International Conference on **Probiotics & Food Sustainability 2018** (ICPFS2018)

23-24 September 2018

Pulai Springs Resort, Johor Bahru, Malaysia

Organized By:



Food and Biomaterial Engineering Research Group, School of Chemical and Energy Engineering, Faculty of Engineering, Universiti Teknologi Malaysia

In collaboration With:





International Conference on Probiotics and Food Sustainability 2018

ICPFS 2018

Abstract Book



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SCHOOL OF CHEMICAL & ENERGY ENGINEERING Faculty of Engineering







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PROFESOR DR. MOHD GHAZALI MOHD NAWAWI

Advisor ICPFS2018 Chair, School of Chemical and Energy Engineering Faculty of Engineering Universiti Teknologi Malaysia

Assalamualaikum and Salam Sejahtera

I am pleased to welcome all participants to the International Conference on Probiotics and Food Sustainability 2018 (ICPFS2018), organized by Food and Biomaterial Engineering Research Group (FoBERG), School of Chemical and Energy Engineering, Faculty of Engineering, Universiti Teknologi Malaysia in collaboration with Asia Pacific Institute of Food Professionals (APIFP) and Universiti Kuala Lumpur-Malaysian Institute of Chemical and Bioengineering Technology (MICET). This conference is the first of its kind to be held by Universiti Teknologi Malaysia, and serves as a platform to connect food researchers from academic, government and private institutions, as well as business operators particularly food manufacturers, suppliers and retailers.

According to FAO, the focus of Malaysia is on improving the nutritional value of food and agricultural products, reducing post-harvest food losses along the food supply chain, and developing a partnership programme to implement technical cooperation projects at national and regional level. Malaysia as one of the leading countries in South East Asia, should grab the opportunity to become the key player in food sustainability and food security in this region. Thus, efforts such as shown by this conference to bring together food professionals to discuss food security and sustainability issues will be of high value and importance.

I hope that this two-day conference will be impactful and beneficial in paving the way to more research and business collaborations, be it national, regional or international level. I also hope that the primary aim of this conference that is to explore emerging technologies and science-based approaches to tackle complex issues of food security and sustainability can be achieved successfully.



Welcome Note From ICPFS 2018 Chairperson and Director

Dear Participants,

On behalf of the organizing committee of ICPFS 2018, we warmly welcome you to the International Conference on Probiotics and Food Sustainability 2018 (ICPFS2018), and also the 5th Asia-Pacific Probiotics Workshop 2018 in Johor Bahru, Malaysia.

It is a great honor and privilege for the Food and Biomaterial Engineering Research Group (FoBERG) Universiti Teknologi Malaysia and other collaborating institutions to co-host the meeting in Johor Bahru, Malaysia. ICPFS 2018 will offer the environment for promoting international discussions on the progress in probiotics research and food sustainability related issues, science and technology.

It is a great pleasure to receive you at the International Conference on Probiotics and Food Sustainability 2018, Johor Bahru, Malaysia. This Conference consists of a pre-conference workshop on 23rd September 2018 (the 5th Asia-Pacific Probiotics Workshop 2018) and the main conference on 24th September 2018. This two-day event is specifically aimed at addressing issues and current research in food, with the workshop dedicated to probiotics and conference divided into three main themes: (1) Innovative Food Products and Functional Foods, (2) Food Safety, Sustainability and Nutritional Security and (3) Emerging Technologies.

On behalf of the organizing committee we would like to express our greatest appreciations and congratulations to all Invited Speakers, Participants, Sponsors, Partners and Committee Members for their support and great effort in materializing ICPFS 2018. We really appreciate each and everyone's contribution, especially the APIFP and local committee who worked hard in making this event successful.

We hope you enjoy the scientific program and equally cherish visiting the Universiti Teknologi Malaysia (UTM) main campus and Johor Bahru City. We enjoy our food very much with their diverse range of flavors and fragrances, and we hope you will find some Malaysian foods and fruits that suit your taste too.

We will do our best to make your stay at this conference a pleasant and fruitful one. If you have any suggestion or question, please do not hesitate to directly communicate with us.



PROFESOR DR. IDA IDAYU Muhamad

Chairperson ICPFS Head Researcher, Food and Biomaterial Engineering Research Group, School of Chemical and Energy Engineering Faculty of Engineering, Universiti Teknologi Malaysia



DR. ZANARIAH HASHIM

Director ICPFS2018 Researcher/Senior Lecturer, Food and Biomaterial Engineering Research Group, School of Chemical and Energy Engineering, Faculty of Engineering, Universiti Teknologi Malaysia

International Conference on **Probiotics & Food Sustainability 2018** (ICPFS2018)

Welcome Note From APIFP Chairperson



Dr Malik Altaf Hussain

Co-Chairperson ICPFS 2018, Executive Director, Asia-Pacific Institute of Food Professional (APIFP)

Dear Food Professionals and ICPFS2018 Participants

I extend my warm welcome to all speakers and delegates who are participating in these specialised technical and scientific events in Asia-Pacific region; (1) International Conference on Probiotics and Food Sustainability 2018 (ICPFS2018), and (2) 5th Asia-Pacific Probiotics

Workshop 2018. I would also congratulate the Food and Biomaterial Research Group (FoBERG), Faculty of Chemical and Energy Engineering (FCEE), Universiti Teknologi Malaysia (UTM) for hosting these international level events. Previously, FoBERG (UTM) and the Asia Pacific Institute of Food Professionals (APIFP) jointly organised two Food Safety and Security Workshops in 2015 and 2016. This is an excellent example of continuation of scientific and technical collaboration between a highly reputed academic institute and a professional organisation.

I would also like to briefly discuss the historical perspective of the probiotics workshop and food security conferences. APIFP has been actively engaged to promote the exchange of knowledge and information for the improvement of the quality, safety and sustainability in food supply systems in collaboration with several academic institutes, government agencies and professional organisations in the region. Some examples of such activities are listed below:

Probiotics Workshops

- 4th Asia-Pacific Probiotics Workshop 2017 hosted by Industrial University of Ho Chi Minh City, Vietnam
- 3rd Asia-Pacific Probiotics Workshop 2016' hosted by Research Institute of Food Science and Technology, Mashhad, Iran

• 2nd Asia-Pacific Symposium on Probiotics and Human Health hosted by Jinan University, Guangzhou, China

• 1st Asia-Pacific Probiotics Workshop 2014 hosted by Lincoln University, Christchurch, New Zealand Food Security and Sustainability

• International Symposium on Food Security and Sustainable Development 2017 (HCM City, Vietnam)

• Asia-Pacific Food Security Symposium 2017 (Bangkok, Thailand)

• International Workshop on Sustainability of Food Resources and Supply Chain 2016 (Kuala Lumpur, Malaysia)

Inaugural Asia-Pacific Symposium on Food Safety 2015 (Singapore)

ICPFS2018 will take our efforts to next level of collaborations and is aimed to explore emerging technologies and science-based approaches to tackle complex issues of food security and sustainability. Probiotics is selected as a special topic of interest to discuss the scientific development to improve health and reduce the symptoms of certain diseases.

Finally, I would like to express my sincere gratitude to the Advisor, the Chairpersons, the Director, management and organising committees of ICPFS2018 as well as UTM, supporting organisation and sponsors. I hope the probiotics workshop and food sustainability conference provide a valuable learning experience for all participants.

About Asia Pacific Institute of Food Professionals (APIFP)



Asia Pacific Institute of Food Professionals (APIFP) (www.apifp2015.wixsite.com/apifp) is a non-profit professional organization and operates with a philosophy that future food supply challenges need collaboration, engagement, communication and continuous efforts to address them effectively. The Asia-Pacific region faces a diversity of food-related challenges, including food security, food safety, food quality, and food shortages. APIFP provides food professionals with a platform to address regional food challenges and exchange information to ensure high quality and safe food supply in the region. It consolidates efforts to develop more and better regional collaborations and cooperative arrangements for the development of food sector. APIFP connects regional food professionals for the benefit of the public and the local food sector through education, research, training and regular engagement. APIFP's key events include scientific and technical conferences, regional symposiums and workshops, student competitions and awards, and professional meetings. APIFP publishes the Asia Pacific Journal of Food Safety and Security (APJFSS).

APIFP offers food professionals opportunities to engage in several capacities that meet the individual's need. You can join APIFP as:

I- Student member

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- 2- Associate member
- 3- Professional member
- 4- Institutional champion
- 5- Regional champion
- 6- Executive committee member

APIFP has set-up many avenues for the food professionals to participate in scientific, technical, and skills development opportunities. Some examples are listed below:

Food professionals are welcome to join APIFP expert groups in following areas.

- Food Safety Professionals
- Food Security Professionals
- Food Microbiology
- Food Toxicology
- Food Nutrition
- Food Processing Technology
- Product Development Professionals
- Postharvest Technology
- Food Industry Professionals
- Food Industry Executives

There are also opportunities for the active food professionals to work collaboratively with APIFP executive team to organise events on emerging food science related issues.

- Scientific and Technical Conferences
- Symposiums
- Regional Workshops
- Professional Development Trainings



Participants of the International Workshop on Sustainability of Food Resources and Supply Chain. The workshop was jointly organized by Food and Biomaterial Research Group (FoBERG), Faculty of Chemical and Energy Engineering (FCEE), UTM and the Asia Pacific Institute of Food Professionals (APIFP) on 20th November 2016 at UTM Kuala Lumpur, Malaysia.

APIFP established committees that are working to promote collaborations between the food professionals working in different countries in the Asia-Pacific region. Joint scientific and technical writing committee is an excellent example that brings food professionals with multiple nationalities to complete a project in the area of mutual interest.

APIFP is also opened to ideas and suggestions from food professionals and organisations to achieve its goals, i.e. the development of food sector in Asia Pacific region.

You are welcome to join APIFP and discover your space as food professional in the Asia-Pacific region. Contact us if you are interested to initiate an event or would like to involve in our activities, APIFP2015@asia.com or info-apifp@asia.com.

For further information:

in https://www.linkedin.com/in/ap-institute-of-food-professionals-a96931112/



About Food and Biomaterial Research Engineering Group

(FoBERG)



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Conference Program

23 September 2018 PRECONFERENCE WORKSHOP

5th Asia-Pacific Probiotics Workshop 2018

in conjunction with International Conference on Probiotics and Food Sustainability 2018 Pulai Springs Resort, Johor Bahru, Malaysia

	Preconference Workshop Venue : Kayangan Suite
08:00 - 08:30 am	Registration
08:30 - 08:45 am	WELCOME AND INTRODUCTION
	Professor Dr. Ida Idayu Muhamad
	Head of Group, Food and Biomaterial Engineering Research Group, School of
	Chemical and Energy Engineering, Faculty of Engineering, Universiti Teknologi
	Malaysia
08:45 - 09:30 am	Keynote Speech : AN OVERVIEW OF GLOBAL PROBIOTICS INDUSTRY AND
	MARKET
	Dr. Malik Altaf Hussain
	Executive Director, Asia Pacific Institute of Food Professionals and Adjunct
THEME 1. PROBIO	TICS DEVELOPMENT
09:30 - 10:15 am	BIOPROCESS PLATFORM DESIGN FOR INDUSTRIAL PRODUCTION OF
07100 10110 am	PROBIOTIC YEASTS: FROM SLANT TO POWDER
	Professor Dr. Hesham Ali El Enshasy
	Director, Institute of Bioproduct Development, Universiti Teknologi Malaysia
10:15 - 11:00 am	THE COLONIZED DIFFERENCES OF ANALYSIS AND TARGETED PREBIOTICS OF
	EVALUATION FOR Akkermansia muciniphila
	Professor Dr. Xiyang Wu
11.00 11.20 am	Vice Dean, International School, Jinan University, Guangzhou, China
11:00 - 11:30 am	MORNING TEA
11·30 - 12·15 pm	EXOPOLYSACCHARIDE PRODUCTION BY PROBIOTIC LACTIC ACID BACTERIA
11100 12110 pill	ISOLATED FROM SOURDOUGH
	Assoc. Professor Dr. Marzieh Hosseininezhad
	Director of International Scientific Cooperation Office, Research Institute of Food
	Science and Technology (RIFST), Mashhad, Iran
12:15 - 01:00 pm	KEFIRAN, A NOVEL POLYSACCHARIDE BY THE PROBIOTIC Lactobacillus
	kefiranofaciens
	Dr. Daniel Joe Dailin
	Researcher/Senior Lecturer, Food and Biomaterial Engineering Research Group,
	Teknologi Malaysia
01.00 - 02:15 pm	Lunch
THEME 3: PROBIO	TICS APPLICATION
02:15 - 03:00 pm	PALM KERNEL CAKE AS POTENTIAL PREBIOTIC SOURCE
	Dr. Noriza Ahmad
	Head of Section Food Technology, Universiti Kuala Lumpur Branch Campus,
	Malaysian Institute of Chemical & Bioengineering Technology, Melaka.
03:00 - 03:45 pm	PROBIOTICS DEVELOPMENT AND THEIR APPLICATIONS FROM PAKISTAN
	PERSPECTIVE Prof. Dr. Muchtag A. Saloom
	Proj. Dr. musiliuq A. Suleeni Dean Faculty of Life Sciences, University of Central Puniah, Labore, Pakistan
03:45 - 04·00 nm	Afternoon Tea
THEME 4: CHALLEN	NGES IN GLOBAL PROBIOTICS INDUSTRY
04:00 - 04:45 pm	PROBIOTICS INDUSTRY IN VIETNAM: CHALLENGES AND OPPORTUNITIES
	Assoc. Professor Dr. Dam Sao Mai

	Dean, Office of Science Management and International Cooperation, Industrial University of Ho Chi Minh City, Vietnam
04:45 - 05:30 pm	PROBIOTICS <i>Lactobacillus casei</i> SHIROTA FOR THE PREVENTION OF AFLATOXN EXPOSURE Dr. Mohd Redzwan Sabran (Yakult Representative) Department of Nutrition and Dietetics, Faculty of Medicine and Health, Universiti Putra Malaysia.
05:30 - 06:00 pm	Panel Discussion and Closing

	Dinner and Opening Ceremony
	Venue : Maharaja Suite
08:00 pm - 08:15 pm	Arrival of Participants & Guests
08:15 pm - 08:30 pm	Arrival of VIPs
	Arrival of Chair, School of Chemical & Energy Engineering
	Prof. Dr. Mohd. Ghazali bin Mohd. Nawawi
	Arrival of Dean, Faculty of Engineering
	Prof. Dato' Ir. Dr. Mohammed Rafiq bin Dato' Abdul Kadir
08.30 pm - 10.00 pm	- Welcome Remark
	- Speech by Chair of ICPFS2018
	Prof. Dr. Ida Idayu Muhammad
	- Speech by Co-Chair of ICPFS2018
	Dr. Malik Altaf Hussain
	- Speech and OPENING CEREMONY by:
	Dean, Faculty of Engineering
	Prof. Dato' Ir. Dr. Mohammed Rafiq bin Dato' Abdul Kadir
	- Token of Appreciation giving
	- Dinner and instrumental performance
10.00 pm	End of ceremony

24 September 2018 CONFERENCE

International Conference on Probiotics and Food Sustainability 2018 (ICPFS2018) Pulai Springs Resort, Johor Bahru, Malaysia

	MORNING SESSION
	Venue : Kayangan Suite
08:00 am - 08:30 am	Registration
08:30 am - 09:00 am	WELCOME SPEECHES
	Dr. Zanariah Hashim
	Director ICPFS2018
	Dr. Malik Altaf Hussain
	Executive Director, APIFP, Adjunct Senior Lecturer, Lincoln University, New Zealand
09:00 am - 10:00 am	Plenary Speech: FOOD SECURITY IN ASIA-PACIFIC: DEFICIENCY OR
	DISPARITY?
	Professor Dr. William Riley
	Professor of Food Quality and Nutrition, Department of Food Science and
	Nutrition, University of the Philippines-Diliman, Philippines.
10:00 am - 10:30 am	Morning Tea
10:30 am - 11:15 am	Keynote Speech 1: AN OVERVIEW OF GLOBAL EFFORTS TO TACKLE THE
	FOOD SECURITY CHALLENGES
	Professor Dr. Ida Idayu Muhamad
	Head of Group, Food and Biomaterial Engineering Research Group, School of
	Chemical and Energy Engineering, Faculty of Engineering, Universiti
11.15 am 12.00 mm	I EKIIOIOGI MAIAYSIA
11:15 am - 12:00 pm	REVOLUTION FOR FOOD INDUSTRY
	Dr Razam Abd Latin
	Vice President, Sime Darby Research Sdn Bhd, Selangor, Malaysia
12:00 am - 12:15 pm	Group photo
12:15 am - 12:45 pm	Poster session
12:45 am - 02:00 pm	Lunch

Track 1 : INNOVATIVE FOOD PRODUCTS AND FUNCTIONAL FOODS		
Venue : Kayangan Suite		
C 1 (2.00	Session Chairs:	
Session 2 (2.00pm	1-3.15pmJ : Associate Professor Dr. Dam Sao Mai & Dr. Malik Altar Hussain	
Session 2 (5.50pm	1-5.50pm): Dr. Lify Arsanti Lestari & Dr. Chaleeda Borompichalchartkui	
2:00 – 2:30 pm	Invited Speech 1: KONJAC GLUCOMANNAN; A NOVEL MULTIFUNCTION COATING	
	MATERIALS FOR INNOVATIVE FUNCTIONAL FOOD INGREDIENTS	
	Dr. Chaleeda Borompichaichartkul	
	Food Technologist, Food Technology Department, Faculty of Science, Chulalongkorn	
2.20 2.45 nm	ODIVERSITY, BANGKOK, I NAHANA.	
2.30 – 2.43 pm	LACTORACILLIIS PLANTARIIM	
	Dr. Tran Gia-Buu	
2:45 – 3:00 pm	OP2: PHYSICOCHEMICAL PROPERTIES OF MALAYSIAN LOCAL FRUITS SPRAY-	
	DRIED POWDER	
	Ms. Zaitul Iffa binti Abd. Rasid	
3:00 – 3:15 pm	OP3: VIABILITY OF PROBIOTIC LACTOBACILLUS ACIDOPHILUS IFO 13951 AND	
	BIFIDOBACTERIUM LONGUM ATCC 15707 IN GUMMY CANDY DURING STORAGE	
2.15 2.20 mm	Dr. Lily Arsanti Lestari	
3:15 – 3:30 pm	Теа вгеак	
3:30 – 4.00 pm	Invited Speech 2: THE EFFICACY AND SAFETY OF PROBIOTICS AS HEALTH	
	INTERVENTION	
	Mr. Mona Reaza Aba Kanman Chief Evecutive Officer, CC Nutracouticale Malaveia, Kuala Lumpur, Malaveia	
4.00 - 4.15 nm	OS1. EXTRACTION OF LIGNAN FROM FLAX SEED AND DEVELOPMENT OF FLAX	
1.00 1.15 pm	INCORPORATED MISHTI DAHI	
	Ms. Poojitha Pushparaj	
4:15 - 4:30 pm	OS2: PRODUCT INNOVATIONS DIRECTED TOWARDS ENHANCED FUNCTIONALITY	
	AGAINST ENTEROPATHOGENS	
	Ms. Srijita Sireswar	
4:30 – 4:45 pm	OS3: EFFECT OF STORAGE TEMPERATURE AND MICROWAVE-BLANCHING	
	TREATMENT ON DEGRADATION RATE OF PHYSICOCHEMICAL PROPERTIES OF	
	DLACK MULDERRI JUICE Ms. Nur Salina Salleh	
4·45 – 5·00 pm	OS4: PROBIOTIC PUREE FROM PURPLE SWEET POTATO WITH <i>LACTOBACILLUS</i>	
iiio oloo piii	CASEI IN DEVELOPING HIGH ANTHOCYANIN WEANING FOOD	
	Ms. Hong Li Lian	
5:00 – 5:15 pm	OS5: HEALTHIER DIET MANAGEMENT OF FRIED FOOD USING FIBRE-FORMULATED	
	BATTER	
	Ms. Liew Wen Ching	
5:15 – 5:30 pm	Closing and award giving ceremony	

Track 2 : FOOD SAFETY, SUSTAINABILITY AND NUTRITIONAL SECURITY		
Venue: Maharaja Suite		
	Session Chairs :	
Session 1 (2.00pm	-3.15pm) : Assoc. Professor Dr. Marzieh Hosseininezhad & Dr. Noriza Ahmad	
Session 2 (3.30pm	-5.30pm) : Dr. Zulkifli Khair & Assoc. Prof. Dr. Gokul Shankar Sabesan	
2:00 – 2:30 pm	Invited Speech 3: FOOD SAFETY IN HOSPITALITY INDUSTRY – EXPECTATION VS	
•	REALITY	
	Dr. S Gokul Shankar Sabesan	
	Senior Associate Professor Microbiology Unit, Deputy Dean, Faculty of Medicine,	
	AIMST University, Kedah, Malaysia.	
2:30 – 2:45 pm	OP4: PREBIOTIC IMPACT OF LACTOFERRIN ON PROBIOTICS: A NOVEL HEALTH	
	BOOSTING APPROACH	
	Dr. Bushra Niaz	
2:45 – 3:00 pm	OP5: IDENTIFICATION OF PHEROMONES OF CUCURBIT PESTS IN BANGLADESH:	
	FOCUSING FOOD SUSTAINABILITY	
	Dr. Md. Azharul Islam	
3:00 – 3:15 pm	OP6: FOOD INSECURITY IN COLLEGE AND UNIVERSITY: A REVIEW	
0.45 0.00	Dr. Zulkifli Khair	
3:15 – 3:30 pm		
3:30 – 4.00 pm	Invited Speech 4: MALNUTRITION: A HIDDEN DANGER IN THE GENERAL POPULATION	
	Dr. Hans Alexander Mahendran	
	General and Upper Gastrointestinal Surgeon, Department of Surgery, Hospital	
	Sultanah Aminah Johor Bahru, Malaysia	
4.00 – 4:15 pm	OS6: UTILIZATION OF UNIVERSAL CYTB AND 16S RRNA GENE FOR HALAL	
	VERIFICATION AND PROCESSED FOOD AUTHENTICATION	
	Ms. Linah Essam A Ali	
4:15 – 4:30 pm	OS7: PERCEIVED NEIGHBOURHOOD FOOD ENVIRONMENT APPLIED IN URBAN	
	NEIGHBOURHOODS OF MALAYSIA: MEDIATION EFFECTS	
4.00 4.45	Ms. Noor Hashimah Hashim Lim	
4:30 – 4:45 pm	US8: A REVIEW: ORAL DELIVERY SYSTEM OF PROBIOTICS AND THEIR	
	THERAPEUTICS EFFECTS ON HUMAN HEALTH	
4.45 5.00 mm	MS. KOSHINA JAMAIUAIN	
4:45 – 5:00 pm	US9: BIUAVAILABILITT AND SAFETT OF ENCAPSULATED PROBIDITIES IN	
	BIOPOLIMERIC SISTEM FOR FOOD APPLICATION	
5.00 - 5.15 nm	OS10. ADDI ICATION OF SUSTAINARI F ACDICIII TUDE SVSTEM RV IITII IZINC	
5.00 – 5.15 pill	INDUSTRIAL WASTES AS ORGANIC FERTILIZER	
	Ms Desrihastuti	
5.15 - 5.30 nm	Closing and award giving ceremony (Kavangan Suite)	
5.15 5.50 pm	crossing and award ground ceremony (nayangan suite)	

Track 3 : EMERGING TECHNOLOGIES		
Venue: Maharani Suite		
	Session Chairs :	
Session 1 (2.00pm-3 Session 2 (3.30pm-5 2:00 – 2:30 pm	3.15pm) : Professor Dr. Xiyang Wu & Dr. Abdul Halim Mohd Yusof 3.30pm) : Dr. Nor Raihana Mohamed Zam & Dr. Tong Woei Yenn Invited Speech 5: NANOTECHNOLOGY IN FOOD PACKAGING AND FOOD SAFETY: BIOPRESERVATIVE Dr. Tong Woei Yenn	
	Senior Lecturer, Section of Bioengineering Technology, Universiti Kuala Lumpur Branch Campus, Malaysian Institute of Chemical & Bioengineering Technology, Melaka, Malaysia	
2:30 – 2:45 pm	OP7: COMPARATIVE STUDY OF PHYSICO-CHEMICAL AND SENSORY QUALITY ATTRIBUTES OF PEACH FRUIT TREATED WITH 1-MCP, CALCIUM CHLORIDE SALICYLIC ACID AND ALOE VERA GEL DURING COLD STORAGE <i>Dr. Abdul Sattar Shah</i>	
2:45 – 3:00 pm	OP8: PINEAPPLE WASTE: AN EMERGING SOLUTION FOR HEALTHY AND SUSTAINABLE FOOD Dr. Nur Izyan Wan Azelee	
3:00 – 3:15 pm	OP9: INVESTIGATION ON STRUCTURAL AND THERMODYNAMIC CHANGES OF FISH PROCESSING WASTE HYDROLYSATES FROM ATLANTIC MACKEREL (<i>SCOMBER SCOMBRUS</i>) AND MIXED FISH (MF) BY FT-RAMAN SPECTROSCOPY, DIFFERENTIAL SCANNING CALORIMETRY (DSC) AND SMALL DEFORMATION RHEOLOGY Dr. Nor Raihana Mohamed Zam	
3:15 – 3:30 pm	Tea Break	
3:30 – 3:45 pm	OS11: MICROWAVE-ASSISTED EXTRACTION OF PECTIN FROM PINEAPPLE PEEL <i>Ms. Noorzetty Akhtar Zakaria</i>	
3:45 – 4:00pm	OS12: SIMULATION STUDY OF A HELICAL TREATMENT CHAMBER FOR PEF PASTEURIZATION <i>Mr. Rai Naveed Arshad</i>	
4.00 – 4:15 pm	OS13: MICROENCAPSULATION OF PROBIOTIC LACTOBACILLUS PLANTARUM RS09 IN FINGER MILLET MILK BY USING SPRAY DRYER <i>Ms. Priscilla Anitha</i>	
4:15 – 4:30 pm	OS14: ANTIMICROBIAL ACTIVITY AND TOXICITY ANALYSIS <i>OF SWIETENIA</i> <i>MAHAGONI</i> SEED OIL EXTRACTED BY USING SUPERCRITICAL CARBON DIOXIDE (SC-CO2) AND MICROWAVE-ASSISTED EXTRACTION (MAE) <i>Ms. Noor Fadzilah Abu Bakar</i>	
4:30 – 4:45 pm	OS15: DISINFECTANT AND REPELLANT ACTIVITIES OF CATNIP (<i>NEPETA</i> CATARIA L.) ESSENTIAL OIL COMPONENTS <i>Ms. Nur Atiqah Zularifin</i>	
4:45 – 5:00 pm	OS14: EFFECT OF SOLVENT CONCENTRATIONS TOWARDS EXTRACTION EFFICIENCY OF LATHER LEAF (<i>COLUBRINA ASIATICA</i>) ON SAPONIN YIELD USING DIFFERENT EXTRACTION METHODS <i>Ms. Nurul Nadrah Zabidi</i>	
5:00 – 5:15 pm	*Session ends	
5:15 – 5:30 pm	Closing and award giving ceremony (Kayangan Suite)	

ABSTRACTS

WORKSHOP, PLENARY AND KEYNOTE

Workshop 1

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AN OVERVIEW OF GLOBAL PROBIOTICS INDUSTRY AND MARKET

Malik Altaf Hussain^{1, 2*}

 ¹ Adjunct Senior Lecturer in Food Microbiology, Department of Wine, Food and Molecular Biosciences, Lincoln University, New Zealand,
² Executive Director, Asia-Pacific Institute of Food Professionals (APIFP) *Corresponding author: malikaltaf_ft@hotmail.com

Probiotics along with prebiotics, and synbiotics represent the largest segment of the global functional foods market. The term 'probiotics' refers to live microorganisms generally belong to bacterial groups of bifidobacteria, lactobacilli and certain streptococci. Foods like yoghurt, cheese, kafir, miso and sour cream are sources of these beneficial bacteria. The functionality and effectiveness of probiotic products are attributed to cell viability and bioactive metabolites produced as a result of probiotic growth in fermented products and/or microbial activities in gastro-intestinal tract. The global probiotic market is expected to exhibit increasing growth driven by the high demand for functional foods and dietary supplements in developing Asian countries. Population growth, health consciousness and increase in disposable incomes in these nations are the driving forces for the market growth. The total value of probiotic products market was US\$33.19 Billion in 2015 as compared to projected value of US\$46.55 Billion by 2020 (growing at a CAGR of 7.0%). The Asia-Pacific probiotic products market is expected to have the highest and rapid growth specially in countries such as Japan, India, and China. This presentation will provide an overview of the emerging trends and novelty in probiotic industry and highlight the economic growth indicators in the rapidly growing sector within functional foods.

Keywords: probiotics market, emerging trends, economic growth, population growth

Workshop 2

BIOPROCESS PLATFORM DESIGN FOR INDUSTRIAL PRODUCTION OF PROBIOTIC YEASTS: FROM SLANT TO POWDER

Hesham A. El Enshasy ^{1,2,3}

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Nowadays, probiotics microorganisms are widely used in healthcare industries as biotherapeutics agents due to their high capacity to exhibit beneficial effects on human and animal health. Beside the well-known probiotic bacteria belong to species of Lactobacillus, Enterobacter, Bifidobacteria, and Bacillus, probiotic yeasts gained increased attention based on their high health benefits. At present, many yeast strains belong to Saccharomyces, kluyveromyces, and Candida isolated from different sources have been reported as high potential probiotic strains according to their functional properties. In particular, Saccharomyces boulardii have been used for many years as therapeutic bioagent due to its high capacity to prevent diarrhea by competing against pathogenic microbes in gastro intestinal tract (GIT). In addition, this yeast has the ability to liberate effective enzymes, proteins and other tropic factors during intestinal transit which enhance the immune system of the host and increase nutrient absorption. However, the main challenges to produce this strain in industry are the limited information about the process of high cell density cultivation of this strain in the industrial scale and the cell sensitivity to heat and dryness during downstream processing and storage. In this work, industrial platform for high cell density cultivation and downstream of probiotic yeast will be presented in details using physiological and bioprocess engineering parameters. At first, cell adaptation to high temperature and dryness were carried out to increase the shelf-life of the produced cells and to decrease the cost of downstream by replacing freeze drying by spray drying. Furthermore, many steps of bioprocess optimizations were carried out in different scales to increase cell mass production with minimal alcohol production.

Keywords: healthcare, biotherapeutics, probiotics strain, downstream processing, bioprocess optimization

THE COLONIZED DIFFERENCES OF ANALYSIS AND TARGETED PREBIOTICS OF EVALUATION FOR Akkermansia muciniphila

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Akkermansia muciniphila (AKK), plays an important part in improving host health, which has become a research hotspot of intestinal microbiota and probiotics recently. This study quantified AKK colonizing in population of two different age groups using q-PCR. Then, we evaluated the colonization ability of AKK in an in-vitro gut fermentation model. Bioscreen-qPCR technology was applied to screen the potential prebiotics targeting AKK. The analysis on population of different groups in Guangzhou (n=131): The youth group (n=35) had AKK colonization rate of 88.57% and average abundance was 7.522 ± 0.2346 LOG (cfu/mL); the elder group (n=96) had the colonization rate of 89.58% and average abundance was 5.213 \pm 0.152 LOG (cfu/mL) ; the total colonization rate was 89.31% and to average abundance was 5.825 LOG (cfu/mL). After AKK was spiked into the vitro model, the results of 16S rDNA gene sequencing showed the abundance of Bacteroidetes and Firmicutes reduced and the abundance of Protechacteria augmented; in the level of genus, Escherichia_Shigella grew significantly while the abundance of most of other genus showed the tendency of decline; in the level of species, the abundance of Lactobacillus vaginalis Lactobacillus lactis, Lactobacillus johnsonii, Streptococcus gallolyticus.sub sp had an upward tendency, the abundance of Oscillospiracese bacterium redunced dramatically and the abundance of Lachnospiracese bacterium was stable. Results showed that: ferulic acid ester, β -oat-D-glucose, stachyose, galacto-oligosaccharides and polyfructosan could be regarded as the potential prebiotics targeting AKK.

Keywords: AKK, cultivation, colonization, in-vitro gut fermentation model, targeted prebiotics

Workshop 4

EXOPOLYSACCHARIDE PRODUCTION BY PROBIOTIC LACTIC ACID BACTERIA ISOLATED FROM SOURDOUGH

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Probiotic bacteria have the capability of synthesizing extracellular polymers known as exopolysaccharides (EPS) with commercially significant physiological and therapeutic properties. Microbial exopolysaccharides, used as food and medicinal additives, are high molecular weight polymers produced from reducing sugars during the growth cycle of various Bacillus strains and lactic acid bacteria (LAB). It has been suggested that the health interest of probiotic bacteria is attributed to the production of EPS. However, the exact role of EPS and its composition, structure and biological functions may greatly depend on the type of producing microorganism, structural unit and environmental conditions that protect them in foods against environmental stresses. Sourdough is a very complex non-aseptic fermentation ecosystem used as a generally recognized as safe biological additive in bread-making. It is one of the oldest and important spontaneous fermentations known to humankind, based on lactic acid and alcoholic fermentation of flour and water. So far, diverse LAB species have been isolated and identified from sourdough fermentation. In our lab, dominant LAB isolates from spontaneous fermentation of wheat bran sourdough were isolated and evaluated for productivity of microbial EPS in spontaneous fermentation and controlled condition. Genotypic identification of selected LAB was carried using polymerase chain reaction (PCR) and 16S rDNA gene sequencing. The effect of the microbial EPS encapsulation of probiotics to enhancing their viability in food samples was investigated. This talk will present the findings on formation of EPS by LAB during the spontaneous and controlled fermentations of sourdough and its functional applications in food and bakery products.

Keywords: exopolysaccharides, bacillus, lactic acid, sourdough, encapsulation of probiotics

KEFIRAN, A NOVEL POLYSACCHARIDE BY THE PROBIOTIC Lactobacillus kefiranofaciens

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Recent interest in the area of study involving microbial polysaccharides such as kefiran is extensively emerging as an important source of natural biopolymer materials. Polysaccharides are widely used and have continuous demand especially in different food and pharmaceutical industrial sectors. The supplies are not sufficiently meet the demand and inconsistently. Therefore, there has been a great interest to isolate and identify new microbial polysaccharides that might have better characteristics. Kefiran is a type of water-soluble polysaccharide that is produced by the microbial probiotic lactic acid bacteria known as *Lactobacillus kefiranofaciens*. This carbohydrate polymer was first isolated from kefir grain and it is produced either as extracellular or in capsular form. Kefiran have diverse potential application in food, nutraceutical and cosmeceutical industries based on its GRAS (Generally Regarded as Safe) status. Moreover, it was also proven to have many functional properties in pharmaceutical applications as antimicrobial and immunostimulant polysaccharides.

Keywords: kefiran, biopolymer materials, lactobacillus kefiranofaciens, immunostimulant polysaccharides, antimicrobial

Workshop 6

PALM KERNEL CAKE AS POTENTIAL PREBIOTIC SOURCE

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Prebiotics are non-digestible short chain carbohydrates that impart health benefit. Prebiotics have been known to reduce risk of cancer and increase calcium and magnesium absorption in large intestine. For food application, the addition of prebiotics improves sensory characteristic such as taste and texture, enhances the foam stability, emulsion and mouthfeel. Prebiotics can be manufactured from plant recourses, microbiological production and enzymatic hydrolysis. This study investigates the potential of mannan from palm kernel cake (PKC) as potential source of prebiotics. Microorganisms were isolated from different kind of sources namely decayed oil palm trunk, decayed oil palm fronds, the soil underneath oil palm tree, PKC, and rotten fruits. The isolated microorganisms were screened for the ability to produce cell wall-degrading enzymes such as mannanase, amylase, cellulase, pectinase, and xylanase. The enzyme obtained was partially purified using ammonium sulphate precipitation method. Oligosaccharides were produced by treating the PKC with partially purified mannanase and the prebiotic properties were tested against commercial prebiotics to determine its effectiveness. Treating PKC with the partially purified enzyme altered the surface structure of PKC and released oligosaccharides. Prebiotic effectiveness test proves that this treated PKC have the potential to be a source of prebiotic. Two out of three prebiotics tested gives a positive result in prebiotic activity score.

Keywords: palm kernel cake, prebiotic, microorganism, partially purified enzyme, oligosaccharides

PROBIOTICS DEVELOPMENT AND THEIR APPLICATIONS FROM PAKISTAN PERSPECTIVE

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Food safety is significantly important to customer, manufacturer and economy of each country. Natural food products and alternative processing techniques are gaining popularity due to public awareness for healthy food choices. The incorporation of probiotics in food products is useful to regulate gut microbiota and improve overall health and wellbeing of the consumer. The main goal of using probiotics is to enhance immune system. *Lactobacillus* and *Bifidobacterium* are the most common species, which are used in probiotics formulations and have been distinguished to exert beneficial effects through modification of gut microbiota. An important part of the probiotic screening criteria is that these bacterial species remain in pristine form when gain access to large intestine. The most common beneficial effects of probiotics use include inhibition of pathogenic microorganisms, lowering of the cholesterol level, promoting the immune system and reducing the inflammatory bowel disease. This presentation provides an overview of probiotics and their applications from Pakistan perspective. It focusses on how probiotics effect the natural microbiota in a beneficial way. Several probiotic products are reviewed for their utility, effect and safety concern. Probiotics intervention can act as an alternative of antibiotics use to maintain animal and human health in the future. This talk also highlights the rules and regulations regarding food quality, safety and security in Pakistan.

Keywords: probiotics, natural microbiota, lactobacillus, bifidobacterium

Workshop 8

PROBIOTICS INDUSTRY IN VIETNAM: CHALLENGES AND OPPORTUNITIES

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The use of probiotic foods (or as a natural ingredient in food or fermented foods) has long been known, but the study of intestinal microflora and probiotics, developed from the 80s of the 20th century. In Vietnam, although the use of probiotics also has been around for a long time, but the researches into the production of probiotics for food and feed are still new and have begun to be interested in about a recent decade. In Vietnam, the probiotics products are usually in the form of functional food, sour pickled vegetables, freeze-dried probiotic, capsules, powder, therapy Yogurt, probiotics added products. Two kinds of probiotics can be divided, such as: probiotics for feed (Probio-S, EM,..) and probiotics for human (Lacclean Gold LAB, Viabiovit, yogurt, Cosmetics used probiotic, ...)This presentation will discuss the current situation and prediction of probiotics products in Vietnam.

Keywords: probiotic foods, intestinal microflora, current situation, future trend, Vietnam

PROBIOTIC Lactobacillus casei Shirota FOR THE PREVENTION OF AFLATOXIN EXPOSURE

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Probiotics is live microorganism which, when administered in adequate amounts, confers a health benefit on the host. Of great importance, probiotic is a potential biological adsorbent and one of the dietary approaches to prevent aflatoxin exposure. Aflatoxin is produced by *Aspergillus* species of fungi, ubiquitously found in food and agriculture commodities. The consumption of aflatoxin-contaminated foods can cause aflatoxicosis. Hepatocellular carcinoma (HCC) is the most well-established toxic effect of aflatoxicosis. Recent insights found that gut microbiota might be affected by aflatoxicosis, leading to intestinal dysbiosis. It is suggested that aflatoxin modifies the gut microbiota in a concentration-dependent manner. The consumption of probiotic can alleviate aflatoxicosis-related symptoms/diseases. Probiotic prevents aflatoxin by liver enzymes into its carcinogenic form is reduced. In fact, its application to prevent human dietary aflatoxin exposure is promising. This presentation will cover the use of probiotic in vitro, in vivo and human intervention studies as a potential adsorbent of aflatoxin. The relevance of data collected from these studies is discussed and a proof of concept study on the interaction of well-defined probiotic bacteria with aflatoxin will be presented

Keywords: probiotics, biological asorbent, aflatoxin-contaminated food, alfatoxicosis, gut micriobiota

Plenary Speech

FOOD SECURITY IN ASIA-PACIFIC: DEFICIENCY OR DISPARITY?

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Issues of food security tend to focus on a deficit of available food resources for both the current and future world population. In geographical areas of caloric and nutrient deficiency, such as sub-Saharan Africa, the East Indian sub-continent, parts of southeast Asia, and the Amazon River Basin of South America, there is little doubt that significant portions of the population suffer now from a lack of adequate food supplies. This situation will only be exacerbated when the world population expands from its current 7.5 billion people to 10.0 billion shortly after 2050 (~33% increase) and to more than 12.0 billion by the turn of the next century (~60% higher than the current figure) (UN, World Health Organization projections). This anticipated growth will not be homogeneous. In fact, the bulk of the increase will be in the very regions that suffer from food deficiencies, further magnifying the severity of the problem. In the near future, Africa will replace Asia as the most populated continent in the world, yet it currently has some of the poorest, most malnourished countries on the planet. The challenge to feed the current and future disadvantaged population is onerous. To meet this challenge, governments and industry have tended to emphasise the development of new food sources, and in industrialized countries, which are home to much of the advanced food industry, this has meant alternative foods, processed and packaged foods, and especially "more meat and meat products to meet the growing demand for these by the growing middleclass in the world". But how does this agenda compare with the reality of the situation where the need most exists? The Philippines has one of the highest rates of "stunting" in the world, and vitamin A deficiency leading to night blindness is a continuing public health challenge. Yet, the top 10% of the Filipino population – over 10 million people – suffer from the same type of malnutrition that the developed world does – obesity, leading to Type 2 diabetes, heart and kidney diseases. This part of the population consumes far more calories than it needs, while millions of Filipinos go without sufficient caloric intake. Is this due to a food shortage or a disparity in distribution? The same can be said for most other food deficient regions of the world. In the Philippines, the consumption of pork has increased to where the it is the most consumed meat in the country, and the Philippines ranks as one of the top ten pork producers in the world. But it takes nearly 3 kg of grain, oilseed meals and other ingredients to produce one kg of live pig weight. Is this the most efficient way to utilize the country's abundant plant resources – to feed to animals, and especially to produce pork that may find its way on to the plates of Filipino consumers as expensive, processed pork products, which may not be the healthiest way to consume protein? "Food for thought!" Disparity, greed, politics, war, waste - these may all be better words to describe the reasons behind many (but not all) of the food security issues that exist and that will continue to exist in the world.

Keywords: food security, deficiency, malnutrition, disparity, food distribution

AN OVERVIEW OF GLOBAL EFFORTS TO TACKLE THE FOOD SECURITY CHALLENGES

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Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. The four pillars of food security are availability, access, utilization and stability. Understanding the structural and underlying causes of food insecurity and malnutrition is required to identify and prioritize actions to promote food security and nutrition and the right to adequate food for all people. An indicative, non-exhaustive list of factors that may contribute to hunger and undernourishment has been compiled from a wide variety of sources. These factors are mainly (i) Governance, (ii) Economic and production issues (iii) Demographic and social issues, and (iv) Climate or Environment. Globally, results achieved over several decades show that both the prevalence of undernourishment and the number of undernourished has declined. However, the rate of reduction of the number of undernourished is lower than that of the prevalence of undernourishment. Looking ahead, several emerging challenges in food security and nutrition will need to be addressed. A number of predominant frameworks provide key principles and strategies for the achievement of food security and nutrition including the 2030 Agenda for Sustainable Development, and the International Covenant on Economic, Social and Cultural Rights (ICESCR), which established the human right to adequate food, and all applicable international law relevant to food security, nutrition, and human rights.

Keywords: *sustainable supply, food security, undernourishment, challenges, social.*

Keynote Speech 2

INDUSTRY PERSPECTIVE -4TH INDUSTRIAL REVOLUTION FOR FOOD INDUSTRY

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Industrial revolution 4.0 is not new as it has been introduced in Germany since 2011. There are many approach in explaining this big term and where the future of industries will be heading for the next decades. Sime Darby Plantation being in the food industries need to adapt in this industry revolution to remain competitive in this ever-challenging global business environment. Under Sime Darby Plantation, Sime Darby Research is an entity that focussing on the innovation and technology break through to ensure that we remain competitive, relevant and align with the current world economic revolution. Plantation activity and food industries can be tracked back since the early of human civilization existence. Sime Darby Plantation is 108 years old multinational company, we survive many obstacles for example the World War II and the major economic depression. However, it's sad to say the current technology used in the palm oil industries are old and hardly changes since decades ago. Plantation and food industries are considered as the most laborious industries as compared to other industrial sector. We still use old and manual system in our processing. We are running with corrective instead of preventive measure to control our process. However, we realize there are big gap and we are working hard to close this gap to ensure we remain competitive and relevant with the current industrial trends. Industrial 4.0 in palm oil industries term can be summarized in this simple word, automated harvesting mechanism, intelligent monitoring, automated control system, advance big data analytic, minimum labour required, and interconnected infrastructure that link operation and businesses via advance communication network. As world population touching 9 Billion people in near decades, food industries need to be able meet this ever-increasing demand in food industries. This can be achieved through synergizing the current industries practice with industrial 4.0 revolution.

Keywords: *industrial revolution, food industry, global business, innovation, technology*

ORAL PRESENTATION

THEME: INNOVATIVE FOOD PRODUCTS AND FUNCTIONAL FOODS

Invited Speech 1

Konjac glucomannan; A NOVEL MULTIFUNCTION COATING MATERIALS FOR INNOVATIVE FUNCTIONAL FOOD INGREDIENTS

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Konjac glucomannan (KGM) is a water-soluble polysaccharide which extracted from *Amorphaphallus muelleri*, are substance that are not normally consumed as food itself but are added to food intentionally for a technological purpose. According to United States of Food and Drug Administration (2014), since the year of 1997, KGM is classified as generally recognized as safe (GRAS). The advantages of KGM apart from its solubility in water, are due to its ability in film-forming and the film formed is very stable in cold and hot water and acid solution. Moreover, konjac flour which is unrefined KGM considered as low-calorie ingredient given by its non-digestible fiber content as well as the ability to delay gastric empting, aids in avoiding constipation, being a laxative to support diverticulitis management, a fermentable substrate in colon, restricting the growth of pathogens in the gut. These functionalities of KGM were not find in the modified starch such as maltodextrin. Some studies show prebiotic activity of KGM. Application of hydrolyzed KGM can be used alone or combining with other coating or drying aids materials to encapsulate bioactive compounds from the plant extract successfully via spray drying process. Therefore, current paper will demonstrate the multifunction of KGM as coating materials to create innovation value added functional food ingredients.

Keywords: konjac glucomannan, polysaccharide, amorphaphallus muelleri, konjac flour, functional food

OP1

STUDY FOR PRODUCTION OF FERMENTED SOURSOP JUICE BY Lactobacillus plantarum

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Soursop (*Annona muricata*) is one type of tropical fruit which popularly grows in South America and East Asia regions. Soursop has light-sour taste, chalky, with high amount of minerals, calcium and vitamins such as vitamin C, B1, B2, P...In Vietnam, soursop is one of key agricultural products in some southern provinces such as Soc Trang, Tien Giang, Dong Thap, Can Tho. However, the number of food products from soursop is limited, soursop is usually consumed directly or as a few processing foods, including smoothie and jelly candy. Therefore, diversification strategy of soursop product has been developed in recent years. In this study, we research on the effects of seeding culture percent, Brix content, pH, the temperature and fermentation time on production of fermented juice from soursop with *Lactobacillus platarum*. The data showed that fermentation of soursop juice with indicated parameters: 3% seeding, 19 Bx, pH 4.5, at 37°C, for 24 hours manufactured a unified milky product with pleasant flavor and light-sour taste containing about 2.65x1010 CFU/ml of *L. platarum*. Furthermore, final product was preserved at 4°C without any odd flavor and color until 24 days.

Keywords: soursop, probiotics, lactobacillus platarum, fermentation, tropical fruit

PHYSICOCHEMICAL PROPERTIES OF MALAYSIAN LOCAL FRUITS SPRAY-DRIED POWDER

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Malaysian local fruits such as banana, papaya, durian, rambutan and pineapple are exploited in various ways in the food application and possess beneficial medicinal values; still their over production during harvesting season often leads to food spoilage and wastage. Spray drying has emerged as a novel technology for converting fruit extract into powder form; owing to its ability to prolong shelf life of dried powder at ambient temperature, reduce transportation cost and make the powder ready-to-use. Thus, in this study these fruits were spray-dried and their physicochemical properties were evaluated. The characterization of the resulting powder was analysed based on total yield, total soluble solids (TSS), pH, solubility, antioxidant activity and proximate composition analysis of food. These fruits powder of this study can be incorporated into different value-added products such as fruit juice, yogurt, jelly, cereal and other potential nutritional food products.

Keywords: Malaysian local fruits, spray drying, spray-dried powder, physiochemical properties

OP3

VIABILITY OF PROBIOTIC Lactobacillus acidophilus IFO 13951 AND Bifidobacterium longum ATCC 15707 IN GUMMY CANDY DURING STORAGE

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In addition of fermented milk, incorporation of probiotic bacteria into other food has been increasing in recent year. Gummy candies are favored by customer in all age groups. Incorporation of probiotic bacteria into gummy candy is aimed to increase the consumption of probiotic since it has many health benefits. The aim of the study was to evaluate the viability of probiotic bacteria *Lactobacillus acidophilus* IFO 13951 and *Bifidobacterium longum* ATCC 15707. We evaluated the viability of probiotic bacteria during storage at room temperature (25-30 °C) and cold temperature (4-10 °C) for 28 days. The viable cell of *Lactobacillus acidophilus* IFO 13951 was counted with Rogosa Agar, while *Bifidobacterium longum* ATCC 15707 was counted with Bifidobacterium longum ATCC 15707 that has been stored in room temperature. While the viability of *Lactobacillus acidophilus* IFO 1395 in cold storage temperature was higher than other probiotic bacteria. Even though there were reduction of cell viability after 4 weeks of storage, the number of probiotic bacteria. Even though there were reduction of cell viability after 4 weeks of storage, the number of probiotic cell were ranged between 6.27 to 7.03 log CFU/g hence the probiotic gummy candy met the criteria of probiotic product based on the cell number.

Keywords: *probiotic candy, viability, storage time, storage temperature*

Invited Speech 2

THE EFFICACY AND SAFETY OF PROBIOTICS AS HEALTH INTERVENTION

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Probiotics are usually beneficial bacteria that have health benefits when consumed and serve some function in the body. Some evidence even suggests that they may improve digestive health, reduce depression and promote heart health. Getting probiotics from supplements is popular, but you can also get them from foods that are prepared by bacterial fermentation (fermented foods). What about probiotic supplements? Research discussed about the potential benefits, but there appears to be publication bias in the scientific literature about probiotics. This is something related to a lot with drug companies, where the sponsor, the supplement company paying for their own probiotic research, may not report negative results—not publish it, as if the study never happened. And so, consumers or patients just see the positive studies. Compared to many pharmaceutical agents, probiotics are well tolerated and extremely safe, and serious adverse effects rarely occur. The researchers were criticized for not telling nor cautioning consumers or patients about the risk of consuming the probiotic supplement. For this article, recommendations are made based upon the current understanding of scientific, clinical and regulatory issues, with a special focus on safety.

Keywords: Probiotic efficacy, fermented food, potential benefit, probiotic supplement, risk

OS1

EXTRACTION OF LIGNAN FROM FLAX SEED AND DEVELOPMENT OF FLAX INCORPORATED Mishti dahi

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There has been an explosion of consumer interest in the health enhancing role of specific foods or physiologically- active food components, so-called functional foods. The term functional foods was first introduced in Japan in the mid-1980s and refers to processed foods containing ingredients that aid specific bodily functions in addition to being nutritious. Flax lignans have potential health benefits which is why it is emerging as an important food ingredient. This study aims to investigate the lignan supplementation effect on *mishti dahi*. Lignan is extracted from flaxseed and incorporated into *Mishti dahi* followed by optimization based on physicochemical and sensorial parameters. For the preparation of *mishti dahi*, sugar is replaced with honey in which an optimization concentration of 10% honey and 3.75% of lignan concentration was best suited for the incorporation. Nutritional profile for the optimized product was analysed and compared with the commercial product. Crude lignan and optimized product was investigated for its antioxidant activity by DPPH assay and found to be 89.34 % and 76%, respectively. It is been found that the developed *mishti dahi* with 3.75% lignan could serve as a potent antioxidant and hence can serve humanity with its health benefits.

Keywords: functional food, mishti dahi, lignan, flax seeds, honey, antioxidants

OS2

PRODUCT INNOVATIONS DIRECTED TOWARDS ENHANCED FUNCTIONALITY AGAINST ENTEROPATHOGENS

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Objective: The innovation drive in probiotic product development has resulted in exploration of several nontraditional food matrices. This work reports one such development of non-dairy probiotic product where the interaction between plant phenolics and probiotic strains has been evaluated with the aim of enhancing functionality of the resulting product. Methodology: Sea buckthorn and apple based, malt supplemented beverage matrices were developed and each of them were fortified with 8 log CFU/mL of L. plantarum (ATCC 8014), L. casei Shirota (ATCC 334) and L. acidophilus (ATCC 4356) separately. The antipathogenic potential of the matrices were assessed against enteropathogenic E. coli (ATCC 43887) and Salmonella enteritidis (ATCC 13076) during 0, 7, 14 days of shelf storage. Results and Discussion: Enhanced functionality against pathogens was observed in the developed beverage matrices. Principal component analysis (PCA) revealed a notable reduction in E. coli and S. enteritidis counts in probiotic fortified sea buckthorn matrix compared to that of apple. Of the probiotic formulations, strain L. casei Shirota fortified in sea buckthorn matrix was the most potent in the clearance of E. coli and S. enteritidis by 92.28% and 95.61%, respectively, within 1 hour of co-incubation at day 0. A complete inhibition (by 99.99%) was observed within 2 hours of co-incubation. In contrast, L. casei Shirota fortified apple matrix inhibited E. coli and S. enteritidis counts by only 42.45% and 47.51% respectively, within 1 hour of co-incubation at day 0, while a complete inhibition was observed only after 3 hours of co-incubation. Compared to the apple matrix, the antagonistic activity of probiotics fortified in sea buckthorn matrix remained superior. Significantly, the enhanced functionality of the matrix was retained till 14 days of storage period. Conclusion: There is a need for effectual probiotic formulations with sustainable functionality throughout the product shelf life. The present data indicate that the functionality of probiotic strains can be substantially influenced by the food matrices.

Keywords: probiotics, phenolics, enteropathogens, fortified probiotic, shelf life

OS3

EFFECT OF STORAGE TEMPERATURE AND MICROWAVE-BLANCHING TREATMENT ON DEGRADATION RATE OF PHYSICOCHEMICAL PROPERTIES OF BLACK MULBERRY JUICE

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Total phenolic and antioxidant content from black mulberry fruits are prone to degradation due to oxidation process and enzymatic reaction of polyphenol oxidase (PPO). The aim of this study was to investigate the effect of storage temperature (4°C and 37°C) and microwave blanching treatment on the degradation rate (k- value) and half-life (t1/2) of total phenolic content (TPC), antioxidant content and total colour difference (TCD) in black mulberry juice during 30 days of storage. The data was collected at three days interval for 30 days. Polyvinylpolypyrrolidone and catechol content, Follin-ciocalteu assay, 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay and L a b values were conducted to determine the PPO residual, TPC, antioxidant content and TCD of the juice. All physicochemical properties reduction followed first-order kinetic except for PPO residual. It was observed that samples stored at 4°C showed lower degradation rate for TPC (k: 0.0024 day-1 ; t1/2: 262.6 days), antioxidant (k: 0.0010 day-1 ; t1/2: 630.6 days) and TCD (k: 0.0377 day-1 ; t1/2: 16.72 days) compared to samples stored at 37 °C; TPC (k: 0.004 day-1 ; t1/2: 153.7 days), antioxidant (k: 0.0025 day-1 ; t1/2: 252.1 days) and TCD (k: 0.1230 day-1 ; t1/2: 5.12 days). Microwave-blanched treatment did not have significant effect in reducing the degradation rate of TPC and antioxidant, however, it reduced the degradation rate of TCD at 4 °C (k: 0.0176 day-1 ; t1/2: 35.81 days) during storage. Storage at 4°C was able to improve stability of total phenolic and antioxidants in black mulberry juice during 30 days storage.

Keywords: black mulberry, storage, stability, degradation, total phenolic, antioxidant, total colour difference, half-life

PROBIOTIC PUREE FROM PURPLE SWEET POTATO WITH Lactobacillus casei IN DEVELOPING HIGH ANTHOCYANIN WEANING FOOD

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This study optimized the conditions of *Lactobacillus casei* B26 which been well studied for induction of immune stimulation in gut cultivation in high stability of anthocyanin purple sweet potato puree (PSPP). The optimum incubation time, stability of anthocyanin before and after incubation, colour, pH, and viability cell count of adding probiotic on PSPP were evaluated. The optimum incubation time for *L. casei* were found to be in 15 hours at 37 °C. Results shows that after incubation, PSPP pH decreased from initial pH value of 5.51±0.03 to final pH of 3.55±0.07 which favoured the stability of anthocyanin molecules due to acid produced by the organisms. The incubation of *Lactobacillus casei* in purple sweet potato puree as weaning food generally achieved viable cell counts were higher than 8.00 Log CFU/mL. The values of redness, a* and total color change increased and the values of yellowness, b* reduced significantly at 15 hours of fermentation. The high probiotic viability and stability of anthocyanin in PSPP indicated that it can be an effective probiotic delivery vehicle in weaning food.

Keywords: Lactobacillus casei, probiotics, anthocyanin, purple sweet potato, weaning food

OS5

HEALTHIER DIET MANAGEMENT OF FRIED FOOD USING FIBRE-FORMULATED BATTER

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Adequate fibre intake may benefit healthier body. In this study, healthier fried food was developed by formulating the batter. The effect of fibres addition into coating batters was studied on rheology and oil uptake of fried food by varying the percentage of fibres and oil temperature. The amount of fibres in prepared batter (Delete 'was') varied (0, 10, 20%) while different oil temperatures were investigated during deep frying (160, 170, 180°C). It was found the fibres addition reduced the oil uptake of fried food products as well as improving their textural properties in terms of appearance, colour, texture and overall acceptability. Addition of 10% of pineapple fibre at 170 °C showed the lowest oil uptake and moisture content also received highest score of sensory analysis.

Keywords: *fibre intake, coating batter, oil uptake, texture, fried food*

ORAL PRESENTATION

THEME: FOOD SAFETY, SUSTAINABILITY AND NUTRITIONAL SECURITY

Invited Speech 3

FOOD SAFETY IN HOSPITALITY INDUSTRY - EXPECTATION VS REALITY

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The hospitality industry is made up of thousands of exciting organizations including hotels, restaurants, food service management, fast food outlets, coffee shops and pubs, bars and nightclubs, theme parks, transportation, cruise line and other additional fields in tourism industry. Transnational trade; travel; and migration and globalization of food production, manufacturing, and marketing pose greater risk of cross-border transmission of infectious diseases and food-borne illness. The risk is higher especially with small food outlets and road side vendors which are generally not monitored by any health authorities. In the United States and Europe over the past several years, the people have begun eating more meals in restaurants. It is the same trend in people all over the world including countries like India and Malaysia. With the rapid rise of food poisoning incidents in catering industry, Hotel and hospitality industries realize the importance of food safety which is the key success of protecting their brand. Deadly outbreaks of food-borne illnesses over the past few years have focused increased attention on food safety and preparation. Food safety includes food hygiene, hazard related to food and the management of its risks. Microbiological hazard is the most considerable and increasing interest in the food safety programs as the outbreaks are world wide and also can be a transnational issue. The horrifying food-borne illnesses that struck Europe in the spring of 2011 served as a reminder that even the most "healthy" foods can sicken and potentially be lethal. It was a huge surprise when the culprit ultimately was identified as 'bean sprouts'. The Center for Science in the Public Interest has offered a simple formula "2 hours -- 2 inches -- 4 days" for ensuring left-over food safety. HACCP and HARPC are management systems in which food safety is addressed through prevention of potential hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product. The implementation of HACCP plan in small outlets is difficulty due to the complexity of the procedures and need for proper documentation (involving extensive paper work). Richard Bonne et al are working on a simplified HACCP plan for practical and easy implementation. In most cases, the identification of critical control points is a challenge. The challenges of training food handlers are also of major concern. Food safety is often hampered because of lack of hygiene awareness, inappropriate training, stubborn hard to change practices, lack of adequate man power and extended working hours. The expectation of the consumers is high but the reality is in contrast. The present talk shall highlight the gap between the expectation and reality and address the keys to identify the critical control points based on the speaker's experience with hospitality industries in India and Malaysia. All that is clean is not hygiene! HACCAP is way forward for healthy cuisine!

Keywords: Food safety, hospitality industries, food-borne illness, food hygiene, food management system

OP4

PREBIOTIC IMPACT OF LACTOFERRIN ON PROBIOTICS: A NOVEL HEALTH BOOSTING APPROACH

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Lactoferrin is an extremely conserved protein exhibiting varied range of roles linked to resistance from infection and improvement of nutritional status. Malnutrition, infection and intestinal pathologies are vital inter-related issues, denote significant threats to existence and are linked with hostile continuing health consequences after preterm birth. Lactoferrin (Lf) is iron binding protein existing in milk and it has been deliberated to be a prebiotic agent. It has ample immunomodulatory and antimicrobial potential. It owns bacteriostatic as well as bactericidal properties. The gastrointestinal tract of human being is sterile at birth but the microecology in the intestine grows quickly when newborns are exposed to the environment. Bifidobacteria and Lactobacilli signify a leading group of microflora in animal and human intestines, these prebiotics display worth in hosts because they decrease gastrointestinal infections, hinder the growth of pathogens and control the mucosal physiology and immunology of intestines. Lf is an antibacterial protein that can prevent he growth of an extensive range of pathogens and Lf in breast milk has been recommended to simulate prevalence of specific probiotics in infant intestines. Lf can be the alternative and a solution to challenges associated with fructooligosaccharies (FOS) due to its dual action. Lf enhances iron absorption and utilization across intestinal membrane that's why it is added to iron based infant formulas. Studies show that the growth of Lactobacillus acidophilus is enthused by bovine holo- Lf (the iron saturated form of Lf). Both holo-Lf and apo-Lf roused the progression of Bifidobacterium breve, Bifidobacterium infantis, and Bifidobacterium bifidum. Conversely, bLf (10-20% iron saturated) displays no growth-promoting or growth-inhibiting effects on Lactobacillus reuteri, Lactobacillus plantarum, Lactobacillus rhamnosus, L. acidophilus, Bifidobacterium lactis and Pediococcus acidilactici. This presentation will discuss prebiotic potential of Lf and its mechanism of action and long-lasting impact on human being by replacing other prebiotics especially FOS.

Keywords: lactoferrin, malnutrition, prebiotic, ganstrointestinal, long-lasting impact

OP5

IDENTIFICATION OF PHEROMONES OF CUCURBIT PESTS IN BANGLADESH: FOCUSING FOOD SUSTAINABILITY

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Pheromone control could be a better option instead of the excess use of chemical pesticides in cucurbits production which has already been appreciated by many scientists and researchers. The researcher also emphasized on appropriate identification of pheromone component which would be more important for friendly environment as well ensuring food sustainability. Male and female of cucurbits pests (mostly fruit flies) were collected in from the cucurbits fields (horticulture farm, nearest vegetable fields around BAU campus). Artificial culturing and feeding were performed in laboratory. Extraction of pheromone was done from pheromone glands and proper analytical analysis (HPLC, GC) was conducted in Department of Environmental Science, BAU Central laboratory and BCSIR laboratory, Dhaka, Bangladesh. To confirm the pheromone, the analyzed chemicals were used in field trapping through different types of traps in vegetable fields. Laterally, available pheromones in markets of Bangladesh were also used in field trials for comparing the effectiveness to manage the target pest insects. Results revealed that heterogeneous pest species were attracted when available commercial pheromones were used in field trial. By analytical comparison and based on field trial results of examined pheromone showed difference from chemical communication with previously established pheromones identified previously in different regions of the World. It may vary due to environmental factors as well as variation of genetically strains of target pest species. Further studies require for confirmation of the results and for better comparison with previous reports. Thus, the proposed study will try to examine chemical communication of some vegetable insects with their appropriateness to overcome the limitation of pheromone availability in the study area.

Keywords: *pheromone*, Z 6-*nonen*-1-*ol*, *crude extracts*, *fruit fly*, *Bangladesh*.

OP6

FOOD INSECURITY AND ACADEMIC ACTIVITIES IN COLLEGE AND UNIVERSITY: A REVIEW

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The last two decades have seen a rapid rise in studies on food insecurity with its impact to academic activities among adult learners in colleges and universities. The present study is a quantitative integration and review of that research. It based from Science Direct, Springer and NCBI databases, published for 20 years, from 1998 to 2018. There are seven themes founded from the publications; overview on food insecurity, financial resource issue, financial management issue, financial expenditure issue, eating behaviour issue, impacts of food insecurity experience on academic activities and finally, impacts of food insecurity experience on academic performance. The discussion suggests researchers to conduct more systemic studies university and recommends local authorities to develop holistic solutions to the problem.

Keywords: food insecurity, academic activity, academic performance, adult learner

Invited Speech 4

MALNUTRITION: A HIDDEN DANGER IN THE GENERAL POPULATION

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There are significant misconceptions as to what constitutes a 'healthy' diet. Inadequate protein intake and the predilection to unhealthy food choices results in a significant percentage of the population having subclinical malnutrition which has significant effect on their ability to heal and recover from illness. Furthermore, there is a tendency to continue their poor dietary habits upon discharge to their community after recovering from an acute illness. This often results in complications, the need for readmission and sometimes death. This lecture aims to raise awareness about the importance of having a proper diet that will aid in prevention as well as recovery from illness.

Keywords: healthy diet, misconceptions, subclinical malnutrition, prevention, recovery

OS6

UTILIZATION OF UNIVERSAL cytB AND 16s rRNA GENE FOR HALAL VERIFICATION AND PROCESSED FOOD AUTHENTICATION

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The fraud in quality and safety of food ingredient has been a major concern among consumers. Nowadays, substitution and adulteration with porcine and other animal derivatives become a trend among food manufacturers in processed foods. This has become the main authenticity issue as it interferes with religious practices due to consumption of porcine and certain animal species. Hence, DNA-based method demonstrates accurate identification of animal species based on DNA sequence of the amplified products. The use of universal mitochondrial cytB and 16s rRNA genes provides more coverage on various animal species. In this study, genomic DNA was isolated from raw meats of porcine, chicken, beef and fish and cytB and 16s rRNA genes were PCR amplified. The PCR fragment was then sent for sequencing. Animal pecies was then identified in NCBI Genbank database and analyzed using phylogenetic tree. A total of four processed foods were tested to identify the presence of porcine DNA and potential adulteration. Sequence alignment of extracted DNA showed high species identity (between 89-98%) for porcine, chicken, beef and fish when amplified using cytB and 16s rRNA genes in processed foods also produced precise bands with expected amplicon size and all meat species were verified by sequencing. This indicated that universal cytB and 16s rRNA genes are potential barcode for these four animal species. In conclusion, mitochondrial cytB and 16s rRNA are reliable biomarker genes to determine halal food status and authenticate meat species in processed foods.

Keywords: DNA- deoxyribonucleic acid, cytB- cytochrome B, 16s rRNA- 16s ribosomal RNA, PCR-polymerase chain reaction

OS7

PERCEIVED NEIGHBOURHOOD FOOD ENVIRONMENT APPLIED IN URBAN NEIGHBOURHOODS OF MALAYSIA: MEDIATION EFFECTS

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Studies engaging the role of place in predicting health outcome in Malaysia is still not explored enough. A particular gap is testing the association of physical environments, particularly the food environment of different socio-economic neighbourhoods in predicting body mass index (BMI). Thus, the aim of the study was to examine the associations between neighbourhood socio-economic status (NSES) and BMI status, as well as the possible mediating effect of perceived neighbourhood food environment variables (PNFE). The four main indicators of PNFE identified from a systematic review were perceived food store type availability, perceived geographical food accessibility, perceived healthy food availability and perceived food affordability. BMI status of 60 subjects from three different NSES were collected. Their perceptions toward the neighbourhood food environment in which they live in was measured using a culturally and linguistically appropriate questionnaire (ICC = 0.59 -0.82) that was adapted to be conducted on Malaysians living in urban areas. Multiple regression models were ran and mediation tests were conducted. Overall, both NSES and PNFE explained a low variability proportion of BMI status (R2 = 0.36), whereby perceived food store type availability was positively associated with BMI status (Beta = 0.200 (95% CI = 0.021 to 0.380), p = 0.030), perceived geographical food accessibility was positively associated with BMI status (Beta = 0.644 (95% CI = 0.316 to 0.971), p = <0.000) and perceived healthy food availability (Beta = 0.315 (95% CI = 0.041 to 0.589), p = 0.025; but not perceived food affordability. Through the addition of the PNFE variables, NSES was found to be significant and positively associated with BMI status (Beta = 0.200 (95% CI = 0.021 to 0.380), p = 0.030). It is worth noting that although a model containing only variables of the socio-demographic characteristics, NSES and PNFE variables might be a poor to moderate predictor for BMI status, this does not negate the fact those variables are statistically significant as predictors of BMI status. It recommended that more environmental factors such as physical built environment

and social environment, as well as behavioural factors such as diet quality and physical activity level to be included in future studies to predict BMI better.

Keywords: perceived neighbourhood food environment, Neighbourhood socio-economic status, Malaysia, BMI

OS8

A REVIEW: ORAL DELIVERY SYSTEM OF PROBIOTICS AND THEIR THERAPEUTICS EFFECTS ON HUMAN HEALTH

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There are up to 500 bacterial species resides in a healthy human gastrointestinal (GI). Imbalance of microflora in human guts has caused few health problems according to scientific studies. Introducing good bacteria or known as probiotics in daily diet can improve colon health, allergic reaction and obesity. However, probiotics are vulnerable to few environmental factors in human GI such as acidity of digestive enzyme and human body temperature. Thus, encapsulate probiotics into delivery system can enhance and maintain the viability of probiotics to be consumed in adequate and safe amount. Apart of that, development of oral delivery system of probiotic bacteria can change the conventional vehicle delivery for probiotics in dairy products and provided the different choices for those who has lactose tolerant to consume probiotics in their daily diet. In this review, we provide an overview of the challenges in oral probiotic delivery, recent encapsulation method and technology and therapeutics effect of probiotics using delivery system.

Keywords: probiotics, delivery system, encapsulation, health

OS9

BIOAVAILABILITY AND SAFETY OF ENCAPSULATED PROBIOTICS IN BIOPOLYMERIC SYSTEM FOR FOOD APPLICATION

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Encapsulation of probiotics in biopolymeric system is an excellent technique to enhance the protective effect, to prolong the shelf life and to deliver the probiotics at human gastrointestinal tract at specific time. Probiotics are usually loaded in biopolymeric system or the food itself as a natural carrier for food application. Probiotics are well-known for a healthy intestinal tract and digestibility of nutrients. The fate and viability of these bacteria in the digestion system is explored through in vitro and in vivo evaluations. Probiotics encapsulated with natural or bio-polymers such as alginate, chitosan, gelatine, whey protein are found to improve their bioavailability in either emulsion or hydrogel system. This review emphasized on the bioavailability of encapsulated probiotics loaded with biopolymers using different dispersion methods including emulsification, extrusion and drying. Biodegradable polymers could promote the safety of food product containing functional ingredients such as probiotics.

Keywords: encapsulation, probiotics, bioavailability, food safety, biopolymers

OS10

APPLICATION OF SUSTAINABLE AGRICULTURE SYSTEM BY UTILIZING INDUSTRIAL WASTES AS ORGANIC FERTILIZER

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Agro-industry development such as the palm oil industry and the pulp and paper industry should be able to reduce the environmental impact to a minimum, because their industrial activities generates organic waste as a by product. These organic wastes consist of empty fruit bunches (EFB), palm oil mill effluent (POME), Eucalyptus leaves litter and biosludge of pulp and paper. These industrial waste were composted using passive aeration method with the composting ratio of 1:1. Plastic container with the perforated pipe was designed as a composter. Parameter of temperature, total organic carbon, total nitrogen content and C/N ratio was observed during the composting process. The composting of EFB with biosludge of pulp and paper reached a maximum temperature of 59.500C on seven days of composting, and total nitrogen content increased from 1.38% to 1.94%. Meanwhile, the composting of EFB with POME did not differ significantly with EFB and Biolusge of pulp and paper for parameter of C/N ratio and total organic carbon. Compost from industrial waste could be used as organic fertilizer to support sustainable agriculture programs.

Keywords: *empty fruit bunches, palm oil mill effluent, Eucalyptus leaves litter, biosludge of pulp and paper, composting*

ORAL PRESENTATION THEME: EMERGING TECHNOLOGIES

Invited Speech 5

NANOTECHNOLOGY IN FOOD PACKAGING AND FOOD SAFETY: BIOPRESERVATIVE

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Food spoilage can be defined as the undesirable changes take place in food due to the influence of air, heat, light and moisture, which encourage the growth of microorganisms. According to United Nations Food and Agriculture Association (FAO), one third of food are not consumed and wasted, which about 1.3 billion tons per year worldwide. Therefore, food security can be assured by reducing the amount of food wasted due to the food spoilage. Bio-preservative can be suitably added into food products to prolong its shelf life. However, most of these bioactive compounds are highly volatile and easily decompose, due to direct exposure to heat, humidity, light, or oxygen. Nanoencapsulation technology can used to protect these bioactive compounds against environmental factors. In our studies, we develop several nanoparticles-based biopreservative using biodegradable polymeric matrix to enhance the antimicrobial efficiency of natural compounds. The nanoparticles were synthesized with FDA approved polymeric matrix such as polyvinyl alcohol, polyvinylpyrrolidone, dextran, nanocellulose and chitosan. We sucessfully synthesized the nanoparticles for curcumin, limonene, cinnamaldehyde and tertatin. The nanoparticles significantly improved the antimicrobial efficiencies of the compounds on food borne microorganisms. The nanoparticles also prolonged the release of the bioactive compounds on food system, which helps to prolong the efficiency of biopreservative. All the nanoparticles did not showed any burst release effect on in vitro the release test. The nanoparticles synthesized are suitable to be used in food products to prevent food borne microbial infections. In conclusion, nanotechnology can be applied to improve the efficient of naturally-derived bioactive compounds as biopreservative.

Keywords: *nanoparticles, nanotechnology, antimicrobial activity, bioactive compounds.*

OP7

COMPARATIVE STUDY OF PHYSICO-CHEMICAL AND SENSORY QUALITY ATTRIBUTES OF PEACH FRUIT TREATED WITH 1-MCP, CALCIUM CHLORIDE SALICYLIC ACID AND ALOE VERA GEL DURING COLD STORAGE

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Peaches are climacteric fruits and are spoiled rapidly at ambient temperature after harvesting due to high respiration and ethylene production. Cold storage is an option to slow down the spoilage of peaches. However, the shelf-life of peaches is shorter even in cold storage because of susceptible chilling injury, decay and sensory quality degradation. Chemical treatments before storage of peaches are needed to increase the shelf-life. The aim of this study was to investigate the effects of 1-methylcyclopropene (1-MCP), calcium chloride, salicylic acid and aloe vera gel on the physicochemical and sensory properties of peaches during cold storage. Physiological matured peach fruits were treated with 1-MCP (500 μ g/L), calcium chloride (3%), salicylic acid (0.10 g/L) and in combinations with 1-MCP and calcium chloride and 1-MCP and salicylic acid along with aloe vera wax. The treated samples were dried for 30 minutes by dry air. The samples were analyzed at 10 days interval for physicochemical (total soluble solids, pH, acidity, sugar acid ratio, reducing sugar, non-reducing sugar, vitamin C and firmness) chilling injury, decay index and sensory attributes (colour, flavour, texture and over all acceptability) were evaluated and compared among various treatments. The research study observed that that the various chemical treatments and aloe vera gel treatments prior to cold storage of peach study observed that that the various chemical treatments and aloe vera gel treatments prior to cold storage of peach study.

significant effects (p < 0.05) on chilling injury, decay index and overall quality of the peaches. All chemical treatments demonstrated potential to increase the storage-life of peaches. However, the treatment with a combination of 1-MCP, calcium chloride and aloe vera gel illustrated the best results increasing storage-life of the peaches up to 30 days by decreasing chilling injury, decay and maintaining firmness, physicochemical and sensory attributes of peaches. These treatments were most effective and can be used for commercial storage of peaches, which increase the export potential of peaches.

Keywords: Supercritical carbon dioxide (SC-CO2) extraction, microwave-assisted extraction, antimicrobial, toxicology, wwietenia mahagon

OP8

PINEAPPLE WASTE: AN EMERGING SOLUTION FOR HEALTHY AND SUSTAINABLE FOOD

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The utilization of waste in fruits and vegetable processing industries is one of the important and challenging jobs for food sustainability. The discarded fruits as well as its waste materials is anticipated to have potential use for further industrial purposes viz. fermentation, extraction of bioactive components, extraction of functional ingredients etc. Pineapple waste is currently under intensive study due to their continuous supply, easy and safe handling, and biodegradable nature. This abundant agro-industrial residue is studied as a low-cost material for the generation of different value-added products. Researchers have focused on the utilization of pineapple waste primarily for the extraction of prebiotics oligosaccharides and bromelain enzyme also as cheap material for the socioeconomic prospective, pineapple waste can be a new source of raw material to the industries and can potentially replace the current expensive and nonrenewable sources. This mini review is the summary of previous reports on various approaches used for pineapple waste processing along with several important value-added products healthy and sustainable food for the future.

Keywords: pineapple waste, sustainable food, prebiotics, bromelain

OP9

INVESTIGATION ON STRUCTURAL AND THERMODYNAMIC CHANGES OF FISH PROCESSING WASTE HYDROLYSATES FROM ATLANTIC MACKEREL (Scomber scombrus) AND MIXED FISH (MF) BY FT-RAMAN SPECTROSCOPY, DIFFERENTIAL SCANNING CALORIMETRY (DSC) AND SMALL DEFORMATION RHEOLOGY

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Up to 50% of fish is lost during filleting, including significant levels of high quality protein (10–23% (w/w)), which may be a source for biofunctional peptides. The fish processing waste protein hydrolysate can be a potential solution for minimizing the environmental issues related to marine processing products, and act as an alternative to producing value added fish processing by products. The main aim of this study was to investigate the structural and thermodynamic changes of fish processing waste streams from Atlantic Mackerel (*Scomber scombrus*) and mixed fish (MF) by FT-Raman spectroscopy, differential scanning calorimetry (DSC) and small deformation rheology respectively. The DSC thermograms from the samples indicated that fish waste samples may be comparable. Moreover in fish waste sample hydrolysates, the same trends were obtained in 10 kDa AM and MF fractions. Fish waste samples especially hydrolysed fish waste samples, showed different protein denaturation transition peaks, indicating that enzymatic hydrolysis can affect the thermodynamic and functional

properties of protein samples. Similarly, the rheological properties were different for different fish samples (AM and MF) with AM showing higher G' or elastic modulus values (p<0.05). The proteins in mackerel and mixed fish waste stream were characterised by FT-Raman spectroscopy and showed significant differences in their respective spectra and most of the assigned peaks (p<0.05). The results indicated that potential functional proteins and bioactive peptides could be recovered from fish processing waste streams. This study will contribute to food security by reducing post-harvest losses in sustainable food product chains.

Keywords: fish waste protein, fish processing waste, food security, rheological properties, Atlantic Mackerel (Scomber scombrus)

OS11

MICROWAVE-ASSISTED EXTRACTION OF PECTIN FROM PINEAPPLE PEEL

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Pineapple peel waste has high amount of insoluble fiber-rich fraction which mainly consists of pectic substances. Conventionally, the extraction of pectin took long hours of operation. Microwave-assisted extraction is currently being used as an alternative to extract the pectin from pineapple peel. This study investigates the effects of different parameters in microwave-assisted extraction towards the pectin yield in pineapple peel. The parameters involved were microwave power (400, 500, and 600 W), solid to liquid ratio (w/v) (1:10, 1:20, and 1:30), pH value of solvent (pH 1.0, 1.5, and 2.0), temperature (70, 80, 90 and 100 °C), and time of extraction (1.0, 2.5, 5.0, 10.0 and 20.0 minute). Design of experimental work was carried out by using one-factor-at-a-time (OFAT) method. Each factor had shown a significant effect for the range tested except for the time of extraction. The highest yield of extractable pectin can be obtained from pineapple peel is 3.45 % with extraction ratio of 1:20 (w/v), 450 W microwave power, pH 1.83 solvent, 82.6 °C temperature, and time 2.5 minutes. This experiment shows that microwave-assisted extraction has potential to produce pectin from pineapple peel in few minutes. The pectin is then useful in food application and pharmaceutical purpose.

Keywords: pineapple peel, pectin, Microwave-assisted extraction

OS12

SIMULATION STUDY OF A HELICAL TREATMENT CHAMBER FOR PEF PASTEURIZATION

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Pulsed electric field (PEF) is a developing non-thermal way for the treatment of liquid food with fresh and nutritional properties. The treatment chamber is a vital part of this process where high intensity pulsed electric fields are provided to the sample foods for a very short interval. Non-uniform distribution of electric field is a common problem in the treatment chambers and geometry of the treatment chamber mainly controls this distribution. Numerical simulation is a way to analyze the distribution of the electric field before designing any treatment chamber. The helical shape was a motivation due to its favorable features including the tabular flow of the liquid inside the chamber The helical geometry was simulated for ensuring its uniformity in the electric field. The simulation results indicate a homogenous electric field strength for the whole liquid in the chamber. This study provides new insights into industrial-scale set up by using multiple helical chambers in a continuous flow PEF pasteurization.

Keywords: pulsed electric field (PEF), pasteurization, treatment chamber, tabular flow, numerical simulation

OS13

MICROENCAPSULATION OF PROBIOTIC Lactobacillus plantarum RS09 IN FINGER MILLET MILK BY USING SPRAY DRYER

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In recent years, spray drying technique has been extensively employed for the production of dehydrated food products to enhance their shelf life. In this study, spray drying of finger millet milk containing *Lactobacillus plantarum* RS09 (isolated from traditionally fermented finger millet) and the influence of the storage temperature (25 °C) on the viability of *L. plantarum* RS09 and the physical properties of the powder during 30 days of storage were evaluated. Probiotic finger millet milk was spray dried at an optimized inlet temperature (120 °C) with maltodextrin (30%) and almond gum (1.5%) as carrier materials. Microbial survival rates were higher than 90% for the microencapsulated probiotic powder at a storage temperature of 25 °C for 30 days. Various in vitro and physicochemical characteristics of the spray dried powder were analysed. The encapsulated probiotic powder remained stable during the storage period and showed adequate survival in simulated gastric juices (0.3%) and intestinal juices (0.1%). The water activity (aw<0.40) and moisture content (4.15%) remained the same. No characteristic changes in the colour and pH level were observed. Therefore, microencapsulated probiotic powder (109 CFU/g) can be used in the development of functional food product that has positive impact on consumer's health.

Keywords: ragi millet, almond gum, maltodextrin, dehydration, encapsulation, survivability, stability, viability

OS14

ANTIMICROBIAL ACTIVITY AND TOXICITY ANALYSIS OF Swietenia mahagoni SEED OIL EXTRACTED BY USING SUPERCRITICAL CARBON DIOXIDE (SC-CO2) AND MICROWAVE-ASSISTED EXTRACTION (MAE)

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Swietenia mahagoni has been used in treatments for diabetes, asthma, eczema, premenstrual syndrome and migraine traditionally. The conventional extraction method has been used previously and it was proven that the seeds have shown antioxidant, antimicrobial, antifungal and hyperglycemic activity. The recent technologies of extraction process have been developed to provide better extraction yield, safer and easier process. This study aimed to investigate the antimicrobial activity and toxicity content of the extract by using modern extraction method including supercritical carbon dioxide (SC-CO2) extraction and microwave-assisted extraction. The optimized conditions of both methods were studied. The toxicity test of *Swietenia mahagoni* seed extract using 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide assay on human skin fibroblast cell (HSF 1184) and antimicrobial disk diffusion method was performed. The result showed that *Swietenia mahagoni* seed extracts at studied concentrations of 10, 1, 0.1, 0.01, 0.001 and 0.0001 mg/ml are non-toxic with cell viability above 80%. The extract showed growth inhibition effect on *Bacillus subtilis, Staphylococcus aureus* and Escherichia coli at concentration of 100 mg/ml.

Keywords: Supercritical Carbon Dioxide (SC-CO2) Extraction, Microwave-Assisted Extraction, antimicrobial, toxicology, Swietenia mahagoni

OS15

DISINFECTANT AND REPELLANT ACTIVITIES OF CATNIP (Nepeta cataria L.) ESSENTIAL OIL COMPONENTS

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The study was aimed to investigate the chemical components of Catnip essential oil towards disinfectant and repellent activities. The essential oil was extracted by hydro-distillation processes from water. The essential oil obtained was analysed by gas chromatography-mass spectrometry (GC-MS) instrument and 21 compounds were identified. The effects of Catnip essential oil on the growth of six microorganisms (*Bacillus cereus, Bacillus subtilis, Bacillus amyloliquefaciens, Escherichia coli, Staphylococcus aureus* and *Pseudomonas aeruginosa*) were investigated. The Catnip essential oil was found to have a low antimicrobial activities against *S. aureus,* while there were no activities found against *E. coli* and *P. aeruginosa*. Results indicate the significant antimicrobial effect, which may be depended on the yield of major compounds in the essential oil. The Catnip essential oil contains isomers of nepetalactone and was tested for repellent activity to *Musca domestica L.* (houseflies).

Keywords: catnip, essential oil, antimicrobial, repellent

OS16

EFFECT OF SOLVENT CONCENTRATIONS TOWARDS EXTRACTION EFFICIENCY OF LATHER LEAF (*Colubrina asiatica*) ON SAPONIN YIELD USING ULTRASOUND ASSISTED EXTRACTION

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This research determined the effect of methanol concentration (vol.%) on the extraction of saponins from *C.asiatica* leaves using ultrasound-assisted extraction (UAE) at different concentrations of methanol as solvent with bath temperature of 25° C. The optimized frequency (20kHz), power (150W), particle size 20µm of grinded *C. asiatica* leaf and extraction time of 1-2 hours were applied, respectively in this study. The yields of total saponins were influenced by solvent concentration, with the highest value at 45–60%. A conventional extraction method; soxhlet extraction(control) was conducted for a period of 8 hour and resulted in highest yield at concentration ranges of 50-75%. The results show that the methanol concentration was influential in UAE extraction of saponins and that total imparted energy and level of applied power should be considered in terms of extraction efficiency.

Keywords: solvent concentrations. UAE extraction, Methanol, Extraction efficiency

POSTER PRESENTATION

PP1

EFFECT OF MANGO PEEL POWDER ON VIABILITY OF PROBIOTIC BACTERIA IN LOW FAT YOGURT

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The peel of many fruits contains valuable compounds and can be added as a nutritious additive to other foods. Mango peel is one of the wastes of Mango processing units and due to compounds such as beta-carotene and fiber it has a nutritional and prebiotic value. The aim of this study was to evaluate the effect of different amounts of mango peel powder (MPP) on the survival of *Lactobacillus acidophilus* bacteria and physicochemical properties of low fat yogurt. MPP (0, 1.5, 3 and 4.5%) and probiotic culture were added to yoghurt formulation and acidity, pH, the count of *Lactobacillus acidophilus*, syneresis and viscosity of the final product was examined. The results showed that the addition of different amounts of MPP did not have a significant effect on the acidity, pH and number of probiotic bacteria in yogurt, but decreased the syneresis in the samples. The lowest viscosity was observed in the control (without MPP) but it increased when the dosage of MPP expanded. In general, the use of MPP, while adding value, improves the quality characteristics of low-fat yogurt.

Keywords: *mango peel, probiotic yogurt, viability, prebiotic*

PP2

Saccharomyces boulardii (SB): A NOBEL PROBIOTIC YEAST AS A ANTIDIARRHEAL AGENT

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The nonpathogenic yeast *Saccharomyces boulardii* (Sb) has beneficial effects on human intestine thus applied as probiotic for the treatment of several types of diarrhea. This is the only one commercialized yeast with the purpose in human medicine. Currently, little is known about their multiple mechanisms of actions. A *S. boulardii* yeast strain is isolated and identified by using Biolog identification system and also morphologically. To understand the functional roles, the present study investigates the ability of this yeast to tolerate different concentrations of bile salt (0.5, 1, 1.5 and 2.0%) and gastric acid. The effect of different pH (1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5) and temperature (20, 25, 30, 35, 40, 450C) was also monitored on the growth and survivals of the yeast cell. The physico-chemical analyses revealed that *S. boulardii* can survive in stomach condition at pH 2.5, temperature 370C and 2% bile salt. The antibacterial activity of the isolated yeasts against pathogenic bacteria (especially for diarrhea) *Escherichia coli* and coliform were in vitro determined by Well's Diffusion method. The Swiss albino mice model of diarrhea induced by castor oil showed that 2.3×108 CFU/kg of viable cells given 1 hr before castor oil administration significantly reduced the onset of diarrhea. The experimental findings suggest that the probiotic yeast *S. boulardii* possesses good antidiarrheal use as biotherapeutic agent.

Keywords: Saccharomyces boulardii, nobel probiotic, antidiarrheal agent, Biolog

MOLECULAR IDENTIFICATION OF POTENTIAL PROBIOTIC BACILLUS SPP. STRAIN ISOLATED FROM STINGLESS BEE HONEY (Heterotrigona itama)

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Probiotic microorganisms have been a great help in improving health benefits for humans as they offer an alternative to antibiotics by decreasing the drug resistance that occurs due to overuse or prolonged use of antibiotics to treat infections. Honey is a good source of probiotic microorganisms which originated from the nectars and the bee's stomach. One of the microorganisms that are present in stingless bee honey is Bacillus spp., which is recently known as new candidates for potential probiotic bacteria. This study aims to isolate and identify the species of potential probiotic Bacillus spp. from stingless bee honey, Heterotrigona itama of different places. Bacillus spp. were isolated from 5 different H. itama colonies. The isolates were characterized through Gram-staining, catalase test as well as its tolerance towards NaCl (7%). Gram-positive and catalase positive bacteria were selected for further identification. The 16S rRNA genes from extracted bacterial DNA were amplified via polymerase chain reaction (PCR) using 16S specific primers (27F and 1492R). In this study, Bacillus altitudinis (34%) and Bacillus pumilus (33%) were the dominant Bacillus species detected in stingless bee honey, H. itama while the remaining bacterial isolates were identified as Bacillus megaterium (13%), Bacillus anyloliquefaciens and Bacillus aryabatthai (8%), followed by Bacillus subtilis (4%). Stingless bee honey can also be considered as the source of probiotic bacteria as this research had provide an opportunity to discover bacteria strains with potential probiotic properties that might be useful as probiotic cultures for functional food products or as starter cultures in food industries.

Keywords: Stingless bee honey, Heterotrigona itama, probiotic, Bacillus spp.

PPS2

MOLECULAR IDENTIFICATION OF LACTIC ACID BACTERIA AND Bacillus spp. ISOLATED FROM BEEBREAD OF STINGLESS BEE (Heterotrigona itama)

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Aim: To isolate and identify lactic acid bacteria and *Bacillus spp*. from beebread of stingless bee (*Heterotrigona* itama). Introduction: Probiotic has shown promising outcomes in mitigating symptoms pertaining to gastrointestinal (GIT) diseases. Although lactic acid bacteria (LAB) is commonly associated as probiotic, Bacillus spp has become a new profound interest as probiotic among researchers due to its spore-forming nature, which makes it more robust than LAB during ingestion. Beebread is the fermented bee pollen stored in bee hives. Microbial ecology in beebread is suggested to be affected by bee species, bee caste, and geographical region. To date, identification of potential probiotic bacteria from beebread of stingless bee (Heterotrigona itama) remain unexplored. Therefore, this study aims to isolate and identify LAB and Bacillus spp. from beebread of stingless bee (H. itama). Method: Beebread of H. itama were collected from four commercial bee farms in different states of Malaysia - Selangor, Negeri Sembilan and Johor. Lactic acid bacteria and Bacillus spp. were isolated using the culture-dependent method and characterized according to their morphology, Gram-staining, and catalase test. Selected isolates were identified through 16s rRNA gene sequencing. Results: Total of 9 LAB and 7 Bacillus spp (N=16) were successfully identified. Bacillus (41.2%) was the dominant genus followed by Lactobacillus (27.8%), Fructobacillus (17.7%), Leuconostoc (0.1%) and Enterococcus (0.1%). Meanwhile, Fructobacillus fructosus were the dominant bacterial species isolated from beebread of stingless bee (H. itama). Conclusion: The findings revealed that beebread could be a new source to isolate probiotic bacteria. Future works need to be done to further characterize the functional properties of these bacteria in vitro.

Keywords: Probiotic, Beebread, Stingless bee, Bacillus, Lactic acid bacteria

CHILLING INJURY IN PINEAPPLE FRUITS: PHYSICAL QUALITY ATTRIBUTES AND ANTIOXIDANT ENZYME ACTIVITY

PS3

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Malaysian pineapple fruit cultivars with different susceptibility toward chilling injury (CI), Morris (Queen-type) and Josapine (Smooth-Cayenne-type) cultivars (cv.) were stored at sub-optimal storage temperatures $(4 \pm 2^{\circ}C)$ for 28 days to investigate the effects of chilling injury (CI) condition towards physical quality attributes comprises the total soluble solid (TSS), pH, titratable acid (TTA), firmness, colour, % internal browning (%IB), weight loss and ion leakage (EL). In addition, the activities of polyphenoloxidase (PPO), ascorbate peroxidase (APX) and catalase (CAT) enzymes were also measured during the storage. The result indicates that, CI was observed at both cv. with Morris score of 5.1 % higher CI than Josapine cv. towards the 28 days of sub-optimum cold storage. Overall physical quality attributes showed development of CI was found positively correlated with increase of EL and TTA also decrease of firmness, weight (% starting), brightness (L*) and redness (A*). Additionally, correlation was found between CI symptoms and the activities of PPO and APX.

Keywords: pineapple, chilling injury, physical quality attributes, antioxidant enzyme, antioxidant activity

PS4

COMPARISON OF ANTIOXIDANT ACTIVITY BETWEEN Capsicum annuum SEED AND PERICARP EXTRACTS

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Capsicum annuum is reported to be a widely cultivated species, a good source of bioactive compounds and has an important role in the diet as a health-promoting ingredient. Recently, waste of vegetable processing, like seeds, has been the subject of many studies as an attempt to find new alternative and cheap resources of bioactive compounds with application in several industries. Despite their chemical, biological and ecological importance, C. annuum seeds are still poorly studied. Thus, this study was carried out with the aim to evaluate the differences among fruit parts (pericarp and seed) in terms of total phenols and flavonoids content, and antioxidant activity. Antioxidant activity was done by using DPPH free radical scavenging assay. In particular, the chilli pericarp exhibited the highest levels of total phenols (31.26 \pm 6.71 µg gallic acid equivalent, GAE/mg dry weight) compared to chilli seed ($26.76 \pm 2.08 \ \mu g \text{ GAE/mg}$ dry weight) although not statistically significant (p>0.05). The total flavonoid content of chilli pericarp extract was significantly (p<0.05) (21.65 \pm 1.13 µg quercetin equivalent, QE/mg dry weight) higher than the chilli seed extract ($16.43 \pm 0.37 \mu g$ QE/mg dry weight). In terms of the antioxidant activity, the pericarp extract exhibited a higher DPPH radical scavenging compared to the seed extract. Although the seed extract showed a lower DPPH radical scavenging activity than the pericarp, it still contains phenols and flavonoids which appeared to be the main contributors to the antioxidant activity. Thus, F seeds which are normally considered as waste during the manufacturing of chilli paste can be further used as a potential source of valuable bioactive compounds for nutraceuticals, pharmaceuticals and food industry.

Keywords: Chilli seed, chilli pericarp, antioxidant activity, total phenolic content, total flavonoid content

END OF ABSTRACT BOOK