Industry, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia.*

** Corresponding author: moneruzzaman@unisza.edu.my*

Abstract

In the quest for new medicines, methanol extract of giant green wax apple leaves were analyzed for antioxidant and alpha glucosidase potential. Giant green leaves were collected at differences maturity stages which are young leaves (YL), mature leaves (ML) and old leaves (OL). Antioxidant activities was determined by using 2,2-diphenyl- 1-picrylhydrazyl radical (DPPH), nitric oxide radicals (NO^-), 2,2'-azinobis-(3-ethylbenzothiazoline-6-sulphonic acid) (ABTS) and ferric reducing power assays. The alpha glucosidase inhibitory activity was performance by using α-glucosidase enzyme from *Saccharomyces cerevisiae*. Among the stages of young leaves extract showed better efficiency than that the mature and old leaves. The radical scavenging activity of DPPH were higher in young leaves followed by mature and old leaves extracts. A similar trend was observed in NO^-, ABTS and ferric reducing power assays. Based on the results, inhibition activity of alpha glucosidase follow the same order of young > mature> old leaves. Unexpected, the both of reference standards that are quercetin and acarbose showed lower inhibition activity and higher IC_{50} value compared to all leaves extracts. In this study, we found that young leaves extract possess potential antioxidant and alpha glucosidase activities. Therefore, young leaves extract could be excellent source of natural antioxidant and may provide a new approach to treat the diabetes mellitus.

Keywords: *Antioxidant, Wax apple, Leaf, Diabetes, Maturity*

AG-P-26 PQCZR

Integration of Genomic and Transcriptomic Analysis For The Identification of Candidate Genes and Functional Marker For Drought Tolerant Trait In Rice

Shahril A.R. [a,*], Zulkifli A.S. [b], Nor Helwa Ezzah N.A. [a], Site Noorzuraini A.R. [c], Shamsul Amri S. [d], Rahiniza K. [d], Siti Norhayati I. [a], Muhammad Fairuz M.Y. [a] and Khairun Hisam N.[a]

[a] *Centre for Marker Discovry and Validation, Genebank and Seed Centre, MARDI Headquarters, 43400 Serdang, Selangor*
[b] *Biotechnology and Nanotechnology Research Centre, MARDI Headquarters, 43400 Serdang, Selangor*
[c] *Genebank and Seed Centre, MARDI Seberang Perai, 13200 Kepala Batas, Pulau Pinang.*
[d] *Rice Research Centre, MARDI Seberang Perai, 13200 Kepala Batas, Pulau Pinang.*

* *Corresponding author: shahrilf@mardi.gov.my*

Abstract

Rice is one of the main important food crop consume globally. However, the rice production has been significantly decreased owing to climate change especially water shortage or drought. Cultivation of drought tolerance rice variety was proven to be the effective way to minimize the yield losses during the drought stress. To date, up to 15 quantitative trait loci (QTL) related to yield under drought stress has been identified. In this study we aim to identify candidate genes and functional marker related to qDTY 11.1 which previously mapped on chromosome 11 in rice genome with the approximate size of 15,115,210,884 bp. Genomic analysis of the qDTY region revealed the presence of 1035 coding genes. Out of 1035 coding genes, only 7 coding genes namely Os11g0282300, Os11g0289700, Os11g0439600, Os11g0444700, Os11g0451700, Os11g0502700 and Os11g0525200. All the expressed gene were up-regulated genes except Os11g0282300 which was identified as down-regulated gene. In addition, sequence analysis of the expressed genes revealed the presence of 255 single nucleotide polymorphism (SNP). The identified SNPs will be further validated in segregated mapping population before could be use in marker assisted breeding (MAB) programme. The employment of the identified SNPs in the will significantly increase the selection accuracy and efficiency in breeding program.

***Keywords*:** Drought tolerant, Genomic, Transcriptomic, Oryza sativa

AG-P-27 TKAFZ

The Usage of Rice Straw and Availability Of Rice Straw In Pendang, Kedah

Nur Fazreen Z. [a,*], Nor Atiqah M.F. [a], Rohana A.R. [a]

[a] *Economics and Analyses Strategic Programme, Forest Research Institute Malaysia, Kepong 52109, Kuala Lumpur, Malaysia*

* *Corresponding author: nurfazreen@frim.gov.my*

Abstract

Traditionally, in Malaysia and other South and Southeast Asian countries, combustion of straw is done after harvesting season of paddy. Such activity causes air pollution, affects safety of road users and thus contributes to climate change. There are many alternative uses of straw besides being used as agricultural waste. Among them are livestock feed, fiberboard, paper and used in energy production. A food-packaging manufacturing company based in Kedah, has been using FRIM's pulp production technology from the rice straw in its production operations. With the pulping technologies, converting rice straw from waste of agricultural resources into the value-added products such as egg cartons, food packaging and other packing materials could help to generate revenues as well as to encourage the use of environmentally products. This paper highlights the usage of rice straw and availability of rice straw in Pendang, Kedah. The information in this study were collected through questionnaires and personal interview. A total of 295 farmers were identified with 226 male and 69 female. Malays ethnic were covers with 62 percent, followed by Siam with 37 percent and the rest is Chinese ethnic with 1 percent. Based on the total respondents, the availability of the rice straw that can be produced from the paddy plantation were 3.15 million kg per season. The results of this study will help food-packaging manufacturing company ensure the raw material resources for production and thus increase the company's production in producing eco-friendly food packaging.

***Keywords*:** rice straw, pulping technologies, environment friendly products

AG-P-28 NWAQB

The Physico-Chemical Properties of Microfibrillated Cellulose from EFB Fibers

Fatiha Ismail [a,*], Nur Eliyanti Ali Othman [a], Noorshamsiana Abdul Wahab [a], Kamarudin Hassan [a] and Astimar Abdul Aziz[a]

[a] Biomass Technology Unit, Engineering & Processing Division, Malaysian Palm Oil Board, 6, Persiaran Institusi, Bandar Baru Bangi, 43000 Kajang, Selangor

** Corresponding author's e-mail: fatiha@mpob.gov.my*

Abstract

The isolation of MFC from empty fruit bunch fibre (EFB-fibre) is using the acid hydrolysis method, followed by ultra-sonication. The important parameter involved is concentration of sulphuric acid and time of reaction. The thermal behaviour and functional group of resulting MFC was analysed using the TGA and FTIR, respectively. From the results, the particle size of MFC ranged between 1 and 20 µm. The morphological features and crystallinity were identified using Scanning Electron Microscope (SEM) and X-Ray Diffraction respectively. From the micrograph, the parameters used tended to influence the morphological features of MFC.

***Keywords*:** microfibrillated cellulose, EFB fibers, acid hydrolysis.

AG-P-29 UKTJZ

Evaluation of Two Pruning Techniques on Shoot Production of *Labisia Pumila*

S.B. Syafiqah Nabilah [a,*], M.A. Farah Fazwa [a] and S. Norhayati [a]

[a] *Plant Improvement Program, Forestry Biotechnology Division, Forest Research Institute Malaysia (FRIM), 52109 Kepong, Selangor, Malaysia*

[*] *Corresponding author: syafiqah@frim.gov.my*

Abstract

Labisia pumila or commonly known as kacip fatimah, belongs to the family of Primulaceae. It possesses several medicinal properties such as pre and post-partum medication, anti-obesity, anti-aging and anti-microbial. In this paper, an attempt was made to discover the suitable leaf pruning technique of *L. pumila* for increasing the biomass and improving the quality of shoot production. Two pruning techniques were identified namely half cut and full cut. In half cut, the leaves petiole was remained on the stem while in full cut, all leaves and petiole was removed from the stem. Results showed that full cut pruning technique produced new shoot earlier than half cut after 12 weeks of observation. This finding can be applied in the field plantation of *L. pumila* to improve the plant health as well as to increase the leaves production.

Keywords: Herb, Cutting, Plant biomass, Plantation management, Plant health

AG-P-30 VMGGS

Identification of Mutant Heliconia Using DNA Fingerprinting Approach (*Heliconia nickerensis*)

Siti Zainab Jantan [a,*], Muhammad Hanif Azhari Noor [a], Farah Zaidat Mohd Nadzri [b], Wan Rozita Wan Engah [b] and Norzihan Abdullah [a]

[a] *Centre for Marker Discovery and Validation (CMDV), Genebank and Seed Centre (GB), MARDI Headquarters, 43400 Serdang, Selangor*
[b] *Fruits Program, Horticulture Research Centre (HR), MARDI Headquarters, 43400 Serdang, Selangor*

** Corresponding author: zainabj@mardi.gov.my*

Abstract

Ornamental breeding focused on commercial traits such as flower colour, longer shelf life, fragrance modification, and plant and flower architecture. Induced mutation technique using gamma radiation has been widely used for varietal development in ornamental plants. Induced mutation in ornamental plants help to increase genetic variabilities by modifies genetic constituents through deletion, rearrangement of DNA or doubling the chromosomes. These genetic variabilities can be distinguished by DNA fingerprinting. Molecular markers have been derived to visualise DNA sequence polymorphism. One of the molecular markers that are widely utilised in DNA fingerprinting is Simple Sequence Repeat (SSR) marker. In this study, *Heliconia nickerensis* leaf samples were mutated by exposing to gamma rays at different level of dosage; Gy55, Gy65 and Gy75. The mutants then were screened using 10 SSR markers to detect polymorphism at genetic level. Gy0 and *Heliconia stricta* were also included in this experiment to act as a control and outgroup samples. Out of 10 SSR markers, only 8 SSR markers can amplify well the samples collected. A dendogram was constructed to understand the effective doses of radiation on heliconia mutation and effect of radiation which resulted DNA alterations.

Keywords: Mutation, DNA fingerprinting, Simple Sequence Repeats (SSR) marker, *Heliconia nickerensis*, dendogram

AG-P-31 WATKH

Association of Heavy Metals Concentration in Air and Health Risk Assessment in Paka, Malaysia

Siti Noor Syuhada Muhammad Amin [a], Azman Azid [a,*], Saiful Iskandar Khalit [a], Mohd Saiful Samsudin [a], Ku Mohd Kalkausar Ku Yusof [a]

[a] *Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia*

* *Corresponding author: azmanazid@unisza.edu.my*

Abstract

Heavy metals are classified as the materials that have density five times higher than water. They can be spread in the world through air, water and other route. In this study, it is focused on heavy metals in air. Paka has choosen in this study as it is the industrial estate that contributed to air pollution. The aim of this study is to determine an association between heavy metals concentration in air and health risk assessment in Paka, Malaysia. Eight points respectively were selected for this study within two monsoon seasons. The sampling for southwest monsoon was done in August and September 2017 and northeast monsoon was done in December 2017 and February 2018. The samples were digested by using aqua regia method. The concentration of heavy metals were analysed by using inductively coupled plasma mass spectrometry (ICPMS). For southwest monsoon, the results showed that the concentration of Fe was the highest with the value of mean±SD (0.272 mg/Kg ± 0.103) and the lowest mean concentration was recorded for Cu with the value of 0.002 mg/Kg ± 0.001. For northeast monsoon, Fe was recorded the highest concentration of heavy metals and As was the lowest with the value 0.125 mg/Kg ± 0.041 and 0.002 mg/Kg ± 0.001 respectively. The health risk assessment indicates no risks from these metals as the HQs and HIs of six metals are almost all lower than the safe level (=1) for the industrial workers. The HI values decreased in the order of Fe>Cd>Pb>As>Zn>Cu. Fe and Cd showed higher values close to safe level, while Zn and Cu are lowest. It could be concluded that the industrial emission was the major source of heavy metals in the atmosphere along Paka industrial area. The human health risk assessment has proved to be a powerful tool to distinguish heavy metals and exposure routes of most concern in urban environments to estimate the risk of mix metal contaminates.

***Keywords*:** Heavy metals, Health risk, Paka, ICPMS

AG-P-32 MRJSC

Business Entities For Smes In Malaysia; Special Reference to Agriculture Business

Zuhairah Ariff Abd Ghadas [a,*] and Mohd Shahril Nizam Mohd Radzi [b]

[a] *Faculty of Law and International Relations, Universiti Sultan Zainal Abidin, Malaysia*
[b] *Faculty of Entrepreneurship and Business, Universiti Malaysia Kelantan*

** Corresponding author email: zuhairahariff@unisza.edu.my*

Abstract

Carrying out trade in any countries all over the world would require certain medium to deliver business to the market. These medium are generally known as business vehicles or business entities. In Malaysia, the business entities which are available for the small and medium entrepreneurs (SME) are merely confined to sole proprietorships, partnerships and company structure. Although these medium had proved to be competent in delivering business to the market, with the fast and vast advancement in information technology, increase in consumer awareness, ever changing rules and regulation as well as renewed trade relation and agreements, the business risk are getting bigger and less predictable. This paper discuss the legal aspects of business entities which are available for the Malaysian SME entrepreneurs. This paper aims to analyze the nature of agriculture business in Malaysia and to propose an appropriate business entity for Malaysian SMEs who are involved in agriculture businesses. This paper applied the doctrinal analysis as the research methodology.

Keyword**:** SME, Agriculture Business, Malaysia

AG-P-33 MRJSC-2

Small Farmers' Rights Under The Plant Variety Protection Law: The Malaysia Law Perspectives

Murshamshul Kamariah Musa [a,*] and Zuhairah Ariff Abd Ghadas [a]

[a] *Faculty of Law and International Relations, Universiti Sultan Zaianl Abidin, Terengganu, Malaysia*

** Corresponding author email: mshaml@unisza.edu.my*

Abstract

This right to food is universally accepted as one of the fundamental human rights under Article 25 of the United Nations Declaration of Human Rights. This right is also reaffirmed in the International Covenant on Economic, Social and Cultural Rights (article 11), and through the right to life, in the International Covenant on Civil and Political Rights (article 6). In relation to the right to food and in ensuring continuous food security and food production, each nation needs to guarantee protection and assistance to the nation's food producers - which are the farmers. The protection and assistance can be either through economic assistance, legal protection and social development of the farming community of a country. In Malaysia, most of the food producers of our staple food, the rice farmers are small holding farmers. Malaysia has acceded to the International Treaty on Plant Genetic Resources for Food and Agriculture (FAO Treaty 2001) on 5 May 2003 as part of its international commitments. Malaysia also enacted the Protection of New Plant Varieties Act in 2004 which grants exclusive intellectual property rights, the plant variety protection (PVP), to commercial plant breeders but this Act is said to cause disadvantages to small farmers. This paper discuss the rights of small farmers in Malaysia under the plant variety protection law and analyze whether there is any loophole or weakness under the Malaysian legal framework/policy on farmers' rights in protecting the small farmers. This paper applied the doctrinal analysis as the research methodology.

***Keywords*:** Small Farmers, Plant Variety Protection Law, Malaysia

AG-P-34 ZYBHN

Actual Purchase Behavior of Edible Bird's Nest Products in Malaysia using Cluster Analysis

Nurul Nabilah Huda Mohamad Shukri[a], Nolila Mohd Nawi[a,*], Amin Mahir Abdullah[a], Norsida Man[a]

[a] *Department of Agribusiness and Bioresource Economics, Faculty of Agriculture, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia*

** Corresponding email: nolila@upm.edu.my*

Abstract

The issue with counterfeit and adulteration in edible bird's nest products in the market slightly shaking the Swiftlet ranching industry in Malaysia. Numerous actions and efforts have been taken by the Malaysian government to regaining the public's trust and confidence which slowly boost local bird's nest price. Rising concern in health and food safety changing customers spending behavior that influence their purchasing decision. The focus of this study is to determine factors that influence the customers' actual purchase behavior in edible bird's nest products. Understanding the customers' spending behavior is important to any organization for strategically targeting the right customers. Determining the profile of actual customers directly tell the characteristics of products that should be on the shelf. The data were collected from a random sample of 1307 of participants however, only 321 respondents were actually purchasing edible bird's nest products. Cluster analysis is used in this study for segmentation techniques to explore the degree of association between two groups of customers in their spending behavior. Three cluster methods (K-Means, Kohonen, and Two-step) are used to evaluate the homogeneity of dichotomous data and comparison of the performance were based on complexity and quality for selecting the most fitting method to this study. Foremost, two-step cluster analysis provides better results and identify two distinct groups (segments) from 11 variables. The first cluster with lower income level spends less than the second cluster. But, it seems both cluster extremely concern toward food safety and health issues. The results specify the characteristics of buyers that will be useful to build a target list of potential customers and develop new offerings to meet the new needs of customers for edible bird's nest products in Malaysia.

***Keywords*:** Actual purchase, cluster analysis, edible bird's nest, food safety

AG-P-35 BBBBB

Agriculture and Security Challenges in Northeastern Part of Nigeria: An ICT Perspective

Isah Baba Ahmed [a], Lukman Abiola Oluodo [b], Meshach Dauda Bwala [c]

[a] *Faculty of Informatics and Computing, Universiti Sultan Zainal Abidin, 22300, Kuala Besut, Kuala Terengganu, Malaysia*
[b] *Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, 22300, Kuala Besut, Kuala Terengganu, Malaysia.*
[c] *Faculty of Agriculture, University of Maiduguri, 1069, Borno, Nigeria*

** Corresponding author:kasuwa65@gmail.com*

Abstract

Insecurity has been identified today to be a threat to the existence and survival of Nigeria in the hands of Insurgence (Boko Haram Sect). There has been unprecedented insecurity situation from 2009 to 2013. The upshot and the extent of insecurity was an observation obtained by the authors based on secondary data and concrete evidence about the incidence noticed in different parts of the Country. This paper shows that insecurity is one of the major problems affecting the Agricultural production in Nigeria. The Government should embrace the ICT based automation, Gamma-ray- based scanner and lawful interception laws which would lead to addressing and removing the fears concerning the cultivation of Agricultural Products in Northeastern Nigeria.

***Keywords*:** ICT, Insecurity, Agriculture, Technology, Information.

AG-P-36 BYEXE

Production of Salak (*Salacca zalacca*) Integrated With Oil Palm

Norkaspi, K [a] and Raja Zulkifli, R O [a]

[a] *Malaysian Palm Oil Board (MPOB), No. 6, Persiaran Institusi, Bandar Baru Bangi, 43000, Kajang, Selangor.*

** Corresponding author: kaspi@mpob.gov.my*

Abtract

Salak (Salacca zalacca) is a palm species native to Indonesia and Malaysia. Salak fruits grow in clusters at the base of the palm. The fruits have sweet taste and good aroma. It also has a good demand from small and medium industry for pickle production. But locally produced salak fruits are limited and need to import from Indonesia or Thailand for fulfilling a raising demand. In future, import of salak fruits will increase due to continuing shortage of local supply. Thus, increase the salak fruit price in the market. Salak palm is commonly planted under the trees and quite tolerant to limited light intensity. Therefore, there is a good reason for studying potential of salak integration with oil palm. A study was carried out on salak integration with oil palm using double row avenue oil palm planting system in MPOB Research Station in Kluang, Johor. Two rows of salak palms were planted at 3m x 3m in the 15.2 avenue with total density of 280 salak palms per hectare of oil palm. The study was carried out for five years. Result of this study indicated that the salak palm grows well under the oil palm environment and bearing fruits comparable to mono-crop salak planting system. Study on pondoh salak indicated that the salak palm produced an average of 1.50 t/ha of fruits per year. It was also free from serious disease infestation. Only rodents were quite significant pest for salak fruits. At the same time, salak integration did not significantly affect the oil palm yield. The calculated financial parameter for this salak integration such as net present value was RM20,592. Internal rate of return was 50%. Benefit cost ratio was 2.5 and payback period of four years. Therefore, the salak integration in double row avenue oil palm planting is financially feasible to be carried out by the oil palm growers. This integration optimises the land use and generates additional income per unit area of oil palm land. It will also contribute the fruit production industry and the national economy of Malaysia.

Keywords: Salak palm, crop integration, oil palm, double row avenue

AG-P-37 TZBWQ

Transcriptome Profiling For Identification of Putative Pathogen Resistance Genes in *Hevea brasiliensis*.

Urwashi Kamerkar [a,*], Ahmad Sofiman [a]

[a] *School of Biological Sciences, Universiti Sains Malaysia,Gelugor 11800, Penang, Malaysia*

* *Corresponding author: urwashi.kamerkar@gmail.com*

Abstract

Resistance (R) genes confer pathogen specific disease resistance in plants by producing R proteins which mainly consists of nucleotide binding (NB), Leucine Rich Repeat (LRR), Toll Interleukin 1 Receptor (TIR) and Coiled Coil (CC) domains. Pathogen resistance mechanism of R proteins commonly occurs via pathogen recognition, toxin neutralization, Kinase-mediated signaling, and hormone-mediated signaling towards activation of pathogenesis related genes. Oidium leaf fall is among major diseases hampering the production yield of rubber, which is caused by Oidium heveae. Identification of genes related to disease resistance and their functional mechanism will aid the selective breeding programs in developing resistant rubber clones. In this study de novo transcriptome assembly and gene expression profiling data generated using Illumina HiSeq platform from latex and bark tissues of rubber was used to identify putative resistance genes in rubber. To perform the transcriptome assembly, 3093521807 high quality reads were used, generating 381475 contigs. The contigs lengths ranged from 201 bp to 48514 bp, with a mean length of 988 bp. The contigs of bark and latex from selected clones were searched against UniProtKB/Swiss-Prot protein databases using BLASTX (version ncbi-blast-2.2.29+) with a cut-off e-value of 10^{-5}. The BLAST2GO program was used to acquire gene ontologies (GO) and Kyoto Encyclopaedia of Genes and Genomes (KEGG) annotations based on the BLASTX output. 1431 unigenes demonstrated pathogen response function. The resistance genes identified include, Cf-4/9, ADR1, RFL1, RGA2, RPH8A, RPM1, RPP13, RPP8, RPS2, RPS5, and uncharacterized TIR-NBS-LRR, NBS, NBS-LRR, and LRR domain containing genes.

***Keywords*:** Pathogen response genes, Hevea, R genes, gene expression

AG-P-38 UWDTN

Phytochemical Screening and Antioxidant Properties of Stingless Bee *Geniotrigona thoracica* Propolis

Ainur Awanis Mohd Badiazaman [a], Nur Basyirah Md Zin [a], Aulia Rani Annisava [a], Nor Elani Mat Nafi [a], and Khamsah Suryati Mohd [a,*]

[a] *School of Agriculture Sciences and Biotechnology, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22000 Besut, Terengganu, Malaysia*

* *Corresponding author: khamsahsuryati@unisza.edu.my*

Abstract

Propolis consists of mainly constituents like resin and volatiles which are substances that have been obtained from a various botanical process in different parts of plants and beeswax secreted by bee. The chemical composition of propolis is varied depend on various factors such as vegetation, season and environmental conditions of the sample collection. The aim of the study is to determine chemical profile and evaluate antioxidant properties of crude methanol extract of *Geniotrigona thoracica* propolis from five localities, namely Besut, Dungun, Lundang, Gua Musang and Tanah Merah. Phytochemical screening by thin layer chromatography (TLC) showed the presence of terpenoid, phenol, coumarins, unsaturated and aromatic compounds. The extracts displayed different characteristic of chemical profile and vary from each other. The antioxidant properties of extracts were evaluated based on total phenolic content, total flavonoid content and 1,1-diphenyl-2-picrylhydrazyl (DPPH) free radical-scavenging activity. Gua Musang (GM) exhibited the highest total phenolic content with 19.53 ± 0.01 mg GAE/g meanwhile Besut (BST) exhibited the highest total flavonoid content with 17.22 ± 0.01 mg QUE/g and showed highest percentage of inhibition with 84.40% for DPPH radical scavenging activities. As a result, *G*. *thoracica* from Besut is a good source of antioxidant due to its antioxidant properties.

Keywords: stingless bee propolis, phytochemical, TLC profiling, antioxidant

AG-P-39 WQPVC

Production of Furfural From Palm Oil Empty Fruit Bunch Fibres

Nur Eliyanti A. Othman [a,*], Wan Hasamudin Wan Hassan [a], Astimar Abdul Aziz [a] & Kamarudin Hassan [a]

[a] *Malaysian Palm Oil Board, 6, Persiaran Institusi, Bandar Baru Bangi, 43000 Kajang, Selangor*

** Corresponding author: nureliyanti@mpob.gov.my*

Abstract

This study aims to determine the process conditions of furfural production from xylan which was extracted from oil palm empty fruit bunch (OPEFB) using a two-step process: acid hydrolysis followed by dehydration. The extracted xylan yield was about 30-35%. In order to convert xylan to furfural, there were three important parameters consisting of acid concentration (11–15% v/v), reaction time (30–150 min) and presence of NaCl as promoter to the process. The maximum furfural production 9.01 % was achieved in 15% of sulphuric acid concentration for 90 minutes reaction time. However, pentosans only contribute a portion of the total composition of lignocellulose, compare to cellulose which is the largest fraction of lignocellulosic biomass. Hence, the furfural should be extracted using integrated approach for value economy.

Keywords: furfural, palm oil empty fruit bunch, dilute acid

AG-P-40 ZNHRG

FTIR Coupled GC-MS Profiling of Freeze-Drying *Erechtites valerianifolia* and *Erechtites hieraciifolia* Leaves In Different Solvents Extraction

Natasha Aziz [a] & Zalilawati Mat Rashid [b,*],

[a] *School of Food Industry, School of Agriculture Science and Biotechnology, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia.*
[b] *School of Food Industry, School of Agriculture Science and Biotechnology, Faculty of Bioresources and Food Industry, Institute of Agricultural Production and Food Inovation (AGROPOLIS) Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia.*

* *Corresponding author: zalilawati@unisza.edu.my*

Abstract

Erechtites valerianifolia (EV) and *Erechtites hieraciifolia* (EH) are commonly known as "*Gedebe Lembu*", which are regarded due to their ethnomedicinal values among rural people. This study designates on discrimination of two wild species extracted using different solvents based on FTIR and GC-MS silyl derivatives data sets. The leaves were freeze-dried, powdered and separately extracted with water (AQ), ethanol (E) and ethanol: water (8:2) (EAQ). Crude extracts were then subjected to Fourier-Transfrom Infrared Spectroscopy (FTIR) and Gas-Chromatography Mass Spectrometry (GC-MS) analysis for metabolite profiling. FTIR showed different fingerprints region in range 4000 to 600 cm $^{-1}$. Qualitatively, GC-MS analysis of trimenthysilyl derivatives revealed the chemical compounds from both species following three extraction solvents. EAQEV contained higher amount of compound octadecene, glycerol, phthalic acid, lactic acid, D-fructose compared to other extract. FTIR spectroscopy and GCM spectrometry succesfully revealed the chemicals variability between the species as well as samples extracted using different solvents.

Keywords: *Erechtites valerianifolia*, *Erechtites hieraciifolia*, solvents extraction, silyl derivatives, GC-MS, FTIR

AG-P-41 NPVPE

Allelopathic Evaluation of Selected Weed Species from BRIS Soil

Nornasuha Y [a,*], Nor Hadirah Hashim [a], Nurul Ainina Sa'ad [a], Norhafiza Yaakob [a] Nashriyah Mat [a] & Ismail B.S. [b]

[a] *School of Agriculture Science and Biotechnology, Faculty of Bioresource and Food Industry, Universiti Sultan Zainal Abidin, Kampus Besut, 22200 Besut, Terengganu, Malaysia.*
[b] *School of Environmental and Natural Resource Sciences, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia.*

* *Corresponding author: nornasuhayusoff@unisza.edu.my*

Abstract

Laboratory experiments were conducted to evaluate the allelopathic potential of selected 15 weed species from BRIS soil. The allelopathic activity can be determined by using both of Sandwich method and Dish pack method. These methods were used respectively for testing the effect of leaf litter leachate and leaf volatilization of selected weed species (act as the donor species) with three replications. The Sandwich method was carried out by using three different amounts of leaves which were 5 mg, 10 mg and 50 mg whilst the Dish pack method was done by using four different distances (41, 58, 82 and 92 mm) from the donor species. The pre-germinated *Lactuca sativa* (lettuce) was used as receptor plant. Among the 15 weed species, *Crotalaria mucronata* showed the highest inhibition on elongation for radicle of lettuce (81.34%) in Sandwich bioassay compared to the control, followed by *Melastoma malabathricum* (51.31%) and *Asystasia gangetica* (50.60%). Meanwhile, *Mimosa pudica* showed the highest inhibition on elongation for radicle of lettuce (27.00%) in Dish pack bioassay compared to the control, followed by *Lantana camara* (22.09%) and *Acroceras munroanum* (20.50%). The result obtained will provide the guideline information for elucidation of allelochemicals involved in this significant allelopathic interaction.

Keywords: Allelopathic, weed species, BRIS soil, Sandwich method, Dish pack method

AG-P- 42 PDUYE

Effects Of Hydrogen Peroxide and Methyl Eugenol (ME) on Fruit Growth and Fruit Fly Infestation of *Syzygium samarangense*

Siti Zuriani Ismail [a], Nashriyah Mat [a] and Mohammad Moneruzzaman Khandaker [a,*]

[a] *School of Agricultural Science and Biotechnology, Faculty of Bioresource and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22000 Besut, Terengganu, Malaysia*

** Corresponding author: moneruzzaman@unisza.edu.my*

Abstract

A study was conducted to see the effects of hydrogen peroxide (H_2O_2) and methyl eugenol (ME) on fruit growth and fruit fly infestation of wax apple fruits, a widely cultivated fruit tree in South East Asia. The wax apple trees ((Syzygium samarangense, var. jambu madu) were spray treated with 0, 20 mM H_2O_2, 20 mM H_2O_2 plus methyl eugenol and methyl eugenol under field conditions. The results showed that combine treatment of $H_2O_2$and ME increased the net photosynthetic rate, CO_2 assimilation, stomatal conductance and internal CO_2 concentration of wax apple trees. In addition, fruit weight, fruit firmness and TSS content of wax apple fruits significantly improved with H_2O_2 and ME treatment. Methyl eugenol alone or combination with H_2O_2 reduced the number of reared fruit fly in wax apple fruits under lab condition. There was positive correlation between fruit fly infestation and fruit size and between fruit fly infestation and fruit sweetness (TSS content) in H_2O_2 and Methyl eugenol treated fruits. Besides, we recorded negative correlation between the fruit fly infestation and firmness of treated wax apple fruits. It is concluded that application of hydrogen peroxide and methyl eugenol once a week produced better fruit growth and reduced the fruit fly infestation of wax apply under field condition.

Keywords: Hydrogen peroxide, Methyl eugenol, Wax apple, fruit growth, fruit fly infestation

AG-P-43 PDUYE2

In Vitro Antioxidant and Alpha Glucosidase Inhibitory Activities of *Syzygium samarangense* Leaves at Different Maturity Stages

Nuruljannah Suhaida Idris [a], Zalilawati Mat Rashid [b], Nashriyah Mat [a] and Mohammad Moneruzzaman Khandaker [a,*]

[a] *School of Agriculture Science & Biotechnology, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia*
[b] *School of Food Industry, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia*

** Corresponding author: moneruzzaman@unisza.edu.my*

Abstract

In the quest for new medicines, methanol extract of giant green wax apple leaves were analyzed for antioxidant and alpha glucosidase potential. Giant green leaves were collected at differences maturity stages which are young leaves (YL), mature leaves (ML) and old leaves (OL). Antioxidant activities was determined by using 2,2-diphenyl- 1-picrylhydrazyl radical (DPPH), nitric oxide radicals (NO^-), 2,2'-azinobis-(3-ethylbenzothiazoline-6-sulphonic acid) (ABTS) and ferric reducing power assays. The alpha glucosidase inhibitory activity was performance by using α-glucosidase enzyme from *Saccharomyces cerevisiae*. Among the stages of young leaves extract showed better efficiency than that the mature and old leaves. The radical scavenging activity of DPPH were higher in young leaves followed by mature and old leaves extracts. A similar trend was observed in NO^-, ABTS and ferric reducing power assays. Based on the results, inhibition activity of alpha glucosidase follow the same order of young > mature> old leaves. Unexpected, the both of reference standards that are quercetin and acarbose showed lower inhibition activity and higher IC_{50} value compared to all leaves extracts. In this study, we found that young leaves extract possess potential antioxidant and alpha glucosidase activities. Therefore, young leaves extract could be excellent source of natural antioxidant and may provide a new approach to treat the diabetes mellitus.

Keywords: *Antioxidant, Wax apple, Leaf, Diabetes, Maturity*

AG-P- 44 ZXDYF

Antagonistic and PGPR Effects of *Bacillus* Species In Biocontrol of Wheat *Fusarium* Wilt

Rouag N. [a], O. Benchikh [b], S. Benamrani [a], R. Bera [a], N. Karkar [a] And S. Kassouar [a]

[a] *Department of Agronomy, Faculty of Nature and Life Sciences, University of Ferhat Abbas Sétif-1, Algeria. Laboratory of Applied Microbiology, University Ferhat Abbas - Sétif -, Algeria.*
[b] *Department of Microbiology, Faculty of Nature and Life Sciences, University of Ferhat Abbas Sétif-1, Algeria. Laboratory of Applied Microbiology, University Ferhat Abbas - Sétif -1, Algeria.*

** Corresponding author: n.rouag@univ-setif.dz*

Abstract

The present study investigates the biocontrol of coleoptiles of three durum wheat varieties by rhizobacterial strains when infected with pathogenic *Fusarium* species. The results of the pathogenicity test revealed that the three species of *Fusarium* namely *F.graminearum*, *F.culmorum* and *Fusarium sp*. were pathogenic with different severity levels on the three durum wheat varieties tested (Waha, Boussellam and GTA hard) by either preventing the growth of coleoptiles altogether or by drastically reducing it. *F. graminearum* was the most virulent followed by *Fusarium sp*. and finally *F. culmorum*. In biocontrol by 10 strains of *Bacillus sp*. (S 29-2, BB 18-3, M 17-1, BB 19-1, BB 15-4, M4-1, M11-1, Bac16, S33-1 and B14-x), strain S33-1 showed satisfactory protection against all *Fusarium* species tested. While looking for PGPR effect across the coating of durum wheat seeds by solutions of maize starch and *Bacillus* strains, the results show only a slight PGPR effect on coleoptiles length of durum wheat seeds. These strains can be integrated into biological control programs of durum wheat crops against fungi of telluric origin such as *Fusarium* pathogens.

***Key words**:* Durum wheat, Coleoptile, Fusarium, Bacillus, Biocontrol, PGPR, Pathogenicity.

AG-P-45 ZXDYF2

Varietal Behavior of Some Chickpea Genotypes to Wilt Disease Induced by *Fusarium oxysporum* F.sp. ciceris

Rouag [a,*] N., Khalifa [b] M. W., Benchikh [c] O., Selloum [a] S. And Benarif [a] K.

[a] *Department of Agronomy, Faculty of Nature and Life Sciences, University of Ferhat Abbas Sétif-1, Algeria. Laboratory of Applied Microbiology, University Ferhat Abbas - Sétif -, Algeria.*
[b] *Laboratory of Characterization and Natural Resources Valorization, Faculty SNV-TU, University Bordj Bou Arreridj, Algeria.*
[c] *Department of Microbiology, Faculty of Nature and Life Sciences, University of Ferhat Abbas Sétif-1, Algeria. Laboratory of Applied Microbiology, University Ferhat Abbas - Sétif -1, Algeria.*

** Corresponding author: n.rouag@univ-setif.dz*

Abstract

The present experimental work on the study of the behavior of some genotypes of chickpea with respect to *Fusarium oxysporum* induced Fusarium wilt under natural conditions of infection at the ITGC experimental station of Sétif. The chick posture plants of the different genotypes showed a variety of symptoms in the field caused by the *Fusarium oxysporum* f.sp. ciceris strain local ranging from lateral or partial wilting of some branches, to a total drying of the plant conjugate sometimes with a weakness of growth. The search for sources of resistance against chickpea wilt among the 42 genotypes tested shows that in terms of infection rate, the study revealed the presence of 7 groups and no genotype was found o have an absolute resistance. While in terms of severity, we obtained three homogeneous groups. The first group formed by the most resistant genotypes in this case Flip10-368C; Flip11-77C; Flip11-186C; Flip11-124C; Flip11-142C, Flip11-152C; Flip11-69C; Ghab 05; Flip11-159C; Flip11-90C; Flip10-357C and Flip11-37C while the second group is the Flip 10-382C genotype, which proved to be the most sensitive for the natural infection.

Key words: chickpea, *Fusarium oxysporum*, vascular wilt, genotype resistance.

AG-P-46 FLCLN

Plant characterization of a segregating F_1 jackfruit based on national test guidelines

Noor Baiti A. A.[a*], Johari S.[b], Abdul Rahman M.[c]

[a] *Horticulture Research Centre, Malaysian Agricultural Research and Development Institute, 86000 MARDI Kluang, Johor, Malaysia*
[b] *Director General Office, Malaysian Agricultural Research and Development Institute, 80350 MARDI Johor Bahru, Johor, Malaysia*
[c] *Faculty of Sustainable Agriculture, Universiti Malaysia Sabah, Sandakan Campus, 90509 UMS Sandakan, Sabah, Malaysia*

* *Corresponding author: aabaiti@mardi.gov.my*

Abstract

Jackfruit (Artocarpus heterophyllus) is a promising cash *crop* that was given priority in Malaysia as a commercial cultivation. It is one of the fruit types that were domesticated in Malaysia. Even though it is a tropical crop, establishment on the field was a major constrain because the crop faced disease problem. Jackfruit breeding programme was initiated in 2012 at MARDI Kluang, Johor with the objective of disease resistant. Result from five serries of crosses between wild type species and jackfruit commercial clones were produced a segregating F_1 population. A total of 218 plants of F_1 hybrids were identified on plant characterization and field evaluation based on the national guidelines for the conduct of tests for distinchness, uniformity and stability (DUST). National test guideline was developed by Department of Agriculture Malaysia. All observation has been done on trees older than 3 years. Twenty characters were characterized at different parts of progeny plant (tree, petiole, leaf and flower). Five characters were observed at tree stage. All characters are quantitative characteristics (QN) and three of that are most important traits that should be considered in varietal characterization (growth habit, density of crown and stem girth). For petiole, two characters were identified as important and one of the characters is pseudo-qualitative (PQ: colour) while another one is quantitative trait (petiole length). Characters in leaf recorded the most significant difference characters with 11 traits (PQ: 2, QL: 3 and QN: 6) that should be included in the guidelines. Among that 'leaf shape' and 'leaf colour' are the most importantant characters. Two characters were found in flower position and both of that were identified as qualitative traits (QL: position of male and female inflorescence). Since there is a segregating population most of the progenies were showed different phenotypes between each others in term of plant characterization. Later, all of the progenies will be evaluated on fruit characterization for further hybrids evaluation and selection.

Keywords: Jackfruit, *Artocarpus heterophyllus*, progeny, plant characterization, national test guidelines

ANIMAL / AQUATIC SCIENCE

Animal Sciences - Aquatic Sciences

AS-O-01 BATSJ

Comparison Study of Merawang-Arab and Arab-Merawang Chicken's Performance From Week One to Week Ten of Age

Harini N. [a,*], Sinaga E.[a], Darwati S. [b], Rohmatulloh P. [b]

[a] *Faculty of Biology, Universitas Nasional*
[b] *Departement of Animal Production and Technology, Faculty of Animal Science Bogor Agriculture University*

** Corresponding author: harininurcahya@yahoo.com*

Abstract

Indonesia has many local chicken. Merawang chicken and Arab chicken are among the most preferable local chicken by Indonesian people. Arab chicken is a layer local chicken that has egg production higher than the Merawang chicken. In this study, the use of crossed bred chicken; Merawang-Arab chicken (MAMA) and Arab-Merawang chicken (AMAN) was aimed to study and to compare the performance of these two crossed bred chicken. A total of 98 MAMA chickens and 46 AMAM chickens were observed for their bodyweight, feed intake, feed conversion ratio?, and mortality rate?. This study used covariance (ANNOVA) in randomized complete block designed (RCBD). The crossed bred chicken was used as a treatment and concimitent is weight. There was difference (P>0.05) in bodyweight of MAMA and AMAM. The bodyweight of males and females MAMA at age 10 weeks were 843.10 g and 763.5 g, respectively. The bodyweight of males and females AMAM at age 10 weeks were 825.82 g and 741.2 g, respectively. Feed intake and feed conversion of males and females MAMA and AMAM did not differ (P>0.05). Mortality was occurred in AMAM chicken in the early rearing phase (2.2%). Meanwhile, mortality in later stage was occurred in MAMA (6.12%) and AMAM (6.52%). Performance of MAMA chicken and AMAM chicken at age 1-10 weeks were same.

Keywords: Arab-Merawang and Merawang-Arab chicken, breed crossing, performance, production trait

AS-O-02 LDRWV

The Effects of Shiitake Extract on The Pigments of Zebrafish Embryos

Ibrahim Mahmood [a], Azhar Mohamad[c], Fauzi Daud [a], Babul Airianah Binti Othman [a,b], Douglas Law [g], Cheah Yew Hoong [d], Mushrifah Idris [e], Azwan Mat Lazim [e,f], Seng Joe Lim[f], Nur Hidayah Jamar [a,b,e], Herryawan Ryadi Eziwar Dyari [a,b,e], Fatin Qurratu`Aini Zaini [g], Nik Marzuki Sidik [g], Yi Chieh Lim [h], Shazrul Fazry [a,b,e,*]

[a] *Pusat Pengurusan Ekosistem & Sumber Semulajadi, Fakulti Sains dan Teknologi, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia*
[b] *Pusat Bioteknologi & Makanan Berfungsi, Fakulti Sains dan Teknologi, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia*
[c] *Malaysian Nuclear Agency, Bangi 43000, Kajang, Selangor, Malaysia*
[d] *ZACH Biotech Depot Sdn. Bhd., 43300 Cheras., Selangor, Malaysia*
[e] *Pusat Penyelidikan Tasik Chini, Fakulti Sains dan Teknologi, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia*
[f] *School of Chemical Sciences and Food Technology, Fakulti Sains dan Teknologi, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia*
[g] *Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus, Locked Bag 100, 17600 Jeli, Kelantan, Malaysia*
[h] *Danish Cancer Society, Research Centre Strand boulevard, 49DK-2100 Copenhagen, Denmark*

** Corresponding author: shazrul@ukm.edu.my*

Abstract

Crude extracts from shiitake mushroom (*Lentinula edodes*) has been used as whitening agent in cosmeceutical products. Here we study the effect of crude aqueous extracts from mutant (ME) and wild (WE) shiitake mycelium on the pigments of zebrafish embryos. The mutant shiitake used in this study is a mutant line produced from our previous studies. The base concentration of WE and ME extracts were standardized according to its total phenolic compounds (TPC). Both WE and ME (600 µg/ml) reduced the heartbeats of zebrafish embryo (54.4± 7.26 beats/min and 104±6.32 beats/min, respectively) compared to control embryo (142.67±13.30). We also observed that embryos treated with 300 µg/ml WE did not hatch after 72 hrs with reduction in pigmentation (39.33±1.00. pigmentation spots/tail). Treated embryo with 300 µg/ml ME did not show any delays in hatching comparable to control but with reduced pigmentation (63.33±2.08 pigmentation spots/tail and 42.33±2.51 pigmentation spots/tail, respectively). We concluded that both WE and ME contained metabolites that are able to reduce pigment formation in the skin. The shitake mutant line may have gene(s) mutation that reduce the production of metabolite(s) that inhibit or produced stress to the zebrafish from hatching after 72 hrs.

Keywords: shiitake; mutation; melanin; zebrafish embryos.

AS-O-03 LDRWV2

The Effect of MRN Complex and ATM Kinase Inhibitors on UVC-Treated Zebrafish Embryonic Development

Shazrul Fazry [a,b,c,*], Malina Kumaran [a], Herryawan Ryadi Eziwar Dyari [a,b,c], Nur Hidayah Jamar [a,b,c], Douglas Law [d], Nik Marzuki Sidik [d], And Yi Chieh Lim [e]

[a] *Pusat Pengurusan Ekosistem & Sumber Semulajadi, Faculty Of Science And Technology, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia*
[b] *Pusat Bioteknologi & Makanan Berfungsi, Faculty Of Science And Technology, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia*
[c] *Pusat Penyelidikan Tasik Chini, Faculty Of Science And Technology, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia*
[d] *Faculty Of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus, Locked Bag 100, 17600 Jeli, Kelantan, Malaysia*
[e] *Danish Cancer Society, Research Centre Strand Boulevard, 49dk-2100 Copenhagen, Denmark*

** Corresponding author: shazrul@ukm.edu.my*

Abstract

Zebrafish is an ideal animal model to study developmental biology due to its transparent embryos and rapid development stages of embryogenesis. Here we investigate the role of DNA damage proteins, specifically ATM Kinase and MRN complex during embryogenesis by inhibiting its function using specific MRN complex (Mirin) and ATM Kinase inhibitors (Ku60019 and Ku55933). Zebrafish embryos at midblastula transition (MBT) stage are treated with Mirin, Ku60019 or Ku55933, prior to UVC irradiation (100-280 nm wavelengths) to induce DNA lesions. The embryonic development of the embryos was monitored at 24 hours-post fertilisation (hpf), 48hpf and 72hpf. We observed that the inhibitors (3μM of Mirin, 1.5 nM of Ku60019 and 3nM of Ku55933) and UVC treated embryos survive pass the hatching stage, however they are phenotypically deformed. Control or mock treatment of all embryos shows normal embryonic development. This study confirmed that DNA damage proteins are crucial during embryo development to prevent undesired abnormal biological development. We also proved that protein inhibitors are a cheaper alternative to study the role of specific protein during embryogenesis compared to genomic modification tools or transcription modification tools.

Keywords: MRN complex, ATM Kinase, DNA damage, zebrafish, *Danio rerio.*

AS-O-04 WQWTG

Comparison of Semen Characteristics of Indigenous and Amo Breed of Cockerels In Gombe State, Nigeria

Tijjani, H. U,[a,*] Sir, S.M. [a] and Ma'aruf, B.S. [a]

[a] *Department of Animal Science, Faculty of Agriculture, Federal University of Kashere, 761124 Gombe State, 23412 Nigeria*

* Correspondent author: thusman4real@gmail.com

Abstract

The experiment was carried out to compare the semen characteristics of indigenous and Amo strains of cockerels at poultry unit of teaching and research farm of Federal University of Kashere, Gombe State, Nigeria. Semen samples were collected from 9 indigenous and 9 Amo breeds of cockerel at three days interval for two weeks using abdominal massage technique. .Semen samples were examined macroscopically for semen colour, pH and ejaculation volume and microscopically for sperm concentration, mass motility, progressive motility, live and dead sperm percentage, normal and abnormal sperm for semen characteristics. The results shows a significant difference ($P \leq 0.05$) between mass motility, progressive motility, sperm concentration and head defects of 4.85±0.27 to 4.37±0.19, 95.13±0.43 to 81.63±1.15%, 4.93±1.84 to 3.40±1.07×109/ml and 2.96 ± 0.17 to 3.44 ± 0.12% for indigenous and Amo breed of cockerel respectively. There were no significant differences in semen colour, ejaculate volume, semen pH, live/dead normal sperm neck (mid-piece) defect tail defects and sperm total abnormalities were 2.85±0.07 to 2.00±0.090.21±0.17 to 0.20±0.02/ml, 88.85±0.58 to 72.70±0.54%/11.14±0.58 to 27.29±0.54%, 81.00±0.78 to 66.22±0.61%, 9.03 ± 0.42 to 13.96 ± 0.47%, 9.70 ± 0.30 to 13.00 ± 0.30 and 21.70 ± 0.59 to 30.40 ± 0.53% between the indigenous and Amo breed groups of cockerel respectively. It is concluded that semen quality characteristics could be differ between genetically improved (Amo strain) and indigenous breed of cockerels.

Keywords: Cockerels, semen, sperm, indigenous, Amo breed

AS-O-05 YUKLN

Characterization, Expression and Regulation of ELOVL Fatty Acid Elongase-5 Genes With Overfeeding In Goose Fatty Liver

Rashid. H. Osman [a,b,*], Daoqing Gong [b], Long Liu [b], Ahmed Kamel [c], Mojahid A. Abdalhag [b,d,*], Tamador. A. Algam [d] and Kaingu. F. Baraka [e]

[a] *Colleage of Animal Production, West Kordofan University, El Nuhud 20, Sudan*
[b] *College of Animal Science and Technology, Yangzhou University, Yangzhou 225009, China*
[c] *College of Veterinary Science, Seuz Canal University, Seuz, Egypt*
[d] *College of Agricultural Technology & Fish Science, Al-Neelain University, Khartoum, Sudan*
[e] *School of Agriculture &Biological Sciences, Karatina University, Nyeri, 1957-10101 Kenya*

** Corresponding authors: roshdi.20023@yahoo.com (Rashid); mojahidhag@hotmail.com (Mojahid)*

Abstract

Goose liver is an important economic trait which can be affected by high carbohydrate diet contents. So, fatty acid elongase ELOVL plays an important role in the synthesis of long-chain polyunsaturated fatty acids (LCPUFA). We hypothesized that ELOVL5 are involved in goose fatty liver development. To address this, we determined the response of goose ELOVL5 gene to overfeeding and their expression in goose liver and primary hepatocytes with related factors (glucose, fatty acid and insulin). Overfeeding expression data indicated that ELOVL5 was significantly reduced after two days of overfed. In primary hepatocytes data expression by qPCR was not affected by glucose and palmitate treatment while reduction expression of what?? by high level of insulin. Bioinformatics analysis of the sequence gene was indicated considerably conserved among avian species.

Keyword: *Fatty liver, Goose, ELOVL fatty acid elongase-5, Overfeeding*

AS-O-06 AABCC

Liver Condemnation at An Abattoir Due to Fluke Infection

Khadijah, S.[a, *] and Nik Izzudin, A.H. [a]

[a] *School of Food Science and Technology, Universiti Malaysia Terengganu, 21030, Kuala Terengganu, Terengganu*

**Corresponding author: khadijahsaad@gmail.com*

Abstract

This study was conducted for nine months to determine the prevalence of liver fluke infection in slaughtered large ruminants (cattle and buffaloes) at an abattoir in Kuala Nerus, Terengganu. Livers from slaughtered animals were collected and flukes observed were identified based on morphological characteristics. Results showed that the total number of cattles and buffaloes slaughtered during these 9 months were 1422 and from this number, 23 (1.6%) livers were condemned. It was found that 15 livers (65%) were condemned due to flukes infection. There were three different species? of flukes infected condemned livers of cattle and buffaloes at Kuala Nerus abbattoir (*Fasciola, Paramphistomum and Dicrocoelium)*. The *Fasciola* was found in eight livers (34.8% of all condemned livers), *Paramphistomum* was found in six livers (26.1%), where in two livers both flukes were present, and *Dicrocoelium* was found in 3 livers (13.0% of all condemned livers). This is the first report of *Dicrocoelium* in condemned livers of large ruminants in Terengganu.

Keywords**:** *Fasciola, Paramphistomum, Dicrocoelium,* cattle, buffalo, fluke

AS-O-07 BBACC

The Effect of *Gynura Procumbens* Leaf Ethanolic Extract on *Anabas Testudineus* Sperm Viability.

Afiqah Fasihah Abdul Rahim [a] , Mahanem Mat Noor [a], Herryawan Ryadi Eziwar Dyari[a,*]

[a] *Faculty of Science and Technology, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia*

* *Corresponding author: herry@ukm.edu.my*

Abstract

Gynura procumbens is a medicinal plant that has many benefits and widely used in Southeast Asia. This herb is believed to have positive effects on fertility. This study aims to investigate the effects of *G. procumbens* leaves ethanolic extract on the quality of sperm in climbing perch (*Anabas testudineus*) as a fish model. A total of 20 male fishes were used and divided into four groups; one normal control group and three treatment groups. Each fish from the treatment groups was given *G. procumbens* leaves extract based on this dosage; 250 mg/kg, 500 mg/kg, 750 mg/kg using force-feeding method for 8 days. At the end of the experiment, all fishes were sacrificed to analyse the sperm quality regarding number, motility, viability and morphology. The result showed that there were significant differences in number and viability but not for the sperm motility. Sperm count for the 250 mg/kg group produced the highest sperm count (2.49 ± 0.15) x 10^9 in comparison with control group, (1.79 ± 0.15) x 10^9. The same group had the highest number of sperm with progressive motility 9.42 ± 2.44% in comparison with control group 5.78 ± 2.96%. In conclusion, ethanolic extract of *G. procumbens* leaves gives positive effects and is suitable to be used in promoting sperm quality in fish.

***Keywords*:** Gynura procumbens; Sperm viability; Fish sperm

AS-O-08 EMHDP

Effect Of Dietary Organic Selenium Supplementation on The Productivity, Selenium Distribution In Egg and Blood Hematology of Laying Quail

Ziaul Islam [a,*] and Muhammad Ikram [a]

[a] *Department of Animal Sciences, Faculty of Sciences, Shaheed Benazir Bhutto University Sheringal Dir Upper-Khyber Pakhtunkhwa (Pakistan)*

** Corresponding author: ziaulislam@sbbu.edu.pk*

Abstract

The current research was design to study the effect of organic selenium supplementation on production, egg quality parameters, blood biochemical parameters and the concentration of selenium in the egg. Total of 120 laying Japanese quail at age of 21 weeks were taken randomly and divided into four groups. Each group consisted of three replicates and each replicate having 10 birds. Different treatments i.e. T_0 Control (without Se), T_1 Treatment (1.50 mg Se /kg of feed), T_2 treatment (2.50 mg Se /kg of feed) and T_3 treatment (3.50 mg Se /kg of feed) were provided to the quails. During the treatments egg rate and dietary intake were recorded. After treatment, at the day 15 and 28, six eggs were selected for the determination of selenium content while at day 28 serum biochemical analysis was carried out. Weight gain and egg shell thickness was significantly affected by selenium supplementation, while other egg quality parameters and serum biochemical parameters were none significantly affected. Treatments of Se significantly ($p < 0.05$) increased egg selenium content as compared to the Control T_0 (without treatment). It is concluded that selenium enriched yeast could be used in large doses for the production of selenium enriched quail egg without any deleterious effect on the production performance and blood hematology.

***Keywords*:** Egg Selenium Content, Egg Quality,Laying Japanese quail, Se-enriched Yeast

Assessing Breed Composition of Malaysian Katjang Goat with 50K SNP Panel

Mohd Azwan, J. [a,*], Amie Marini, A.B. [b], Najihah, M. [a], Megan, M.R. [c], Mohamad Hifzan, R. [b], Norzihan, A. [a]

[a] *Centre for Marker Discovery and Validation, Genebank and Seed Centre, Malaysian Agricultural Research and Development Institute, MARDI Headquarters, 43400 Serdang, Selangor*
[b] *Animal Science Research Centre, Malaysian Agricultural Research and Development Institute, MARDI Headquarters, 43400 Serdang, Selangor*
[c] *Animal Science & Industry, Kansas State University, Manhattan, KS 66506, United States of America*

* *Corresponding author: azwanj@mardi.gov.my*

Abstract

Our indigenous Katjang goat has a high tolerance to the local environment but it has low meat quantity. Thus, several attempts have been made to cross Katjang with the exotic introduced breeds to develop goat breed with both high local environment tolerance and meat quantity. However, disorganized and uncontrolled crossbreeding activities have caused heavy genetic erosion. This study therefore aims to apply the commercial whole genome markers panel to determine the mixed breed of the current Katjang for assessing its breed composition. This is to ensure the breeding program planned in future for the Katjang involves the highest purity animal. Through the analysis of 398 DNA samples comprise of Katjang and its potential parental line with STRCUTURE and MEGA software, we managed to show breed composition of Katjang goat throughout Malaysia. For examples, for Katjang collected in Kelantan, the breed composition showed that it comprise of 70% of Katjang blood with 25% of Jamnapari blood and 2%, 2.4% and 0.6% of Boer, Kalahari and Savanna blood respectively. This study also successfully developed a cheaper, smaller and more precise SNP panel smaller panel of 384 SNPs instead of 53347 SNPs to assess the breed composition.

***Keywords*:** Breed Composition, Katjang, SNP Panel, Single nucleotide polymorphisms.

AS-O-10 MXZCP

Hemato-Biochemical and Immunological Alterationsons Inducedced by Individual and Combined Effect of Fumonisin (FB1) and Ochratoxin A (OTA) In Broilers

Shahzad Akbar Khan [a,*] and Eiko Nakagawa Itano [b]

[1]Department of Pathobiology, Faculty of Veterinary & Animal Sciences, The University of Poonch, Rawalakot
[*1]Department of Pathologic Sciences State University Londrina, Londrina, PR, Brazil**

** Corresponding author: shahzadakbar@upr.edu.pk*

Abstract

For the study sixty broiler chicks of one day old were divided into five groups of A to E. Group A was kept as vaccinated control, while chicks those in groups B, C, D and E, were provided OTA and FB1 contaminated feed at 0.1mg (OTA+0.1mg FB1), 0.3mg (FB1), 0.5mg (OTA +FB1) and 0.9 mg (FB1/kg) of feed, respectively, for a period of 21 days respectively. FB1 alone and in combination with OTA caused a significant increase in relative weights of kidneys and liver of chicks of all experimental groups as compared to control group ($p<0.05$, while significant decrease in weight of bursa and thymus was observed in all FB1alone or OTA+FB1 treated groups, similarly, significant reduction ($p<0.05$) in relative weight of spleen was observed in FB1 alone or OTA+FB1 treated groups. Hematological profile indicated significant decrease ($p<0.05$) in hematocrit of group B treated with 0.5mg FB1 +OTA, similarly significant decrease of erythrocytes, hemoglobin, leukocytes and lymphocytes was found in FB1 alone or FB1+OTA treated groups, while significant increase in heterophils, monocytes and eosinophils was observed ($p<0.05$). All experimental groups of chicks indicated that FB1 alone and in combination with OTA caused significant increase of the levels of urea, triglycerides, uric acid, creatinine, ALT, GGT and AST ($p< 0.05$), however, FB1 alone caused non-significant increase of AST in chicks of experimental group C, similarly, glucose and protein levels were reduced in all experimental groups. Specific IgY level against *Eimeria sp* HSP-70 was reduced day 14 and 21 post vaccination in all FB1 and OTA treated groups.

Keywords: Fumonisin, lymphoid organs, hematology, biochemical, ochratoxin

AS-O-11 RNHLD

The Effect of Binder Type of Ruminant Pellet Based on Fermented Oil Palm Trunk to Physical and Nutrients Quality

Yetti Marlida [a,*], Harnentis [a] and Arnim [b]

[a] *Department of Animal Nutrition and Feed Technology, Faculty of Animal Science, Andalas University, West Sumatera, Indonesia*
[b] *Department of Animal Production, Faculty of Animal Science, Andalas University, West Sumatera, Indonesia*

* Correspounding author: *yettimarlida@ansci.unand.ac.id*

Abstract

The purposed of research were to obtained type of binder of ruminat pellet based on fermented oil palm trunk to physical and nutrients quality. Ratio of fermented oil palm trunk to concentrates were 40:60%. The experiment was conducted using a completely randomized design (CRD) with four treatments and five replications. The treatments were A: 7.5% seaweeds; B: 7.5% waste of cassava, and C: 7.5 % cassava starch; D: 7.5% tarro stach as binder and the measured variables were physical (water content, texture and durability) and nutrients quality (protein, fat, organics contents and fiber fractions). The results showed that the treatment has significantly affected (P>0.01) to the physical quality and did not significantly affected (P<0.05) to nutrients content. Conclusion the use of 7.5 % tarro starch as binder yielded the best physical and nutrients pellet quality with the following characteristics: water content: 8.40%, texture: 179,75 N/cm^2, and durability: 99.50%, the best nutrients contents were NDF : 40,79%, ADF : 30,39%, sellulose : 23,06%, and hemisellulose : 11,91% and fat content 4.0%

Key word: pellet, ruminant, oil palm trunk, nutrient, physical

AS-O-12 EQDTM

The Effect of Combination of fungis *Phanerochaete chrysosporium and Neurospora crassa* with Fermentation Time to Improve Quality and Nutrient Content of Palm Oil Sludge

Mirnawati [a,*] and Gita Ciptaan [a]

[a] *Department of Animal Nutrition and Feed Technology, Faculty of Animal Science,Andalas University, Padang 25163, Indonesia*

* *Correspounding author: mirnawati@ansci.unand.ac.id*

Abstract

This study aims to determine the effect of combination of fungis (Phanerochaete chrysosporium and Neurospora crassa) with fermentation time to improve the quality and nutrient content of palm oil sludge. The research is an experimental study using completely randomized design (CRD) 3x3 factorial pattern with 3 replications. The treatments consist of Factor A (a combination of Phanerochaete chrysosporium and Neurospora crassa) consists of A1 (3: 1), A2 (3: 2), and A3 (4: 1). Factor B (fermentation time) consists of B1 (7 days), B2 (10 days), and B3 (13 days). The results of the analysis of variance showed that there was a significant interaction ($P < 0.05$) between factor A and factor B. Each factor A and B was significantly affected ($P < 0.05$). In this study, it can be concluded that the combination of Phanerochaete chrysosporium and Neurospora crassa (4: 1) and 13 days fermentation time gives optimal results as seen from 26.20% crude protein, 14.49% crude fiber, 14.54% lignin, 58.20% nitrogen retention and 57.66%. crude fiber digestibility.

Keywords: Fermentation, Palm oil sludge, *Neurospora crassa*, *Phanerochaete chrysosporium*.

AS-O-13- UKGGN

Using of Palm Kernel Cake in Ration and its influence on VFA, NH3 and pH Goat Rumen's Fluid

Arief [a,*], B. Satria [a] and N. Jamarun [a]

[q] *Faculty of Animal Science, Andalas University Padang, West Sumatera, Indonesia*

** Correspounding author: aarief@ansci.unand.ac.id*

Abstract

The main problem in the development of livestock in Indonesia is feed both in terms of quality and quantity. On the other hand, conventional feed ingredients are expensive and difficult to obtain. Therefore, it is necessary to find alternative feed ingredients that are cheap, quality and potential. Feed ingredients that meet the above requirements are byproducts of the palm oil industry, namely palm kernel cake (PKC). This study aims to obtain the best PKC composition for Etawa goat concentrate ration. This research consists of 2 stages. Stage I is an experimental study in the laboratory (*in-vitro*) using the Tilley and Terry method, 1989. The study used a Completely Randomized Design (CRD) with 4 treatments of rations and 4 replications. The treatment is the composition of the use of PKC in the ration, namely, A). 10%, B). 20%, C). 30%, D). 40%. Other feed ingredients are corn, rice bran, tofu waste and minerals. The measured variables are the characteristics of the rumen fluid (pH, VFA and NH3). Stage II, in this stage the best ration of the results of phase I (Ration C) was followed by testing the use of Tithonia (*Tithonia difersifolia*) and agricultural waste of sweet potato leaves as a source of forage for livestock in in-vitro. The study used a CRD with 3 treatments and 5 replications. The treatments were: Treatment A) Best Concentrate Ration Stage I + Tithonia; Treatment B) Best Concentrate Ration Stage I + Tithonia and Sweet potato Leaves; and Treatment C) Best Concentrate Ration Stage I + Sweet potato leaves. The data obtained were analyzed using variance analysis while the differences between treatments were tested using the Duncan's Multiple Range Test (DMRT). The results of Phase II showed that the use of PKC in rations as concentrate feed combined with forage originating from Tithonia and sweet potato leaves produced pH, VFA and NH3-N which were still in normal conditions. The best treatment was obtained from Treatment B ($P < 0.05$) with pH 6.9, 116.29mM VFA and NH3-N 15mM. From the results of the study it can be concluded that PKC can be used as feed ingredients for dairy goat concentrate with a combination of forage from Tithonia and sweet potato leaves.

Keywords: By product palm oil, Palm kernel cake, concentrate, rumen fluid

AS-O-14- SXSTR-2

The Effect of *Gliricidia Sepium* Suplementation on Rice Straw Ammoniated Complete Feed on Digestibility *In Vitro*

Mardiati Zain, Rusmana WSN, Erpomen, Ezi Masdia Putri, Malik Makmur

[1]*Department of Animal Nutrition and Feed Technology, Faculty of Animal Science, Andalas University, KampusLimauManis, Padang - 25163, Indonesia.*

*Corresponding Author:mardiati@ansci.unand.ac.id, liveDNA:*62.19662

Abstract

Leguminous is the best source of protein to ruminant. Tannin content in legumes can provide protein by pass for ruminant. This study was conducted to determine the effect supplementation of leguminouses (*Gliricidia sepium,)* on digestibility of the complete feed straw rice straw ammoniated. The study was conducted in an in vitro used a randomized block design where there are 4 treatments dan 4 replications. The treatments were A. 50% rice straw ammoniated + 50% concentrate, B. 50% rice straw ammoniated + 40% concentrate + 10% Gilicidia sepium, C. 50% rice straw ammoniated + 30% concentrate + 20% Gliricedia sepium, D. 50% rice straw ammoniated + 20% concentrate + 30% Gliricedia sepium. **Result.** The results showed that the addition of Gliricidia sepium increased the digestibility of BK, BO, NDF, ADF, Cellulose and Hemicellulose (p> 0.05). Increased doses of *Leucaena leucocephala* until 30% decreased digestion of nutrition compared with doses 10% and 20% but was still higher than control. The best results from this study were obtained at supplementation of 20% *Leucaena leucocephala* to complete feed rice straw ammoniated.

Keywords : digestibility, *gliricedia sepium, complete feed, rice straw ammoniated*

AS-O-16 YQLBN

Improving the Quality and Nutrient Content of Soybean Meal Waste Through Fermentation with *Aspergillus ficum*

Gita Ciptaan [a,*], Mirnawati [a] and Ade Djulardi [a]

[a] *Department of Animal Feed and Nutrition, Faculty of Animal Husbandry, Andalas University, Padang 25163, Indonesia*

** Corresponding author: gitaciptaann.unand@gmail.com*

Abstract

The aim of this research was to improve the quality and nutrient content of soybean meal waste through fermentation by *Aspergillus ficum*,with combination inoculum dosage and fermentation time. The experiment used complete randomized design (CRD) with 2x3 factorial and three replication. The first factor was two kind of innoculum dosage (A): (1) 5% (2) 10%. The two factor was fermentation time (B): (1) 5 day, (2) 7day and (3) 9 day. The parameters were phitase enzyme activity, sellulase enzyme activity, protease enzyme activity, crude protein, nitrogen retention, crude fiber and crude fiber digestibility soybean meal waste fermented. The results of study showed that there were significantly (P<0,05) interaction between factor A, and B, than every factor A and B were significantly (P<0,05) affected to phitase enzyme activity, sellulase enzyme activity, protease enzyme activity, crude protein, nitrogen retention, crude fiber and crude fiber digestibility soybean meal waste fermented. The conclusion was soybean meal waste which was fermented by *Aspergillus ficum,* inoculume dosage 10% and fermentation time 9 day showed that the better quality and nutrient content of soybean meal fermented. This condition can be seen in 7.49 U/ml phitase enzyme activity, 48.55 U/ml sellulase enzyme activity, 7.77 U/ml protease enzyme activity, 34.95% crude protein, 62.99% nitrogen retention, 11.01% crude fiber and 58.92% crude fiber digestibility soybean meal waste fermented

Keyword: Quality, Nutrient, Soybean Meal Waste, Fermentation, *Aspergillus ficum*,

AS-P-01 MBJEY

Morphological Characteristics of Pak Chong Napier (*Pennisetum purpureum X Pennisetum glaucum*) at Different Cutting Intervals Under Glass House Condition

I. Siti Syamsiah [a,*], M.Z. Sasya Fezleen [a] and N. Samat [b]

[a] *Animal Science Research Centre, Malaysian Agriculture Research and Development Institute, MARDI Kluang, P.O Box 525, 86009 Kluang, Johor, Malaysia*
[b] *Animal Science Research Centre, Malaysian Agriculture Research and Development Institute, Persiaran MARDI-UPM,43400, Serdang, Selangor, Malaysia*

[*] *Corresponding author: ctsyami@mardi.gov.my*

Abstract

Napier or Elephant grass (*Pennisetum purpureum*) is one of the pasture species widely distributed in tropical and subtropical regions of the world. In Malaysia, napier was first introduced in the 1920's. Currently, it became the famous and commonly used pasture as fodder grass in dairy and feedlot production systems. Recently, a hybrid cultivar Pak Chong napier (*Pennisetum purpureum x pennisetum glaucum*) from Thailand was introduced to local farmers. In order to evaluate the growth performance of Pak Chong napier under local climate, the study was conducted under glass house condition at MARDI Kluang. Sixty planting materials of Pak Chong napier were planted in polybags arranged in rows with spacing of 0.5 m x 0.5 m. At 5, 6, 7 and 8 weeks of age, plant height, number of tillers per plant, number of leaves per plant, and leaf to stem ratio (LSR) were recorded. The whole plant of each cutting interval were sampled and percent of dry matter (DM) were detemined. The results showed different cutting intervals significantly ($p<0.0001$) affected plant height, number of leaves per plant, percentage of DM and LSR. By increasing the cutting interval, the plant height and percentage of DM were increased. The highest leaf number per plant was at the age of 8 weeks but the LSR was the highest at the age of 5 weeks. There was no significant difference ($p<0.4044$) between different cutting intervals on number of tillers per plant. Based on this study, Pak Chong napier would achieve greater DM at the longest cutting interval with lower LSR. It is proposed that the suitable cutting interval for Pak Chong napier under local condition is between 6 to 7 weeks due to its high DM, leaf number per plant and acceptable LSR value.

Keywords**:** Napier, Pak Chong, Cutting interval, Dry matter, Leaf to stem ratio

AS-P-02 QFTCW

Socioeconomic Factor That Influence The Gap of Using Technology In Village Chicken Farming

Ahmad Zairy Zainol Abidin [a,*], Nor Amna A'liah Mohammad Nor [a], Mohd Syauqi Nazmi [a], Azlina Azma Ismail Affendee [b], Shamizah Omar Hisham [c], Mohd Dainori Md Shah [a], Nurul Huda Sulaiman [a]

[a] *Economic dan Social Science Research Centre, MARDI Headquarters, Persiaran MARDI-UPM, 43400 Serdang, Selangor.*
[b] *Animal Science Research Centre, MARDI Headquarters, Persiaran MARDI-UPM, 43400 Serdang, Selangor.*
[c] *Department of Veterinary Services, Federal Government Administrative Center, 62624 Putrajaya.*

* *Corresponding author: zairy@mardi.gov.my*

Abstract

Market contribution for the village chicken to the total broiler industry in Malaysia was still very small (5%), however it was showing an increasing trend with higher demands every year. The needs on achieving the increasing demands should be in line with the increasing production. Therefore, the intervention of modern technology was needed to ensure the sustainability of the supply. Among the village chicken farmers, the adoption of technology was quite low. This study was done to identify the factors that influent the farmer in adopting the technology. This study gathered the information from 114 farmers which subject to the seven indicator that related to the technology gap (from fuzzy logical model analysis). The correlation test was done to identify the relationship between the technology gap indicator with socioeconomic variables namely as gender, age, education, working experience, involvement in society, ownership, business entity, numbers of worker, attended related courses as well as capital, marketing, technology and attitude issues. The results showed that seven variables had a positive relation that influence the technology gap which are education, working experience, business entity, numbers of worker, attended related courses, attitude issues ($P<0.05$) and marketing issues ($P<0.01$). Further analysis was done using regression test and shows that only working experience ($\beta=.574$, $P<0.05$) and attended related courses ($\beta=.502$, $P<0.05$) were the significant factors that influenced the farmer in adopting the technology as part of the rearing system. It shows that experience farmers were more open to adopt new technology in order to improve the system. Second factor was attending the courses were farmers who attends the related courses were exposed to the new relevant technology which influence them to adopt the technology. As the gap of adopting the technologies among the farmers were smaller, this could improve the village chicken industry. This could increase the production to meet the demand that is increasing nowadays.

***Keywords*:** Socioeconomic factor, technology gap, correlation test, regression test.

AS-P-03 WCPML

The Use of Fermented Chicken Feather Meal with *Bacillus* and *Lactobacillus* As A Protein Source In Growing Broiler Chickens

Wiwaha Anas Sumadja [a,*], Ella Hendalia [a], Nurhayati [a] and Resmi [a]

[a] *Departement Animal Feed and Nutrition, Animal Husbandry Faculty, University of Jambi. Jl. Raya Jambi-Bulian Km 15 Mendalo, Jambi, Indonesia*

[*] *Corresponding Author: wiwahasumadja@unja.ac.id*

Abstract

The aim of this research is to study the effect of fermented chicken feather meal with Bacillus spp., and Lactobacillus spp. and its combination as a substitute of fish meal in ration to broiler performances. This study used 216 chicks aged one day (DOC), using a completely randomized design 3 x 3 factorial pattern with 3 replications. The first factor was the use of 3 types of fermented chicken feather meal (CFM) by bacteria (CFM-Bacillus, CFM-Lactobacillus and CFM-Bacillus + Lactobacillus), while the second factor was 3 levels of fermented chicken feather meal (4%, 8 % and 12%) in the ration. The data collected for this study were feed consumption, body weight gain, feed conversion, slaughter weight, absolute carcass weight and relative carcass weight. The data were analyzed using ANOVA SPSS version 16. The result showed that CFM type only had a significant effect on slaughter weight, but no significant effect on absolute carcass weight and relative carcass weight. Meanwhile, the CFM usage level had affected ($P<0.05$) the slaughter weight, absolute carcass weight and relative carcass weight. There is no interaction between CFM types and their use levels. The results of this study concluded that the use of CFM in poultry with ration of 4% level can be used to substitute the use of fish meal.

Keywords: Chicken Feather Meal, Bacillus, and Lactobacillus.

AS-P-04 YTDHN

Effect of Mixing Duration on the Feed Homogeneity by Using Mictrotracer® Technique

Muhammad Faisal Abu Bakar [a,b,*], Abd Rahman Abdul Rahim [b], Noraini Samat [c]

[a] *Malaysian Agriculture Research & Development Institute (MARDI), MARDI Kluang, P.O.Box 525, 86009 Kluang, Johor, Malaysia*
[b] *UTM RAZAK School of Engineering and Advanced Technology, Universiti Teknologi Malaysia, Jalan Sultan Yahya Petra, 54100 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur, Malaysia*
[c] *Malaysian Agriculture Research & Development Institute (MARDI), Animal Science Research Center, MARDI Headquarter, Persiaran MARDI- UPM, 43400 Serdang, Selangor, Malaysia*

* *Corresponding author: mfab@mardi.gov.my*

Abstract

Feed homogeneity is one of the most important elements in animal feed industry. The aim of homogeneity evaluation is to ensure the quality of feed. The purpose of mixing is to ensure proper proportions of individual components in each portion being dosed. The efficient process are characterized by having the minimum value of coefficient of variation (CV) in each batch of cycle (homogeneity) and a maximal of similar CV among different cycles (uniformity) for all mixed ingredients. In this study, the effect of mixing parameters on the homogeneity of the output was determined by analyzing the output as the function of time and feed. Complete Randomized Design (CRD) was implemented in this study which four (4) level of time (5, 10, 15 and 20 minutes) of mixing were evaluated. Every sample for each level of time was taken from 10 different plots in the mixer. While for feed, a maintenance formulation for goat was formulated. The raw ingredients were palm kernel expeller (PKE) (0.17%), wheat pollard (0.28%), corn (0.06%), molasses (0.01%), di calcium phosphate (DCP) (0.01%), mineral premix (0.02%) and calcium carbonate (0.02%). This value indicated the total of 55% out of total feed. While, the other 45% comes from forage which has been given freshly (cut and carry). For analyze the homogeneity, it is necessary to determine the amount of tracer (particle *F-blue*) in the sample using Microtracer® technique. The quality of mixing is indicated by value of CV. If the value is less than 10, the quality of mixing is good while less than 5 are the best. Results from the ANOVA test show the p-value for particle *F- blue* has significant different ($P<0.05$) for 5 minutes (0.012) and 15 minutes (0.024) time of mixing. However, there was no significant differences ($P>0.05$) for 10 minutes and 20 minutes. The CVs has no significant value compared to the time of mixing when all the P values show more than 0.05 i.e. 0.320, 0.066, 0.635, and 0.656, respectively. In conclusion, the homogeneity of mixing for these feeds is not influenced fully by the type of raw material and time of mixing. However, it might be due to the element of particle size of the raw material which warrants further investigation..

***Keywords*:** Feed Homogeneity, Mixing, Microtracer ®, Coefficient variation

AS-P-07 SXSTR

Peformance of Bali Cattle Fed Complete Feed Based Oil Palm Frond That Added With Rumen Microbes Growth Factor (RMGF)

J. Juliantoni [a] Mardiati Zain [b], Ryanto. I [b], Elihasridas [b], and Kasrad [b]

[1] Master Degree student, Faculty of Animal Science, Andalas University
Kampus Limau Manis, Padang - 25163, Indonesia.
[2]Department of Animal Nutrition and Feed Technology, Faculty of Animal Science, Andalas University, Kampus Limau Manis, Padang - 25163, Indonesia.
[3]Department of Animal Production, Faculty of Animal Science, Andalas University, Kampus Limau Manis, Padang - 25163, Indonesia

** Corresponding Author:mardiati@ansci.unand.ac.id*

Abstract

The research objective was to determine effect forage : concentrate ratio (F:C) on the productivity of cattle fed a complete ration with ammoniatted based of oil palm-frond supplemented with Rumen Microbes Growth Factor (RMGF). The research used Randomized Block Design applying 4 rations as treatment and 4 groups cattle. The experiment diets were: A (60% oil palm frond ammoniated + 40% concentrate + RMGF); B (50% oil palm frond ammoniated + 50% concentrate + RMGF); C (40% oil palm frond ammoniated + 60% concentrate + RMGF); and D (30% oil palm frond ammoniated + 70% concentrate + RMGF). The measured parameters were dry matter (DM) and organic matter (OM) intake, average daily gain (ADG), feed efficiency, total digestible nutrient (TDN), and digestibility of crude protein (CP), neutral detergent fiber (NDF), acid detergent fiber (ADF), cellulose, hemicellulose. The result showed that the treatment had no significant effect (P> 0.05) on DM intake, OM intake, daily weight gain, feed efficiency, digestibility of DM, OM, CP, TDN, NDF, hemicellulose but had highly significant effect (P <0.01) on digestibility of ADF and cellulose. All treatments with different ratio of F:C (oil palm frond ammoniated : concentrate + RMGF) had no different effect on cattle productivities.

Keywords : ammoniated oil palm frond, digestibility, rumen microbes growth factor, Bali cattle, complete feed

AQ-O-01 JQNMA

Infusoria Cultivating Methods for Marine Finfish Larvae using Vegetables and Dry Fish Powder

Syafiqah Hanani Mohd Shahidin[a], Normawaty Mohammad Noor[b], Shaharah Mohd Idris[c], Sufian Mustafa[c], Yukinori Mukai[b,*]

[a] *Department of Biotechnology, Kulliyyah of Science, International Islamic University Malaysia, 25200 Kuantan, Pahang, Malaysia*
[b] *Department of Marine Science, Kulliyyah of Science, International Islamic University Malaysia, 25200 Kuantan,Pahang, Malaysia*
[c] *Marine Fish Aquaculture Research Division, FRI Tanjung Demong, 22200 Besut, Terengganu, Malaysia*

** Corresponding author: mukai9166@gmail.com*

Abstract

Seed production of marine finfish in Malaysia is still facing problem particularly live feed for starter diet. Currently, aqua culturists use S or SS type rotifers, which have sizes from 100 to 200μm. Early stage larvae of some marine finfish species select feeds less than 100 μm. Infusoria is a collective term of aquatic microorganism that has been identified to be suitable live feed, as their body sizes are less than 100μm. To date, there are no publications on basic culture methods of Infusoria. Thus, the objective of this experiment is to study the method of culturing infusoria using batch culture method and continuous culture method. In batch culture method, infusoria were cultured in triplicates for a duration of 2, 4, 6, and 8 days in 500 mL saline water respectively. In this experiment, the nutrients used were powder vegetables (*Brassica pekinensis* and *Brassica chinensis*) and powdered anchovies. The nutrients were only given at the first day of experiment. In continuous culture method, infusoria were cultured in the beakers for a duration of 11 days in triplicates. Every day, 10%, 20%, and 30% of cultured water were harvested from the beaker. After that, the same amount of saline water and nutrients were added in the beaker. For the results of batch culture method, the highest total harvested was in 4 days which was 2,690,000 ind/500 mL. Followed by, 2 days with 2,480,000 ind/500 mL, 6 days with 607,000 ind/500 mL, and 8 days with 202,000 ind/500 mL. The results for continuous culture method showed that the total harvested in 11 days were 777,250 ind in 10%, 1,123,000 ind in 20%, and 814,500 ind in 30% respectively. Based on the results, the recommended cultivation period for batch culture method was 4 days. For continuous culture method, the recommended harvesting amount per day was 20%.

Keywords : live feed, starter diet, infusoria, batch culture method, continuous culture method

AQ-O-02 VZGWJ

The Spectrophotometric Determination of Visual Spectral Sensitivity of Sutchi Catfish *Pangasianodon hypophthalmus*

Nai Han Tan [a], Yukinori Mukai [b,*], Ryo Okawa [c], Kazuhiko Anraku [c]

[a] *Department of Biotechnology, Kulliyyah of Science, International Islamic University Malaysia, Jalan Sultan Ahmad Shah, Bandar Indera Mahkota, 25200 Kuantan, Pahang, Malaysia*
[b] *Department of Marine Science, Kulliyyah of Science, International Islamic University Malaysia, Jalan Sultan Ahmad Shah, Bandar Indera Mahkota, 25200 Kuantan, Pahang, Malaysia*
[c] *Laboratory Fisheries Technology, Faculty of Fisheries, Kagoshima University, Shimoarata 4-50-20, Kagoshima 890-0056, Japan*

* *Corresponding author: mukai9166@gmail.com*

Abstract

Visual spectral sensitivity refers to the relative sensitivity of the eye towards different wavelengths of light. In fish, their eyes show specific adaptation in sensitivity to match the different light environments in their natural habitats. Sutchi catfish *Pangasianodon hypophthalmus* is one of the commercially cultured freshwater fish species in Southeast Asia. The present study aimed to understand the visual spectral sensitivity of sutchi catfish through spectrophotometric analyses of the spectral absorbance of retinal wholemounts for the goal to establish appropriate lighting conditions in aquaculture system to improve growth performance of sutchi catfish. In the dark room, the retinae of sutchi catfish were isolated under a dissecting microscope with the help of a night vision goggles. The isolated retinae were cut into approximately 9 mm^2-size pieces. Each retina sample was then placed on a coverslip with a drop of saline solution and covered with another coverslip. Spectral absorbance of retinal wholemounts was measured by means of a portable modular spectrophotometer. A broad wavelength LED was used as the main light source, while blue (peak at 454 nm), green (520 nm), yellow (590 nm) and red (632 nm) LEDs were used as the supplementary light sources for flashing. Spectrophotometric measurement data were used to generate spectral absorbance curves. Comparison between the peaks of the curves showed that red light exposure induced a prominent shift of peak spectral absorbance towards shorter light wavelengths, suggesting the eyes of sutchi catfish had spectral sensitivity for light wavelength of red.

Keywords: Sutchi catfish, *Pangasianodon hypophthalmus*, spectral sensitivity, spectrophotometry, visual pigment

AQ-O-03 YUVWS

Nutritional Value and Antioxidant Activity of Mud Crab (*Scylla olivacea*) Essence

Nurul U. Karim[a,*], Nurul S. Mohd Noor[a], Syahnon Mohammad[b] and Mhd Ikhwanuddin[b]

[a] *School of Fisheries and Aquaculture Sciences, Universiti Malaysia Terengganu, 21030 Kuala Terengganu, Terengganu, MALAYSIA*
[b] *Institute of Tropical Aquaculture, Universiti Malaysia Terengganu, 21030, Kuala Terengganu, Terengganu, MALAYSIA*

** Corresponding author: ulfah@umt.edu.my*

Abstract

Mud crab (*Syclla olivacea*) represent a valuable component of traditional and small scale coastal fisheries in tropical and subtropical Southeast Asia countries. Mud crab had been consumed not only as food but also for the purported medicinal and tonic properties. This study was undertaken to find out the nutritional value and antioxidant properties from muscle and hepatopancreas of mud crab essence. The lipid profiling of both muscle and hepatopancreas essence were also had been investigated. Protein content of mud crab musscle were significant ($p<0.05$) higher compared to the protein content in the hepatopancreas. Lipid content of mud crab musscle were recorded at 3.36±3.00% and significantly low ($p<0.05$) than in hepatopancreas essence which is valued at 14.72±2.14%. The radical scavenging activity (DPPH) were relatively low and not significantly different ($p>0.05$) in both mud crab essences. In addition, the ferric reducing antioxidant power (FRAP) in mud crab muscle essence gives a slightly higher ($p<0.05$) value compared to mud crab essence from the hepatopancreas. Mud crab muscle essence had a potentially to benefit as an alternative for natural antioxidant and a healthy product.

***Keywords*:** Syclla olivacea, essence, nutritonal value, antioxidant activity

AQ-O-04 ZRZKW

The Emergence of Alien Fish Species In Rice Agroecosystem: Can We Exploit Them?

M. Aqmal-Naser[a,*] and Amirrudin, B.A.[a,b]

[a] *School of Marine and Environmental Sciences, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia.*
[b] *Institute of Tropical Biodiversity and Sustainable Development, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia.*

* *Corresponding author: amirrudin@umt.edu.my*

Abstract

Many alien species were introduced into Peninsular Malaysia for aquaculture and ornamental purposes. However, studies on invasion issues of alien species in natural water bodies are neglected. A total of 26 species of fishes from 14 families was recorded in rice agroecosystem from various types of habitats and stages for two seasons of paddy planting in Seberang Perai Tengah, Pulau Pinang. Seven introduced species were recorded in this area namely *Barbonymus gonionotus* (Cyprinidae), *Esomus metallicus* (Cyprinidae), *Gambusia affinis* (Poecilidae), *Oreochromis niloticus* (Cichlidae), *Trichopodus pectoralis* (Osphronemidae), *Clarias gariepinus* (Clariidae) and *Hypostomus plecostomus* (Loricariidae). *Esomus metallicus* was the most dominant and abundant species in this rice agroecosystem followed by *Oreochromis niloticus* compared to other native species in certain stages and habitats in the rice field. Species such as *Barbonymus gonionotus*, *Clarias garipienus* and *Trichopodus pectoralis* were preferable as a cheap protein source, however *Clarias garipienus* can potentially become the top predator due to its massive size and ferocious feeding preferences. Other species such as *Esomus metallicus*, *Barbonymus gonionotus* and *Oreochromis niloticus* can be harvested throughout the season of paddy planting to generate income for the local community by utilization this species as fish feed or food for human consumption. Further studies on the negative impact of alien invasive species on native species as well as utilization of other aquatic resources available in rice agroecosystem is needed and in fact the latter has great potential to benefit the local communities.

Keywords: Introduced species, native species, paddy planting, Seberang Perai Tengah, utilization

AQ-O-05 JKBXH

Demand Feeding Device Using A Video Processing System And Fish Behavior As Parameter for A Computer Program to Control Feeding Time and Amount

Yukinori Mukai[a,*], Zahari Taha[b], Shahbudin Saad[a], Muhammad Firdaus Sallehudin[a], Nai Han Tan[a], Khairul Muttaqin Ismail[a], Mohd Azraai Mohd Razman[b], Faeiz Azizi Adnan[b]

[a] *Department of Marine Science, Kulliyyah of Science, IIUM*
[b] *Innovative Manufacturing, Mechatronics, and Sports Laboratory, Faculty of Manufacturing Engineering, UMP*

** Corresponding author: mukai9166@gmail.com*

Abstract

Fish feeding system has three methods; manual, automatic and demand feeding. Demand feeding system serves feeds to fish, when fish switch on feeders. Although demand feeding system has advantages, there are still some problems; e.g. social status in fish. A few fish occupy the actuation of switch of the feeder, so results show the variation in fish growth. Another issue is that the fish learning period of demand feeders becomes long depending on fish species. New type feeding system was developed to overcome these problems related to feeding to fish. The new feeding system uses fish behaviour as sensor to control feeding device. In general when fish are hungry and not hungry, their behaviours are different. In this system, CCD cameras detected fish behaviour and computer program analysed the differences of behaviour, then the programed decided and transmitted the order to feeding device to start feeding or stop feeding. Asian seabass young were used for feeding test of this feeding system. Control experiments were prepared with timer feeder and infrared feeding system. Glass aquaria (45 cm x 45 cm x 90 cm) were prepared with each feeding system and water filtration system. Each system was prepared triplicate aquaria. Feeding experiment results showed no significant difference among each feeding system, however the experiment showed the new feeding system could provide the feed to fish smoothly and it can be used for fish rearing.

***Keywords*:** Demand feeder, behaviour, image processing system, computer program, CCD camera

AQ-O-06 TDZMJ

Phytochemical, Antibacterial and Antioxidant Activity of Three Macro Algae Extracts In The Waters of Tidung Island, Kepulauan Seribu

Sri Handayani[a,*], Retno Widowati[b], Suprihatin[c,],Nyoman Yudi Antara[d],Indra Lesmana Rahayu[d]

[a] *Center of Marine Studies and Management Coastal, Universitas Nasional, Jakarta 12520, Indonesia*
[b] *Department of Biology, Graduate School, Universitas Nasional, Jakarta 12510, Indonesia*
[c] *Department of Midwifery, Faculty of Health Sciences, Universitas Nasional, Jakarta 12510, Indonesia*
[d] *Faculty of Biology Universitas Nasional, Jakarta 12520, Indonesia*

[*] *Corresponding author: handayani2001id@yahoo.com*

Abstract

Macro algae is a *Thallophyta* plant that has been known as a potential food and medicine, one of which is in Kepulauan Seribu, especially in Tidung Island. Therefore, the purpose of this study is to explore the potential of three types of macro-algae *Hormophysa triquerta*, *Padina australis*, and *Sargassum binderi* (*Phaeophyceae*) in the waters of Tidung Island by revealing phytochemical, antibacterial and antioxidant activity. The design used in this study was a complete randomized factorial design. Phytochemicals tested were flavonoids, alkaloids, tannins, saponins, quinones, steroids and terpenoids. The antibacterial was tested by wel diffusion method in Muller Hinton agar in a petri dish with a size of 100 mm and a thickness of 10 mm. All three macro algae tested were extracted by using methanol solvent and made into four concentrations ie 5%, 10%, 15%, and 20%. The test bacteria used were *Staphylococcus aureus* ATCC 6539 and *Escherichia coli* ATCC 8739. Observation of antibacterial test was performed 24 hours after incubation at 370C. Antioxidant activity at concentrations of 100, 200, 300, 500, 700 ppm was performed by the DPPH method (1,1-diphenyl-2-picrylhydrazyl). Phytochemical test results obtained compound flavonoids and steroids in the three macro algae tested, while saponin only found in S. binderi. The drag zone results indicate that the third extract of the tested algae macro does not inhibit *E. coli* bacteria. The largest inhibitory zone was shown at a 20% concentration of *S. aureus* bacteria, ie *H. triquerta* = 10.09 ± 0.89, P. austraslis = 11.46 ± 1.09, and S. binderi 8.00 ± 1.29 . Results of regression of macro algal antioxidant activity tested showed IC50 value was 13.290 ppm (*H. triquerta*), 3,800 ppm (*P. australis*), and 4,053 ppm (*S. binderi*).

Keywords: antibacterial, antioxidant, phytochemical, macro algae

AQ-P-01 SBRTG

Habitat Characterics of Giant Freshwater Prawn *Macrobrachium Rosenbergii* (DE MAN 1897) in The Kemana River, Bintulu, Sarawak

Abu Hena M. K. [a,*], Ismail J. [a], Danil N. A. [a], Kumar U. [a], Nesarul M. H. [a], Idris M. H. [a,b] and Hamli H. [a]

[a] *Department of Animal Science and Fishery, Universiti Putra Malaysia Campus Bintulu Sarawak, Nyabau Road, 97008 Bintulu, Sarawak, Malaysia*
[b] *School of Fisheries and Aquaculture Sciences, Universiti Malaysia Terengganu, 21030 Kuala Terengganu, Terengganu DarulIman, Malaysia*

* *Corresponding author: hena71@yahoo.com*

Abstract

Giant freshwater prawn *M. rosenbergii* is considered to be an indigenous species of Sarawak and inhabitant in riverine and estuarine environment. This species is economically and commercially important due to its fast growth and high price demand. This preliminary study on the habitats characteristics of *M. rosenbergii* was conducted in the well known Kemana river at Bintulu, Sarawak. Shrimp weight was recorded from post larvae to adult (3 to 115 gm) during the study period, and suggesting this river serves as breeding ground of graint freshwater prawn including broodstock. Major water nutrients NO_3, PO_4 and NH_4 were found to be <1 mg/l during the investigation period. The presence of natural food like plankton was less in the water column of this river. Phytoplankton species was not noticed in the water colum, while only few types of zooplankon species were found in the studied stations. Surprisingly, this prawn distributed well in acidic (pH <6.0) and turbid water condition (50-100 NTU) with low dissolved oxygen (<3 mg/l) and salinity (<4 psu) in Kemana river, Bintulu, Sarawak. The adaptation processes of this prawn in this highly acidic (pH<6.0) and turbid waters with less natural foods is still unknown; hence we want to investigate it further for long term. The findings of this study would help to establish successful freshwater gaint prawn aquaculture industry in the acidic environment in future.

Keywords: freshwater gaint prawn, *M. rosenbergii*, acidic water, Kemana river, Sarawak

AQ-P-02 YETUR

Proximate Composition of Shrimp Feed Incorporated With Selected Medicinal Plants (*Piper betle* and *Centella asiatica*)

Sofiah, H. [a], Siti-Hasmah, M. [a,*], Diana, A.W. [a], Nawwar-Zawani, M. [b]

[a] *Department of Science and Biotechnology, Faculty of Engineering and Life Sciences, Universiti Selangor, 45600 Bestari Jaya, Selangor, Malaysia*
[b] *Faculty of Applied Science, Universiti Teknologi MARA, Cawangan Perlis, 02600 Arau, Perlis, Malaysia*

* *Corresponding author: hasmah@unisel.edu.my*

Abstract

In recent years, the investigation on proximate composition of aquatic animal feed especially fish and crustacean have gained a lot of effort to ascertain their nutritional requirements especially the nutritional diets in their feeding regimes. The measurement of some proximate profiles such as protein content, lipids, ash content, nitrogen-free extract and crude fiber is often necessary to ensure that they meet the dietary requirements and commercial specifications. Therefore, the present study was aimed to investigate the proximate composition of shrimp feed supplemented with various concentration of *Piper betle* and *Centella asiatica* extract which will be further employed as a medicated diet in Tiger shrimp (*Penaeus monodon*). The protein, lipid, ash and moisture content percentage were analysed in both control (devoid any supplementation of the herbal extract) and two experimental diet groups containing either *Piper betle* or *Centella asiatica* extracts. The methanolic and ethanolic extract of *Piper betle* (PB) and *Centella asiataca* (CA) were prepared and incorporated into the shrimp feed at different concentration of 0, 25, 50 and 75 g/kg feed which designated as control, 5%, 10%, and 15% respectively. The results showed that the percentage of protein was found higher in the diet incorporated with 15% of methanolic and ethanolic extracts of PB (21.58 ± 0.1022 and 21.05 ± 0.7546 respectively) and methanolic extract of CA (21.56 ± 0.3116) compared to the control diet (20.31 ± 0.4596). The result on lipid content indicated that the experimental diet of methanolic and ethanolic extracts of PB and CA at all concentrations were found lower compared to the control diet (34.03 ± 11.2351). Changes on the protein and lipid content might be due to the presence of some active ingredients and phytochemicals in both methanolic and ethanolic extract of *Piper betle* and *Centella asiatica* which influence the proximate composition of the experimental diets. The analyses on moisture and ash content of both experimental diets showed a variety of findings. It can be suggested that the specific characteristics of physical appearance and chemical properties of both methanolic and ethanolic extracts that reflect the result of proximate analysis of the experimental diet. In conclusion, investigation on the proximate composition of the experimental diet containing a various concentration of *Piper betle* and *Centella asiatica* extract provide benchmarking on the suitability of the plant extracts to be exploited as additional nutrient into the feed regimes of aquatic animals.

Keywords: proximate analysis, *Piper betle*, *Centella asiatica*, shrimp, experimental diet

AQ-P-03 PAVTP

EAFM on IUU of Tuna in Semporna

Connie Fay Komilus [a,*] & Norasma Dacho [b]

[a] *Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin Besut Campus, 22200 Besut, Terengganu, Malaysia.*
[b] *Department of Fisheries Sabah, Level 4, Wisma Pertanian, Off Jalan Kolam, 88628, Kota Kinabalu, Sabah, MALAYSIA*

** Corresponding author: conniekomilus@unisza.edu.my*

Abstract

Combating Illegal, unreported and unregulated (IUU) tuna fishing is a global management measure to overcome the intensification of tuna exploitation. Semporna is a famous spot known as the tuna haven of North Borneo or eastern part of East Malaysia, Sabah. Continuous trends of misreporting on tuna catch are still vague as quantity of IUU associated by-catch is still difficult to be estimated at present. This paper reviews the IUU status on tuna fisheries in Semporna, examine existing legislation, policy and regulatory on tuna fisheries. In addition, this paper also reviews the business relationship of tuna caught in Semporna that are sold to both local and foreign markets. The tuna value chain ecosystem is reviewed from the Ecosystem Approach to Fisheries Management (EAFM) approach in which both quantitative and qualitative information including determinants of quality of life experienced by tuna stakeholders are discussed. Results of this review also suggest possible approaches and adaptive management that can be adopted in line with the pillars and principles of EAFM to eliminate IUU in tuna fisheries

***Keywords*:** IUU, Tuna fisheries, EAFM, Semporna

AQ-P-04 YETUR2

Effect of Methanol Extract of *Piper Betle* Towards Water Quality and Immunity Level In Tiger Shrimp (*Penaeus Monodon*)

Geetha, S. [a], Siti-Hasmah, M. [a,*], Roshani [a], O., Sofiah, H [a]

[a] *Department of Science and Biotechnology, Faculty of Engineering and Life Sciences, Universiti Selangor, 45600 Bestari Jaya, Selangor, Malaysia*

* *Corresponding author: hasmah@unisel.edu.my*

Abstract

Shrimp lack of adaptive immune system and rely on innate immune responses against microbial invasion. The enhancement of non-specific immunity through the application of immunostimulants derived from medicinal plants have been found to be effective in tiger shrimp. The aim of the present study was to investigate the effect of methanol extract of *Piper betle* towards water quality and immunity level in tiger shrimp through bath immersion approach. Tiger shrimps (*Penaeus monodon*) were maintained in the artificial seawater at an optimum condition for the shrimp breeding. The bath immersion experiment was conducted by maintaining four groups of tiger shrimp in the water containing a different concentration of *Piper betle* extract (0.00 mg/L, 0.05 mg/L, 0.10 mg/L and 0.15 mg/L). Water quality for each treatment was monitored at daily basis based on parameters including pH, salinity and content of ammonia, nitrate and nitrite. The immunostimulatory effect of *Piper betle* in tiger shrimp was determined based on the growth performance, analysis of haemocyte counts and total bacterial load. Analysis of water quality demonstrated significant improvement of pH, salinity and content of ammonia, nitrate and nitrite for the treated water incorporated with 0.15 mg/L of *Piper betle* extract. The growth performance analyses demonstrated enhancement of weight and length gained from the shrimp treated with 0.15 mg/L concentration of *Piper betle* extract. Based on haemocyte and total bacterial count, the tiger shrimp maintained in water containing 0.15 mg/L concentration of *Piper betle* extract had demonstrated the highest number of haemocyte count and the lowest number of bacterial load compared to other groups of treatment. The present study demonstrated the addition of an appropriate concentration of *Piper betle* in the artificial seawater had improved water quality and enhanced the growth performance and level of immunity in tiger shrimp.

Keywords**:** *Piper betle*, tiger shrimp, water quality, immunity, growth performance

FOOD SCIENCE

Food Sciences – Food Technology – Nutritions

FS-O-01 DPJMQ

The Effect of *Schizophyllum Commune* on Mycelium Formation Is Associated to Culture Conditions

Nur Diyana Rosnan a, b and Andrew A. Ngadin a, b,*

[a] *Laboratory for Pest, Disease and Microbial Biotechnology (LAPDiM), School of Food Sciences and Technology, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia.*

[b] *School of Food Science and Technology, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia*

* *Corresponding author: andrew@umt.edu.my*

Abstract

Schizophyllum commune Fr. (Split gill mushroom), is an edible mushroom belongs to Schizophyllaceae of Agaricales which is easily recognised based on its morphology. It is important to determine the optimum culture conditions that would produce thick mycelia mass with fast growth and fruiting body formation. This study was conducted to evaluate the effect of mycelia culture conditions of *S. commune* based on temperature, pH and type of medium. The optimum temperature for mycelial growth was obtained at 28°C whereas, the minimum mycelial growth was found at 16°C. The observed variations in colony size, mycelia density and number of fruiting body formation, shows that pH 5 was the most suitable for mycelial growth of *S. commune.* Interestingly, all seven culture media tested were suitable for the vegetative growth of *S. commune*. However considering the growth phenotype of mycelia, the most favorable culture media for *S. commune* was malt extract agar supplemented with yeast extract and glucose (MYGPA). The results obtained in this study can be used as a guideline for the spawn production of *S. commune* and could assist local growers in improving their cultivation of split gill mushroom.

***Keywords**: Schizophyllum commune*, Culture conditions, Mycelial growth, Mycelial density, Fruiting body

FS-O-02 JUEFC

Potential Utilization of Rubber Seed Meal As Food and Feed Material

Connie Fay Komilus [a,*], Nurul Huda [b], Lukman Abiola Oluodo [c]

[a] *School of Animal Science, Universiti Sultan Zainal Abidin, 22300, Besut Campus, Terengganu, Malaysia*
[b] *School of Food Industry, 22300, Besut, Institute for Community (Health) Department, Universiti Sultan Zainal Abidin, 21300, Gong Badak Campus, Terengganu, Malaysia*
[c] *Outreach Department, Rubber Research Institute of Nigeria, 1069, Benin City, Nigeria*

** Corresponding author: conniekomilus@unisza.edu.my*

Abstract

The food and feed crisis, which has been a global concern mainly due to the shortage and increase in the prices of conventional stable foods and feeds, has led researchers to consider the importance of non-conventional source such as rubber seed as potential alternative material. This paper discusses potential utilization and existing research conducted on rubber seed usage on food and feed. *Rubber tree (Hevea brasiliensis)* is a multipurpose tree, which is primarily meant for production of latex. The rubber tree is primarily cultivated for its milky substance (latex) for the plastics and rubber sector but also have numerous by-products such as rubber seed, wood logs and oil extracted during the process of seed cake with different beneficial form for human food, animal feed, fertilizer, fuel, and biodiesel. The crushed rubber seed meal (seed cake) is, however, has a high amount of protein, with the presence of a main toxic compound: cyanogenic compound as well as anti-nutritional factors: trypsin inhibitors, phytic acid, and saponin has hindered the proper utilization. Many drawbacks associated with poor nutritive composition and usage can be overcome through proper processing methods, i.e. boiling, roasting, fermenting, storage, and protein isolate. From the past literature, the proximate analysis revealed that the average moisture content of 3.99%, the protein content of 23 g/100g, fat content of 68.5 g/100g and ash content of 4.3 g/100g from the accesses random papers. The amino acid in rubber seed is high in Glutamic acid (16.13%) and low in Cysteine (0.78%). Despite its promising protein contents, the inclusion rate from the feeding of livestock and aquatic species have been 20 – 25%. It is recommended that if appropriate processing methods such as boiling, fermenting and storage period are adopted could lead to increased utilization of rubber seed as livestock feed and edible materials.

Keywords: Rubber seed, Feed, Food, and livestock

FS-O-03 KCXX2

Resistant Starch For The Management of Civilization Diseases

Gupta PD [a, *], Anbazhagi Muthukumar [b]

[a] *Adjunct Professor , Manipal University , Manipal, India*
[b] *Department of Environmental Science, School of Earth Science Systems, Central Unviersity of Kerala Kasaragod , Kerala- 671314, India*

**Corresponding author: pdg2000@hotmail.com*

Abstract

Potato and rice are most staple foods for most of the people in the world. However, potatoes and rice are forbidden for diabetics. Eating potatoes decreases cellular sensitivity to insulin, leading to higher blood glucose and a tendency to carry extra adipose tissue. These tendencies seem to grow with age. With age, skeletal muscle cells usually become less sensitive to insulin while fat cells become more which leads to more uptake of glucose into our fat cells, fuelling their growth. This is why it is recommend avoiding starchy foods which tend to lead to a rapid rise in blood sugar.Less known in health and nutrition circles is that cooling cooked starchy foods increases their content of resistant starch, which can actually help slow the rise in blood sugar that occurs after a substantial meal. This holds true with potatoes and rice as well. The resistant starch content remains even after re-heating. For this reason cooked and cooled potatoes actually improve mineral absorption and increase elimination of exogenous and endogenous toxins.Biochemically, resistant starch is made up of long straight chain polysaccharides, and it's the fermentation of these polysaccharides and resultant production of short chain fatty acids such as, sodium butyrate that supports the health of all of our organ systems and ultimately lowers our risk of most types of cancer.

Keywords: disease management, potato, rice, resistant Starch

FS-O-04 ZCAAG

Phytochemical Screening and Antioxidant Activity Of Propolis From Different Localities

Aulia Rani Annisava [a], Nor Elani Mat Nafi [a], Ammira Shafiqha Abdul Khadar [a], Nur Basyirah Md Zin [a], Norzilawati Pauzi [a], Ainur Awanis Mohd Badiazaman [a], Muhammad Muslim Mohd Rodi [b], Abdul Jamil Zakaria [b] and Khamsah Suryati Mohd [a,*]

[a] *School of Agriculture Sciences and Biotechnology, Faculty of Bioresources and Food Industry*
[b] *Agriculture Production and Food Innovation Research Institute (AGROPOLIS)*
Universiti Sultan Zainal Abidin, Tembila Campus, 22200 Besut, Terengganu, Malaysia

** Corresponding author: khamsahsuryati@unisza.edu.my*

Abstract

Propolis is a sticky material manufactured by stingless bees to build and protect their hive. Propolis has been used worldwide for years in folk medicine and currently marketed by the pharmaceutical industry. However, study on Malaysian stingless bee propolis is still lacking. The main issue surrounds propolis work is that the chemical compositions and biological activities are attributed to plant sources, geographical area and collecting season. The aim of this study is to evaluate and compare the phytochemical composition antioxidant activity of ethanolic extracts of propolis produced by *Heterotrigona itama* from ten localities, namely; 1)-. Gajah Hulu Island Village, Pengkalan Chepa (PC-1); 2)-. Department of Agriculture (Paddy, Industrial Crop & Floriculture), Lundang (JPL-1); 3)-. Pasir Forest, Ketereh (KTRH-1); 4)-. Panau Hill, Tanah Merah (TM-1); 5)-. Pondok Kelewek Village, Tanah Merah (TM-2); 6)-. Kesedar Putra, Gua Musang (GM-3); 7)-. Felda Chiku 1, Gua Musang (GM-4); 8)-. Relak Village, Kuala Balah, Jeli (J-1); 9)-. UniSZA Apiary Farm, Besut (BST-1); and 10)-. Padang Serai, Dungun (DGN-1). Phytochemical composition was screened by thin layer chromatography (TLC), total phenolic content and total flavonoid content. Whereas, antioxidant activity was determined using 2,2-diphenyl-1-picrylhidrazyl (DPPH) free radical scavenger methods. Phytochemical screening showed that all localities have different chemical composition in terms of number of bands and intensity of the bands. Likewise, all samples have different TPC in order of BST-1 (19.01 ± 0.01 mg GAE/g) > TM-2 (14.86 ± 0.01 mg GAE/g) > GM-4 (14.85 ± 0.01 mg GAE/g) > KTRH-1 (14.59 ± 0.06 mg GAE/g) > DGN-1 (14.21 ± 0.01 mg GAE/g) > J-1 (13.61 ± 0.01 mg GAE/g) > GM-3 (12.14 ± 0.03 mg GAE/g) > PC-1 (11.14 ± 0.05 mg GAE/g) > TM-1 (10.99 ± 0.05 mg GAE/g) > JPL-1 (10.28 ± 0.03 mg GAE/g). For TFC, the rank of the value is in order of GM-3 (34.24 ± 0.00 mg QE/g) > GM-4 (32.09 ± 0.02 mg QE/g) > KTRH-1 (31.16 ± 0.03 mg QE/g) > BST-1 (28.27 ± 0.05 mg QE/g) > J-1 (27.74 ± 0.03 mg QE/g) > TM-2 (20.90 ± 0.01 mg QE/g) > JPL-1 (19.51 ± 0.11 mg QE/g) > DGN-1 (19.39 ± 0.01 mg QE/g) > TM-1 (17.88 ± 0.01 mg QE/g) > PC-1 (14.89 ± 0.02 mg QE/g) >. BST-1 also gave the highest percentage of DPPH inhibition (87.37 ± 0.00 µg/mL). This study have shown that it is necessary to clarify the quality and quantity of the constituents in propolis in order to evaluate its biological activity.

***Keywords*:** Propolis, stingless bee, *Heterotrigona itama*, antioxidant, TPC, TFC

FS-O-05 LGVJV

Microbiological Status and Hygiene Quality of Actual Food Handling Practices In Two Bakery Production Lines: A Case Study of Ziq Bakery Franchise In Kuala Terengganu

Zainal-Shukri, W.H. [a,*], Nadiayana Atan [a], Rahijan Abdul Wahab [a], Tuan Zainazor Tuan Chilek [a]

[a] *School of Food Science and Technology, Universiti Malaysia Terengganu, 21030, Kuala Nerus, Terengganu Malaysia*

** Corresponding author: wanafiz@umt.edu.my*

Abstract

This study aims to examine the microbiological status and hygiene quality among food handlers in a bakery production line, besides establishing numbers of aerobic bacteria, *Escherichia coli* and *Staphylococcus aureus* density contained in samples taken. Ziq Bakery franchise, which produces Halal bakery and pastry products operated by local Malay Muslims has issues pertaining to short shelf life of bakery products which leads to a profit decline. Poor hygiene practices among food handlers working in the production line was identified as the key problem, although the source of the food contamination was uncertain. Few studies have investigated on the level of food hygiene practices and microbiological quality of baked products prepared and sold in bakeries. Bakery products are at higher risk of contamination due to the preparation process, the types of ingredients used and types of equipment or utensils used, which may lead to food contamination. Swab analysis on food handler's hands, food tongs, trays and working tables and cutting boards were carried out at Ziq Bakery's two main franchise outlets located at Gong Kapas and Mydin Mall. A total of 10 food handlers in the production line at both outlets were randomly selected for hand swab test. Other selected food contact surfaces were swabbed from both outlets during peak working hours. All samples were collected in triplicates and were processed on the same day. The microbiological analysis for determination of total plate count (TPC) and *Staphylococcus aureus* was performed by using the standard methods which was adapted from Australia Standard, whilst the Practical Food Microbiology by Roberts & Greenwood (2003) was used for determination of total coliforms and *Escherichia coli*. The hand swab analysis indicated Mydin Mall outlet had higher total plate count, although both outlets remained below the national standard and at a safe limit. The findings revealed that workers in the production line at Mydin Mall had poor hand washing practices (3.24 X 10^3 MPN/ml. total coliforms count for hands). The presence of the fecal coliforms usually associated with the poor hand washing practices and improper handling practices. The cutting boards also reported a high total coliform count, especially at Ziq Bakery (5.28 X 10^3 MPN/ml). Most worrying, food tongs at Gong Kapas recorded higher total plate count. All in all, the number of microbial loads on the food tongs at both Mydin Mall and Gong Kapas outlets exceeded the national standards. The presence of *Staphylococcus aureus and E.coli* were also detected. *E.coli* counts on food tongs at Mydin Mall outlet was also higher (1.092 cfu/cm^2). The study concludes that poor hygiene practice of using the same soiled cloth repeatedly to wipe working table and utensils such as food tongs and trays, and touching baked products using bare hands contributed to the rampant food contamination. In addition, the staff may require food safety training to perform the task of cleaning and sanitizing more effectively.

***Keywords*:** food handlers, microbiological quality, food contamination, food contact surfaces, *Staphylococcus aureus, E.coli.*

FS-O-06 FTSPL

Effects of Medium Variation and Fermentation Time Towards The Antioxidant and Antimicrobial Properties of Kombucha

Batul Kagalwala [a], Shazrul Fazry [a], Fareed Sairi [a], Babul Airianah Othman [a,*]

[a] *School of Biosciences and Biotechnology, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia.*

** Corresponding author: airianah@ukm.edu.my*

Abstract

Kombucha is one of traditional fermented drink and has gained popularity due to its health benefits and therapeutic efficacy. It is prepared by sweetened black tea and fermented using a bactocellulosic culture of acetic acid bacteria and yeasts. The drink can also be brewed using different type of tea and alternate carbon sources. An investigation was conducted to characterize the antioxidation and antimicrobial effect of kombucha by variation of carbon sources (white sugar, Kelulut honey and jaggery) in black and green tea media over a period of 7, 14, 28 and 60 days of fermentation. It was found that the antioxidant activity for all samples increased after 7 days of fermentation and subsequently decreased except for the combination of green tea with jaggery. Fermentation with green tea demonstrated a higher antioxidant activity compared to black tea, whereas fermentation using jaggery showed the least antioxidant activity in comparison to white sugar and honey. Antimicrobial activity was also found to increase with fermentation time for all combination. *E.coli*, *S.aureus*, *P.aeruginosa*, *B.subtilis* and *S.marecens* were used for testing the antimicrobial efficacy. *P.aeruginosa* and *S.aureus* were found to be most susceptible while *B.subtilis* was the most resistant.

***Keywords*:** Kombucha, SCOBY, antioxidation, antimicrobial, medium variation

FS-O-07 UCJFW

Physicochemical, Antioxidant and Antimicrobial Properties of Selected Malaysian Honey As Treated At Different Temperatures: A Comparative Study

Sulaiman, N. H. I. [a], Sarbon, N. M [a]

[a] *School of Food Science and Technology, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia.*

Abstract

The antioxidant and antimicrobial properties of honey are well known to be good for human health. However, the heating process affects its physicochemical, antioxidant and antimicrobial properties. The main objective of this study was to determine the effects of heat treatment on the physicochemical, antioxidant and antimicrobial properties of honey Kelulut, Tualang and Acacia honey. Each type of honey was heated at 50, 75 and 90**°C** and an unheated honey was used as a control. The results show that the pH and colour intensity of Kelulut, Tualang and Acacia honey increased after heat treatment. Antioxidant values increased as temperature of the heat-treated honey increased. Additionally, the antimicrobial properties of heat-treated honey decreased with the increase of heating temperature. For agar well diffusion, only Kelulut honey has a zone of inhibition encompassing all temperatures. In general, physicochemical and antioxidant properties of honey increased and antimicrobial properties were reduced in the heat-treated honey in which Kelulut honey showed better antioxidant and antimicrobial properties than Tualang and Acacia honey. In conclusion, heat treatment up to 90°C can improve the physicochemical and antioxidant properties of honey.

Keywords: Malaysian honey; physicochemical; antioxidant; antimicrobial; heat treated honey.

FS-O-08 VNFGX

Potential Mutant of *Lentinula edodes* With High Yield Of (1-3), (1-6-) *B-D-Glucan*

Ibrahim Mahmood [a], Azhar Mohamad [c], Fauzi Daud [a], Babul Airianah Binti Othman [a,b], Hanis Hasan [a], Douglas Law [g], Cheah Yew Hoong [d], Mushrifah Idris [e], Azwan Mat Lazim [e,f], Seng Joe Lim [f], Nur Hidayah Jamar [a,b,e], Herryawan Ryadi Eziwar Dyari [a,b,e], Fatin Qurratu`Aini Zaini [g], Nik Marzuki Sidik [g] and Shazrul Fazry [a,b,e,*]

[a] *Pusat Pengurusan Ekosistem & Sumber Semulajadi, Fakulti Sains dan Teknologi, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia*
[b] *Pusat Bioteknologi & Makanan Berfungsi, Fakulti Sains dan Teknologi, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia*
[c] *Malaysian Nuclear Agency, Bangi 43000, Kajang, Selangor, Malaysia*
[d] *ZACH Biotech Depot Sdn. Bhd., 43300 Cheras., Selangor, Malaysia*
[e] *Pusat Penyelidikan Tasik Chini, Fakulti Sains dan Teknologi, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia*
[f] *School of Chemical Sciences and Food Technology, Fakulti Sains dan Teknologi, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia*
[g] *Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus, Locked Bag 100, 17600 Jeli, Kelantan, Malaysia*

** Corresponding author: shazrul@ukm.edu.my*

Abstract

Lentinula edodes or better known as Shiitake mushroom contains β-1,3;1,6-glucan as part of the cell wall components and studies have shown that it has the ability to enhance the immune system and work as anticancer. The aim of this study is to create potential strain of *L. edodes* with the high content of β-1,3;1,6-glucan, which has the potential for biotechnological purposes. *L. edodes* spores were irradiated with gamma ray (ɣ-rays) and incubated, which formed monokaryon mycelium (MM). Compatible mating of mutated monokaryon formed mutant line dikaryon mycelium (MLDM) that were selected for genotypic and phenotypic comparison with the wild-type line dikaryon mycelium (WLDM). The concentration of β-1,3;1,6-glucan were measured using a commercial β-Glucan Megazyme Assay Kit (Yeast & Mushroom). Three MLDM, (A37, A26, and C07) 38.8, 36.0 and 34.5 %w/w of 100 mg respectively, significantly produced higher amount of β-1,3;1,6-glucan in comparison with WLDM (20.2 %w/w of 100 mg).

***Key words*: D**ikaryon mycelium, Monokaryon mycelium, Mutation, *Lentinula edodes*.

FS-O-09 XWQNN

The Antioxidant Drinks of The Fruit Extract of *Eucalyptus alba*

Dodi Darmakusuma [a,d*], Suwari [a], Luther Kadang [a], Tengku Mohammad Ariff Raja Hussin [b], Amor T. Karyawati [c], Senkoen A. Manek [d], Vito A. Payong [d], Leny Heliawati [e]

[a] *Jurusan Kimia, Universitas Nusa Cendana, Kupang, Indonesia*
[b] *Institute for Community Health Development i-CODE, UniSZA, Kuala Terengganu, Malaysia*
[c] *Jurusan Biologi, Universitas Nusa Cendana, Kupang, Indonesia*
[d] *Laboratorium Riset Terpadu, Universitas Nusa Cendana, Kupang, Indonesia*
[e] *Jurusan Kimia, Universitas Pakuan, Bogor, Indonesia*

* Corresponding author: dodi_darmakusuma@staf.undana.ac.id , dodikimia@yahoo.com Telp. +6281339808678

Abstract

The scavenging activity of the antioxidant drinks formula that contains Eucalyptus alba fruit extract has investigated. This study was conducted to determine the potential of free radical scavenging of the some formula of Antioxidant drinks that contains water extract of E. alba fruit. In this study made four formula beverage containing water extract of E. alba fruit. The total antioxidant capacity of the formula is determined as free radical activity which eradicate in accordance with the elimination of radical 1,1-diphenyl-2-picryl-hydrazyl (DPPH). The total phenol content of the formula is measured spectroscopically by the Folin-Ciocalteu reaction. All formulas are found to have radical scavenging effects associated with total phenolic content. The total antioxidant capacity of the formula II (92.07%±0.36) was observed higher than that of the others, since Formula II has a higher phenolic content than formulas I, III and IV. As a result, due to its antioxidative properties, formula II is selected as an antioxidant drink formula of the E. alba Fruit Extract.

Keywords: Antioxidant Drinks, Eucalyptus alba

FS-O-10 EBXDC

Honey For Increased Hemoglobin Level In Third Trimester Pregnant Women

Retno Widowati [a,*], Dewi Kurniati [b], Putri Marlina [b]

[a] *Department of Biology, Graduate School, Universitas Nasional, Jakarta 12510, Indonesia*
[b] *Department of Midwifery, Faculty of Health Sciences, Universitas Nasional, Jakarta 12510, Indonesia*

[*] *Corresponding author: retno.widowati@civitas.unas.ac.id*

Abstract

Anemia in third trimester pregnant women is defined as a decrease in hemoglobin (Hb) level of less than 11 g/dL during pregnancy. It is affected by iron deficiency. Anemia during pregnancy has many adverse outcomes for the mother and her fetus. In Indonesia, the prevalence of anemia in pregnant women is still a concern. Honey is known as a prime natural ingredient as well as a healthy nutrition for pregnant women. It contains sugar, vitamins, amino acids, trace enzymes and minerals such as iron. The objective of this research is to determine the effect of honey consumption on hemoglobin levels in third trimester pregnant women. A quasi experiment with pre test and post test was designed to determine the effect on pregnant women in third trimester at Mandalawangi Public Health Center of Pandeglang, Banten, Indonesia on April 2018. Hb levels were checked before and after administration of one tablespoon of honey, twice daily, in the morning and evening, for seven days. There were 25 third trimester pregnant women who were diagnosed for anemia. The research used independent paired samples t-test for the analysis. The results show that there were 16 mothers with mild anemia and 9 mothers with moderate anemia. At the end of intervention, there were 18 normal mothers and 7 with mild anemia. The mean Hb level at the beginning of the study was 8.996 g/dL (SD 0.807) and at the end was 11.360 g/dL (SD 0.997). Honey increases Hb levels of third trisemester pregnant women significantly.

Keywords: anemia, pregnant women, hemoglobin, honey, iron

FS-O-11 EGYYE

Microbiological Quality and Shelf Life Studies of Ready to Eat Burgers Sold At Street Stalls Around Kuantan City, Pahang

Maryam I. Zulkifli [a,*], Ibrahim A. Bakar [b]

[a] *International Institute for Halal Research and Training (INHART), International Islamic University Malaysia, Kuala Lumpur, 50728, Malaysia.*
[b] *Department of Nutrition Science, Kuliyyah of Allied Health Sciences, International Islamic University Malaysia, Kuantan, 25200, Pahang, Malaysia.*

* *Corresponding author: insyirahzu@yahoo.com*

Abstract

The objectives of this study were to evaluate the microbiological quality of RTE Halal burgers collected from street stalls around Kuantan city and to determine the shelf life of the street burgers. A total of 68 convenient samples were randomly purchased and examined for Total Plate Count (TPC) and *S. aureus* count. For shelf life study, about 14 samples of RTE halal street burgers were purchased at the same time from one street stall burger. The samples were divided into 7 groups where each group contains two burgers (duplicate). The seven groups were left at ambient temperature for seven interval holding hours (<4h, 4h, 8h, 12h, 16h, 20h, 24h). The analysis of TPC and *S. aureus* were then performed for each groups of the samples. The result showed that all RTE halal street burger samples had low to medium risks where TPC were less than $3.0x10^3$ cfu/g and *S. aureus* count range from $0.1x10^2$ to $4.0\ x10^3$ cfu/g. Shelf life study also showed that all street burger samples had low to medium risks where TPC below $1.7\ x10^2$ cfu/g and *S. aureus* count less than $1.9x10^2$ cfu/g even though the samples were left at ambient temperature up to 24 hours.

Keywords**:** Ready-to-eat Halal street burger, Total Plate Count, *Staphylococcus aureus* and Shelf Life Study.

FS-O-12 FDGUE

Effect of Drying on Physicochemical and Functional Properties of Stingless Bee Honey

Yien Hui Chen [a] , Fook Yee Chye [a,*]

[a] *Faculty of Food Science and Nutrition, Universiti Malaysia Sabah, 88400 Kota Kinabalu, Sabah, Malaysia.*

* *Corresponding author: fychye@ums.edu.my*

Abstract

This study aims to evaluate the effect of drying on the functional quality of stingless bee (*Heterotrigona itama)* honey. The honey was subjected to vacuum drying (40-60^{o}C), vacuum evaporation (40-60^{o}C) and freeze-drying respectively to achieve a standardized moisture content. The physicochemical properties, antioxidant capacity and antibacterial activity of the dehydrated stingless bee honeys were determined. The dehydrated honey seemed to have a significant ($p<0.05$) darker colour (lower L* and higher b* values) as compared to the raw honey. Results suggested that the dryness of the dehydrated honey has significantly affected its antioxidant capacity except oxygen radical absorbance capacity (ORAC) assay. Additionally, drying at higher temperature (60^{o}C) with shorter time exhibited stronger antioxidant capacity for both vacuum methods. It seems that vacuum drying at 60^{o}C for 3.3 hours produced honey with higher total phenolic (300.24 ± 6.81 mg GAE/kg) and flavonoid contents (273.83 ± 2.52 mg QE/kg), which were also characterized by the highest 2,2-azinobis-(3-ethylbenzothiazoline-6-sulphonate) (ABTS) (371.34 ± 2.57 µmol TE/100g) and ferric reducing antioxidant power (FRAP) (344.20 ± 6.81 µmol Fe^{2+}/100g). A sharp decline in antibacterial activity against *Staphylococcus aureus* and *Escherichia coli* was observed on the dehydrated honeys despite the freeze dried honey could better retained its inhibitory activity. None of the dehydrated honey presented with 5-hydroxymethylfurfural (HMF) content exceeded 30 mg/kg limit. A significant change in glucose content was observed after drying. Five phenolic compounds were quantified by high-performance liquid chromatography with diode array detector (HPLC-DAD) with rosmarinic acid and quercetin exists predominantly in dehydrated honey. In conclusion, high temperature short time vacuum drying could be an efficient way to improve honey stability with enhanced antioxidant activity but antibacterial activity was compromised.

***Keywords*:** Dehydrated stingless bee honey, antioxidant, antibacterial, 5-hydroxymethylfurfural, sugar, phenolic compounds

FS-O-13 JGWVU

Effects of Roasting Temperature and Time on Chemical Markers and Biological Activities of Syconia Extracts From Two Varieties of *Ficus Deltoidea* Jack

Alkasim K. Yunusa [a,d], Zalilawati M. Rashid [a,b], Nashriyah M. [a], Che Abdullah A. Bakar [a], Abdul M. Ali [a,b,c,*]

[a] *Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia*
[b] *Institute of Agropolis, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia*
[c] *Natural Medicine Research Centre, Universiti Islam Malaysia, Cyberjaya, Selangor*
[d] *Department of Food Science and Technology, Kano University of Science and Technology Wudil, Kano State Nigeria*

* *Corresponding author: manaf@unisza.edu.my*

Abstract

Ficus deltoidea Jack (Moraceae) is one of the medicinal plants with long history in Malay traditional medicine. Roasting influences on total phenolics content (TPC), antioxidant, alpha glucosidase activities and marker compounds of ethanolic and aqueous extracts of syconia of *Ficus deltoidea* were evaluated. Total phenolics content and α-glucosidase inhibitions of aqueous extract of both var. *trengganuensis* and var. *kunstleri* were not affected by roasting. DPPH (IC_{50}) of ethanolic extracts of var. *trengganuensis* increased in all the roasting conditions. FRAP values were also increased in syconia roasted at 130°C 15 min and 140°C 10 min. Two marker compounds, namely, vitexin and isovitexin were quantified by HPTLC. In general, level of vitexin and isovitexin of ethanolic extracts of var. *trengganuensis* were reduced after roasting, while remained unchanged in var. *kunstleri*. Roasting conditions significantly increased the isovitexin content of the aqueous extracts of var. *trengganuensis*. This study concludes that the antioxidant activities can be increased via maillard reaction. Thus, roasting temperature of 130-150°C are suitable for roasting syconia of *Ficus deltoidea* for the production of coffee-like beverage.

Keywords: *Ficus deltoidea* · Antioxidant activity · Roasting · vitexin · isovitexin

FS-O-14 LGPYV

Characterisation of Boiled Eggs: *Pindang* Egg and Tea Egg

Noorakmar, A. W. [a,*], Ng, W. M. [a], Fan, H. Y. [a], Mohd Ismail, A. [a]

[a] *Faculty of Food Science and Nutrition, Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Malaysia.*

* *Corresponding author: aqemanur@ums.edu.my*

Abstract

Pindang egg and tea egg were processed by boiling in hot water for a few hours with variety of leaves and spices to provide brownish colour and aroma onto the boiled eggs. The aim of this study was to compare the physicochemical and sensory properties as well as shelf life of the boiled eggs upon storage at room (25°C) and chill (4°C) temperatures. Therefore, analyses of ash, protein, fat, minerals, tannin content and texture profile analysis were conducted to determine the physicochemical properties of the boiled eggs. Quantitative Descriptive Analysis (QDA) and microbiological study were used to investigate the sensory properties and shelf life of the boiled eggs, respectively. The results showed that *pindang* egg was higher in protein and ash content compared to tea egg ($p<0.05$), but there was no significant different in fat content ($p>0.05$). *Pindang* egg also had high sodium (Na), calcium (Ca), iron (Fe) and magnesium (Mg) content compared to tea egg and hard-boiled egg ($p<0.05$). Moreover, tannin content of *pindang* egg and tea egg were higher than hard-boiled egg ($p<0.05$), and decreasing in trend of tannin content were found up to four days of storage at room and chill temperatures ($p<0.05$). At day 0, hardness and cohesiveness of *pindang* egg and tea egg were higher than hard-boiled egg ($p<0.05$), but the eggs were adhesive ($p>0.05$). Upon storage at room and chill temperatures, the hardness, adhesiveness and cohesiveness of all eggs were increased ($p<0.05$). Both *pindang* egg and tea egg had strong aroma, darker colour, hard and bitter compared to hard-boiled egg, however tea egg showed better overall acceptance than others ($p<0.05$). *Pindang* egg and tea egg could last up to four days at chill storage (4°C). In conclusion, *pindang* egg and tea egg had better chemical values, hardness, acceptance and longer shelf life than hard-boiled egg.

***Keywords*:** Egg, physicochemical properties, sensory properties, shelf life

FS-O-15 MHHKE

Innovation of Beras Kencur As An Antioxidant Drink That Has Potential of Anticancer and Antibacterial

Abdullah Mutis[a,*], Siti N.A Wardah[a], Fedderica G.I Rustiarini[a], Ipo Darliyanti[a], Nury N. Aradea[a]

[a] *SMAN 1 Ciomas, Kabupaten Bogor, West Java, Indonesia*

* *Corresponding author: MutisAbdullah1@gmail.com*

Abstract

Beras Kencur is one of the Javanese traditional health drink. The main compounds of the drink are *kencur* (*Kaempferia galanga*) and white rice (*Oryza sativa* L.). The aim of this research is development of formulation of Beras Kencur drink made from red rice and black rice as antioxidant drink that have potential as anticancer and antibacterial. The research was done in four steps. The first step is formulation of Beras Kencur with infusion of red rice and black rice. Four formulations were made i.e. Formula I consists of 20% A solution (contain infusions of *kencur*, ginger, and palm sugar) and 80% B solution (red rice infusions); Formula II consists of 50% A solution and 50% B solution; Formula III consists of 20% A solution and 80% C solution (black rice infusions); Formula IV consists 50% A solution and 50% C solution. The second step is screening of antioxidant activity of formula using 2,2-diphenyl-1-picrylhydrazyl (DPPH) method. The third step is screening of anticancer potential based on inhibition assay of MFC-7 cell line proliferation using 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) method. The fourth step is screening of antibacterial activity of the formula using disk diffusion method against *E.coli* and *S. typhi*. The research results show that all formulations had antioxidant activity against DPPH. Formulation IV was the best in inhibition activity of MFC-7 cell line proliferation (74.713±2.787%) at 10%(v/v) concentration. The formulation showed inhibition activity against *S.typhii* (8mm). Therefore it is recommended as an antioxidant drink that has potential as anticancer and antibacterial.

Keywords**:** *Beras Kencur, Antioxidant, Anticancer, Antibacterial, Red Rice, Black Rice*

FS-O-16 TKFPG

Glycemic Index of Chocolate Fortified With Selected Vegetables and Its Effect on Mood and Cognitive Functions of Female Students

Norshazila, S., Zarinah, Z., Wan Nor Atikah, W.R., Nurul Zaizuliana, R.A.

Faculty of Bioresources and Food Industry, University Sultan Zainal Abidin, Besut Campus, 22200, Tembila, Terengganu.

* *Corresponding author: norshazila@unisza.edu.my*

ABSTRACT

Moringa, red spinach, and butterfly pea flower are underutilized vegetables that can give a natural coloring when added into food. In addition, these selected vegetables also contain a high value and nutrient content that can give benefits to human health when consumed it. The objectives of this study is to determine the glycemic index of chocolate fortified with moringa, red spinach, and butterfly pea flower powder, and to observe the effect of fortified chocolates consumptions on mood and cognitive function of female students in UniSZA. 10 respondents were asked to consume glucose solution, control chocolate, and fortified chocolate in order to determine the glycemic index by finger-prick blood sample using a glucometer in a duration of 2 hours. The mood and cognitive function of the 30 respondents were observed. The blood pressure of the respondents also were observed during the mood test. The results showed the mood increase to slightly happy from neutral feeling after 30 minutes consumption of chocolates. Moreover, the percentage of the memorized items in order form also increased after 30 minutes consumed fortified chocolate. The means score of the blood pressure also in a normal range which is below 120/80 mm Hg. Besides, Area under Curve (AUC) was calculated to determine the glycemic index and the results showed all of fortified chocolate had low glycemic index to be compared with glucose solution. Thus, consumption of fortified chocolate could enhance happy mood and reduce stress, improve cognitive ability, and suitable for diabetes patients due to the low glycemic index.

Keywords: *V. parahaemolyticus*, PCR, antibiotic susceptibility test, MAR index, survivability, biofilm formation

FS-O-17 TKFPG

Sensory Evaluation and Physicochemical Properties of Chocolate Fortified With Selected Local Crops From Terengganu

Norshazila, S.,[a] Zarinah Z., [a] Nurfarhana, S., [a] Nurul Zaizuliana, R.A.[a]

[a] *Faculty of Bioresources and Food Industry, University Sultan Zainal Abidin, Besut Campus, 22200, Tembila, Terengganu.*

** Corresponding author: norshazila@unisza.edu.my*

Abstract

The aim of this research was to determine sensory evaluation and physicochemical properties of chocolate fortified with purple sweet potato powder, orange sweet potato powder and pumpkin powder. Purple sweet potato, orange sweet potato and pumpkin were pre-treated with blanching and soaking in sodium meta- bisulphate solution and dried in cabinet dryer at 40ºC then grind before being sieved (250µm) to produce three types of powder. These powders were analyzed for its nutritional composition and color stability for five months. Chocolate fortified with 1%, 3% and 5% of purple sweet potato powder, orange sweet potato powder and pumpkin powder were produced to determine the most acceptable formulation by 30 untrained panelists. Sensory evaluation revealed that the most acceptable chocolate fortification was obtained at 1% addition level of purple sweet potato powder, 3% addition level of orange sweet potato powder and 1 % addition level of pumpkin powder. Chocolate fortified with 1% of purple sweet potato powder and 1% pumpkin powder were analyzed in terms of their proximate composition, color stability, texture analysis and also thermal properties. The result showed that there were significant different ($p<0.05$) in protein and ash between the three powder samples. For color stability of purple sweet potato powder, orange sweet potato powder and pumpkin powder, significant different in a* value and b* value was observed. The proximate analysis for chocolates showed that there were a significant different ($p<0.05$) in fat and ash content. This study also revealed that color stability of chocolate fortified with 1% of purple sweet potato powder increased significantly in L* value and decreased significantly in a* value. Meanwhile, chocolate fortified with 1% of pumpkin powder showed significant increased in a*value. Besides, it showed that hardness and melting point of chocolate increased after addition of powder into chocolate. Thus, addition of 1% purple sweet potato powder and 1% pumpkin powder into chocolate can improve nutritional value in term of mineral content.

FS-O-18 VJPXN

Physicochemical Properties and Stability of *M. oleifera* Seed Oil-in-Water Emulsions As Affected by Different Types of Gum and Emulsifier

Nor Hayati Ibrahim [a,*], Ong J. Jin[a], Nizaha Juhaida Muhamad [a], Wan Rosli Wan Ishak [b]

[a] *School of Food Science and Technology, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia*
[b] *School of Health Sciences, Universiti Sains Malaysia, Health Campus, 16150 Kubang Kerian, Kota Bharu, Kelantan, Malaysia.*

* *Corresponding author: yati@umt.edu.my*

Abstract

M. oleifera seed oil has been regraded as a potential medicinal oil and converting it into a functional food emulsion is of current interest to widen its consumpition. This study was conducted in order to investigate physicochemical properties (pH, viscosity and 1, 1-diphenyl-2-picrylhydrazyl scavenging activity) and stability (creaming stability and turbidity loss rate and total oxidation value) of *M. oleifera* seed oil-in-water emulsions as affected by different types of gum i.e. xanthan gum (XG), guar gum (GG), carboxymethyl cellulose (CMC) and emulsifiers i.e. sodium caseinate (NaCas) and whey protein isolate (WPI). There were significant ($p < 0.05$) interaction effects of gum and emulsifiers on the pH, viscosity (at $0.04s^{-1}$), creaming stability and total oxidation value of the emulsions. A significant ($p < 0.05$) lower pH in XG-WPI (4.98) and XG-NaCas (4.72) emulsions were observed as compared to other emulsions (5.19-5.40), which favored their stability since the values were far enough from the isoelectric points of whey protein (5.3) and casein (4.2). The Interaction of XG-WPI and XG-NaCas further resulted in significant ($p < 0.05$) higher viscosity values of 35100 mPa.s and 10750 mPas in their emulsions, respectively as compared to others (550-850 mPas). This seemed to result in their excellent creaming stability as no synerisis (phase separation) was observed even after storage (15 days, 4°C). Main effects of gum and emulsifier somehow significantly ($p < 0.05$) affected the scavenging activity (28.61 – 40.68%) of the emulsions, with XG emulsions showed the highest activity. Total oxidation values (11.18 – 24.93) as measured after accelerated oxidation period (48 hours, 60°C), were more influenced by peroxide value rather than anisidine value. All WPI emulsions and CMC-NaCas emulsion showed significant ($p < 0.05$) low total oxidation values relative to other emulsions. All emulsions however showed no significant difference in their turbidity loss rate ($1.2 – 3.3 \times 10^{-3}$). These findings assist in producing a good quality of functional food emulsions based on *M. oliefera* seed oil when the system was stabilized by XG-WPI. This is mainly due to their positive (i.e. synergistic) interaction effects on emulsion pH and viscosity which eventually led to a good stability against creaming and inhibition of lipid oxidation.

Keywords**:** *M. oleifera* seed oil, gum, emulsifier, emulsion, properties, stability

FS-O-19 XRGDR

Development of Gluten-Free Cake From Heat-Moisture Treated Sago Flour and Xanthan Gum

Jau-Shya Lee [a,*], Md. Jahurul Haque Akanda [a], Fui-Peng Oon [a]

[a] *Faculty of Food Science and Nutrition, Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah, Malaysia*

[*] *Corresponding author: jslee@ums.edu.my*

Abstract

The effects of heat-moisture treated (HMT) sago flour and xanthan gum on the physicochemical characteristics, sensory acceptance, proximate content and shelf-life of gluten-free sago cake were investigated. A 2 x 4 Factorial Design consisted of eight sago cake formulations using HMT sago flour (15 %, 20 % moisture content) and xanthan gum (0%, 0.4 %, 0.8 %, 1.2 %) was employed. Cakes prepared by 100 % of wheat flour and sago flour were used as standard and control for comparison in this study. Heat-moisture treatment and xanthan gum were found to improve the quality of the cake by increasing the batter viscosity, subsequently increased the volume and the texture of the cake ($p < 0.05$). The use of HMT sago flour increased the resistant starch content in the final product by at least three-fold as compared to the control ($p < 0.05$). In contrast, addition of xanthan gum decreased the resistant starch content ($p < 0.05$). The most acceptable formulation was determined by Hedonic Test, in which this cake was found most desirable in term of volume, colour and texture ($p < 0.05$). The resistant starch content of this cake was higher than the standard, whereas the dietary fibre content was also higher than the control ($p < 0.05$). The shelf-life of this cake was also found longer than the standard and control.

Keywords: *gluten-free, resistant starch, heat-moisture treatment, xanthan gum*

FS-O-20 ZXUBZ

Comparative Studies of The Physicochemical and Pasting Properties of Malaysian Breadfruit (*Artocarpus altilis*) Flour and Commercial Wheat Flour

Siti Nuriah, M.N. [a], Zarinah, Z. [a,*] and Napisah, H. [b]

[a] *Faculty of Bioresources and Food Industry, Kampus Besut, Universiti Sultan Zainal Abidin, 22200 Besut, Terengganu, Malaysia.*
[b] *Faculty of Health Sciences, Kampus Gong Badak, Universiti Sultan Zainal Abidin, 21300 Kuala Terengganu, Terengganu, Malaysia*

**Corresponding author: zarinah@unisza.edu.my*

Abstract

Artocarpus altilis or breadfruit is considered as underutilized food crop in Malaysia. Information on its physicochemical and pasting properties is vital for enhancing its utilization as an alternative flour source in vast industrial applications. Breadfruit flour (BFF) was produced from matured unripe breadfruit from Terengganu, Malaysia and its physicochemical and pasting properties were assessed and compared with commercial wheat flour (CWF). BFF exhibited lower moisture content (10.98%) than CWF (12.42%) and possessed higher value in ash (2.25%) as compared to CWF (1.71%). The crude fat for BFF, 0.74% was lower than CWF (1.44%), but BFF showed high value in crude fibre content (4.85%) as compared to CWF (0.23%). The mean for water holding capacity (WHC), oil holding capacity (OHC) and dispersibility of the BFF were 1.52g/g, 1.16g/g and 40% respectively and were higher than the values of the CWF. The swelling power of the BFF and CWF showed the same trend; as the temperature increased, the values also increased. The pasting temperature (PT) for the BFF was higher than the CWF; 82.75°C and 69.73°C respectively. Moreover, BFF also showed slightly higher final viscosity than the CWF, where the values were 3402.5 cP and 3323.0 cP respectively. This study concluded that BFF has displayed its specific physicochemical and pasting properties which made it differs from the commercial flour, thus promising its uses in so many areas especially in food industries.

***Keywords*:** Breadfruit flour, commercial wheat flour, physicochemical properties, swelling power, pasting properties

FS-O-21 FSBXF

Inhibition acivity of α-Glucosidase by *Sargassum hystrix* Extract and Its Fractions

Ratih Paramadina Sulistyo[a], Amir Husni[a,*], Prihati Sih Nugraheni[a]

[a] *Department of Fisheries Faculty of Agriculture Universitas Gadjah Mada, Jalan Flora Gedung A4 Bulaksumur Yogyakarta 55281 Indonesia*

Abstract

Seaweed has great potentials in the pharmaceutical field, and one of them as antidiabetic. The purpose of this study was to isolate and identify the active fraction of *Sargassum hystrix* in inhibiting α-glucosidase. *S. hystrix* was extracted using methanol, then partitioned using chloroform, ethyl acetate, and methanol. Ethyl acetate fraction was then separated by column chromatography to obtain the purer fractions. The crude extract, the ethyl acetate fraction, and the column chromatography fraction were tested for their activity in inhibiting α-glucosidase. The active fractions of ethyl acetate in inhibiting α-glucosidase were further identified using *gas chromatography-mass spectrometry* (GC-MS). The results showed that inhibitory activity (IC_{50}) of *S. hystrix* extract and ethyl acetate fraction successive, i.e., 0.344 ± 0.052 and 0.009 ± 0.002 mg/mL. All column chromatography fractions have an inhibitory activity to α-glucosidase, i.e., E1-E7 were 57.39, 54.37, 67.94, 58.11, 47.73, 95.48 and 98.95%, respectively. The analysis of GC-MS showed that the suspected compound which had inhibited α-glucosidase in ethyl acetate fraction were 1,3,5-benzenetriol dihydrate, 9-octadecenoic acid, hexadecanoic acid, oleic acid, 1-heptadecanecarboxylic acid, and 9-Octadecanoic acid (Z).

***Keywords*:** *Sargassum hystrix,* antidiabetic activity*,* α-glucosidase, ethyl acetate fraction

FS-O-22 WUVMB

A Comparative Study of Palm Antioxidants; Palm Phenolics, Palm Vitamin E and Their Combination, In An Experimental Atherosclerosis Rabbit Model

C.A. Che Idris [a,*], T. Karupaiah [b], K. Sundram [c], Y.A. Tan [a], N. Balasundram [a], S.S. Leow [a], R. Sambanthamurthi [a]

[a] *Product Development and Advisory ServicesDivision, Malaysian Palm Oil Board, Bandar Baru Bangi, 43000 MPOB Kajang, Selangor, Malaysia*
[b] *School of Healthcare Sciences, Faculty of Health Sciences, National University of Malaysia, 50300 UKM Kuala Lumpur, Malaysia*
[c] *Malaysian Palm Oil Council, Wisma Sawit, MPOC 47301 Kelana Jaya, Selangor, Malaysia*

* *Corresponding author: anis@mpob.gov.my*

Abstract

This study aims to evaluate the protective effect of vitamin E and the palm water soluble antioxidant either alone or in combination in the prevention of atherosclerosis in an atherogenic rabbit model. Male New Zealand White rabbits were divided into four groups consisting of eight animals per group. They were either fed with atherogenic diet only (CTR), or atherogenic diet with vitamin E (VIT E), or atherogenic diet with oil palm phenolics (OPP), or atherogenic diet with both vitamin E and oil palm phenolics (VIT E+OPP). Animals were fed diets *ad libitum* for 100 days. Results from lipid profile and antioxidant analyses were not significantly different between groups ($p>0.05$). However, fibrous plaques were associated with the CTR group (8.90±5.41%) and these were significantly less ($p<0.05$) in the VIT E (2.88±2.01%) and OPP (1.48±4.45%) groups. Fibrous plaques were not detected at all in the VIT E+OPP group. Our findings suggest that oil palm vitamin E and oil palm phenolics individually inhibited atherosclerotic lesion development. However, oil palm vitamin E in combination with oil palm phenolics provided the highest protective effect against development of atherosclerotic lesions.

***Keywords*:** Atherosclerosis, Oil palm phenolics, Lipid profiles, Antioxidant activity, Rabbits

FS-P-01 ZDYHV

Isolation and Identification of Fungi Responsible For Postharvest Decay of Tomato Fruits (*Lycopersicon esculentum* Mill.) In Kura, Kano State, Nigeria

Dandago, Munir Abba [a,*], Gungula, Daniel T. [b] and Nahunnaro, Hycenth [c]

[a] *Department of Food Science and Technology, Kano University of Science and Technology,Wudil, Kano State, Nigeria.*
[b] *Department of Crop Production and Horticulture, Modibbo Adama University of Technology Yola, Adamawa State, Nigeria.*
[c] *Department of Crop Protection, Modibbo Adama University of Technology Yola, Adamawa State, Nigeria.*

** Corresponding author: dandago223@gmail.com*

Abstract

Tomato (*Lycopersicon esculentum* Mill.) is a popular vegetable worldwide and plays a vital role nutritionally because it is rich in vitamins, minerals, sugars, fiber and essential amino acids. It contains high amount of lycopene, a carotenoid with antioxidant properties. Nigeria is the second largest producer of tomato in Africa and 13th in the world but estimated postharvest loss is about 60% .Fungi are the most important pathogens infecting tomatoes, causing important losses during harvesting, transportation and storage. This study was conducted in *Kura* (latitude 11° 46′ N and longitude 8° 25′ E) between 25th March to 18th April 2013 and 2nd March to 27th March 2014. Analyses were conducted in the laboratories of Kano University of Science and Technology Wudil. The design was a 3x3x3 factorial laid out in RCBD with 3 factors at 3 levels replicated 3 times. Treatments consisted of 3 kg sound fruits. Fungi were isolated and identified from rotten tomatoes every 3 days for 24 days using Collins and Lyne (1976) and Snowdon (1989). Pathogenicity test as reported by Onunka and Ekwenye (2000) was conducted to prove that the organisms isolated were responsible for the decay. Results revealed five fungi namely *Aspergillus flavus, Aspergillus niger, Aspergillus fumigatus*, *Mucor* spp. and *Rhizopus stolonifer. Mucor* spp. had the highest occurrence of 29.2 and 30.4% followed by *Rhizopus stolonifer* with 29.2 and 26.1% in 2013 and 2014. Inoculation of isolates on fresh tomatoes revealed that the 5 fungi inoculated were pathogenic because they developed rots characteristics of the particular organism while the control remains firm and healthy after the 3 days. Further studies on ways to control the major postharvest fungi of tomatoes particularly using natural antimicrobials were recommended.

***Keywords*:** Tomato, fungi, kano, storage, postharvest

FS-P-02 AEAE

Phytochemical Composition and Antioxidant Activity of Pumpkin Flour and Pumpkin Seed Flour

Norfarizan-Hanoon N.A. [a,*] and Nor Aniza M.A. [a]

[a]*Nutrition and Dietetic Programme, School of Health Sciences, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan.*

** Correspondance author: nhanoon@usm.my*

Abstract

Pumpkin (*Cucurbita moschata*) and pumpkin seed have been receiving an increasing attention due to its nutritional value and medicinal purposes. This study aims to evaluate the chemical compositions, total phenolic compounds as well as antioxidant activity of the pumpkin flour (PF) and pumpkin seed flour (PSF). Antioxidant activity was determined using 2, 2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity while total phenolic content (TPC) was determined using Folin-Ciocalteu assay. PF had a significant highest on moisture, ash, and carbohydrate but lower calorie content as compared to both PSF and control flour ($P < 0.001$). PSF had a significant highest on crude fat (34.58 ± 0.62%), crude protein (32.73 ± 0.85%), calorie (608.90 ± 0.98 kcal/100g) and crude fiber (13.33 ± 0.29%) contents as compared to PF and control flour ($P<0.001$). PSF has a significantly highest on iron and copper content than PF and control flour ($P < 0.001$) while there is no significant differences in the zinc content between PF and PSF. Besides, the highest TPC was detected in control flour while there is no significant differences in the TPC between PF (5.49 ± 0.24 mg GAE/g) and PSF (5.38 ± 0.56 mg GAE/g) ($P = 0.95$). PF was found to be the most potent scavenger with (67.59 ± 1.10%) of radical scavenging activity at concentration of 1.0 mg/ml. The DPPH radical scavenging activity of PF in all concentrations were significantly higher in comparison to PSF ($P < 0.05$). The DPPH radical scavenging activity of PF in all concentrations was significantly higher than control flour except for concentration of 0.2 mg/ml. In conclusion, PF and PSF may be potentially used as a functional ingredient to improve the nutritional and economic values of food.

Keywords: chemical composition, total phenolic content, antioxidant activity, pumpkin flour, pumpkin seed flour

FS-P-03 BAMUW

The Influence of The Image of Chocolate Origin (Domestic And Imported) Towards Consumer Acceptance Rate In Indonesia

B.S. Muhammad [a,*], D. Maulana [a], M.F. Irsali [a]

[a] *Bogor Agricultural University*

* *Corresponding author: budysalaam@gmail.com*

Abstract

The purpose of this research is to test the influence of the image of chocolate origin (imported and domestic) towards consumer acceptance in Indonesia. The sample of this research is 90 students of Bogor Agricultural University with random sexes and ages. The study was conducted in 2 phases and performed on different days. In the first phase, respondents were asked to assess some domestic chocolate which labelled import and being presented with interesting packaging and description. In the second phase, respondents assessed the same chocolate but without the label and description. Assessment was done by using hedonic test followed by ranking test, interview and CATA (check-all-that-apply) test. The data obtained was then processed to determine the difference of the acceptance of chocolate commodities based to their origin using the SPSS with 95% significant level ($p<0,05$), followed by Duncan post hoc test. This research can imply towards the preference tendency of Indonesian consumers towards import image of some food products, especially chocolate which has big potential to be developed further. This preference can also be great value on deciding strategies in chocolate products to comply with consumers needs in response to more open and fluctuative market since the era of ASEAN Economic Community.

Keywords*: : *Food Preference, Chocolate, Image Origin, Consumer Behaviour

FS-P-04 PQMAW

The Effect of Temperature on Total Phenolic Contents and Radical Scavenging Activity of Tualang and Kelulut Honeys

Syaliza Omar [a,*], Noor Marinah Sahri [b], Hafizah Abd. Aziz [b], Maimunah Sanny [c,d]

[a] *Faculty of Veterinary Medicine, University Malaysia Kelantan, 16100 Kota Bharu, Kelantan, Malaysia*
[b] *Faculty of Pharmacy, University Technology MARA, Puncak Alam Campus, 42300 Bandar Puncak Alam, Selangor. Malaysia*
[c] *Department of Food Science, Faculty of Food Science and Technology, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia*
[d] *Laboratory of Food Safety and Food Integrity (FOSFI), Institute of Tropical Agriculture and Food Security, University Putra Malaysia, 43400, Serdang, Selangor, Malaysia*

**Corresponding author: syaliza.o@umk.edu.my, dr.syaliza@gmail.com*

Abstract

The effect of temperature at 50°C, 70°C and 100°C for up to 120 min on the content of phenolic compounds and antioxidant activity of Tualang honey and Kelulut honey was studied. Unheated honey samples for both varieties were used as control. The total phenolic content and radical scavenging activity were examined using Folin-Ciocalteau and DPPH assays, respectively. Both honeys vary widely in the total phenolic content and radical scavening activity upon heating and time of heating. The total phenolic content in both honeys showed fluctuations at all temperatures throughout 120 min. In comparison to controls for both honeys, heating at 100°C for 10 min demonstrated a drop in total phenolic content in Tualang honey (13%) and Kelulut honey (29%), but the radical scavening activity increased 29% and 57% in Tualang and Kelulut honeys, respectively. The study generates information on the characteristics of components in both honeys which react differently to heat and time of heating, therefore this will help the honey manufacturers or public to optimise the processing protocols in order to preserve the quality of honey.

Keywords: antioxidant activity, DPPH assay, total phenolic contents, honey

FS-P-05 QRHHT

Detection and Characterization of *Vibrio parahaemolyticus* In Raw Mackerel Fish and Fish-Based Street Food

Syamimi Hanim Mat Sa'ad [a], John Yew Huat Tang [a,*], Lee-Hoon Ho [a], Kamarul'ain Mustafa [a]

[a] *School of Food Industry, Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut,Terengganu , Malaysia*

* *Corresponding author: jyhtang@unisza.edu.my*

Abstract

This study aims to investigate the prevalence of *Vibrio parahaemolyticus* in raw mackerel fish as well as fish-based products namely *satar* and *otak-otak*. A total of 120 fish, 90 *satar* and 35 *otak-otak* that had been purchased randomly in Terengganu were subjected to PCR and conventional plating method for detection and isolation of *V. parahaemolyticus*. The isolates were characterized by 12 types of antibiotic using discs diffusion method. Survivability of *V. parahaemolyticus* in artificially contaminated *satar* and *otak-otak* were determined using spread plate method. Biofilm formation of *V. parahaemolyticus* on stainless steel, glass and plastic surfaces was assessed using crystal violet assay. About 67.5%, 23.3% and 5.71% of fish, *satar* and *otak-otak* respectively, were contaminated with *V. parahaemolyticus*. A total of 58 *V. parahaemolyticus* isolates were recovered from fish. Among them, 24 of *V. parahaemolyticus* isolates carried *tdh* gene and 3 isolates had *trh* gene. All the isolates were susceptible to amikacin, norfloxacin, ceftazidime, ciprofloxacin, and enrofloxacin. They had high resistance towards penicillin (93.1%), vancomycin (89.7%) and ampicillin (55.2%). About 56.9% of strains isolated showed a MAR index higher than 0.2, indicating these strains were from high risk sources of contamination. Survivability of *V. parahaemolyticus* in *satar* and *otak-otak* inoculated with approximately 8.66 log CFU/ml found decreasing number of *V. parahaemolyticus* with the increasing incubation time. For biofilm formation, the readings of OD_{570} at time 96 h for fish broth growth medium on stainless steel, glass and plastic were 0.76±0.04, 1.38±0.03 and 0.96±0.04, respectively, indicating fish broth could support *V. parahaemolyticus* biofilm formation. The results showed that the attachment of *V. parahaemolyticus* cells on these contact surfaces increases with time. This study found that *V. parahaemolyticus* contaminating raw fish mackerel, was capable to survive in *satar* and *otak-otak* and form biofilm on different food contact surfaces.

Keywords**:** *V. parahaemolyticus*, PCR, antibiotic susceptibility test, MAR index, survivability, biofilm formation

FT-O-01 CJUTC

Impact of Hydrothermal Modifications of Broken Rice Flour on Characteristics of Flat Rice Noodles

Nor Afizah, M.[a,b,*], Tang, L.Y.[a], Wan Zunairah, W.I.[a], Nor Khaizura, M.A.R.[a], Nur Hanani, Z.A.[a]

[a] *Faculty of Food Science and Technology, Universiti Putra Malaysia, 43400, UPM Serdang, Selangor, Malaysia.*
[b] *Halal Product Research Institute, Universiti Putra Malaysia, 43400, UPM Serdang, Selangor, Malaysia.*

[*] *Corresponding author: nor_afizah@upm.edu.my*

Abstract

Broken rice is a by-product produced during milling process, containing high percentage of damage starch that can affect cooking and textural properties of products. Expanding the utilization of broken rice flour requires modification of its functional properties. Hydrothermal treatments of broken rice flour (MR263) via heat-moisture treatment (HMT) and microwave-heat-moisture treatment (microwave-HMT) were performed to investigate the effects on characteristics of flat rice noodles. Broken rice flour adjusted to 20% (w/w) moisture content were subjected to HMT at 110ºC for 3 h and microwave-HMT at 119 W for 5 min. Color, swelling power and solubility of the rice flours were compared with untreated flour (Control). The flours were used to produce flat rice noodles and final products were evaluated for color, optimal cooking time, water absorption, cooking loss and sensory properties. No significant different in swelling power and solubility of the flours was observed, while the hydrothermal treatments decreased the lightness of flour. Flat rice noodles made from HMT broken rice flour exhibited the lowest water absorption and cooking loss, but noodles obtained had the lowest lightness (L*) and the highest yellowness (b*). Noodles made from HMT flour had the highest sensory acceptance compared to the untreated and microwave-HMT. In conclusion, HMT treatment of broken rice flour enhances the characteristics of broken rice, the cooking properties and consumers' preferences of flat rice noodles. Therefore, the utilization of broken rice in various food applications can be widen via one-step physical modification of starch.

Keywords**:** Broken rice, heat-moisture treatment, microwave-HMT, swelling power, flat rice noodles, cooking properties.

FT-O-02 EABYK

Efficient Protein Separation Process Via High Selective PVDF/Surfactant Ultrafiltration Membrane

Safari N.H.M. [a], Takwa C.W.I.C.W. [a], Hassan A.R. [a,b,*], Sulaiman N.A. [a], Rozali S. [a]

[a] *East Coast Environmental Research Institute (ESERI), Universiti Sultan Zainal Abidin, Gong Badak Campus, 21300 Kuala Nerus, Terengganu, Malaysia*
[b] *Faculty of Innovative Design and Technology (FRIT), Universiti Sultan Zainal Abidin, Gong Badak Campus, 21300 Kuala Nerus, Terengganu, Malaysia*

* *Corresponding author: rahmanhassan@unisza.edu.my*

Abstract

Sodium dodecyl sulfate (SDS), Triton X-100 and Tween 80 surfactants were incorporated into poly(vinylidene fluoride)/polyvinylpyrrolidone (PVDF/PVP) blending to yield a series of PVDF-surfactant ultrafiltration (UF) membranes by phase inversion technique. In this study, the effects of single and dual surfactants in the PVDF-surfactant ultrafiltration (UF) membranes were examined in terms of permeability and proteins (bovine serum albumin, BSA; egg albumin, EA) separation efficacy. Experimental data shows that dual surfactants (SDS/Tween 80) in the membrane solutions significantly enhanced the membrane permeability up to 838.11 L/m²h at 300 kPa. In addition, PVDF-dual surfactants membranes improved flux rate and protein separations, which are 285.51 L/m²h and 93% of separation for BSA protein, respectively compared to the performances of PVDF-single surfactant membranes. Moreover, the membranes cross-sectional morphologies analyzed by scanning electron microscopy (SEM) revealed that, the incorporation of surfactants into the PVDF/PVP membranes led the formation of enlarged macro-voids in the sub-layer and increased the growth of small finger-like structure beneath the top skin layer. As the surfactant materials played an important role in determining the performance and properties, the fabricated high selective PVDF-surfactant UF membrane showed to have a great opportunity to be used as an efficient process for agricultural and biotechnology as well as food processing industries.

***Keywords*:** Ultrafiltration, surfactant, poly(vinylidene fluoride), bovine serum albumin, egg albumin.

FT-O-03 EDUAB

Refining Process For Production of Refined Palm-Pressed Fibre Oil

Nur Sulihatimarsyila A.W. [a,*], Harrison L. N. Lau [a], Nabilah K.M. [a], Nur Azreena I. [a]

[a] *Energy and Environment Unit, Engineering and Processing Research Division, Malaysian Palm Oil Board, 6, Persiaran Institusi, Bandar Baru Bangi, 43000 Kajang, Selangor, Malaysia.*

** Corresponding author: nursulihati@mpob.gov.my*

Abstract

Palm-pressed fibre oil (PPFO) is rich in natural phytonutrients such as carotenes and tocotrienols (vitamin E), and is worth for further development to enhance its quality. Crude PPFO is currently being extracted using solvent without further refining. This study aims to refine crude PPFO using a combination of processes including degumming, bleaching and deacidification. Various doses of hot distilled water at 0.5, 1.0, 2.0, 3.0, 4.0 and 5.0 v/v% were applied during water degumming to remove soluble and hydratable gummy materials in crude PPFO. Degumming with acids at 0.1, 0.3, 0.5 and 1.0 wt% were tested to obtain oil with low phosphorus content. Bleaching earth at 0.1, 0.5 and 1.0 wt% were used to adsorb trace metals and other impurities. The bleached PPFO was subjected to deacidification to remove free fatty acid (FFA). The optimum refining conditions were using 5.0 v/v% of hot distilled water at 90°C for 20 min for water degumming, 1.0 wt% of phosphoric acid at 90°C for 10 min for acid degumming, 0.1 wt% of natural bleaching earth at 105°C for 15 min during bleaching, and deacidification at 110°C at 0.1 mtorr. The refined PPFO (RPPFO) showed a significant reduction of phosphorus content of 98% (from 565 ppm to 13±2 ppm) and FFA of 97% (from 5.94% to 0.15%) while increase in deterioration of bleachability index (DOBI) of 44% (from 1.99 to 2.87±0.17). In addition, RPPFO was high in carotenoids (1208±23 ppm) and vitamin E (904±8 ppm) that can be developed into high value products. The RPPFO meets the quality specification of refined bleached deodorised palm oil (RBDPO) while maintaining the heat-sensitive phytonutrients.

Keywords: Red fibre oil, degumming, bleaching, phytonutrient, phosphorus content

FT-O-04 EGKJS

Effect Of Encapsulation With Gelatin and Alginate, and Coating With B-Glucan, Chitosan and Gellan Gum On The Viability of *Lactobacillus acidophilus* During Freeze-Drying and In Simulated Gastrointestinal Conditions

Chee Weng Lam [a], Fook Yee Chye [a], Chee Kiong Siew [a,*]

[a] *Faculty of Food Science and Nutrition, Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah, Malaysia.*

* *Corresponding author: cksiew@ums.edu.my*

Abstract

One major challenge in the delivery of probiotic products is the reduced survivability of the probiotic microorganisms caused by the high or low temperature during processing and storage, and the extreme acidic pH conditions in the gut (such as the gastric juice) before reaching the target site colon. The aim of this study was to investigate the effect of encapsulation and coating with hydrocolloids on the viability of *Lactobacillus acidophilus* (La05) during freeze-drying and in simulated gastrointestinal conditions. La05 was encapsulated in 2 different hydrocolloid matrices namely (1) alginate (ALG) and (2) gelatin (GEL) using extrusion method with calcium chloride solution. The beads obtained were subsequently subjected to coating using 3 different materials namely (1) β-glucan (BG), (2) chitosan (CH), and (3) gellan gum (GG). All encapsulated La05, with and without coating, were exposed to freeze-drying and subsequently 4-hr sequential simulated gastrointestinal environment. Free cells of La05 were used as the control sample. Free cells of La05 recorded 3.58 log CFU g^{-1} reduction in cell viability during freeze-drying, from the initial (before freeze-drying) 8.90 log CFU g^{-1} to the final (after freeze-drying) 5.32 log CFU g^{-1}. Cell viability during freeze-drying of the encapsulated La05 was improved ($p<0.05$) with a reduction of 1.86 - 1.92 log CFU g^{-1}, from the initial 8.24 – 9.07 log CFU g^{-1} to the final 6.32 - 7.21 log CFU g^{-1}. The cell viability during freeze-drying was further enhanced by coating with a lower reduction of 1.22 - 1.52 log CFU g^{-1}, from the initial 8.10 – 8.88 log CFU g^{-1} to the final 6.66 - 7.53 log CFU g^{-1}. The protection on the La05 by the encapsulation was again demonstrated during the simulated gastrointestinal exposure with a lower reduction in cell viability (4.22-4.23 log CFU g^{-1}) for the encapsulated La05. Further protection on the La05 by coating was evident as a much lower reduction in cell viability (2.64 – 3.43 log CFU g^{-1}) was observed during the simulated gastrointestinal exposure. Without the protection of encapsulation and/or coating, the free cells of La05 were undetectable after the simulated gastroinstestinal exposure. In conclusion, encapsulation provided protection to La05 during both freeze-drying and simulated gastrointestinal exposure. Additional coating to the encapsulated La05 provided further protection to the La05. As compared to the other samples, GEL-encapsulation with BG-coating provided the highest protection to La05 during freeze-drying and in simulated gastrointestinal conditions.

Keywords**:** *Lactobacillus acidophilus*; viability; encapsulation; coating; gelatin; alginate; β-glucan; chitosan; gellan gum; freeze-drying; simulated gastrointestinal conditions.

FT-O-05 GCMXF

Effect of Garlic (*Allium sativum* L.) on The Physicochemical, Microbiological and Sensory Properties of Chili Sauce

Mahmood A. [a,*], Tuan Zainazor T.C. [a] and Anuar N.R. [a]

[a] *Pusat Pegajian Sains dan Teknologi Makanan, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu.*

** Corresponding author: azizah.m@umt.edu.my*

Abstract

Garlic or scientifically known as *Allium sativum* L. is known to have natural antimicrobial properties that help to prolong the shelf life of food products. However, the presence of many sulphur-containing compounds dominated in garlic cloves could affect the physicochemical properties and sensory acceptability of food products if added at a high quantity. The aim of the present study is to evaluate the effects of different percentages of garlic (3%, 5% and 10%) on the physicochemical, microbiological and sensory properties of chili sauce product. The physicochemical properties such as pH, total soluble solid, viscosity and colour as well as microbiological activities of *Bacillus cereus*, yeast and mold were evaluated. The growth of microorganisms in the spiked samples of chili sauce was continuously examined for 30 days of the experimentation period. The acceptance of chilli sauce formulated with different percentage of garlic was determined by untrained panellists using affective test. Incorporation of garlic to the chili sauce had increased the pH, total soluble solid and viscosity with increasing percentage of garlic added. The colour of chili sauce tends to have more lightness and yellowness while showing less redness at higher percentage of garlic. The effectiveness against *Bacillus cereus*, yeast and mold were identified in the sauce contains of 10% garlic and maintain within the acceptable level for up to 30 days of the experimental period. Sensory evaluation showed that the addition of up to 10% garlic also did not affect the acceptance level ($p>0.05$) of the chili sauce. The present study shows that garlic has a potential to replace chemical preservatives that are normally being used in making chili sauce.

Keywords: garlic, physicochemical, antimicrobial, acceptability, chili sauce

FT-O-06 GURTN

The Effect of Extrusion Conditions on The Physical Properties of Fish-Based Expanded Snacks (Amplang)

Nor Qhairul Izzreen, M. N.[a,*], Noorakmar A. W.[a], Lee J. S.[a], Amir, H.[a], Umi Hartina, M. R.[a], Faridah, H.[b], Azman, H.[b]

[a] *Faculty of Food Science and Nutrition, Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Malaysia.*
[b] *Food Science and Technology Research Centre, MARDI, 43400 Serdang, Selangor.*

** Corresponding author:qhairul@ums.edu.my*

Abstract

Amplang is a well-known and popular snack in Sabah. However, Amplang is manually produced and is limited to cottage production. The aim of this project was to increase the production of Amplang using extruder and to compare between the Amplang produced using manual method and extruder. Therefore, the effect of extrusion conditions, including feed moisture content (15–18%), screw speed (146–208 rpm), and barrel temperature (100–140 °C) on the physical properties (density, expansion and textural characteristics) of an expanded Amplang was investigated. Increasing barrel temperature resulted in extrudates with higher expansion but with lower density and hardness. Increasing screw speed caused a reduction in density and hardness of fish extrudate. Higher feed moisture content increased density and hardness but lower the expansion of extrudate. Amplang produced manually resulted in 6.22 – 8.14 expansion, 0.15 – 0.20 g/cm3 bulk density and 58.74 – 63.37 hardness. Meanwhile, the extrudate results of expansion, bulk density and hardness were 1.37 – 3.12, 0.51 – 1.55 g/cm3 and 54.6 – 58.3 respectively, in which the most differences were observed for the expansion between the two methods.

***Keywords*:** Twin screw extrusion, fish, physical properties

FT-O-07 KCXXX3

Food Waste: An Energy Source For Developing Countries

Shilpa V. [a,*], Anbazhagi Muthukumar [a], Muthukumar Muthuchamy [a]

[a] *Department of Environmental Science, School of Earth Science Systems Central University of Kerala, Kasaragod Kerala-671314, India*

* *Corresponding author: sanbazhagi @cukerala.ac.in*

Abstract

The serious challenge faced by our society is the effective management of the increasing food waste. In developing countries like India, 67 million tonne of food wastes is generated every year and these food wastes pose serious societal challenges. Food waste is an organic solid waste which has a relatively high energy content. Several techniques have been adopted to convert food waste to renewable energy. Microbial fuel cell (MFC) is a promising technique that uses bacteria and several chemicals contained in the food waste for the generation of electrical charges. Hence this MFC has a good potential for electricity generation and waste stabilisation.Some limiting factors such as high internal resistance and high cost of membranes hinder the practicability of MFC for scaling up, therefore appropriate optimization is needed to make the microbial fuel cells suitable to large scale production of electricity. This study suggests the adoption of less expensive MFC for routine generation of electricity as well as management of food waste.

Keywords: Electricity generation, food waste, microbial fuel cell, renewable energy

FT-O-08 KCXXX

Ozonation and Light Emitting Diodes: A Novel Approach to Combat Foodborne Pathogen

Anbazhagi Muthukumar [a,*], Muthukumar Muthuchamy [a]

[a] *Department of Environmental Science, School of Earth Science Systems, Central Unviersity of Kerala Kasaragod , Kerala-671314, India*

* *Corresponding author:: sanbazhagi @cukerala.ac.in*

Abstract

Food-borne illnesses are rampant among the human population. Globally, the developed countries are searching for efficient and safe protocols for providing food safety. The best way to reduce incidence of food-borne diseases is to secure safe food supply. The aim of the study is to recommend simple, efficient, easy to use, multifunctional, and inexpensive disinfection technique for the inactivation of foodborne pathogens such as Salmonella sp., Shigella sp., Bacillus cereus, Listeria monocytogenes, Staphylococcus aureus and Streptococcus sp*. Ozone is an an attractive option for the food industry since it has high oxidation potential without leaving any toxic residues making it environmental friendly. Another option to inactivate food borne pathogens is through exposure to Light emitting diode (LED). LED made out of gallium aluminum nitride (AlGaN) and aluminum nitride has promising properties.They also use electricity more efficiently, producing little heat and no toxic substances. The wavelength of UV LED used in this study is 269nm because of the superior disinfection performance. A cocktail of foodborne pathogens are inoculated onto fruits, vegetables, milk, chicken and fish. Microbiological enumeration and estimation of Log reduction of pathogens after exposure to ozone and UVC- LEDS were also performed. Based on the complete reduction of the foodborne pathogens onto the inoculated samples the usage of ozone and Ultra Violet Light Emitting Diode to (UVC-LED 269-nm) has been recommended in food industry.*

Keywords: foodborne pathogens, inactivation, ozonation, Light emitting diodes, food industry

FT-O-09 LJKFU

Stability of Lactic Acid Bacteria and Physico-Chemical Properties of Pasteurized Cow's and Goat's Milk

Malik N. S. [a], Lani N.M.[a] and Ahmad F. T. [a,*]

[a] *School of Food Science and Technology, Universiti Malaysia Terengganu, 21030, Terengganu, Malaysia*

* *Corresponding author: fauziah.tufail@umt.edu.my*

Abstract

This study is done to determine the effect of pasteurization on the stability of lactic acid bacteria and its enzyme, and also physico-chemical properties in raw and pasteurized cow's and goat's milk. Most of the physico-chemical properties (pH, protein, ash and fat) were highest in pasteurized goat's milk. The total viable count for plate count of the bacterial growth concentration was higher in both pasteurized cow's and goat's milk which were 2.48 log CFU/ml. This was followed by raw cow's milk (1.59 log CFU/ml) and raw goat's milk (0.65 log CFU/ml). Besides, there was no yeast and mould detected in both raw and pasteurized in cow's and goat's milk. Lactic acid bacteria was found significantly higher in raw milk compared to pasteurized milk. Interestingly, based on API ZYM assay kit result, there were nine different enzymes were detected in all samples which were *leucine arylamidase, valine arylamidase,cystine arylamidase, trypsin, α-chymotrypsin, naphthol-AS-BI-phosphohydrolase, α-glucosidase, β-glucosidase* and *acid phosphatase* revealed that different type of lactic acid bacteria were detected in treated and non-treated milk samples by different animals.

Keywords**:** Cow's milk, goat's milk, pasteurization, physicochemical, lactic acid bacteria, microbial status

FT-O-10 MYNPN

A Review of Active and Intelligent Biodegradable Film From Valorisation of Industrial Waste

Nur Assyiqah Syuhada Mohamad Asri [a], Siti Noor Suzila Maqsood-ul-Haque [b,*]

[a] *Faculty of Chemical Engineering, Universiti Teknologi Mara (UiTM) Shah Alam, Selangor*

** Corresponding author: suzihaque@salam.uitm.edu.my.*

Abstract

The increase of current consumer demand for convenient and high quality food products leads to the development of creative approaches in packaging technology. Food packaging plays an important role in maintaining the quality of packaged food from any chemical, physical and environmental damage. Among other packaging materials, plastic is the most applicable and has the largest market in packaging industry due to its special characteristics in terms of performances, excellent structural properties and aesthetic quality at lower cost. However, the increasing use of plastic packaging nowadays will create environmental and health risk issues since it is non-degradable and capable to release a toxin to landfill and water supplies. Basically, plastics are made up from petroleum which is one of the non-renewable sources. It is produces from energy-intensive techniques that capable to destroy our ecosystem. Usage of biodegradable material is seemed not applicable as it is more expensive compared to petrochemical-based plastic. Thus, a valorisation of industrial waste as a raw material for making biodegradable packaging film is promising an alternative to achieve economic scale with the 'Green' concept. To make it become the most applicable like plastic, this packaging film must provide good mechanical strength, non-toxic, compatible with food and should not cause any changes of origin food condition including colour, undesired chemical reaction, flavour and aroma. Therefore, this review focuses on the latest advances of biodegradable film from utilization of industrial waste and their properties are reviewed along with their potential for application in food packaging industry.

Keywords: Active and Intelligent food packaging; Bio-degradable; Edible film; Valorisation; Industrial waste

FT-O-11 NFDHM

The Growth and Ph Changes of *Lactobacillus Plantarum*, *Bifidobacterium* and *Escherichia coli* During *In-Vitro Fermentation* of Breadfruit Resistant Starch

Napisah Hussin [b], Nur Jannah Mohd Najeeb [a], Zarinah Zakaria [a,*], Norshazila Shahidan [a]

[a] *Faculty of Bioresources and Food Industry,Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia.*
[b] *Faculty of Health Science, Universiti Sultan Zainal Abidin, Gong Badak Campus, 21300 Kuala Terengganu, Terengganu, Malaysia.*

** Corresponding author: zarinah@unisza.edu.my*

Abstract

Breadfruit or *Artocarpus altilis* is a neglected fruit that has its own nutritional value. Resistant starch is defined as the total amount of starch and the products of starch degradation that resists digestion in the small intestine where they will be fermented by the gut microbiota, producing a variety of products which include short chain fatty acids that can provide a range of physiological benefits through the process of fermentation. The aim of this study is to determine the growth and pH changes of *Lactobacillus Plantarum* ATCC 8014, *Bifidobacterium* ATCC 11863 and *Escherichia coli* ATCC 10536 during *In vitro fermentation* by using different types of carbohydrates or prebiotics sources and different fermentation time (6, 12, 24, 48, and 72 hours). The result showed that the growth and pH changes for *L.Plantarum*, *Bifidobacterium* and *Escherichia Coli* were significantly different ($p<0.05$) between breadfruit resistant starch and other carbohydrate sources after incubation at different fermentation periods (0, 6, 12, 24, 48, and 72 hours) during *in vitro* fermentation. In conclusion, breadfruit resistant starch has the potential to be used as a prebiotic substance to promote one's health, besides increasing the numbers of probiotic bacteria as well as producing metabolites such as acids that could later benefit the host.

***Keywords*:** Breadfruit resistant starch, prebiotic In-vitro fermentation, growth changes, pH

FT-O-12 PEWFP

Antimicrobial Coating Formulation From Rhizome Extract of Purple Nutsedge (*Cyperus Rotundus L.*) As A Solution to Resolve The Problems of Post Harvest Tomatoes

Panji Rahmatullah [a,*], Asri Mutia Sani [a], and Alvi Muntafi Ilma [a]

[a] *Department of Agrotechnology, Science and Technology Faculty of Sunan Gunung Djati State Islamic University Bandung, Indonesia. Jalan A.H. Nasution No. 105, Cipadung, Cibiru, Bandung, West Java, Indonesia.*

* *Corresponding author: panjirahmatullah@outlook.com*

Abstract

Tomato is a commodity that is widely cultivated in Indonesia. Durability of tomato during storage is still a constrain because the tomatoes are stricken with microbes and various post-harvest pest. Note that the rhizome of purple nutrgass that grows wild in Indonesia contains antimicrobial compounds that are able to prevent the growth and the arrival of various types of microbes and post-harvest pest. This study aims to determine the influence of antimicrobial contain rhizome extract of purple nutsedge (REPN) towards growth and the presence of microbes and post-harvest pest on tomatoes, in effort to improve the durability of tomato during storage. This research method using Completely Randomized Design 4 times repeat with 5 treatment; P1 = Control, P2 = 0.5% REPN, P3 = 1% Extract P4 = 2% REPN, and P5 = 3% REPN. The results indicate treatment P4 = 2% REPN is the best formulation that capable of suppressing and preventing the growth of microbes and various post-harvest pest without destroying the texture and flavor of the tomato fruit.

***Keywords*:** Tomato, Post-Harvest, Coating, Storage, Purple Nutsedge Rhizomes.

FT-O-13 QDBCZ

Development of Fish Snacks by Using Extrusion Technology

A.T. Afidah [a], A.R. Russly [b,*], B. Jamilah [b], S. Radhiah [b]

[a] *Department of Technology and Natural Resources, Universiti Tun Hussein Onn Malaysia, Pagoh Campus, Jln Panchor, 84600 Panchor, Johor, Malaysia*
[b] *Department of Food Technology, Faculty of Food Science and Technology, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia*

** Corresponding author: russly@upm.edu.my*

Abstract

People have been forced to choose easy-to-access snacks instead of qualified meals. Therefore, snacks become very important part of the diet and contribute very much to the consumers' daily nutrient and calorie intake. The objective of this study is to develop formulation of expanded fish snacks following the formulations of fish crackers by using two different types of starch which are tapioca and corn. 6 samples of ready-to-eat (RTE) snacks were produced by fixed extrusion condition and drying (50ºC overnight) from blends of fish powder from round scad species, tapioca starch and corn starch along with other ingredients. The snacks were subjected to physical, chemical and sensory analyses. The value of protein was in the range of 4% to 30%. Sample with higher expansion ratio was less in protein. The conducted sensory evaluation study shows that many of the attributes (appearance, colour, texture and others) of the product accepted by consumers was from blends of surimi powder and tapioca starch. However, for highly acceptable nutrient dense snacks were produced from blends of surimi powder and corn starch at ratio 1:1. These results strongly suggest that snacks with high protein content can be developed from extrusion processing.

Keywords: Fish snacks, tapioca starch, corn starch, extrusion technology,

FT-O-14 UCUGK

Glycemic Index and Sensory Evaluation of Breadfruit Resistant Starch Bread

Zarinah Zakaria [a,*], Farah Syimira Rasdi [a], Norshazila Shahidan [a] and Napisah Hussin[b]

[a] *Faculty of Bioresources and Food Industry,Universiti Sultan Zainal Abidin, Besut Campus, 22200 Besut, Terengganu, Malaysia.*
[b] *Faculty of Health Science, Universiti Sultan Zainal Abidin, Gong Badak Campus, 21300 Kuala Terengganu, Terengganu, Malaysia.*

** Corresponding author: zarinah@unisza.edu.my*

Abstract

The objective of this study was to determine the Glycemic Index (GI) of Breadfruit Resistant Starch (BRS) bread. Bread that is frequently consumed by people has a high GI value. Therefore, this study was conducted to determine how breadfruit resistant starch affects the GI value of bread when it is added to the bread formulation. Three different percentage of BRS were added to the bread formulation which is 5 %, 10 % and 15 %. The GI test was conducted by assessing blood glucose level using finger-prick blood samples and the subjects were ten female UniSZA students. Besides that, Hedonic Test was also conducted in this study to determine the organoleptic properties of breadfruit resistant starch bread in term of color, aroma, taste, springiness, chewiness, softness and overall acceptability.The results shows that the addition of breadfruit resistant starch in the bread formulation lowers the Glycemic Index of the bread but the bread still in the category of high GI bread as the the addition of breadfruit resistant starch is only 5% and the GI value also affected by the protein content of the bread whereby decreasing protein content caused an increase in GI value. Other than that, 5% breadfruit resistant starch bread was well accepted by the consumer according to sensory evaluation. As a conclusion, addition of breadfruit resistant starch might helps to lower the GI value of bread but it should be added in a suitable range to obtain a significant effect.

Keywords: Breadfruit Resistant Starch, Bread,Glycemic Index,Organoleptic Properties.

FT-O-14 UCUGK2

Glycemic Index of Chocolate Fortified With Selected Crops From Terengganu and Its Effect on Mood and Cognitive Functions of Female Students

S.Norshazila[a], Y.Syamimi[a], Z.Zarinah[a,*] R.A. Nurul Zaizuliana[a]

[a]*Faculty of Bioresources and Food Industry, Kampus Besut, Universiti Sultan Zainal Abidin, 22200 Besut, Terengganu, Malaysia.*

**Corresponding:zarinah@unisza.edu.my*

Abstract

The objective of the present study is to determine Glycemic Index, mood effect and cognitive function of chocolate fortified with purple sweet potato (PSP), orange sweet potato (OSP) and pumpkin among female students. The control and three types of fortified chocolates were tested on 10 healthy female students to determine blood glucose level before (0 minute) and after 30, 60, 90 and 120 minutes of chocolate consumptions and the Glycemic Index of these chocolate were determined. These fortified chocolate were also tested on another 30 healthy female students to observe mood effect for every 30 minutes until 90 minutes by using 7-scale mood questionnaire and percentage of items memorized (any order and in order) for 30 minutes of chocolate consumption was used to observe the cognitive function. From the result, this study concluded that chocolate which was fortified with PSP and pumpkin were classified as low Glycemic Index food while chocolate fortified with OSP was medium Glycemic Index food. Moreover, the consumption of these fortified chocolate also showed good effect on mood and cognitive function.

***Keywords*:** Fortified chocolate, local crops, glycemic index, mood, cognitive function

FT-O-15 XJPCY

Development of Pineapple Juice Drink Mixed With Fish Collagen Peptide

Umi Hartina, M. R. [a,*], Aw, Z. J. [a], Noorakmar, A. W. [a] and Amir Husni, M. S. [a]

[a] *Faculty of Food Science and Nutrition, Universiti Malaysia Sabah, Jln UMS 88400 Kota Kinabalu, Sabah, Malaysia*

* *Corresponding author: umi.hartina@ums.edu.my*

Abstract

New functional drink was formulated and developed using pineapple juice mixed with fish collagen peptide. Difference and preference sensory tests were conducted to select the most preferred formulation containing 3–7 % collagen peptide with 35 % and 40 % of pineapple. Physicochemical properties, bioavailability and storage quality of the best formulated juice were evaluated and compared with control (juice without collagen peptide). The results indicate that the formulation (F6) with the addition of 40 % pineapple and 7 % collagen peptide was significantly preferred. All of the juice formulations showed significant difference of collagen content ($p<0.05$) in collagen content analysis. Proximate analysis of the best formulated juice showed moisture content of 84.23 ± 0.07 %, ash content of 0.24 ± 0.01%, protein content of 7.64 ± 0.01 %, fat content of 0.23 ± 0.0 2% and crude fiber content of 0.43 ± 0.01 %. pH and total soluble solids of the F6 juice were higher than control juice ($p<0.05$), while the total acidity of F6 juice was lower than control juice ($p<0.05$). Microbiological result showed that F6 juice had a maximum storage quality in the fourth week. pH, total soluble solids and colour in F6 juice were decreased ($p<0.05$) while total acidity was increased ($p<0.05$) during storage period at 4°C. Collagen bioavailability of F6 juice decreased gradually from 89.91 ± 0.03% to 80.74 ± 0.04% ($p<0.05$). The paired-comparison result showed that attributes of colour, sweetness and overall acceptance for the F6 juice were decreased ($p<0.05$) after two weeks of storage, except for aroma. Overall, pineapple juice drink mixed with fish collagen peptide with acceptable quality was successfully developed.

Keywords: pineapple juice, fish collagen peptide, collagen drink

FT-O-16 YXMCZ

Effect of Storage Temperature on Shelf Life of 'Gulai Nasi Dagang' Paste

Tuan Zainazor, T. C. [a,*], Noorazieta, M.R. [a], Mahmood, A. [a] and Fisal, A. [a]

[a] *School of Food Science and Technology, Universiti Malaysia Terengganu, 21030 Kuala Terengganu, Terengganu, Malaysia*

** Corresponding author: t.zainazor@umt.edu.my*

Abstract

'Gulai nasi dagang' paste is a ready-to-cook food that have been used to facilitate food preparation and it is consumed with 'nasi dagang'. The aim of this research was to determine the effect of storage temperature on shelf life of 'gulai nasi dagang' paste at ambient temperature. Samples with additional of 0.07% of sodium benzoate were stored at 25°C, 35°C, and 45°C for 5 weeks. The physical changes (pH, water activity (a_w), color (L*, a*, b* value)), chemical analysis (thiobarbituric acid (TBA) value), and microbial load (aerobic plate count, yeast and mould count, *Bacillus cereus* count, *Escherichia coli* count and *Staphylococcus aureus* count) were evaluated at 1 week interval for 5 weeks. The shelf life of 'gulai nasi dagang' paste was predicted by Arrhenius method using concentrations of thiobarbituric acid (TBA) value. Result obtained showed that there were significant different ($p<0.05$) for all parameters with increasing of storage period except yeast and mould count that was not detected in samples. The pH, a_w, aerobic plate count, *Bacillus cereus* count, *Escherichia coli* count, and *Staphylococcus aureus* count were decreased while the TBA value was increased as the storage time increased. The color of 'gulai nasi dagang' paste was degrade with decreased of L* and a* value while increased of b* value after 5 weeks. This study indicated that the shelf life of paste were 25.06, 31.18, and 27.50 weeks at 25°C, 35°C, and 45°C, respectively. This study found that the most suitable storage condition of 'gulai nasi dagang' paste at ambient temperature was at 35°C.

***Keywords*:** Shelf life, storage temperature, gulai nasi dagang, paste

FT-O-17 PNPUZ

Development of Espresso Cocoa From Ghana Cocoa Nibs

B. A. P. Agus [a], N. Hussain [a,*]

[a] *Department of Food Technology, Faculty of Food Science and Technology, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia*

* *Corresponding author: aryatihussain@upm.edu.my*

Abstract

This study aims to produce highly concentrated cocoa bean extract similar to espresso. The effects of storage and grinding size on the physicochemical properties and sensory attributes were analyzed on Ghana cocoa nibs. The analysis involved grinded cocoa nib at 60, 70 and 80 stored for one, two and three days and compared with none stored nibs. The characteristic of grinded espresso cocoa was compared with grinded Boncafe coffee beans (control) by extracting the nibs using Rancilio Rocky Grinder (USA). In this study, grinded Ghana cocoa nib was coarser than grinded Boncafe coffee bean ($P < 0.05$). The result also showed that the 80 grinding size contributed to significantly the coarsest particle size followed by 70 and 60 grinding size ($P < 0.05$). The least viscous (4.32±0.10mpas) and high alkalinity (pH 5.30±0.02) of Ghana cocoa espresso were found during three days cocoa nibs storage. None stored cocoa nibs did significantly promote ($p<0.05$) higher foam performance (score 3.07±0.90) compared to two days storage (score 2.13±0.74). This study indicates that the coarsest particle size of Ghana cocoa had the lowest mean score for color (score 3.05±0.90) than finer particle size (score 4.35±0.67) which contributed to darker (black brown) espresso cocoa given by the untrained panels. In conclusion, selected storage time (none stored nibs) and grinding size (60) did significantly affect ($p<0.05$) the espresso cocoa characteristics.

***Keywords*:** Espresso cocoa, Ghana cocoa nib, physicochemical characterization, preliminary sensory attributes, grinder

FT-O-18 NTWTD

Hydrophobicity and Phase Transition of Isolated Cuticle

J. Haslizawati [a,*], A. R Russly [a], Z. A Nur Hanani [a], A. T Rosnita[b]

[a] *Department of Food Technology, Faculty of Food Science and Technology, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia*
[b] *Department of Food of Process And Food Engineering, Faculty of Engineering, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia*

* *Corresponding author: hasliza_wati84@yahoo.com*

Abstract

The plant cuticle is considered to be an ideal new bio-based packaging material due to its unique defending barrier and waterproofing characteristics to plant. The aim of this work is to explore the hydrophobicity and phase transition characteristic of cuticles enzymatically isolated from tomato, honeydew and papaya peel waste. There are significant difference in thickness and weight among the cuticles. Honeydew cuticle presented higher value of weight and thickness. The hydrophobicity of cuticles were evaluated by contact angle measurements. The result showed that the hydrophobicity of the outer and inner surface of the cuticles are significantly different for tomato and papaya. The hydrophobicity of honeydew cuticle significantly higher compared to other cuticles. The phase transition in cuticle has been measured using differential scanning calorimetry (DSC). It was found that the cuticle of all samples underwent the endothermic transition.

***Keywords*:** cuticle, hydrophobicity, phase transition, DSC, contact angle

FT-O-19 XVWTB

Lactic Acid Bacteria Diversity In Hive of *Apis dorsata* From Semi Arid Tropic Climate In East Nusa Tenggara: The Potential of Biological Resources of Food Funtional Development

Amor Tresna Karyawati [a,d], Lilis Nuraida [b], Yulin Lestari [c] and Anja Meryandini [c,*]

[a] *Microbiology Program, Department of Biology, Faculty of Mathematics and Natural Sciences, Institut Pertanian Bogor. Dramaga, Bogor 16680, West Java, Indonesia.*

[b] *Department of Food Science and Technology, Faculty of Agricultural Technology and SEAFAST Center, Institut Pertanian Bogor. Dramaga, Bogor 16680, West Java, Indonesia*

[c] *Department of Biology, Faculty of Mathematics and Natural Sciences, Institut Pertanian Bogor. Dramaga, Bogor 16680, West Java, Indonesia.*

[d] *Department of Biology, Faculty of Science and Technic, Universitas Nusa Cendana, Kupang, Indonesia. Tel.: +62-251-8622833, email: amormikrobiologi@yahoo.com*

**Corresponding author: ameryandini@yahoo.com*

Abstract

Lactic Acid Bacteria (LAB) have been isolated from the hive of Giant Honey Bee (*Apis dorsata*) originate from tropical climate. This bee species is also found in Benu Village, Kupang District, East Nusa Tenggara as a area of semi arid tropical climate. Information about the diversity of LAB from the hive of *Apis dorsata* from Benu Village has not been found yet. The information is important as a preliminary study of the potential of biological resources for food functional development in the future. Therefore, It is needed a research on diversity of LAB that isolated from the hive of *Apis dorsata* from the village of Benu as a area of semi arid tropical climate. The purpose of this study is determine the diversity of LAB isolated in the hive of *Apis dorsata* from Benu Village. This research is important because it provides preliminary information about the diversity of LAB species from the hive of *Apis dorsata* from Benu Village as the representation of semi arid tropical climate. The result of analysis of Denaturing Gradient Gel Electrophoresis profiles show the presence of seven isolates of LAB from the hive of *Apis dorsata* from the village of Benu. This is an early indication that hive of *Apis dorsata* from semi arid tropic climate has the potential as a Biological Resources of LAB that important for Food Funtional Development in the future.

Keywords: Lactic acid bacteria, *Apis dorsata,* semi arid tropical climate

FT-O-20 ZTZUB

Development, Proximate Analysis and Physical Sensory Evaluation of Soft Cheese Produced Using *Lactobacillus*

Amir Izzwan Zamri [a,*], Nor Hazwani Hasali [a], Mohd Nizam Lani [a] and Aidilla Mubarak [a]

[a] *School of Food Science and Technology, Universiti Malaysia Terengganu, 21030 Kuala Terengganu*

**corresponding author: amir@umt.edu.my*

Abstract

The study aims to produce soft cheese using *Lactobacillus brevis* as starter culture isolated from stingless bee honey. Soft cheese were develop using standard soft cheese formulation with slight modification of two type of processing condition which are incubation time (180 min and 60 min) and temperature (33°C and 37°C) using two type of starter culture in skim milk to obtain the maximum cheese yield. The best formulation based on maximum cheese yield was 180 min and 37°C of incubation time and temperature, respectively using *Lactobacillus brevis* strain NJ42 (strain 1). The proximate analysis of optimized soft cheese were 17.5% for cheese yield, 55.9% for moisture content, 1% for fat content, 20.6% for protein content and 6.3 for pH of cheese. The chemical composition determination showed that their physicochemical of soft cheese follow the gross composition of standard cheese. The soft cheese using *Lactobacillus brevis* strain NJ42 presented good results of acceptance after the sensory evaluation compared to the cheese produced using commercial starter culture. These findings revealed the *Lactobacillus brevis* strains isolated from stingless bee honey could be used as potential probiotic starter culture in food preparation, envisaging its potential therapeutic role in food industry

***Keywords**:* Soft cheese, cheese yield, proximate analysis, sensory evaluation

FT-P-01 CTMHB

Comparison of Clarification Methods on Pineapple (*Ananas comosus*) Juice Using Natural Sedimentation, Fish Gelatin and Bovine Gelatin

S. Nur Atiqah [a], S. Rabiha [a,b,*], A.R. Russly [a,b], B. Jamilah [a,b]

[a] *Halal Products Research Institute, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia*
[b] *Department of Food Technology, Faculty of Food Science and Technology, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia*

** Corresponding author: rabiha@upm.edu.my*

Abstract

Clarification is a common industrial practice which involves the use of gelatin. However, the source of gelatin becomes controversial issues in food industry, especially on halal issues. Fish gelatin can be considered as a possible alternative due to similar characteristics with mammalian gelatin. Therefore, in this study, fish gelatin is proposed as an alternative aid for clarification of pineapple juice. The objectives of this study are to determine the effect of fish gelatin as clarifying agent on the physical (pH, color, turbidity, total soluble solid, viscosity) and chemical properties (titritable acidity and ascorbic acid) of pineapple juice. Pineapple juice was separately clarified with natural sedimentation for 16 h, bovine and fish gelatin solution at concentration of 2 g/L for 2 h. Clarification method using gelatin significantly reduced the turbidity and viscosity of the clarified pineapple juice ($p<0.05$). Gelatin treatment is an efficient method which reduces clarification time process compared to natural sedimentation. No significant different between bovine gelatin and fish gelatin on the pineapple juice properties. Therefore, fish gelatin can be proposed as an alternative in juice processing for improving halal product.

***Keywords*:** Ascorbic acid, Clarification, Gelatin, Pineapple, Turbidity

FT-P-02 EXMTG

Bioactive Composition and Removal of Bitterness Using Sodium Salts In Mesocarp from *Borassus flabellifer*

Rodiah M. H. [a,b], Jamilah B. [a,*], Russly A. R. [a], and Sharifah Kharidah S. M. [a]

[a] *Universiti Putra Malaysia, Faculty of Food Science and Technology, 43400 Serdang, Selangor, Malaysia*
[b] *Universiti Selangor, Faculty of Engineering and Life Sciences, Department of Science and Biotechnology, Bestari Jaya Campus, Jalan Timur Tambahan, 45600 Bestari Jaya, Selangor, Malaysia.*

** Corresponding author: jamilah@upm.edu.my*

Abstract

This study is aimed to investigate the composition of bioactive compounds and to determine the effectiveness of sodium salt on reducing bitterness (flabelliferin) in mesocarp of *Borassus flabellifer (B. flabellifer)*. Eleven compounds were identified in the mesocarp by high-performance liquid chromatography-electrospray ionization mass spectrometry (HPLC-ESI-MS/MS): phenolic compounds (genkwanin, sakuranetin, ferulic acid, protocatechuic acid and caffeic acid), anthocyanins (malvidin 3-(6''-p-coumarylglucoside) and pelargonidin) and steroidal saponins (flabelliferin I, flabelliferin B, flabelliferin E and flabelliferin D). Removal of bitterness was conducted using sodium hydroxide and sodium bicarbonate at the concentration of 1, 2 and 3% at 30 °C for 24h with an agitation speed of 150 rpm and revealed that removing flabelliferin with sodium salt in the mesocarp causes a decrease in total phenolic content. The highest reduction of flabelliferin can be obtained by 3% of sodium hydroxide with 46.2% reduction percentage. This finding exhibited that sodium salt was not suitable in removing the bitterness of *B. flabellifer* mesocarp due to the gradual decrease of the antioxidant characteristic of the sample.

***Keywords*:** Bitterness, *Borassus flabellifer*, flabelliferin, mesocarp, and steroidal saponin.

FT-P-03 KUQDK

Development of Virgin Coconut Oil Spread Using Fish Gelatin and Sodium Alginate

Hui Yin Fan [a,*], Li Li Choo [a]

[a] *Faculty of Food Science and Nutrition, Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah, Malaysia*

* *Corresponding author: chloefan@ums.edu.my*

Abstract

This study was aimed to develop virgin coconut oil spread using fish gelatin and sodium alginate. Based on D-optimal design, 15 formulations were developed with the constraints of virgin coconut oil (20.0-66.4%), water (20.0-66.4%), gelatin (1.0-5.0%) and sodium alginate (0.5-1.0%). Based on the spreadability and emulsion stability of a selected commercial spread as reference, an optimized formulation of virgin coconut oil spread was generated, containing 20.00% virgin coconut oil, 66.33% water, 1.00% gelatin and 0.57% sodium alginate (desirability of 0.9851). In the eight weeks storage study, the spreadability test on the optimized spread formulation showed an increase in hardness and shear force values (p<0.05) from week four to week five and decreased significantly (p<0.05) from week six onwards. Meanwhile, the free fatty acid value of spread increased significantly (p<0.05) from week two onwards. From the paired comparison sensory test, the spread was detected with significant rancid taste (p<0.05) from week eight when compared with fresh spread sample. Consumer test showed that a total of 88% respondents liked this product. There were 98% of respondents liked the taste or aroma while 2% of respondents liked the color of this product. There were 94% of respondents interested in buying this product if the product is marketed. Overall, this study showed the potential in developing virgin coconut oil spread using fish gelatin and sodium alginate.

***Keywords*:** Fish gelatin, alginate, spread, D-optimal design.

FT-P-05 WQEKD

The Effect of Alginate Concentration For Quality of Artificial Pulpy Orange By Sensory Test

Ellya Sinurat [a,*] and Helen Hayasidarta [b]

[a] *Research Center Product Processing and Biotechnology Marine and Fisheries, Indonesia*
[b] *Faculty of Science and Technology, Swiss German University*

** Corresponding author: ellya_sinurat@yahoo.com*

Abstract

Artificial orange pulpy drink is preferred especially among children. The artificial ingredient of orange pulpy is made from alginate. Alginate is derived from brown seaweed *Turbinaria sp.* In this study, a sensory test was conducted on the effect of alginate concentration on the manufacture of artificial orange pulpy. The type of sensory test was hedonic test, which measured the panelists' preference and acceptance of the samples. The parameters being tested were color, taste, aroma, texture, and overall acceptance. The samples in this sensory test were artificial pulpy orange made up in various concentration of alginate (0.4%, 0.6%, 0.8%, 1%, and 1.2%) and the real pulpy orange obtained from Pontianak orange and real pulp from Minute Maid as the controls. In total, there were seven samples for the sensory test. The least preferred samples were artificial pulpy orange made from 0.4% alginate and pulpy orange from Minute Maid.

***Keywords*:** alginate, artificial orange pulpy, sensory test

FT-P-06 YVHCX

Poultry By-Products: From Waste to Wealth

Fatin Arina [a], Nurul Huda [a,b], Norshazila Shahidan [a] and Abdi Wira Septama [c]

[a] *Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Terengganu, Malaysia.*
[b] *Institute for Community (Health) Development, Universiti Sultan Zainal Abidin, Terengganu, Malaysia.*
[c] *Faculty of Medicine, Universiti Sultan Zainal Abidin, Terengganu, Malaysia.*

** Corresponding author: nhuda@unisza.edu.my*

Abstract

Waste from poultry industry has accounted as one of the most important biomass solid waste in this world. Waste product usually comes from feet, skin, feather, internal organs, blood, bones and residual meat. Malaysia is the world third highest duck producer with an increasing population from 9,35 million in 2012 to 10,68 million in 2015. With the average weight of feet per duck is 70 g, the population will provide around 750 tons of duck feet. In lieu of the environmental pollution, the by-product can be used to produce value added products that have bioactive properties in the form of gelatin and gelatin hydrolysate. Gelatin is a soluble protein compound obtained by partial hydrolysis of collagen which is the main protein that comes from bones, cartilages and skins. It has numerous usage in food and pharmaceutical industry for example as gelling binder, stabilizing substances and production of capsules. Gelatin hydrolysate is one of type of bioactive peptide that can affect numerous physiological functions of the organism for example antihypertensive, antioxidant and anticancer effects. This review present about the potential utilization of gelatin and gelatin hydrolysate by using enzymatic proteolysis from poultry especially poultry by product especially poultry feet as an alternative to the available sources that already exist in the industry.

***Keywords*:** Poultry waste, Poultry feet, Gelatin, Gelatin Hydrolysate, Bioactive peptide

FT-P-07 LWXBZ

In-Vitro Anti-Bacterial Activity of Aspirin Derivatives Bearing Halogenated Thiourea Moiety

Norsyafikah Asyilla Nordin [a,*], Zainab Ngaini [b], Norzilawati Pauzi [c]
[a] *Faculty of Pharmacy, Besut, Terengganu*
[b] *Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak*
[c] *Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Besut Campus, 22200*

* Corresponding author: asyillanordin@unisza.edu.my

Abstract

The study is on chemically modified aspirin *via* incorporation with thiourea moiety and halogen. Aspirin was reacted with oxalyl chloride, followed by potassium thiocyanate and halogenated anilines to obtain twelve (12) aspirin derivatives. All the synthesised compounds were elucidated using elemental analysis, FTIR, ^{1}H-NMR and ^{13}C-NMR spectroscopy. All compounds were evaluated for antibacterial activity against *Escherichia coli, Staphylococcus aureus, Pseudomonas aerugenosa* and *Bacillus subtilis* using disc diffusion method. Several compounds showed excellent inhibition against bacterial growth, in comparison to ampicillin (standard antibiotic) and aspirin (parent compound).

Keywords: Chemical modification, aspirin, thiourea, halogen, antibacterial activity

ICAFT 2018

International Conference On Agriculture, Animal Sciences & Food Technology 2018

Universiti Sultan Zainal Abidin Terengganu, Malaysia