5th IUMS
Outreach Programme
Advances in Food Safety and Mycotoxins

5th IUMS Outreach Programme Advances in Food Safety and Mycotoxins

Faculty of Agricultural Technology, Universitas Gadjah Mada
Yogyakarta, Indonesia
January 19-20, 2017

PROGRAM

Organized by:

Center of Excellence on Mycotoxin Studies (CEMycoS) of Faculty of Agricultural Technology Universitas Gadjah Mada

International Union of Microbiological Societies (IUMS)

In collaboration with:

Indonesian Society for Microbiology

Indonesian Association of Food Technologist

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Introduction

In support of its mission to enhance the scientific background and professional effectiveness of basic and applied microbiologists, the International Union of Microbiological Societies (IUMS) is embarking on a program of educational outreach to developing countries and their microbiologists. The Union envisions an IUMS series of courses that will be offered to groups of microbiologists that may include graduate students, postdoctoral fellows, and practicing professionals from developing countries within a given geographic region. These will be offered periodically in various regions and on different topics of interest and importance.

The first IUMS Regional Course was offered in Singapore during June 14-16, 2010, and served microbiologists from the surrounding Asian countries. Singapore was chosen as the site, because of its proximity to the countries of Asia. IUMS made a contribution to the subsistence of the successful applicants as far as the finances allow. It is expected that this experience will boost the capability of the attendees in their microbiologic work after they return home, and we shall endeavor to forge a network of the attendees, so they can continue to communicate with each other and the instructors by e-mail.

The second IUMS Regional Course on Food Safety was offered in Bali (Indonesia) 22 - 24 June 2011 and organized in collaboration with the Indonesian Society for Microbiology (PERMI), the International Commission on Food Mycology (ICFM) and the International Committee on Food Microbiology and Hygiene (ICFHM). The third IUMS outreach conference on Antimicrobial Resistance took place in Havana, Cuba on November 14-16, 2013. The fourth course in Yogyakarta focused on food safety and mycotoxins

The Faculty of Agricultural Technology Universitas Gadjah Mada (FTP-UGM) via its Center of Excellence on Mycotoxin Studies (CEMycoS) organized "the International Conference on Mycological Aspects of Food and Feed Safety" (IC-MAFFS) on 27-29 June 2013 at Universitas Gadjah Mada Yogyakarta, Indonesia. In 2014, FTP UGM took the opportunity to be the local organizer for the fourth IUMS outreach program, with the title of the activity "IUMS Outreach Program on Food Safety and International Conference on Mycotoxins". This program was conducted for two days, 14-15 November 2014, held at the Faculty of Agricultural Technology UGM.

This year, FTP UGM is pleased to be authorized by International Union of Microbiological Societies (IUMS) to hold "5th IUMS Outreach Programme on Advances in Food Safety and Mycotoxins". This programme is supported by IUMS, International Commission on Food Mycology (ICFM), and Indonesian Society for Microbiology (PERMI) and it will be attended by more than 200 participants including scientists and researchers as well as industrialists from around the globe.

List of Committee
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Advances in Food Safety and Mycotoxins

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Endang S. Rahayu, Prof. Dr.

Vice Chairperson
Tyas Utami, Dr.

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Preface
Chairperson of 5th IUMS Outreach Programme

Prof. Dr. Endang S. Rahayu

Dear participants, guests, and colleagues, welcome to Yogyakarta, Indonesia. I am delighted to have you all to participate and share in the 5th IUMS Outreach Programme hosted by CEMycoS, Faculty of Agricultural Technology, Universitas Gadjah Mada. I wish you all the best while staying in Yogyakarta.

First of all, I would like to thank the International Union of Microbiological Societies (IUMS) via Prof. Robert A. Samson for the opportunity given to the Faculty of Agricultural Technology, Universitas Gadjah Mada to organize the 5th IUMS Outreach Programme: *Advance in Food Safety and Mycotoxins*.

This year, in the 5th IUMS Outreach Programme, there are total of 31 lectures that will be delivered by 20 guest speakers in which 1 speaker from Canada, i.e. Brent R. Dixon; 1 speaker from USA i.e. Emilia Rico; 1 speaker from Germany i.e. Ludwig Niessen; 2 speakers from The Netherlands i.e. Robert A. Samson and Jos Houbraken; 2 speakers from Italy i.e. Giancarlo Perrone and Luca Cocolin; 1 speaker from Sweden i.e. Su-lin L. Leong; 1 speaker from UK i.e. Naresh Magan; 1 speaker from Malta i.e. Vasilis Valdramidis; 1 speaker from Belgium i.e. Andreja Rajkovic; 1 speaker from Spain i.e. Sara Bover-Cid; 1 speaker from China i.e. Weihuan Fang; 2 speakers from Thailand i.e. Warapa Mahakarnchanakul and Kitiya Vongkamjan; 1 speaker from Malaysia i.e. Chay Lay Ching; and 4 speakers from Indonesia i.e. Suratmono, Ratih Dewanti, and Winiati.

This outreach programme is attended by more than 200 participants. The 44 abstracts that have been received by the organizing committee form the heart of the outreach programme. Among those abstracts, 12 abstracts will be presented as oral presentation, while the rest will be presented in form of poster. According to the list of participants, we have 20 foreign participants from ASEAN countries, i.e. Malaysia, Thailand, and Philippine; 76 participants from various universities in Indonesia, 32 participants from institutes and government agencies, 13 participants from industries and 112 Indonesian participants from Universitas Gadjah Mada,.

On behalf of the organizing committee, I would like to express my sincere thanks to IUMS, all guest speakers, oral and poster presenters, participants, as well as sponsors and media partner for their contribution to the success of the outreach programme. The committee have tried their best in order to make this event meaningful and pleasant one. Please do not hesitate to let us know if you have any suggestions or require any assistance during the course of your short stay.

At last, I would like to take this opportunity to thanks all of the colleagues and organizing committee (students) for their never ending precious cooperation that made this event possible.

Preface
Dean of Faculty of Agricultural Technology, Universitas Gadjah Mada

Prof. Dr. Ir. Eni Harmayani, M.Sc.

Assalamualaikum wr wb.,

Warm greetings from Yogyakarta,

First of all, on behalf of Faculty of Agricultural Technology, Universitas Gadjah Mada I would like to express my warmest welcome to guest speakers and all participants of the 5th IUMS Outreach Programme on Advances in Food Safety and Mycotoxins. It is such an honour and privilege to our institution to host this event which is held on 19-20 January 2017 at the Kamarijani-Soenjoto Auditorium, Faculty of Agricultural Technology, Universitas Gadjah Mada.

The outreach programme theme, Advances in Food Safety and Mycotoxins fits with challenges of global food supply chain and increasing world wide consumer demand of safe food. Foodborne pathogen and mycotoxins can develop during production, harvesting, storage, and processing of crops and food. They pose chronic health risks and prolonged exposure of mycotoxin in the diet has been linked to several diseases. Prevention of foodborne pathogens and mycotoxins occurrence especially in tropical countries such as Indonesia is very important since it has many strategic implications not only in health but also in economic losses and on international trade.

Therefore, stronger partnership between researchers, universities, government agencies and industries in national and international level is needed to achieve food safety in Indonesia and globally. I hope through this programme, leading scientists, researchers and industrial experts from around the world could share their expertise and latest findings in the area of food safety to all participants. I believe this priceless opportunity will give benefits to all involve in this programme.

Finally, I would like to congratulate all the members of the organizing committee and volunteers on a job well done. My special gratitude goes to guest speakers, participants and all other parties that supported this event. I hope this programme to be an enlightening and inspiring experience that will improve our food safety.

Welcome and enjoy your time in Yogyakarta, Indonesia.

Wassalamualaikum wr wb.

Preface
Indonesian Society for Microbiology

Dr. Siswa Setyahadi

Dear all colleagues

First of all, on the behalf of Indonesian Society for Microbiology, I would like to welcome all of the guest speakers and participants here. It is a pleasure to meet you all here at the 5th IUMS Outreach Programme on Advances in Food Safety and Mycotoxins, which is held in Yogyakarta, Indonesia. Specifically, at Kamarijani-Soenjoto Auditorium, Faculty of Agricultural Technology, Universitas Gadjah Mada on 19-20 January 2017.

Food safety aspect has a significant role in the food chains. Enhancing the food safety management is strongly needed to prevent diseases and trade disruptions. Global networking is one of the fundamental support in achieving food safety. Focusing on *Advances in Food Safety and Mycotoxins*, I believe that through the 5th IUMS Outreach Programme where people from various backgrounds such as from academic institutions, government agencies, research center and industrial sector, there will be a strong partnership and commitment to make an improvement on food safety management. If we are able to do that, people's health and productivity will raise. As the result, our human resources quality will increase as well.

As a closing, I would like to give applause to the organizer of this programme, since they have successfully held this programme. I also want to thank all of the programme speakers, participants, sponsors and media partners to help this programme. May this programme give so much benefit to each of us.

Preface
International Union of Microbiological Societies (IUMS) and its outreach programs

Prof Dr Dr hc Robert A. Samson (Secretary General)

IUMS is one of the 31 Scientific Unions of the International Council of Science (ICSU). It was founded in 1927 as the International Society of Microbiology, and became the International Association of Microbiological Societies affiliated to the International Union of Biological Sciences (IUBS) as a Division in 1967. It acquired independence in 1980 and became a Union Member of ICSU in 1982.

The objectives of the Union are to promote the study of microbiological sciences internationally: initiate, facilitate and coordinate research and other scientific activities which involve international cooperation; ensure the discussion and dissemination of the results of international conferences, symposia and meetings and assist in the publication of their reports; represent microbiological sciences in ICSU and maintain contact with other international organizations.

The major goal of IUMS is to promote research and the open exchange of scientific information for advancement of the health and welfare of humankind and the environment and strongly discourages any uses of knowledge and resources to the contrary.

The scientific activities of the Union are conducted by the three Divisions of Bacteriology & Applied Microbiology (BAM), Mycology and Eukaryotic Microbiology and Virology and by six specialist international committees, eight international commissions and two international federations. Their major activities include the classification and nomenclature of bacteria, fungi and viruses, food microbiology, medical microbiology and diagnostics, culture collections, education, and biological standardization.

In support of its mission to enhance the scientific background and professional effectiveness of basic and applied microbiologists, the IUMS has embarked on a program of educational outreach to developing countries and their microbiologists. The Union envisions an IUMS series of courses that will be offered to groups of microbiologists that may include graduate students, postdoctoral fellows, and practicing professionals from developing countries within a given geographic region. These will be offered periodically in various regions and on different topics of interest and importance.

It is expected that the IUMS outreach programs will boost the capability of the attendees in their microbiologic work after they return home, and we shall endeavor to forge a network of the attendees, so they can continue to communicate with each other and the instructors.

- The **first** IUMS Regional Course was offered in Singapore during June 14-16, 2010, and served microbiologists from the surrounding Asian countries.
- The **second** IUMS Regional Course on Food Safety was offered in Bali (Indonesia) 22 - 24 June 2011 and was organized in collaboration with the Indonesian Society of Microbiology, the International Commission on Food Mycology (ICFM) and the International Committee on Food Microbiology and Hygiene (ICFHM).
- The **third** IUMS outreach conference on Antimicrobial Resistance took place at the Melia-Habana Hotel in Havana, Cuba on November 14-16, 2013.
- The **fourth** IUMS outreach programme on Food Safety and Mycotoxins - Yogyakarta, Indonesia 14-15 November 2014.

The **fifth** IUMS outreach programme on Food Safety and Mycotoxins is now taking place in Yogyakarta, Indonesia **19-20 January 2017**. We are very proud that this meeting is organized in close collaboration with CEMycoS, Faculty of Agricultural Technology, Universitas Gadjah Mada Yogyakarta, Indonesia, the Indonesian Society of Microbiology, and the International Commission on Food Mycology (ICFM), the International Committee on Food Microbiology and Hygiene (ICFHM) and ILSI Southeast Asia Region. IUMS is very grateful to these partners to make the IUMS outreach program to be a success.

IUMS Congresses 2017 are organized by Singapore Society for Microbiology and Biotechnology (SSMB) on 17-21 July 2017 at the Sands Expo & Convention Centre. This is the first time the IUMS Congress is being held in Asia outside Japan. The IUMS 2017 Congress incorporates three major congresses: the 15th International Congress of Bacteriology and Applied Microbiology, 15th International Congress of Mycology and Eukaryotic Microbiology and 17th International Congress of Virology. The congresses will deal with all aspects of Infectious Diseases and Microbiology and is a platform for the exchange of knowledge and opinions of professionals from academia, industry, government and for fostering international collaborations.

You are all welcome to participate!!

Programme

Thursday (19 January 2017)	
07.00 – 07.45	Registration, breakfast, and coffee morning
07.45 – 07.55	Opening act (Saman Dance, Rempoe UGM)
07.55 – 08.25	Opening ceremony • Dean of the Faculty of Agricultural Technology UGM • Indonesian Society for Microbiology (PERMI) • International Union of Microbiological Societies (IUMS) (Robert A. Samson)
08.25 – 08.30	Programme and introduction of speakers and participants (Endang S. Rahayu)
Session 1 : Food safety 1 Moderator : Tyas Utami	
08.30 – 08.55	1. Current status of food safety in Indonesia and its policy – Suratmono (Indonesia)
08.55 – 09.20	2. An overview of foodborne parasites and the mechanisms for their control - Brent R. Dixon (Canada)
09.20 – 09.45	3. Risks for mycosis caused by foodborne fungi - Su-Lin Leong (Sweden)
09.45 – 10.20	4. Current issues on food safety of ASEAN - Ratih Dewanti (Indonesia)
10.20 – 10.45	Break
Session 2 : Foodborne fungi: risks, control and opportunities 1 Moderator : Gayuh Rahayu	
10.45 – 11.10	5. New and old names of food borne fungi – Robert A Samson, J. Houbraken (The Netherlands)
11.10 – 11.35	6. New insight on safety and quality of salami production related to *Penicillium* species – Giancarlo Perrone (Italy)
11.35 – 12.00	7. Mould spoilage of foods and beverages: Assessment and prevention – Emilia Rico (USA)
12.00 – 12.10	Rapid test for mycotoxins and drug residues and China's experiences - Shenzhen Bioeasy Biotechnology Co.,Ltd (China)
12.10 – 12.30	Group photo session
12.30 – 13.00	Break, Poster Session
Session 3 : Quantitative microbiology 1 Moderator : I Nengah Sujaya	
13.20 – 13.55	8. An introduction to quantitative microbiology -Vasilis Valdramidis (Malta)
13.55 – 14.20	9. Resources to assess and validate the impact of new preservation technologies as control measures in food industry - Sara Bover-Cid (Spain)
14.20 – 14.55	10. From microbial prevalence to virulence – hand in hand data for quantitative food safety evaluation - Andreja Rajkovic (Belgium)
14.55 – 15.20	11. Integration of microbial behaviour in predictive models development: the case of *Listeria monocytogenes* in fermented sausages -Luca Cocolin (Italy)
15.20 – 15.55	12. Modeling the microbial dynamics of food during different processes - Vasilis Valdramidis (Malta)
15.55 – 16.20	13. Progress of microbiological risk assessment development in Indonesia Winiati – (Indonesia)
16.20 – 16.45	Break

Session 4 : Food security Moderator : Agustina Asri Rahmianna	
16.45 – 17.15	14. Food safety and mycotoxins research in ASEAN Countries – Warapa Mahakarnchanakul (Thailand)
17.15 – 17.40	15. Mycotoxin occurence in Indonesian commodities and its risk assessment – Endang S Rahayu (Indonesia)
17.40 – 18.05	16. Microbiological food safety and food security: Application of next generation sequencing technology - Chai Lay Ching (Malaysia)
18.05 – 18.30	17. *Listeria monocytogenes*: Pathogen of concern to the seafood industry - Kitiya Vongkamjan (Thailand)
18.30 – 19.00	Welcome dinner and gathering
19.00 - 20.00	Traditional performance • Gambyong dance, Kamasetra UNY • Committee performance

Friday (20 January 2017)	
07.00 – 08.00	Registration, breakfast and coffee morning
08.00 – 10.00	Technical session
10.00 – 10.25	Break
Session 5 : Methods and approaches in food safety and quality Moderator : Widiastuti Setyaningsih	
10.25 – 10.50	18. New developments in detection and identification of foodborne molds - Jos Houbraken (The Netherlands)
10.50 – 11.10	19. The study of microbial ecology in foods: Opportunities in the use of NGS approaches - Luca Cocolin (Italy)
11.10 – 11.30	20. Aptamer-based detection and quantification of mycotoxins in food - Ludwig Niessen (Germany)
Session 6 : Food safety 2 Moderator : Rachma Wikandari	
11.30 – 11.55	21. Fungi and animal feed: Risks and opportunities for 'one health' – Su-Lin Heden (Sweden)
11.55 – 12.20	22. Emerging non-thermal technologies to improve food safety. Case study: High pressure processing and biopreservation of meat products - Sara Bover-Cid (Spain)
12.20 – 12.45	23. Development of infrastructure for management of microbial food safety in developing countries: All areas and all things considered – urban or rural - Weihuan Fang (China)
12.45 – 13.25	Break, Poster Session
Session 7 : Foodbourne fungi : Risks, control and opportunities 2 Moderator : Agus Wijaya	
13.25 – 13.50	24. Fungi and their involvement in food fermentation - Jos Houbraken & Rob Samson (The Netherlands)
13.50 – 14.15	25. Preservatives: their role in preventing food spoilage – Naresh Magan (UK)
14.15 – 14.40	26. Good Sanitation Practices (GSP) to prevent pathogen contamination and mould spoilage of food and beverages – Emilia Rico (USA)
14.40 – 15.05	27. New insights in genetics of mycotoxin biosynthesis by genomic approach: The ochratoxin A story – Giancarlo Perrone (Italy)
15.05 – 15.25	Break

Session 8 : Method and approaches in food safety and quality 2 Moderator : Endang S. Rahayu	
15.25 – 15.50	28. Detection and molecular characterization of parasites on fresh produce - Brent R. Dixon, (Canada)
15.50 – 16.15	29. Molecular ecology tools to develop control strategies for mycotoxigenic spoilage moulds – Naresh Magan (UK)
16.15 – 16.40	30. Development and application of a LAMP-based assay for the group specific detection of aflatoxin producing fungi in *Aspergillus* section Flavi - Ludwig Niessen (Germany)
16.40 – 17.05	31. Proteomic and functional signature of a cross-talk between Caco2 cells and foodborne *Bacillus cereus* emetic toxin reveals hidden food safety risks of low dose and long term exposure Andreja Rajkovic (Belgium)
17.05	Wrap up and Closing: Robert A. Samson (IUMS)

Programme for Technical Session

Technical session Moderator : Nanik Suhartatik, Titiek F. Djafaar, Tri Marwati	
08.00 – 08.10	Pathogenicity activity of *Fusarium oxysporum* and *Fusarium equiseti* from plantation of citrus plants in the Village Tegal Sari, Jember Umbul Wangi, East Java – Dalia Sukmawati (Indonesia)
08.10 – 08.20	NADES for monascus pigment extraction: A perspective – Ignatius Srianta (Indonesia)
08.20 – 08.30	Addition of natural preservation made from the formulation of guava leaves, soulatri leaves, clove leaves and lime powder on coconut sap toward quality of coconut sugar – Karseno (Indonesia)
08.30 – 08.40	Postharvest quality improvement of nutmeg (*Myristica fragrans*) – Okky Setyawati Dharmaputra (Indonesia)
08.40 – 08.50	Correlation study of food consumption and aflatoxin M1 content in breast milk among lactating mothers in Universiti Putra Malaysia, Selangor, Malaysia – Rashidah Sukor (Malaysia)
08.50 – 09.00	Anti-*Mycobacterium tuberculosis* strain H37Rv activity against Brazilin compound in vitro – Ratu Safitri (Indonesia)
09.00 – 09.10	Natamycin treatment to control *Rhizopus* sp. mold on *Fragaria virginiana* – Vita Meylani (Indonesia)
09.10 – 09.20	Quantitative risk assessment of acrylamide in Indonesian deep fried fritters product – Yoga Pratama (Indonesia)
09.20 – 09.30	Quality assurance of *Rhizopus* for tempe starter – Gayuh Rahayu (Indonesia)
09.30 – 09.40	Diversity of *Aspergillus* spp. from groundnuts (*Arachis hypogaea*) – Latiffah Zakaria (Malaysia)
09.40 – 09.50	Quantification of aflatoxin B1 risk in peanut based product in indonesia: challenges and data gaps – Novinar (Indonesia National Agency of Drug and Food Control /BPOM Indonesia)
09.50 – 10.00	The detoxification of aflatoxin B_1 in maize based product by combination of biological method and chemical binder – FMC. Sigit Setyabudi (Indonesia)

LIST OF ABSTRACTS

List of Abstracts

Invited Speakers

No	Speaker	Institution	Title	Note
1	Andreja Rajkovic	Department of Food Safety and Food Quality, Faculty of Bioscience Engineering, Ghent University, Belgium	From microbial prevalence to virulence – hand in hand data for quantitative food safety evaluation	IS10
			Proteomic and functional signature of a cross-talk between Caco2 cells and foodborne *Bacillus cereus* emetic toxin reveals hidden food safety risks of low dose and long term exposure	IS31
2	Brent R. Dixon	Bureau of Microbial Hazards, Food Directorate, Health Canada, Ottawa, Ontario, Canada	An overview of foodborne parasites and the mechanisms for their control	IS2
			Detection and molecular characterization of parasites on fresh produce	IS28
3	Chai Lay Ching	Institute of Biological Sciences, Faculty of Science, University of Malaya, 50603 Kuala Lumpur, Malaysia	Microbiological food safety and food security: Application of next generation sequencing technology	IS16
4	Emilia Rico	BCN Research Laboratories, Inc., 2491 Stock Creek Blvd., Rockford, TN, USA	Mould spoilage of foods and beverages: Assessment and prevention	IS7
			Good Sanitation Practices (GSP) to prevent pathogen contamination and mould spoilage of food and beverages	IS26
5	Endang S. Rahayu	Faculty of Agricultural Technology, Universitas Gadjah Mada, Yogyakarta, Indonesia	Mycotoxin occurence in Indonesian commodities and its risk assessment	IS15
6	Giancarlo Perrone	Institute of Sciences of Food Production, National Research Council, Bari, Italy	New insight on safety and quality of salami production related to *Penicillium* species	IS6
			New insights in genetics of mycotoxin biosynthesis by genomic approach: The ochratoxin A story	IS27

7	Jos Houbraken	CBS-Fungal Biodiversity Centre, Dept. of Applied and Indoor Mycology, Uppsalalaan 8 3584CT, Utrecht, the Netherlands	New developments in detection and identification of foodborne molds	IS18
			Fungi and their involvement in food fermentation	IS24
8	Kitiya Vongkamjan	Department of Food Technology, Faculty of Agro-Industry, Prince of Songkla University, Hat Yai Thailand	*Listeria monocytogenes*: Pathogen of concern to the seafood industry	IS17
9	Luca Cocolin	Department of Agricultural, Forest and Food Sciences, University of Torino, Italy	Integration of microbial behaviour in predictive models development: The case of *Listeria monocytogenes* in fermented sausages	IS11
			The study of microbial ecology in foods: opportunities in the use of NGS approaches	IS9
10	Ludwig Niessen	Chair of Technical Microbiology, School of Life Sciences Weihenstephan, Technical University of Munich, Freisig, Germany	Aptamer-based detection and quantification of mycotoxins in food	IS20
			Development and application of a LAMP-based assay for the group specific detection of aflatoxin producing fungi in *Aspergillus* section flavi	IS30
11	Naresh Magan	Applied Mycology Group, Environment and AgriFood Theme, Cranfield University, Cranfield Beds. MK43 0AL, U.K.	Molecular ecology tools to develop control strategies for mycotoxigenic spoilage moulds	IS29
			Preservatives: Their role in preventing food spoilage	IS25
12	Ratih Dewanti	Southeast Asian Food and Agricultural Science and Technology Center/SEAFAST, Institut Pertanian Bogor, Indonesia	Current issues on food safety in ASEAN countries	IS4

13	Robert A Samson	CBS-Fungal Biodiversity Centre, Dept. of Applied and Indoor Mycology, Uppsalalaan 8 3584CT, Utrecht, the Netherlands	New and old names of food borne fungi	IS5
14	Sara Bover-Cid	IRTA-Food Safety Programme, Monells, Catalunya, Spain	Resources to assess and validate the impact of new preservation technologies as control measures in food industry	IS9
			Emerging non-thermal technologies to improve food safety. case study: High pressure processing and biopreservation of meat products	IS22
15	Su-lin L. Leong	Dept of Molecular Sciences, Swedish University of Agricultural Sciences (SLU), Sweden	Risks for mycosis caused by foodborne fungi	IS3
			Fungi and animal feed: risks and opportunities for 'one health'	IS21
16	Suratmono	Indonesia National Agency of Drug and Food Control, Jakarta, Indonesia	Current status of food safety in Indonesia and its policy	IS1
17	Vasilis Valdramidis	Faculty of Health Sciences, University of Malta, Malta	An introduction to quantitative microbiology	IS8
			Modeling the microbial dynamics of food during different processes	IS12
18	Warapa Mahakarnchanakul	Department of Food Science and Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok, Thailand	Food safety and mycotoxin research in ASEAN countries	IS14
19	Weihuan Fang	Zhejiang University Institute of Preventive Veterinary Medicine, Hangzhou 310058, China	Development of infrastructure for management of microbial food safety in developing countries: all areas and all things considered – urban or rural	IS23
20	Winiati P. Rahayu	Perhimpunan Ahli Teknologi Pangan Indonesia	Progress of microbiological risk assessment development in Indonesia	IS13

Oral Presentation

No	Speaker/ Authors	Institution	Title	Note
1	Dalia Sukmawati	Department of Biology, Faculty of Mathematics and Natural Sciences Universitas Negeri Jakarta, Indonesia	Pathogenicity activity of *Fusarium oxysporum* and *Fusarium equiseti* from plantation of citrus plants in the Village Tegal Sari, Jember Umbul Wangi, East Java	OP1
2	FMC. Sigit Setyabudi, Ema Damayanti, M. Haryadi Wibowo, Ali Agus, Sardjono	Faculty of Agricultural Technology, Universitas Gadjah Mada, Yogyakarta, Indonesia	The detoxification of aflatoxin B_1 in maize based product by combination of biological method and chemical binder	OP12
3	Gayuh Rahayu	Department of Biology, Faculty of Mathematics and Natural Sciences, Bogor Agricultural University, Darmaga Campus, Bogor 16680, Indonesia	Quality assurance of *Rhizopus* for tempeh starter	OP9
4	Ignatius Srianta, Susana Ristiarini and Ira Nugerahani	Department of Food Technology, Faculty of Agricultural Technology Widya Mandala Catholic University Surabaya, Indonesia	NADES for monascus pigment extraction: A perspective	OP2
5	Karseno, Erminawati and Retno Setyawati	Food Science and Technology Study Program, Department of Agriculture Technology, Jenderal Soedirman University, Purwokerto 53123, Indonesia	Addition of natural preservation made from the formulation of guava leaves, soulatri leaves, clove leaves and lime powder on coconut sap toward quality of coconut sugar	OP3
6	Latiffah Zakaria	School of Biological Science, Universiti Sains Malaysia, 11800 USM Penang, Malaysia	Diversity of *Aspergillus* spp. from Groundnuts (*Arachis hypogaea*)	OP10
7	Novinar, Harsi D. Kusumaningrum and Nugroho Indrotristanto	Indonesia Risk Assessment Center, Indonesia	Quantification of aflatoxin B1 risk in peanut based product in indonesia: Challenges and data gaps	OP11

8	Okky Setyawati Dharmaputra, Santi Ambarwati, Ina Retnowati and Nijma Nurfadila	SEAMEO BIOTROP, Jalan Raya Tajur Km. 6, Bogor 16134, Indonesia; and Faculty of Mathematics and Natural Sciences, Bogor Agricultural University, Darmaga Campus, Bogor 16680, Indonesia	Postharvest quality improvemen of nutmeg (*Myristica fragrans*)	OP4
9	Zuhaili Sulaiman and Rashidah Sukor	Department of Food Science, Faculty of Food Science and Technology, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia	Correlation study of food consumption and aflatoxin m1 content in breast milk among lactating mothers in Universiti Putra Malaysia, Selangor, Malaysia	OP5
10	Ratu Safitri, Aya Sofa Novia W, Mas Rizky A. A. Syamsunarno and Ani Melani Maskoen	Departement Biology, Faculty of Mathematics and Natural Sciences, Universitas Padjadjaran Jl. Bandung - Sumedang Km 21 Jatinangor, Sumedang, West Java, Indonesia	Anti-*Mycobacterium tuberculosis* Strain H37Rv Activity against Brazilin Compound In Vitro	OP6
11	Vita Meylani, Dedi Natawijaya and Adam Saepudin	Department of Biology Education, Faculty of Education and Teacher Trainning, Siliwangi University, Indonesia	Natamycin treatament to control *Rhizopus* sp. mold on *Fragaria virginiana*	OP7
12	Yoga Pratama, Liesbeth Jacxsens and Bruno De Meulenaer	Department of Food Technology, Faculty of Animal and Agricultural Sciences, Diponegoro University, Jl. Prof. Soedarto Tembalang Semarang 50275 Indonesia	Quantitative risk assessment of acrylamide in indonesian deep fried fritters product	OP8

Poster Presentation

No	Speaker/ Authors	Institution	Title	Note
1	Agus Wijaya, Philipp Wiedemann, Andreas Lux, Winfried Storhas and Basuni Hamzah	Department of Agricultural Technology, Faculty of Agriculture, Universitas Sriwijaya, Indonesia	Optimization of RAPD-PCR condition for genotypic identification of lactic acid bacteria isolated from *Bekasam*	PP1
2	Arif Umami and Eko Windarto	Lecturer, Department of Agrotechnology, Institute for Plantation Agriculture (INSTIPER), Indonesia	Adhesion, motility and biofilm formation of *Pseudomonas aeruginosa*	PP2
3	Asama Phaephiphat, Warapa Mahakarnchanakul, Kullanart Tongkhao and Pathima Udompijitkul	Department of Food Science and Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok, Thailand.	Effects of microbubbles water and ozone microbubbles water on elimination of *Salmonella Typhimurium* from artificially inoculated sweet basils	PP3
4	Nazula Rahmi Safitri, Bella Saraswati Tyoso, M. Nur Cahyanto, Tyas Utami and Endang S. Rahayu	Faculty of Agricultural Technology, Universitas Gadjah Mada, Flora street No. 1 Bulaksumur, Yogyakarta 55281, Indonesia.	The study of microbiota kefir : Isolation, identification, antibacterial activities of lactic acid bacteria, yeast, acetic acid bacteria and starter culture development	PP4
5	Chananya Chuaysrinule, Thanapoom Maneeboon, Kullanart Tongkhao, Kanithaporn Vangnai and Warapa Mahakarnchanakul	Department of Food Science and Technology, Faculty of Agro-industry, Kasetsart University, Bangkok, Thailand	Occurrence of aflatoxin and ochratoxin A producing fungi in chili of Thailand	PP5
6	Dewi Yunita and Christine E. R. Dodd	The University of Nottingham, Sutton Bonington Campus, Division of Food Sciences, Leicestershire LE12 5RD, United Kingdom	Antifungal activity of a cell-free supernatant of *Staphylococcus equorum* isolated from a blue-veined cheese	PP6

7	Diah Ayu P. G. and V. Irene Meitiniarti	Universitas Kristen Satya Wacana, Salatiga, 50711	Decolorization of *Amaranth* dye by waste textile and herb industrial bacteria isolate under aerobic and anaerobic conditions	PP7
8	Nazly Al Mahdy, Agnes Murdiati, Sri Naruki, Sri Raharjo, Rafli Zulfa Kamil, Fathyah Hanum P and Endang Sutriswati Rahayu	Departement of Food and Agricultural Product Technology, Faculty of Agricultural Technology, Universitas Gadjah Mada, Jl. No. Flora 1, Bulaksumur, Yogyakarta 55281	Risk assessment aflatoxin B1 in corn-based food (*sekelan*) from Tretep Sub District, Temanggung Regency, Central Java Province	PP8
9	Gener D. Gregorio and Marita G. Pineda	Department of Biological Sciences, Central Luzon State University, Science City of Muñoz, Philippines 3119	Detection of *Aspergillus flavus* link on commercial feeds	PP9
10	I.B.A. Yogeswara, I.G.A Wita Kusumawati and N.W. Nursini	Nutrition Department, Faculty of Health, Science and Technology, Dhyana Pura University, Kuta Utara, Dalung	Antibacterial activity of *L. acidophillus* FNCC 0051 in fermented soymilk against pathogenic bacteria	PP10
11	Ike Sitoresmi M Purbowati, Sujiman and Ali Maksum	Agricultural Technology Departement, Faculty of Agriculture, Jenderal Soedirman University, Dr. Suparno Street, Karangwangkal, Purwokerto 53123, Indonesia	Production and characterization of roselle extract nanoencapsule with β-cyclodextrin as antibacterial agents	PP11
12	Ira Nugerahani, Ratna Megawati Widharna, Anita Maya Sutedja, Ignatius Srianta and Yustinus Marsono	Department of Food Technology, Faculty of Agricultural Technology, Widya Mandala Catholic University, Surabaya, Jalan Dinoyo 42-44 Surabaya 60265, Indonesia	Development of functional beverage based on monascus-fermented durian seed: Process optimization and *in vivo* evaluation	PP12
13	Lilis Puspa Friliansari, Samidjo Onggowaluyo and Anggie Anarahmy	Departement of Medical Laboratory Technology, STIKES	Determination of sporulation and pigmentation of *Aspergillus fumigatus* and *Aspergillus flavus* cultivated in laboratory scale	PP13

		Jenderal Achmad Yani Cimahi		
14	Maria E Kustyawati, Filli Pratama, Daniel Saputra and Agus Wijaya Kustyawati	University of Lampung, Jl. S. Brojonegoro No 1 Bandar Lampung	Effect of sub supercritical CO2 processing on the microbial loads in tempeh	PP14
15	Merkuria Karyantina and Yustina Wuri Wulandari	Faculty of Technology and Food Industry, Slamet Riyadi University	Physicochemical and sensory evaluation of salted catfish (*Pangasius hypophthalmus*) with salt concentration variations and time of fermentation	PP15
16	Nanik Suhartatik and Akhmad Mustofa	Department of Food Technology, Faculty of Technology and Food Industry, Slamet Riyadi University, Surakarta, Central Java-Indonesia, Jl. Sumpah Pemuda 18 Joglo Kadipiro-Surakarta 57136	Black glutinous rice extract anthocyanin degradation using *Pediococcus pentosaceus* N11.16	PP16
17	Ninoek Indriati, Irma Hermana, Izhamil Hidayah and E.S. Rahayu	Centre for Research and Development Product Competitiveness and Biotechnology Marine and Fisheries, Universitas Gadjah Mada	Profile aflatoxin B1 in dried salted fish	PP17
18	Nurul Ikhtiyarini and V. Irene Meitiniarti	Satya Wacana Christian University, Salatiga, 50711	Bacterial isolates solvents phosphate activities obtained from rice land in Ring Road and Gunung Sari, Salatiga	PP18
19	Rachma Wikandari, Endang S. Rahayu,Maura Dania Permata Sari, Inggrid Chrisanti Mayningsih and Pratama Nur Hasan	Faculty of Agricultural Technology, Universitas Gadjah Mada, Flora street No. 1 Bulaksumur, Yogyakarta 55281, Indonesia	Occurrence of aflatoxigenic and ochratoxigenic fungi in dried chili from Yogyakarta	PP19
20	Prima Retno Wikandari, Kharisma Nur Puspitasari and Ega	Chemistry Department, Faculty of Mathematics and Natural Sciences,	Short chain fatty acids production on yacon root (*Smallanthus sonchifolius*) Fermented by *Lactobacillus plantarum* B1765	PP20

	Rocky Maulana Rafsanjani	State University of Surabaya		
21	Rafli Zulfa Kamil, Yulius Damara Darma Putra, Andika Sidar, Widiastuti Setyaningsih and Endang S Rahayu	Departement of Food and Agricultural Product Technology, Faculty of Agricultural Technology, Universitas Gadjah Mada, Yogyakarta, Indonesia	Mold contamination and Aflatoxin B1 (AFB1) levels in salted fish commodities	PP21
22	Ratu Safitri, Yuli Andriani, Shaiyanne Fauziah, Sri Rejeki Rahayuningsih and Roostita Balia	Departement of Biology, Faculty of Mathematics and Natural Sciences, Universitas Padjadjaran Jl. Bandung - Sumedang Km 21 Jatinangor, Sumedang, West Java, 45363 Indonesia.Tel./Fax. + 62-22-779641	Viability and antimicrobial activitity of encapsulated *Bacillus* and *Lactobacillus* in alginate, activated carbon and skim milk	PP22
23	Rochmat Triyadi, Tri Marwati, Titiek F. Djaafar, Ryan H. Setyawan and Endang S. Rahayu	Department of Food and Agricultural Product Technology, Universitas Gadjah Mada, Jl. Flora No. 1, Yogyakarta, 55281, Indonesia	Cocoa bean (*Theobroma cacao* Linn.) fermentation using *Lactobacillus plantarum* HL-15 as starter culture	PP23
24	Tyas Utami , Titiek F. Djaafar, Tri Marwati, Dina A. Nurfiana, Ryan H. Setyawan and Endang S. Rahayu	Department of Food and Agricultural Product Technology, Universitas Gadjah Mada, Jl. Flora No. 1, Yogyakarta, 55281, Indonesia	Development of *Lactobacillus plantarum* HL-15 as culture starter for cocoa bean (*Theobroma cacao* Linn.) fermentation	PP24
25	Satria Mukti Mahardika and Lusiawati Dewi	Universitas Kristen Satya Wacana, Salatiga, 50733	Influence of various rice type to form *Nata de Leri*	PP25
26	Sitti Romlah, Rina Heryawan, Diki Hilmi and Ineu Masitoh	Stikes Jenderal Achmad Yani Cimahi, Jl. Terusan Jenderal Sudirman Cimahi	Identification of *MPB64* Gene used *Polymerase Chain Reaction* (PCR)	PP26

27	Sri Anggrahini and Titis Linangsari	Department of Food and Agricultural Product Technology Faculty of Agricultural Technology Universitas Gadjah Mada, Jl. Flora No.1 Bulaksumur 55281 Yogyakarta, Indonesia	Effect of adding Carboxymethyl Cellulose (CMC) snake fruit kernel and commercial CMC on chemical, physical and organoleptic properties of soy-snake fruit drinks	PP27
28	Supunnika Somjaipeng and Chomphunuch Sangpetch	Division of Agricultural Technology, Faculty of Science and Arts, Burapha University, Chanthaburi Campus, Chanthaburi, 22170, THAILAND	The growth response of aflatoxigenic *Aspergillus flavus* isolated from cassava for feed: Influence of interacting climate change factors	PP28
29	Susana Ristiarini, M. Nur Cahyanto, Jaka Widada and Endang S Rahayu	Faculty of Agricultural Technology, Widya Mandala Surabaya Catholic University, Surabaya	Effect of lauric acid and glycine on color value and citrinin of angkak by *Monascus purpureus*	PP29
30	Titiek F. Djaafar, Tri Marwati, Ayunda H. Mustafa, Tyas Utami, Ryan H. Setyawan and Endang S. Rahayu	Indonesian Agency for Agricultural Research and Development, Ministry of Agriculture, Jl. Stadion Baru No. 22, Yogyakarta 55584, Indonesia	Microflora in fermentation of cocoa bean (*Theobroma cacao* Linn.) in Gunung Kidul, Yogyakarta	PP30
31	Tri Marwati, Titiek F. Djaafar, Rosyida N. B. Khusna, Ryan H. Setyawan and Endang S. Rahayu	Indonesian Agency for Agricultural Research and Development, Ministry of Agriculture, Jl. Stadion Baru No. 22, Yogyakarta 55584, Indonesia	Lactic acid bacteria from fermented cocoa bean (*Theobroma cacao* Linn.) and their potency as anti-fungal growth	PP31
32	Widya Dwi Rukmi Putria, Ni Putu Sarah Saraswati Sujarta, Nur Ida Panca	Agricultural Technology Faculty, Brawijaya University, Veteran Street, Malang, Indonesia	Hypoglycemic effect of annealed breadfruit flour evaluated in normal and diabetic treated rats	PP32
33	Yan Yiyong, Fu Hui and Shen Han	Shenzhen Bioeasy Biotechnology Co., Ltd	Quantitative evaluation of deoxynivalenol in wheat and wheat flour	PP33

34	Yuli Andriani, Ratu Safitri, Sri Rejeki Rahayuningsih, Emma Rochima and Shaiyanne Fauziah	Faculty of Fishery and Marine Science Universitas Padjadjaran, Jln. Raya Jatinangor Km 21, Sumedang 45363, West Java Indonesia, Phone 61-22-87701519	Performance vannamei shrimp (*Litopenaeus vannamei*, Boone, 1931) through the formulations of consortium *Bacillus* and *Lactobacillus* probiotic in dry preparation	PP34
35	Yusma Yennie, Rizky Aulia and Tri Handayani K	Research Center for Marine and Fisheries Product Competitiveness and Biotechnology, Jl. KS. Tubun Petamburan VI Jakarta Pusat, 10260, Indonesia	Multidrugs resistance of *Salmonella* isolated from fresh seafood products from local market in DKI Jakarta and Bogor (West Java), Indonesia	PP35

INVITED SPEAKER'S ABSTRACTS

IS1

Current status of food safety in Indonesia and its policy

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ABSTRACT

Food safety is part of multidimensional aspects. It is not only part of food security but also part of health, economy, and development. Specific policy and strategy on food safety has been developed by World Health Organization (WHO), Food and Agricultural Organization (FAO), as well as Association of Southeast Asian Nations (ASEAN) to provide direction for the Member States in particular and international community in general to improve food safety. Foodborne disease is a prominent example of event which may reflect food safety status. WHO estimates more than 200 diseases is spread through food, ranging from acute disease, e.g. diarrhea, to chronic disease e.g. cancers. Nevertheless, a foodborne disease outbreak is very likely to impede socioeconomic condition by straining health care systems, and harming national economies, tourism and trade at the same time. This talk will provide an overview of food safety status in Indonesia by sharing information regarding consumer concerns, foodborne disease outbreak, and food monitoring. Integration of food safety to the national legislation and development policy will also be discussed. Some examples of BPOM's priority programs will be explained briefly to give insight on BPOM efforts as food safety leading sector in Indonesia in improving national food safety by empowering stakeholders, including community.

IS2

An overview of foodborne parasites and the mechanisms for their control

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ABSTRACT

While the foodborne route of parasite transmission has received much less attention than that of bacterial and viral pathogens, it is, nevertheless, a very important emerging issue due to factors such as the global food trade, consumer demands, and changing practices in food preparation. Recently, the FAO and WHO reviewed the current knowledge on foodborne parasites, including their public health and trade impacts. A global ranking of these parasites was performed, and guidelines for their control are currently being drafted. The foodborne parasites of greatest global concern include those that are found in meats, such as larvae of the tapeworm *Taenia solium* (pork) and the roundworm *Trichinella spiralis* (pork and wildlife), trematode larvae within the family Opisthorchiidae found in the flesh of freshwater fishes, and those that may contaminate fresh produce, including eggs of the tapeworm *Echinococcus* spp., and roundworm *Ascaris* spp., and the cysts, oocysts and other infectious stages of the protozoan parasites *Toxoplasma gondii*, *Cryptosporidium* spp., *Entamoeba histolytica* and *Trypanosoma cruzi*. Focusing on a diverse selection of these parasites of greatest concern, this presentation will outline the factors involved in the contamination of foods and the transmission of parasites. It will also examine the control measures available for the various parasite-food commodities at the farm level, post-harvest and consumer level, including proper composting of manure, restricted access by livestock and other animals, improved sanitation and hygiene, use of filtered water, chemical and physical disinfectants, thorough cooking or freezing of meats and fish, and washing of fresh produce.

IS3

Risks for mycosis caused by foodborne fungi

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ABSTRACT

Invasive fungal infections (IFI) are a cause of mortality particularly associated with certain patient groups, e.g. solid organ and haematopoietic stem cell transplant patients, those undergoing chemotherapy, immunosuppressed individuals, and those with uncontrolled diabetes. In the majority of systemic mycoses, infection occurs via the respiratory route or via breach of the skin or mucosa. However, ingestion of fungi in foods has been proposed as an often overlooked route of infection, in particular in cases of isolated gastrointestinal (GI) IFI. Gastrointestinal mycosis is often difficult to diagnose and so has a high rate of mortality, e.g. the average mortality is 40-70% for mucormycoses of all body systems, and 85% for GI mucormycosis specifically.

Benedict et al. (2016, Foodborne Pathogens and Disease, 13:343) reviewed 17 cases where ingested fungi (often foodborne) were proposed to act as opportunistic pathogens in immunocompromised individuals. Of these, 14 reports were of IFI caused by moulds, with the majority (11 reports) caused by mucormycetes, often *Rhizopus* spp. Fourteen cases were community acquired, and four were nosocomial. However, in only 8-9 studies was the same mould isolated from both patient and food, indicating the difficulty of confirming the epidemiology of mycoses caused by foodborne moulds.

At-risk individuals, e.g. recipients of stem cell transplants are generally recommended to avoid consumption of mould-fermented foods such as salami or tempe. The risk to other vulnerable individuals of eating fungal fermented foods is not known, but a higher-incidence of GI mycosis in black South African males in the 1950's was proposed to be associated with a background of high alcohol consumption in this population, together with regular consumption of dried bread wetted with fermented milk, both substrates supporting potential growth of mucormycetes. Herbal teas and other plant-based supplements have been suggested as a possible source of mucormycetes causing IFI – in Asia, could the widespread use of traditional medicines combined with an increasing number of undiagnosed diabetics represent a risk for increased IFI from foods?

IS4

Current issues on food safety in ASEAN countries

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ABSTRACT

Food safety has gained interest among stakeholders worldwide, as well as in South East Asia (SEA) region. With the majority of the countries fall in category B_regions with with low child mortality and very low adult mortality_most of the SEA countries are facing similar issues with regard to food safety. The latest World Health Organization (WHO) report suggests that C*ampylobacter, Shigella*, Enterotoxigenic *Escherichia coli*, non-typhoidal *Salmonella* and Norovirus were the top 5 foodborne pathogens that cause foodborne illnesses in the region. However, mortality and Disability Adjusted Life Years (DALYs) was mostly attributed to *Salmonella* Typhi. Norovirus and Hepatitis virus are also major contributors to food safety issues and fatalities in the region, while protozoa and helminthic parasites are also still important issues. While the overall picture in the region as projected by WHO is availble, the data in each country may not be exhaustive. Some of the problems in those countries are inadequate or even absence of foodborne disease surveillance and limited foodborne disease outbreak investigation. An example of the problem in Indonesia will be presented.

IS5

New and old names of food borne fungi

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ABSTRACT

The correct identification of food borne fungi is essential because this will provide important data about the characteristic of species such as production of mycotoxins, enzymes, growth conditions. However the developments in taxonomic research can change the nomenclature of the species and in the past years some names of common fungi have changed. The taxonomy of food borne fungi and particularly in the common genera *Penicillium*, *Aspergillus* and *Fusarium* are subject to molecular methods and phylogeny. Another important change in recent fungal nomenclature is the abandonment of dual nomenclature for pleomorphic fungi, following the decision taken at the International Botanical Congress in Melbourne (24-30 July, 2011). In the latest International Code of Nomenclature for algae, fungi and plants the current nomenclature rules require the use of only one name for a fungal species, whereas previously two or more names could be applied to different morphs of the same fungus. In this presentation these changes will be discussed with examples of important foodborne species.

IS6

New insight on safety and quality of salami production related to *Penicillium* species

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ABSTRACT

Fermented meat products are unique and often represented as an element of culinary heritage and gastronomic identity. Together with meat enzymes and bacteria, molds are very important in the ripening of some dry fermented meat products. Fungal starter cultures, contribute to the development of the typical sausage's flavor through their lipolytic and proteolytic activities. They also played an important role in preventing lipid oxidations and counteracting undesirable microorganisms. Various genera of fungi could colonize salami but *Penicillium* species are predominant, and above all *P. nalgiovense*, *P. olsonii*, *P. brevicompactum*, *P. chrysogenum* and a new recently described species *P. salamii*. Recently we investigated the technological aspects of a *P. salamii* strain, already well adapted to the ripening conditions. Its interesting attitude to the seasoning process of meat resulted in fast growth, with high lipolytic and proteolytic activities suggesting it as promising candidate to be used in new fungal starter formulations for meat industry. On the other hand, depending on its peculiar composition, the surface mycobiota could be colonized by undesirable molds, like *P. nordicum* an important and consistent producer of the potent nephrotoxin ochratoxin A (OTA), widely reported as contaminant of dry-cured meat products. In relation to monitoring and addressing the safety of seasoning of salami we developed a sensitive and easy to use LAMP assay for *P. nordicum* detection on salami surface co-inoculated with *P. nalgiovense* and *P. nordicum* at different rates. In addition, we monitored the expression of a keygene of OTA biosynthesis in *P. nordicum* and toxin accumulation in meat during the seasoning process, observing that expression profile was consistent with OTA accumulation. Results revealed that *P. nordicum* monitoring, since early steps of seasoning, could represent a valid and fast molecular tool for early alert of the possible OTA accumulation.

IS7

Mould spoilage of foods and beverages: assessment and prevention

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ABSTRACT

Worldwide, spoilage of foods and beverages due to fungi costs the food and beverage industry big economic losses. The fungi groups associated with fungal spoilage are: (1) xerophilic fungi in low and intermediate water activity (aw) foods; (2) heat-resistant fungi in heat- processed products; (3) preservative-resistant fungi in beverages and foods that are preserved; (4) mycotoxigenic fungi and (5) anaerobic fungi or fungi that can grow under very low oxygen concentration. Xerophilic fungi can grow at water activities below 0.85. Some of them such as *Xeromyces bisporus* can grow at water activities near 0.60. Heat-resistant moulds survive pasteurization of juices and beverages and the baking process. Preservative- resistant fungi can grow in the presence of preservatives such as sorbates. Some heat-resistant fungi are also preservative-resistant. Most fungi produce a variety of secondary metabolites. Some of them are well known mycotoxins such as aflatoxins, ochratoxin A (OTA), *Fusarium* toxins and patulin. Many spoilage fungi can grow at very low oxygen concentration and can spoil foods packaged under vacuum or modified atmosphere. Each food group has an associated mycobiota that can cause spoilage. Usually, this mycobiota is composed by a few species. The right methodology and media has to be used to isolate the associated mycobiota. It is essential that spoilage fungi be accurately identified. New molecular techniques have helped with identifying the species of spoilage fungi. However, in the case of filamentous fungi, DNA sequencing techniques have to be used in conjunction with morphological techniques. Spoilage prevention requires the elimination of these fungi from the ingredients, packaging and processing environment as well as the use of the right formulation and processing. Elimination of these fungi from the processing environment can only be achieved by the implementation of a robust sanitation program and the use of the right sanitizer.

IS8

An introduction to quantitative microbiology

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ABSTRACT

The development and application of models in food safety and food spoilage falls within the discipline of quantitative microbiology also known as predictive (food) microbiology. Overall, the models developed in predictive microbiology aim at the quantification of the effects of intrinsic, extrinsic and/or processing factors on the resulting microbial growth, inactivation or inhibition in food (model) products. These models rely on the possibility to interpolate the resulting microbial proliferation for combinations that are not only originally examined, but also included in the range of the experiment design. Numerous modelling approaches have been published the past years in the literature. These models aim at addressing different issues such as identifying microbial risks and deciding on interventions in the food chain, optimising a food process, assessing the food shelf life, etc. The main principles of predictive microbiology will be discussed by providing an overview and interpretation of terms used in the area as well as demonstrating a classification and a description of the procedure to develop models. The importance of choosing informative experimental designs, selecting appropriate modelling structures, performing identification techniques for estimating accurate and precise parameters and validating the models will be showcased. The multidisciplinary aspects of quantitative microbiology will also be presented by showing how applied statistics, engineering and microbiological knowledge can be intergraded in studies focusing on quantitative microbiology. The applicability of these modelling approaches to perform shelf-life assessment, process design optimization, exposure assessment and systems biology studies will also be presented. The current state of quality modelling methods is most succinctly revealed in a number of software programs available for the general public. Therefore, a summary of existing parameter estimation and simulation software programs will also be presented with some illustrative examples.

IS9

Resources to assess and validate the impact of new preservation technologies as control measures in food industry

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ABSTRACT

Food safety management systems based on the hazard analysis and critical control points (HACCP) require the development and implementation of preventive control measures all along the food manufacture and supply chain, from primary production to consumption. These control measures have to be validated, monitored and verified, three different but complementary actions needed to assure food safety. Within the current flexibility of the food safety management systems, and the emergence of new processing and preservation technologies, the validation and re-validation of control measures acquires increased relevance. Validation studies are addressed to collect and evaluate scientific, technical and observational information to demonstrate that a given control measure is consistently capable of achieving the intended level of hazard control. Validation activities may be resource intensive and time consuming depending on the case and usually can be developed using a wide range of complementary resources: (*i*) scientific literature and technical guidelines, previous validation studies or historic knowledge of process performance; (*ii*) experimental assays such as challenge testing; (*iii*) mathematical modeling, including predictive microbiology (*iv*) data collection during food operation; (*v*) surveys. For emerging and new preservation technologies, usually a combination of approaches will be needed to provide reliable and robust validation results. Furthermore, the design of the studies to be carried out will depend on the type of technology (e.g. intended to reduce the level of hazard through lethal effects, focused on preventing hazard increase by avoiding cross-contamination and/or growth of microbial hazards potentially present), the food safety outcome required (e.g. number of log reductions for the relevant microbial hazard) as well as the uncertainty and variability associated with the food product, the technology and the validation approach itself. The results of proper validation studies may be useful for the design of verification and monitoring procedures, including final product testing.

IS10

From microbial prevalence to virulence – hand in hand data for quantitative food safety evaluation

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ABSTRACT

Despite extensive efforts to develop improved food safety monitoring and evidence-based risk management definitive foodborne illness preventions and interventions remain elusive in large part due to the lack of sufficient information about pathogens diversity. The deepest abyss of unknown is **microbial virulence.**

Risk assessment studies are evolving to reflect variability sources such as storage temperatures of food products, seasonality of different food preparation methods, raw materials, home vs. out of doors eating, culinary practice, consumption patterns across a World, and product handling processes across different producers. But, few or none reflect inter-strain variations in behavior and virulence; and these are vast. Nonetheless, the scientific community has come to the **consensus that existing studies are biased and that fine-tuning should come from scenarios including virulence information and mixture exposure**. Inherent and induced (by food and process) differences in virulence between different strains are areas of prime research interest. Efforts are needed from to incorporate **virulence data into quantitative safety of an integrated food chain**. It is a multidisciplinary setup to quantify dose-response function for microbial food safety hazards. The future food safety risk management will probably need to step away from only enumeration of pathogens per unit of food, and include virulence of pathogens as influenced by specific foods/food processing conditions (pH, water activity, temperature, preservation, background flora, packaging conditions etc.) with an eye on especially vulnerable consumers. In developed world, as much as 30% of people can belong to highly sensitive groups of elderly, infants and children, the immuno-compromised, or those whose exposure to the multiple microbial hazard may be increased due to dietary intake and socio-economic status. Therefore a societal pressure is to reduce the virulence of pathogenic microorganisms in contemporary food production needs to be related also to differences in susceptibility to infection/intoxication across vulnerable subpopulations.

IS11

Integration of microbial behaviour in predictive models development: the case of *Listeria monocytogenes* in fermented sausages

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ABSTRACT

Despite the efforts dedicated by food producing companies, official authorities and research institutions to reduce the prevalence and incidence of foodborne pathogens, they still represent relevant health risks for the consumers. Due to the important repercussions which food safety has on the society, not only by the health point of view, but also economically, deeper investigations are necessary to develop tools to combat and reduce the incidence of foodborne pathogens.

In the last 10 years the possibility to study the behavior of bacteria, through the use of microarrays, reverse transcription quantitative PCR (RT-qPCR) and, more recently, RNA seq has opened up new possibility to comprehend how they express specific genes in response to environmental parameters and throughout the food chain. Moreover prediction models can be developed, which are able to anticipate the behavior of pathogenic bacteria.

In this study we will present the results obtained by applying molecular methods (microarrays and RT-qPCR) to investigate the transcriptomic response of *Listeria monocytogenes* when subjected to several stresses *in vitro* (mainly pH and salt) and *in situ* (during fermentation of sausages). The results obtained underline the heterogeneity of the strains used in the study and they highlight how this intra-species diversity has to be taken into consideration for risk assessment. Moreover, it was underlined the important difference of the outcomes when performed *in vitro* and *in situ*.

The study demonstrate how transcriptomics can be efficiently used to better understand the behavior of *L. monocytogenes* in the food chain.

IS12

Modeling the microbial dynamics of food during different processes

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ABSTRACT

Mathematical models are the main tools to quantitatively describe the impact of a process as well as storage conditions on a food. For that purpose, monitoring and control of critical parameters are essential factors under consideration within the food chain. The knowledge of the processing parameters combined with the kinetics of microbial attributes (e.g., pathogenic/spoilage microorganisms) is of utmost importance. Thereafter, flexible and versatile (mechanistic) mathematical models need to be developed. A model-based process design in which (total) food quality is optimized, while safety constraints are satisfied simultaneously, is a driving force for the further evaluation of the performance of food processes. The objective of this lecture will be to discuss the predictive, kinetic modelling approaches dedicated to different processes (e.g., thermal and non-thermal). The application of predictive modelling tools for critically assessing issues in relation to the efficacy and to the impact of processes on the microbial inactivation will be outlined. Experimental issues, data-processing approaches, kinetic modelling practises, model structure characterization and validation will be presented. All of these will be tackled focusing on the development of valid kinetic modelling structures to be exploited for the design and optimization of food processes. Specific examples will be given in which model based design of food processes (e.g., high hydrostatic pressure) ensuring safety and quality of food systems is developed. Future trends in which parameters are estimated from non-static conditions, while studying the kinetics of numerous safety and quality indices will also be presented. These non-static conditions could refer to any realistic industrial process or food storage environment. User-friendly software on estimating these parameters is likely to be developed in the near future and made available to food researchers and processors, permitting more accurate and precise estimation of the processing operation.

IS13

Progress of microbiological risk assessment development in Indonesia

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ABSTRACT

Foodborne and waterborne diarrhoeal diseases kill an estimated 2.2 million people annually. Indonesia as the most populous country and the largest economy in Southeast Asia is facing challenges in improving living conditions for its growing population, including in ensuring the safety of food. One of the World Health Organization's strategic directions for food safety 2013-2022 is science-based decision making which could be done by using recommendation resulted from risk assessment. In this paper, the advancement of microbiological risk assessment (MRA) in Indonesia were reviewed. The first advancement in MRA was the establishment of Indonesian Risk Assessment Center which aims to provide a scientific base for food safety policy in Indonesia. The Center currently is working on MRA about *Salmonella*, which was aimed to discover the level of salmonellosis risk due to fried chicken consumption and to give recommendations to lower the risk. As a maritime country, Indonesia also has performed three MRAs regarding the contamination of *Salmonella* and *Vibrio parahaemolyticus* on fishery products. The results have been communicated to be used by the risk manager as a base for making policy to handle the refusal of exported Indonesian fishery products. The researchers in Bogor Agricultural University also have joined the cavalcade by adopting MRA as their research topic, i.e. risk assessment of *Escherichia coli* on iced beverages. These findings indicated the positive progress of Indonesia's ability to deal with microbiological food safety problems by using risk assessment framework to support food-safety-policy-making in Indonesia.

Keywords: food safety policy, Indonesia Risk Assessment Center, microbiological risk assessment

IS14

Food safety and mycotoxin research in ASEAN countries

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ABSTRACT

According to the scholar websites such as ScienceDirect, Scopus, Elservise and the others, since 2000 less than a hundred research articles related to the mycotoxins in local foods, particularly in ASEAN countries, and conducted by ASEAN scientists and researchers are published. Firstly the problem of mycotoxins contamination exists in local commodities such as peanuts, spices, corn and feed materials are not the new issue, the adverse incidence is not prominent; the food safety management is not the top priority. Therefore, the sophisticated and costly research related with surveillance, exposure assessment and determination of mycotoxins and mycotoxins producing fungi were less supported by the funding agencies. Secondly, regarding the limit of research funding, the uncertainty of data from improper number of tested samples cause less interest to publish in leading research publications. Such information will be limited only in the local readers and local research articles in the local languages. Thirdly, the development the methodology and detection method for the co-occurrence mycotoxins contamination require the up-to-date analytical equipment to achieve the reliable result. Lastly, less sharing analytical data among industry and government is also the barrier to perform effective risk management, the data are kept due to the concerning of marketing. Usually sharing the data from investigation will be very useful to establish the guideline or regulation for their countries or region. Thus, the scientific collaboration and strong commitment among the ASEAN countries with international agencies are needed and it will be the open gate to rectify the problem. Sharing the resources both academia and facilities will solve the limit of resource and funding. Risk assessment and mitigation of mycotoxins in food and feed such as coffee, cocoa, spices and herbs, maize are the needed research issues that all ASEAN countries member should begin to open communication and conduct closely collaboration with international agengies. The participation from ASEAN countries member leads to the safety and wholesomeness food not only in this region, but the benefit from food markets will return for all ASEAN consumers.

Keywords: Mycotoxin research, Risk management, International collaboration, Food safety, ASEAN

IS15

Mycotoxins occurrence in Indonesian commodities and its risk assessment

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ABSTRACT

Five of mycotoxins have been a major concern in Indonesia, i.e., aflatoxins, deoxinivalenol, fumonisins, ochratoxin, and zearalenon. Priority is given to these five toxins since their producer fungi can grow rapidly and produce their toxins in the tropical condition. Regulation of these five mycotoxins have been set up in SNI (2009, Standard National Indonesia) and decree of BPOM (2009, the Indonesian Food and Drug Control Agency). However, occurrences of these mycotoxins in food have been focused only on aflatoxin, fumonisin and ochratoxin. Aflatoxins and ochratoxin A remain a priority since both of them have a link to the world trade. The occurrence of aflatoxin in nutmeg causing a detention for Indonesian export of this product. Similar situation is the presence of ochratoxin A on cocoa and coffee beans which are also important export commodities. Therefore, implementation of good practices in the food chain is a must. Nowadays, the presence of aflatoxins in some commodities, such as peanuts and corn began to be used to calculate the risk assessment. In this presentation, preliminary study of risk assessment of aflatoxin via consumption of corn in the corn producer area (Temanggung) will be discussed. Aflatoxins and ochratoxin A were also found in chili powder, even aflatoxins also was detected in dried salted fish. Since aflatoxins contamination in food is difficult to be removed completely, so prevention of the occurrence of these toxins from the field and in the supply chain must be done. Risk assessment of aflatoxins should be widen through consumption of several food that susceptible to fungal attract.

IS16

Microbiological food safety and food security: application of next generation sequencing technology

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ABSTRACT

According to the United Nations, about 21,000 people die of hunger or hunger-related causes every day globally; whilst WHO estimated that 1 in 10 people fall ill annually from eating contaminated food and 420,000 people die as a result worldwide. The statistics clearly highlight the global burden of both food security and food safety. While some argue that food security should get more attention than food safety, FAO integrated food safety into food security, defining food security as "a situation that 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". Therefore, while it is important to increase the food production, improving food quality for prolong shelf-life as well as ensuring food safety are equally important in addressing food security issue. Food waste and lost could occur at various points along the food supply chain: pre- and post-harvest, manufacturing, packaging, distribution and storage. In developing countries, food is typically wasted or lost in the early stages of food supply chain, and can be traced back to financial, managerial and technical constraints in harvesting techniques as well as inappropriate storage and cooling facilities. In this presentation, the application of Next Generation Sequencing (NGS) technologies, particularly metagenomics and whole genome sequencing in pre-harvest and during manufacturing to tract source of contamination, for the purpose of improving yield and product quality and safety will be discussed.

IS17

Listeria monocytogenes: pathogen of concern to the seafood industry

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ABSTRACT

Seafood industry is a major food industry in many countries in Asia. Seafood industry plays an important role for Thailand's economy as Thailand is one of the world's leaders in exporting a variety of seafood products. Contamination of seafood products with a major foodborne pathogen, *Listeria monocytogenes* has been occurred worldwide. *L. monocytogenes* causes a serious infection, listeriosis, in which leads to high mortality rates. *L. monocytogenes* is commonly found in seafood processing facilities. Diverse sites or locations of processing facilities may represent important habitats and also allow for particular niches for *L. monocytogenes* to survive. Occurrence of product contamination with this pathogen through various environmental surfaces and locations (post-processing contamination) of the seafood processing facilities has been previously reported. *L. monocytogenes* can persist in the food processing facilities as present by specific "in-house" flora containing certain *L. monocytogenes* subtypes. Among various seafood and environmental samples tested, recovery of *L. monocytogenes* is differed among several seafood processing facilities investigated. *Listeria* species other than *L. monocytogenes* have been detected, suggesting the likelihood of finding *Listeria* species in the seafood processing environments. With the increased demand for lightly preserved and/or ready-to-eat (RTE) seafood products, finding of *L. monocytogenes* contamination in some RTE products is a public health concern worldwide. RTE seafood products have been shown with a leading contamination rate of *L. monocytogenes* as compared to other food categories. Understanding of the occurrence and diversity of *L. monocytogenes* in seafood products and processing environments may expand the tools that the seafood industry and regulatory agencies need for improving *Listeria* control measures. This can ultimately lead to minimizing cross-contamination in finished seafood products and ensuring product safety for domestic and international markets.

IS18

New developments in detection and identification of foodborne molds

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ABSTRACT

Identification of a species is an important step in food mycology. A correct name is vital for optimal communication, and is often the link between studies of various fields. Ideally, identification should be unequivocal, accurate, simple and immutable. In the last decade, new insights have resulted that certain well-known food related species appear to be species complexes. This might lead (initially) to confusion; however, a correct identification has a function: certain species of these complexes have unique properties such as production of different mycotoxins, higher resistance to certain antifungals and/or have unique enzyme profiles.

Until recently, fungal identification of common foodborne moulds was primary based on phenotypic characters and this appears to be difficult for many researchers. Nowadays, sequencing of specific genes for species identification is commonly applied. The choice of the target gene and use of reference databases for identification are crucial for correct species identification. New identification techniques, such as MALDI-TOF MS, are being developed and are promising tools for rapid species identification.

IS19

The study of microbial ecology in foods: opportunities in the use of NGS approaches

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ABSTRACT

In the last five years, the study of microbial ecology in foods has benefit substantially from the development of second generation sequencing techniques, generally referred as next generation sequencing (NGS). Having the possibility to sequence simultaneously multiple DNA sequences opened up a number of opportunities for scientists involved in the understanding of diversity and interactions in complex microbial ecosystems.

It is essential to underline that nowadays the approaches that can be used, based on NGS, are basically two: metagenetics (or 16S rRNA metagenomics) and metagenomics. The information obtained from the application of those methodologies are very different and this aspect must be taken into consideration very carefully in order to avoid misinterpretation of the data obtained. With metagenetics, which is a PCR-based methodology, it is possible to depict the ecology of an ecosystem, at the level of the phylum, class, order, family, etc., based on the differentiation power of the primers used for the amplification. By applying metagenomics, not only the ecological description is reached (by isolating sequences belong to the rRNA genes) since the catalog of the genes present in the microbial ecosystem is created. In other terms, switching from metagenetics to metagenomics, the focus to the ecology shifts to the function (even if DNA is targeted).

We have exploit NGS approaches to study a number of different food ecosystems, both during fermentation and spoilage, in order to define the main bacterial populations involved in the transformation processes. Moreover, metagenomics were used to investigate the changes in the gene content of fermented sausages from the manufacturing to the end of the maturing.The results observed are confirmatory of previous findings, however in some cases it was possible to better highlight some microbial behavior observed in study of the spoilage process of hamburgers packed in nisine-activated films, or during the ripening of an hard type cheese from the North-West Italy.

Aptamer-based detection and quantification of mycotoxins in food

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ABSTRACT

Aptamers are DNA or RNA ploynucleotides that display a specific affinity against molecules other than nucleic acids. Desiging aptamers relies on the SELEX process **(**Systematic Evolution of Ligands by EXponential Enrichment) in which random sequence oligonucleotides are mixed with nanoparticle-bound target molecules. Washing of particles will leave strongly associated oligonucleotides bound to their target molecule. A PCR using bound oligonucleotides will selectively enrich high affinity nucleic acids. After several repititions, the SELEX process leads to the selection of aptamers with highly specific binding to their respective target molecule. Aptamers have been developed against bacteria and viruses, proteins and peptides as well as against small organic molecues such as pharmaceuticals and mycotoxins. Currently they are available for the detection of aflatoxins, ochratoxin A, deoxynivalenol, zearalenone, T-2 toxin, patulin and ergot alkaloids. Mxcotoxin specific aptamers can be applied in formats such as ELAA (enzyme-linked aptamer assay) or LFD (lateral flow device) and dipstick assays which use technology known from immunoassays for attachment of aptamers and signal detection. Several novel assay formats use the specific properties of nucleic acids as well as features of new materials such as terbium and graphene oxide for signal generation. Examples of aptamer-based mycotoxin assays will be discussed in the light of sentivity and usefulness.

IS21

Fungi and animal feed: risks and opportunities for 'one health'

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ABSTRACT

The concept of 'one health' acknowledges that the health of humans is linked to the health of animals and the environment. The growth of mycotoxigenic moulds in animal feeds can affect human health and nutrition either indirectly or directly. Certain mycotoxins can be produced in commodities that are solely or primarily consumed by animals, e.g. pasture grasses, or fodder crops such as lupins; these toxins can affect the growth and health of animals, and the associated decrease in productivity is negative for both humans, for whom animal husbandry is a key part of their livelihood, and environmental sustainability, which is favoured by optimal use of available resources. In contrast, other mycotoxins produced in cereals consumed by both animals and humans have direct impacts on animal and human health. For this reason, permissible levels for trichothecenes, fumonisin, zearalenone, ochratoxin and aflatoxins, among others, are legislated in human foods. The presence of these mycotoxins in animal feeds may be managed by guidelines, legislation, or a combination of these – in the EU, there are guidelines setting levels which should not be exceeded in animal feeds; a special case is aflatoxin B1, for which a legislated limit in the EU of 5 μg/kg is applied in feed to dairy cows. This limit exists due to the direct food safety risk to humans of aflatoxin M1 in the milk of cows which have consumed contaminated feed. The management of mycotoxin contaminated commodities from a 'one health' perspective raises some interesting questions. Given the considerable inputs into producing crops, is directing contaminated grain to biofuels attractive for farmers? Alternatively, what scope is there to 'safely' feed contaminated products to animals via co-feeding of mycotoxin-binders / detoxifiers, thereby supplementing livestock production by small-holder farmers?
Fungi can also positively contribute to 'one health' through improving sustainability of animal feed production, with fungal fermentations increasing nutritional availability, converting side-streams (waste products) to valuable feed ingredients, providing a source of proteins and fats for aquaculture feeds, etc.

IS22

Emerging non-thermal technologies to improve food safety. Case study: high pressure processing and biopreservation of meat products

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ABSTRACT

The increasing demand of consumers for healthier, fresh-like and clean labelled food, if possible commercialized as a convenient product (ready-to-eat/use) with an extended shelf-life, have triggered the emergence of non-thermal food processing technologies. A further driver for the food industry development and innovation of such new technologies is the environmental sustainability, the food security (e.g. extending shelf-life, reaching shelf-stability, reducing food waste) as well as the competitiveness and efficient processing. In this framework, high pressure processing (HPP) is a non-thermal environmentally friendly technology used to inactivate vegetative pathogenic and spoilage microorganisms, enabling cold-pasteurization of food with limited effects on the organoleptic and nutritional quality. Lethal effects on microorganisms and enzyme inactivation are due to the application of pressures up to 6000 bars for few minutes, which cause irreversible changes in macromolecules, while valuable low molecular components (vitamins, flavors, etc.) remain practically unaffected. Biopreservation consists in the use of non-pathogenic microorganisms and/or their metabolites (e.g. organic acids or bacteriocins) to minimize or avoid the growth of spoilage and/or pathogenic organisms. Biopreservatives can be used within the formulation, as surface treatment or within active packaging. The mode of action and effectivity of biopreservation highly depends on the strategy applied and the target organism to be controlled. The combination of HPP with other preservation strategies, such as biopreservation, constitutes an attractive approach to enhance bacterial inactivation and reduce the recovery of sublethally injured cells during product storage. Commercial implementation of HPP and biopreservation has been fast growing in the last years, meat industry being one of the food sectors taking most advantage of such emerging approaches within the hurdle technology philosophy. The main challenge is the inactivation or inhibition of both vegetative and spore-forming pathogenic bacteria until the end of the shelf-life.

IS23

Development of infrastructure for management of microbial food safety in developing countries: all areas and all things considered – urban or rural

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ABSTRACT

While foodborne illness remains a major threat to public health in developed countries, it is far more problematic in developing countries: disease burden largely unknown and risk factors unidentified. Dominance of small-scale food operators (SFO), distributors/retailers, wet markets as well as street foods in developing countries have complicated the already difficult-to-tackle food safety problems. Another problem is that food safety network, if ever existent, does not cover the rural areas where the risk of foodborne outbreaks is high. If comprehensive risk assessment along the food chain and GMP/HACCP approaches in SFOs are not feasible for economic reasons in the short term, governmental authorities should prioritize the measures for better food safety management by efficient use of relevant resources: (1) The established national and regional surveillance programs and network should be fully functional for major foodborne pathogens using recognized testing protocols. The surveillance network should cover rural areas. (2) Different levels of laboratory capacity that could reach the rural areas should be built and equipped with facilities of different performance/complexity from next generation sequencing machine, real-time and regular PCR thermcyclers to conventional microbiology equipment. (3) Training of food microbiologists in testing, source-tracking, management of food safety risks, etc. should be emphasized. They can then be deployed for educating the food vendors and those working in small food operators on good hygienic practices for proper handling of foods (including street foods). All these are additional to food safety laws and regulations. Although the laws and regulations are in place in some developing countries, their effective enforcement is yet a matter of concern. It is expected that strict food safety laws will be implemented and GMP/HACCP will be introduced progressively, though gradual, in the food industry in developing countries for proactive intervention of microbial food safety along the food chain.

IS24

Fungi and their involvement in food fermentation

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ABSTRACT

The growth and metabolic activity of fungi (incl. yeasts) in foods can have different effects. On one hand, undesirable changes such as spoilage and mycotoxin formation can occur; on the other hand, fungal activity has been exploited by man for the purpose of food production. Fermentation is one of the oldest ways of food processing and is of great economic importance. For some food products, the fermentation process is well-documented and starter cultures are used, while other foods are still produced using "traditional" techniques.
In temperature regions, *Aspergillus* and *Penicillium* species play a role in the fermentation of cheese and sausages. The genera have a dualistic role in food technology. Some species used in food fermentation processes appear to be closely related to producers of mycotoxins. For example, *Aspergillus oryzae* and *A. sojae* are typical industrial moulds that are unable to produce aflatoxins, while their wild counterparts (*A. flavus*, *A. parasiticus*) do. The presence of these fungi in natural fermentations can therefore be of concern.

IS25

Preservatives: their role in preventing food spoilage

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ABSTRACT

They often say that "prevention is better than cure". In the food industry to achieve the necessary shelf-life, weather stored at ambient or cool conditions, this approach to a large extent is achieved by the use of a range of different GRAS (Generally Recognized As Safe) preservative compounds. These are used to control both bacterial and yeast spoilage in liquid-based foods and for the control of filamentous spoilage moulds, especially in intermediate moisture foods, especially bakery products. There are a range of approved preservatives for use in food products predominantly based on salts of aliphatic acids such as propionates, sorbates and benzoates and their mixtures and a range of antibiotic-type compounds which are used in dairy products. A range of anti-oxidants are also approved for use in a range of food products. The concentration required for the control of spoilage bacteria and moulds is determined by the water activity, pH and storage temperature of the food product. This will impact on the efficacy of the preservative/s used and the shelf-life of a specific product. Screening of compounds can be done using traditional methods or with rapid methods such as the use of the BioScreen where a significant number of assays can be carried out to identify ED_{50} and MIC values for novel compounds against both bacteria and spoilage/mycotoxigenic moulds. The importance of using an environmental screen to simulate food storage conditions is discussed in context of approaches to identify novel compounds for potential use and control of spoilage microorganisms.

IS26

Good Sanitation Practices (GSP) to prevent pathogen contamination and mould spoilage of food and beverages

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ABSTRACT

In the United States, ready-to-eat (RTE) foods are recalled daily due to the presence of pathogens such as *Salmonella* spp. and *Listeria monocytogenes* (www.foodsafety.gov). Mould spoilage of these foods and beverages also cause significant economic losses every year. These RTE products and beverages have received a lethality treatment to make them safe to eat or drink. However, when these product are directly exposed to the processing environment, they can become cross-contaminated with pathogens as well as spoilage microorganisms such as moulds. The contamination can come from the environment, the employees, or the equipment. Some RTE products may be reheated by the consumer to enhance palatability, but a reheating process will not necessarily eliminate any pathogens that exist on or in the product. Because many RTE products are consumed right from the package or after minimal reheating, any pathogens that are present will be consumed along with the product. Thus, there is an increased risk of these products causing foodborne illness, and establishments producing these products have an increased responsibility for sanitation of the RTE processing environment. Good sanitation practices (GSP) are essential to prevent pathogen contamination and mould spoilage. However, prevention requires more than GSP. It requires a good design of the processing rooms and equipment and above all, seggregation of the areas where the product or beverage is open to the processing environment. This presentation will cover all the essential concepts for the prevention of pathogen contamination and mould spoilage of RTE foods and beverages.

IS27

New insights in genetics of mycotoxin biosynthesis by genomic approach: the ochratoxin A story

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ABSTRACT

In the nineties fungal secondary metabolites (SMs), such as antibiotics and mycotoxins, started to be genetically characterized. Then, the clustered arrangement of genes involved in the biosynthesis of a single SM was studied. In the pre-genomic era, gene cluster discovery in fungi was complex and time-consuming, involving cumbersome traditional molecular methods. Genomics has revolutionized the research on SM biosynthesis pathways, allowing the bypass of such approaches. The breakthrough of next-generation sequencing (NGS) technologies and the advent of Bioinformatics have opened a new era in the study of biological systems. NGS technologies contributed significantly to the increasing availability of fungal genomes and bioinformatic analysis lead to the identification of SM clusters of known metabolites and to the prediction of novel cryptic clusters for still unknown microbial metabolites. However, most of the clusters identified by genome analysis are still to be deeply examined to completely understand the pathway steps and the regulatory network behind the metabolite biosynthesis. Here, we present the example of how the genomic approach has led to the identification of biosynthetic genes and their role in ochratoxin A (OTA) production by *Aspergillus carbonarius*. From the genome sequencing and the subsequent prediction of OTA cluster, we demonstrated by gene knock-out approach the key role of three genes (*AcOTApks, AcOTAnrps* and *AcOTAhal*) in the OTA biosynthesis. Single gene knock-out mutant allowed us to elucidate the order of the enzymatic steps in the biosynthesis pathway. Other predicted genes in the cluster, such as a p450 monooxygenase and a transcription factor gene, need to be investigated for the full knowledge of the structural and regulatory mechanisms of toxin production. Furthermore, transcriptomic analyses are in progress to study and clarify at a deeper level the complex genetic picture of the fungus during OTA biosynthesis.

IS28

Detection and molecular characterization of parasites on fresh produce

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ABSTRACT

Foodborne transmission of protozoan parasites is of growing importance in light of factors such as the global nature of the food trade, international travel, the increased number of immunocompromised and other susceptible individuals, and changes in consumer habits. The parasites *Cyclospora cayetanensis*, *Cryptosporidium* spp. and *Giardia duodenalis* have been linked to numerous foodborne outbreaks of diarrheal illness in North America, most of which have been associated with the consumption of fresh produce imported from developing regions, where water quality, hygiene and sanitation may be sub-optimal, and where numerous surveillance studies have demonstrated the presence of these parasites on fruits and vegetables. The objectives of this study were to determine the prevalence, as well as the genotypes and species, of *Cyclospora*, *Cryptosporidium*, and *Giardia* on domestic and imported packaged leafy greens purchased at retail in Ontario, Canada, in order to determine the potential risk to consumers, and to identify possible sources of contamination. Parasites were eluted from leafy greens and concentrated before being detected by PCR and immunofluorescence microscopy. PCR-positive samples were then sequenced to determine the parasite species and genotypes present. Testing revealed that *Cyclospora cayetanensis* oocysts were present on 1.7% of the samples. *Cryptosporidium* oocysts were present on 5.9%, with all isolates belonging to the zoonotic species *C. parvum. Giardia duodenalis* cysts were present on 1.8% of samples, with the genotype Assemblage B predominating, suggestive of human contamination. These results suggest that parasite-contaminated leafy greens are not uncommon at retail in Canada and that they may represent a health risk since they are generally consumed raw. Effective control measures and improved methods for the detection and characterization of parasites on fresh produce will be crucial in minimizing the risk of transmission.

IS29

Molecular ecology tools to develop control strategies for mycotoxigenic spoilage moulds

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ABSTRACT

Mycotoxigenic fungi are responsible for significant contamination of a range of staple foods, especially in tropical regions of the world. Recent research by the IARC has shown that aflatoxins are responsible for causing stunting in infants and children, especially in parts of Africa and other Low Middle Income Countries. This is an important driver to minimise the contamination of staple foods with mycotoxins. Research has shown that the genes involved in mycotoxin biosynthesis are usually clustered together. An understanding the molecular ecology of the key mycotoxigenic species, especially under different environmental conditions, can help identify approaches to inhibit specific key genes to minimise contamination of staple commodities with mycotoxins. We have used both q-PCR for specific genes involved in mycotoxin production (e.g., aflatoxin, DON, fumonisins) to better understand the impact of ecological conditions on optimum and marginal conditions for mycotoxin production in commodities such as maize and wheat. Examination of specific key genes has also been utilised to better understand the efficacy of fungicides on mycotoxin producing fungi. The use of microarrays has been beneficial in examining the optimum and marginal conditions for mycotoxin production. This has enabled the development of potential RNAi approaches to try and inhibit specific regulatory genes in the biosynthetic pathways for aflatoxin, trichothecene and ochratoxin A production to minimise mycotoxin production. These approaches are discussed in the context of the development on integrated minimisation strategies for mycotoxin control.

IS30

Development and application of a LAMP-based assay for the group specific detection of aflatoxin producing fungi in *Aspergillus* section Flavi

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ABSTRACT

Due to their high toxicity and carcinogenic potential, aflatoxins pose a high risk to human and animal health. Aflatoxins have been found to be produced by 14 different species within sections Flavi, Ochraceorosei, and Nidulantes of *Aspergillus* in a variety of different substrates and evironmental conditions. Early and rapid detection of aflatoxin producing fungi can help to assess the toxicological potential of food and feed commodities and products. Species specifc molecular detection assays are currently available but fail to detect species of minor importance. To enable rapid and sensitive detection of several aflatoxigenic species in a single analysis, a *nor1* (*AflD*) specific LAMP assay was developed. Specificity testing revealed that among 121 different fungal species from 29 genera, all potentially aflatoxigenic species from *Aspergillus* section Flavi were detected. The detection limit of the optimized assay was 9.5 pg of purified genomic DNA of *A. parasiticus* per reaction after 60 min of incubtion at 64 °C. Visual detection of positive LAMP reactions under daylight conditions was facilitated using neutral red. Application of the assay to the detection of *A. parasiticus* spores revealed a detection limit of 218 conidia/reaction with minimum sample preparation. Analysis of rice, nuts, and powdered spices showed good correlation between results of the new assay and chemical or microbiological data.

IS31

Proteomic and functional signature of a cross-talk between Caco2 cells and foodborne *Bacillus cereus* emetic toxin reveals hidden food safety risks of low dose and long term exposure

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ABSTRACT

Bacillus cerus emetic toxin, known as cereulide, is a lipophilic cyclic dodecadepsipeptide produced by certain strains of *B. cereus*. This toxin is known to induce an acute at doses of 8 µg/kg body weight, with even rare fatalities being reported. In contrast with acute doses associated with food poisoning, recent prevalence data demonstrated relatively low concentrations of cereulide in rice and pasta dishes. The effects of repeated exposure to low levels of cereulide through food is largely unknown. The goal of this study was to investigate the impact of a continuous exposure of low doses of cereulide on the behavior of intestinal cells. Caco-2 cells were used as model of the absorption and properties of the intestinal mucosa. First the limit of CER toxicity in undifferentiated Caco-2 cells was evaluated after a three-day exposure to low concentrations. Next, cells were exposed to varying concentrations around the predicted limit of CER toxicity for 18 days to investigate the effect of a longer exposure. To explore the mechanisms involved in the cytotoxic response and mitochondrial function, the (Seahorse) Bioscience XFe24 analyzer (Affymetrix, USA) was used in combination with well-established assays for mitochondrial activity (MTT) and changes in protein content (SRB (sulforhodamine B)). The effects of cereulide on the mitochondrial oxygen consumption rate (OCR) in the Caco-2 cells were assessed using the Bioscience XF Cell Mito Stress Test assay kit. In this assay, modulators of cellular respiration (oligomycin, FCCP, and a mix of rotenone and antimycin A) were serially injected providing insight into different aspects of mitochondrial function. Both MTT and SRB assays showed toxicity on undifferentiated cells at 0.125 ng/mL CER after 3 days of exposure. The three-day treatment with low concentrations of CER on mitochondrial respiration in intact cells showed perturbations in mitochondrial respiration at a concentration of 0.125 ng/ml. These *in vitro* data suggest that repeated exposure of CER might injure intestinal cells even at relative low doses. Cereulide appear to be more toxic than other cyclodepsipeptide toxins with ionophoretic properties like valinomycin and beauvericin.

ORAL PRESENTER'S ABSTRACTS

OP1

Pathogenicity activity of *Fusarium oxysporum* and *Fusarium equiseti* from plantation of citrus plants in the village Tegal Sari, Jember Umbul Wangi, East Java

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ABSTRACT

Fungus is a ubiquitous decomposer and parasite associated with fruit and dead or dying plant tissues that also may be a pathogen on a wide range of agricultural plants. The objective of this work are isolation, identification and pathogenic assay fungi from citrus fruit plantations, Tegal Wangi, Jember, Jawa Timur. Isolation of fungi using the washing method. Samples were taken in the form of stems and leaves from citrus fruit plantation land in Tegal Wangi, Jember, East Java. Pathogenicity testing (the level of virulence of mold) was obtained using the Koch's postulates method; identification of pathogenic fungi using the sequence of internal transcribed regions Spacer (ITS) in the region of ribosomal DNA. A total of 67 mold isolates were obtained (34 isolates from leaves and 33 isolates from stems). The colour of colonies of 7-day-old cultures on PDA were dominated with white while the reverse was whitish to pale yellow. Based on the pathogenicity test, four representative mold isolates were selected and identified based on the sequence analyses of internal transcribed spacer (ITS) regions of rDNA. The molds were identified as: D5K3A (*Fusarium oxysporum* with 99% homology bootstrap value 64), D6. K3.B (*Fusarium equiseti* with 99% homology bootstrap value of 100%), D7.K2.B (*Fusarium equiseti* with 99% homology bootstrap value 99%) and D3.K2.B (*Fusarium equiseti* with 99% homology bootstrap value of 88%). *Fusarium equiseti* is a main source of trichothecenes, zearalenone and other mycotoxins which can cause serious disease in human and animal. This information regarding the *Fusarium equiseti* cause damage to the leaves of citrus can be used for important information about the occurrence of pathogenic fungi in citrus fruit plantations.

Keywords: Fungus, Pathogenicity, Isolation, Identification, ITS rDNA region, *Fusarium equiseti*

OP2

NADES for monascus pigment extraction: a perspective

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ABSTRACT

This article is a perspective on monascus pigment extraction with NADES (natural deep eutectic solvent), a newly unique green solvent. Monascus pigment is a mixture of red, orange and yellow colour pigment compounds. The pigment compounds are produced by *Monascus* sp., a filamentous fungi, through liquid fermentation or solid state fermentation. The pigments have great potential not only for natural colorant but also for functional ingredient in food and beverage application. Because of almost all pigment compounds are insoluble in water, it is usually extracted by using organic solvent especially ethanol. This is a great barrier of the pigments application in food and beverage. NADES is potential to overcome the problem.

Keywords: NADES, monascus, pigment, extraction

OP3

Addition of natural preservation made from the formulation of guava leaves, soulatri leaves, clove leaves and lime powder on coconut sap towards quality of coconut sugar

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ABSTRACT

Coconut sugar is made from coconut sap (neera). Neera is easily damaged because of microbial activity. The effort to prevent damage of neera is by adding preservatives agent which called laru. The aims of this research were : 1) to evaluate the effect of natural laru formula on quality characteristics of coconut sugar, 2) to evaluate the effect of natural laru concentration on quality characteristics of coconut sugar, 3) to determine the combination treatments of formulas and concentrations that produce the best quality characteristics of coconut sugar. Natural laru formula were guava leaves : clove leaves : lime (10:10:80), guava leaves : soulatri leaves : lime (10:10:80), clove leaves : soulatri leaves : lime (10:10:80), guava leaves : clove leaves : soulatri leaves : lime (10:10:10:70) and its concentration of 10% and 20%. Randomized Blocked Design was used in this research. Treatment arranged factorially with 8 treatment combinations and done by three times replication and gained 24 experimental units. Examined variables were chemical variable which consist of water content, reducing sugar content, ash content and sensory variable which consist of color, texture, aroma, sweetness level, and overall acceptance. The result showed that the best coconut sugar gained by addition of natural laru is the one which consist of guava leaves : clove leaves : soulatri leaves : lime (10:10:10:70) at concentration of 10% which produce coconut sugar with sensory characteristics of brown color (1,63), sweet taste (3,01), coconut sugar aroma (2,6), hard texture (3,5), overall preference was like (3,02) and chemical characteristics were reducing sugar content of 4,57% (db), water content of 10,86% (wb), and ash content of 1,1% (db). The quality characteristics were met with Indonesian National Standard for coconut sugar.

Keywords: antimicrobial, coconut sap, coconut sugar, natural laru, neera.

OP4

Postharvest quality improvement of nutmeg (*Myristica fragrans*)

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ABSTRACT

Fragrant nutmeg (*Myristica fragrans*) is an important commodity used in food and pharmaceutical industries, hence its quality should be monitored. Based on a research conducted in 2013, postharvest handling method of nutmeg was not appropriately carried out, especially by farmers and collectors in North Sulawesi Province. Nutmeg kernels collected from farmers and collectors had a high percentage of damaged kernels. Consequently, the kernels can be easily infected by fungi (including *Aspergillus flavus*). A study to investigate the effect of two methods of nutmeg postharvest handling on moisture content, percentage of damaged kernels, population of each fungal species (including *Aspergillus flavus*) and aflatoxin content was conducted in 2014 and 2015. The results showed that appropriate postharvest handling method of nutmeg should be as follows: 1. Preventing ripe nutmeg fruits to have direct contact with the ground in the harvesting or collecting stage; 2. Drying the harvested nutmeg immediately after separating the nutmeg seed from the flesh and mace using smoke-drying method; and 3. Storing the nutmeg with its shell intact. This method is considered as a recommended GHP (Good Handling Practice) of nutmeg to maintain its quality to guarantee food safety, which is very important in international trade.

Keywords: *Myristica fragrans*, nutmeg, postharvest, quality

OP5

Correlation study of food consumption and aflatoxin M1 Content in breast milk among lactating mothers in Universiti Putra Malaysia, Selangor, Malaysia

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ABSTRACT

Aflatoxins are highly toxic group of mycotoxins which occur in environment and foodstuffs. Aflatoxin M_1 (AFM_1), a hydroxylated metabolite of aflatoxin B_1 (AFB_1) can contaminate milk of lactating mothers from the consumption of AFB1-contaminated food. Exposure of infants to AFM_1 is a great public health concern because of its toxic and carcinogenic properties. A correlation study was conducted to determine the occurrence of AFM_1 in breast milk and the relationship with food consumption of lactating mothers in Universiti Putra Malaysia, Selangor, Malaysia. A total of 25 samples were collected and analyzed by competitive-ELISA. Food Frequency Questionnaire (FFQ) was used to obtain information on food consumption pattern of the respondents. Results showed that 28% of breast milk samples contained AFM_1 in the range of 0.018 – 0.050 µg/kg. It was also found that 20% of the sample exceeded the Malaysian Food Regulations 1985 of 0.025 µg/kg for infant formula. Multiple regression analysis indicated that the presence of aflatoxin M_1 was positively correlated ($p<0.05$) to consumption of groundnuts, dried fish and soybean curd. This result suggested that mother's dietary intake was associated with the occurrence of aflatoxin M_1 in breast milk. Breast-fed infants of the university's staffs are at risk of exposure of aflatoxin M_1. Therefore, the evaluation of AFM_1 in human breast milk, correlation with dietary intake and the exposure of infants to AFM1 require immediate attention by the regulatory bodies.

Keywords: aflatoxin M1, breast milk, infant, food consumption, lactating mothers

OP6

Anti-*Mycobacterium tuberculosis* strain $H_{37}Rv$ activity against brazilin compound in vitro

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ABSTRACT

Brazilin compound is known to have capability against several pathogenic bacteria, but until now, the ability of brazilin as antituberculosis haven't been investigated yet. Based on some researches, it's known that brazilin is capable to chelate iron. Mtb's growth also strongly influenced by the presence of iron. The purpose of this study was to assess the potential of anti Mtb from brazilin. This research was conducted by examining the minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC). The MIC and MBC tests used proportion method consisting 4 treatment groups, namely the positive control (Lownstein-Jensen medium inoculated with Mtb), the negative control (LJ medium), the anti TB drugs (rifampicin, isoniazid, ethambutol and streptomycin), and brazilin (1, 2, 4, 8, 16, 32, 64, 128, 256, 512, and 1024 ppm) that were observed for 8 weeks. The capability of brazilin compound to chelate iron in 4 different groups was assessed using Atomic Absorption Spectrophotometer (AAS) method. The test results showed that the MIC of brazilin presented at 128 ppm, while the MBC presented at 256 ppm. The results also showed that brazilin compound at 128 ppm concentration was able to chelate iron up to 32.96% and reduce the growth of Mtb up to 72% in 10^{-3} Mtb dilution and up to 60% in 10^{-5} Mtb dilution. The antituberculosis potential of brazilin is suspected because of its ability to chelate iron and the antimicrobial properties of brazilin structure itself.

Keywords: MIC, MBC, Mycobacterium tuberculosis, brazilin, iron chelation

OP7

Natamycin treatment to control *Rhizopus* sp. mold on *Fragaria virginiana*

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ABSTRACT

Fragaria virginiana (strawberries) fruit has high economic value in food industry which is discovered in Garut, West Java, Indonesia. However, the problem on postharvest disease caused by *Rhizopus* sp. has yet successfully resolved due to unavailable proper treatment methods of natamycin application. The aim of present study is to investigate the effects of natamycin concentration to control *Rhizopus* sp. mold. The natamycin was applied on the *Fragaria virginiana* via dip coating method. The performance proposed method was observed by comparing with control sample. The natamycin concentration treatments are 250 and 500 ppm. Total incidence by *Rhizopus* sp. and weight average of *Fragaria virginiana* observed during the 30 days of storage at 25˚C. The results showed that the *Rhizopus* sp. invasion at days 4th were 43, 30, and 35% for control sample, 250, and 500 ppm, respectively. It is concluded that the natamycin treatment by dip coating method preserved effectively at lower concentration.

Keywords: *Fragaria virginiana*, *Rhizopus* sp., Natamycin

OP8

Quantitative risk assessment of acrylamide in Indonesian deep fried fritters product

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ABSTRACT

Acrylamide, a carcinogenic and neurotoxic compound is a public health concern in fried food product. This paper demonstrated the exposure assessment and risk characterization of acrylamide in deep fried fritters in Indonesian population. Acrylamide concentration data was collected from selected monitoring and laboratory simulated researches in Indonesia and neighboring countries, while the consumption data covered 263 respondents (adult, age 16-40). Exposure assessment was conducted with probabilistic approach and followed by Margin of Exposure (MOE) calculation. Estimated mean, median (P50) and P95 acrylamide intake were 14.85, 4.10 and 76.06 µg/kg-bw/week, respectively. Thus, resulted in estimated 17.4% of population exceed the tolerable intake value (18.2 µg/kg-bw/week). MOE derived from average exposure was 75, indicating significant risk and need of risk management action. Possible mitigation of 70% acrylamide level reduction was simulated and population who exceed the tolerable value was reduced to 6.9%. The risk assessment study including the proposed holistic mitigation strategies can be a valuable input for risk managers such as food safety authorities.

Keywords: *exposure, MOE, risk assessment, acrylamide, fritter, Indonesia*

OP9

Quality assurance of *Rhizopus* for tempeh starter

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ABSTRACT

Quality assurance of tempeh making in Indonesia should be set up for industrial tempeh production, while tempeh making process is shifting from non-hygienic to hygienic process. All the processes involved in hygienic process is intended to minimize the contamination of unnecessary microbes. Beside *Rhizopus microsporus*, yeast and bacteria have been found as a common microbiome in tempeh production. Some of those microbes have been reported to be beneficial to human. However, some strains of R. microsporus has been known to associate with endosymbiotic bacteria. Burkholderia–Rhizopus association which produced toxin was reported to occur in tempeh/sufu starter culture in Vietnam. This "mycotoxin" that is produced by *R. microsporus* is actually formed by the bacteria. Yet, the presence of endobacteria in *R. microsporus* starter of tempeh in Indonesia has not been investigated. Therefore, the existence of endobacteria in *Rhizopus* should be examined prior to using them as a starter for tempeh production. In this research, twenty two *Rhizopus* spp. from various habitat including tempeh starter were examined for the occurence of the endobacteria using 16S rDNA 63F and 1387R primers. The result showed that all of the *Rhizopus* tempeh starter is free from the endobacteria, but *Rhizopus* sp. from Waru (*Hibiscus tiliaceous*) leaf collected from Lumajang (East Java), a natural tempeh inoculant harbored endobacteria. This endobacteria has not yet been identified and determined its ability to produce toxin, therefore further research in those aspect has to be done.

Keywords: endobacteria detection, *Rhizopus* spp., tempeh inoculant

OP10

Diversity of *Aspergillus* spp. from groundnuts (*Arachis hypogaea*)

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ABSTRACT

Groundnuts are often used as ingredients in cooking and consumed as snack. The legume has high nutrient content, thus susceptible to various fungal contaminants, especially species from the genus *Aspergillus* which is a well known storage fungi. *Aspergillus* spp. were isolated from groundnuts obtained from several sundry shops, using direct isolation and surface sterilization methods. Based on molecular identification using ITS, β-tubulin and calmodulin sequences, and phylogenetic analysis, eight species were identified as *A. niger*, *A. tubingensis*, *A. flavus, A. chevalieri*, *A. amstelodami, A. aculeatus, A. sydowii* and *A. fumigatus*. The most common species isolated was *A. niger* (n = 54) followed by *A. flavus* (n = 20). The results indicated that diverse species of *Aspergillus* occurred on groundnuts. Two well-known toxigenic fungi, *A. niger* and *A. flavus* were recovered from the legume, suggested that there are potential of contamination of mycotoxin. The occurrence of *Aspergillus* spp. on groundnuts can also reduce the quality of the food product as well as reducing their shelf life.

Keywords: *Aspergillus*, groundnuts, contamination

OP11

Quantification of aflatoxin B1 risk in peanut based product in Indonesia: challenges and data gaps

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ABSTRACT

Aflatoxin B1 (AFB1) is one of the mycotoxin which poses threat to human health due to possesing the highest potency to cause liver cancer or Hepatocelluar Carcinoma (HCC) among other mycotoxin types. *Aspergillus flavus* and *Aspergillus paracitius* are the common AFB-1 producing fungi which often found in peanut. Since peanut is one of the popular foods consumed by Indonesian, therefore it is necessary to quantify AFB1 risk to estimate the likelihood of adverse health effect due to the consumption of peanut and its products.

Exposure assessment was conducted using deterministic approach with two scenarios to represent existing condition using all peanut based product samples (scenario 1) and implementation of good practices using the samples below maximum permitted limit (scenario 2). AFB1 concentration data were obtained from institutions who conduct AFB-1 study, i.e. Southeast Asian Ministers of Education Organization – Tropical Biology (SEAMEO-BIOTROP), Veterinary Research Agency (BB-Litvet) and National Agency for Drug and Food Control (BPOM). The study suggested intervention should be made to increase good practices to reduce the contamination of AFB-1 for peanut based products. Challenges and data gaps were discussed and came up with recommendations, such as using individual peanut-based product consumption data to estimate risk within vulnerable groups and high consumers as well as using probabilistic approach to overcome variability in population.

Keywords: *aflatoxin B-1, risk assessment, peanut based product, estimated hepatocellular carcinoma*

OP12

The detoxification of aflatoxin B_1 in maize based product by combination of biological method and chemical binder

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ABSTRACT

A melting pot of activities engaged in the prevention and reduction of fungal infestation and mycotoxin contamination has been initiated by a group study of mycotoxin among university and research institution. This emerging consortium is encouraged to disseminate the research output and community service in overcoming those challenge in food chains. Currently, the role of endogenous filamentous fungi has been studied for reducing and detoxifying aflatoxin B_1 under solid state fermentation, particularly in maize. In the other hands, the combination of lactic acid bacteria, yeast, and methionine have been explored for their binding ability in maize based feed product. Moreover, the limited trial of its detoxified product and mycotoxins binder have also applied in broiler feeding study. Although this study has not observed the mechanism of aflatoxins detoxification, our study proposed that the enzyme activity of filamentous fungi may have important role during aflatoxin detoxification in maize. A meanwhile, the mycotoxins binder has reduced potential level of aflatoxin accumulation in broiler digestion. Our study observed that the detoxified product and mycotoxin binder are able to reduce the level of organ damaged within acceptable growth performance of broilers. In future, this study is still open to enhance any opportunities and network for mutual collaboration in overcoming mycotoxins problems on food and feed industry.

Keywords: detoxification, binder, aflatoxin B1, maize

POSTER PRESENTER'S ABSTRACTS

PP1

Optimization of RAPD-PCR condition for genotypic identification of lactic acid bacteria isolated from *bekasam*

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ABSTRACT

A Randomly Amplification Polymorphic DNA-Polymerase Chain Reaction (RAPD-PCR) method was optimized in this reseach by determining the optimal PCR buffer, $MgCl_2$ buffer and M13 primer end concentration. For the optimal condition, RAPD (Randomly amplified polymorphic DNA) PCR reaction should be performed in a 50 µl containing 100 ng genomic DNA, 1 x Taq DNA polymerase buffer (consisting of KCl (200 mM) and $NH_4(SO4)_2$ (25 mM) and without $MgCl_2$), 125 µM of each dNTPs, 0.5 µM M13 primer, 2.5 or 3.0 mM $MgCl_2$ and 2.5 U Tag DNA polymerase. This condition was then applied to identify lactic acid bacteria isolated from *bekasam*, an Indonesian indigenous fermented fish product.

Keywords: RAPD-PCR, lactic acid bacteria, bekasam

PP2

Adhesion, motility and biofilm formation of *Pseudomonas aeruginosa*

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ABSTRACT

It is known that the bacterium *Pseudomonas aeruginosa* is a bacteria-producing biofilm due to secreting extracellular polymers, which can facilitate the attachment of bacteria to surfaces and hold together in order to develop biofilms. This research aimed to prove that adhesion, biofilm formation and motility test could be linked to three genes: *algD*, *pelA* and *pslA*. It was also to know the role of a*lgD*, *pelA* and *pslA* genes for *P. aeruginosa* biofilms formation. The methods consisted of a test microplate, motility tests (swimming, swarming and twitching) and observation of the formation of biofilms using confocal microscope system with a flow cell. The results descriptively showed that the mutant *algD* had the highest adhesion in a microplate. Whereas, in the test of the formation of biofilms, strain PAO1 (wild type) produced the best biofilm. Based on statistical test, in almost all mutants didn't show any significant difference. Based on the confocal microscope, it showed that there was low bacterial biofilm formation by strains a*lgD*, *pslA* and PAO1. It could be concluded that the *ps1*A, *pelA* and *algD* genes play a role in biofilm formation.

Keywords: *Pseudomonas aeruginosa, adhesion, motility, biofilm formation*

PP3

Effects of microbubbles water and ozone microbubbles water on elimination of *Salmonella typhimurium* from artificially Inoculated sweet basils

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ABSTRACT

Recently, the number of fresh produce-related foodborne outbreaks has been increase considerably. Washing process of fresh produce is not only an important step to remove dirt, soil, and debris but also help to reduce microorganisms contamination on vegetables surface. Microbubbles have special properties on high gas dissolution rate and self-pressurizing effect, and can be applied in washing process as a new alternative sanitizer for removing microorganisms from the surface of vegetables. In this study, the effects of microbubbles water (MB) and ozone microbubbles water (OMB) to eliminate *Salmonella* Typhimurium from artificially inoculated sweet basils were evaluated. In washing process, cool wash water at 10°C (tap water, MB and OMB 0.5, 1.0 and 2.0 ppm) were used for 5 minutes with shaking at 60 rpm. The results indicated that microbial reduction by washing with tap water was 92.1%, while MB was 94.4%. The higher effective was observed when washing with OMB 0.5 and 1.0 ppm (98.2 and 98.9%, respectively). Washing with OMB 2.0 ppm performed the greatest efficacy for bacterial reduction (99.1%). According to the results, there were noticeably different in bacterial reduction between tap water and MB, but the combined MB with ozone was more effective as compared to washing with MB only. Moreover, the increase of OMB concentration exhibited better washing efficacy. These novel washing protocols could be potentially implemented in the washing step to enhance the safety of fresh vegetables production.

Keywords: Microbubbles water, Ozone microbubbles water, Washing, Bacterial reduction, Fresh produce

PP4

The study of microbiota kefir : isolation, identification, antibacterial activities of lactic acid bacteria, yeast, acetic acid bacteria and starter culture development

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ABSTRACT

Kefir is fermented milk product that has acid taste, slightly carbonated, and slimy texture. Kefir grains (combination of lactic acid bacteria, acetic acid bacteria and yeast) is used as a starter for kefir fermentation. The objectives of this research are: to study microbiota (lactic acid bacteria, acetic acid bacteria and yeast) in kefir, study anti-bacterial activity against *Staphylococus aureus* and *Eschericia coli* from each kind of microorganisms, and determine combination of culture as starter for kefir production based on their ability to form kefir grains and their acceptance test. The material of this research is *Gedono* brand kefir. The methods of this research are: isolation using streak plate method from *Gedono* brand kefir, anti-bacterial activity test using diffusion method, kefir fermentation from mixture of UHT cow milk and skim milk powder 2% (w/v) and combination of selected cultures as starter in ambient and 37°C temperature, and kefir acceptance test which measures the aroma, mouthfeel, sweetness, acidity, lingering aftertaste and overall attributes from that kefir.

The results are: 9 lactic acid bacteria are successfully isolated and 3 of the isolates are identified as *Lactobacillus plantarum*; 7 acetic acid bacteria are successfully isolated and all of them are identified as *Acetobacter* sp; and 7 yeast are successfully isolated, and 2 of them are identified as *Candida tropicalis*. Only lactic acid bacteria performs anti-bacterial activity. Kefir with combination of *Lactobacillus plantarum* GDN-B6, *Candida tropicalis* GDN-Y2 and *Acetobacter* sp GDN-A3 as starters which is incubated in ambient and 37ºC temperature (with final pH 4.8 and 5.2 respectively) is considered as the most acceptable and potentially able to form kefir grains.

Keywords: kefir, kefir grains, anti-bacteria activity, fermentation, acceptance test

PP5

Occurrence of aflatoxin and ochratoxin a producing fungi in chili of Thailand

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ABSTRACT

The objective of this study was to evaluate the presence of aflatoxin and ochratoxin A producing fungi in chili samples collected from 32 markets located in central region of Thailand. A total of 120 chili samples consisted of 60 samples of each chili powder and dried whole chili were examined for fungal infection using serial dilution method and direct plating method, respectively. Results showed these samples contained fungi less than 10^3 cfu/g, mostly found in chili powder and dried whole chili by 85% and 98%, respectively. A total of 407 fungal isolates was recovered and identified. The most frequent strains were *Aspergillus* section *Flavi* (46%) followed by *Aspergillus* section *Nigri* (37%), *Penicillium* species (13%), *Aspergillus* section *Terrei* (2%) and other fungi (2%). Aflatoxin and ochratoxin A producing ability were studied using CYA medium followed by TLC-densitometric analysis. It was found that 44% of *Aspergillus* section *Flavi* was capable of aflatoxin B production, only 0.5% of them produced aflatoxin B and G. In addition, ochratoxin A was produced by 3% of *Aspergillus* section *Nigri* and 2% of *Penicillium* isolates.

Keywords: Aflatoxin, Ochratoxin A, Chili, Food safety, Mycotoxins

PP6

Antifungal activity of a cell-free supernatant of *Staphylococcus equorum* isolated from blue-veined cheese

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ABSTRACT

Blue cheeses use *Lactococcus lactis* and *Penicillium roqueforti* as the starter cultures. However, from previous studies, it was evident that *Staphylococcus equorum* was also found and this non-starter bacteria could affect the sporulation activity of starter *Penicillium roqueforti* in a model cheese. This could be through direct nutrient competition effects or through the production of an antimicrobial inhibiting *Penicillium roqueforti* growth and/or sporulation. To examine this, a *Staphylococcus equorum* overnight culture isolated from blue-veined cheese and the cell-free supernatants (CFS) which were then neutralized (CFS-N), were treated with protease (CFS-P), and were treated with catalase (CFS-C) were examined by Spot Test and Single Layer Assay on Potato Dextrose Agar. The results showed that the inhibitory effect was because of antifungal agents produced by *Staphylococcus equorum*, not the cell competition. However, the antifungal was not acid and bacteriocin so it was expected that the antifungal was hydrogen peroxide (H_2O_2). Unfortunately, when H_2O_2 was added into an untreated CFS plate, it was confirmed that H_2O_2 did not affect the sporulation of *Penicillium roqueforti.* H_2O_2 is interacting with the plates and being neutralised hence no activity. Interestingly, the more H_2O_2 concentration was added, the more *Penicillium roqueforti* was sporulated. Thus, further investigation is needed to determine how *Staphylococcus equorum* affects *Penicillium roqueforti* sporulation. The antifungal activity of *Staphylococcus equorum* could be important for white cheeses to prevent the undesirable blue mold.

Keywords: antifungal activity, cell-free supernatant, spot test, single layer assay, *Staphylococcus equorum.*

PP7

Decolorization of *amaranth* dye by waste textile and herb industrial bacteria isolate under aerobic and anaerobic conditions

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ABSTRACT

The increasing number of industry growth in Indonesia that use dye stuffs as the raw material gives negative impacts for environmental quality. This was needed to develop an alternative using biology methods in waste water treatment involving high dye degrading bacteria, because it is more effective and environmental friendly. It is known that some microorganisms, including bacteria can degrade azo dyes from the complex structure into smaller structure. Recently reports indicated that this bacteria involved in the waste water treatment. Recently reports have successfully isolated 2 bacteria from waste textile (A isolate) and herb industrial (B isolate) that estimatedly has potention to decolorize. The ability of these isolate haven't known in the decolorization process. The research objectives are to know and compare the decolorization ability and effectiveness of both isolate bacterial using *Enterococcus faecalis* ID 6017 as the comparison. This research uses aerobic (agitation 120 rpm) and anaerobic (static) conditions as the state of the research process. The parameters that are tested are *Amaranth* concentration, biomass level, decolorization and chemical optical demand. The bacterial isolate was inoculated in *Nutrient Broth* with 80 ppm of *Amaranth* for growth medium. Each parameters were monitored by measuring the absorbance difference wave length at different time intervals 0,2,4,6,8,10,12,24 and 48 h. This research result shows that the best degrading Amaranth potential was under anaerobic condition. The highest degrading Amaranth potential was observed 0,229 mg/L by A isolate under aerobic condition at 48 h. The present research indicates potential of A and B isolate to decolorize Amaranth are higher than *Enterococcus faecalis* ID 6017, it supported by significant effectiveness and potential degrading value. It shows that *Amaranth* is an organic compound as carbon source for growth. This research shows that the best degrading potential of Amaranth was A isolate.

Keywords: *Amaranth*, Decolorization, Static, Agitation, Degrading Bacteria

PP8

Risk assessment aflatoxin B1 in corn-based food (*sekelan*) from Tretep Sub District, Temanggung Regency, Central Java Province

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ABSTRACT

Aspergillus flavus is a species of fungus which is often found in corn that can produce mycotoxins, such as aflatoxin B1 (AFB1). *Sekelan* is a staple food that has potency to be used as a substitute of rice. The raw material for *sekelan* is corn. Corn has the potency to be contaminated by AFB1 if the handling on harvesting and post-harvesting is not appropriate. Moreover, when the corn is consumed by humans and animals, it can cause health problems. *Sekelan* is consumed daily by the community in the Tretep Sub District. The samples used in the study were corn, *sekelan* and ready-to-eat *sekelan* obtained from five villages in the Tretep Sub District. Mold contamination, water activity (a_w), AFB1 concentration, and risk assessment were analyzed. Mold contamination in corn was dominated by white mycelia fungi then followed by the genera *Aspergillus*, *Penicillium*, *Eurotium*, and *Trichoderma*. Mold contamination on *sekelan* was dominated by white mycelia fungi and followed by genera *Aspergillus*, *Penicillium* and *Eurotium*. Aflatoxigenic fungi (*A. flavus*) contaminated 1 of 16 samples of corn while in *sekelan* aflatoxigenic fungi were not found. Value of a_w in corn samples ranged between 0.576-0.933, whereas in *sekelan* ranged between 0.483-0.883 and in ready-to-eat *sekelan* ranged between 0.96-0.98. AFB1 concentrations of all samples were below the LOD (LOD=1.75 ppb). Half LOQ value (2.916 ppb) was used as the concentration of AFB1 in calculating the exposure value. AFB1 exposure value was 0.079 µg/kg bw/day or 3.8 µg/kg/day/day. *Sekelan* consumption by the community of Tretep Sub District ranged from 117.1-358.7 g/person/day. Based on the calculation, *Sekelan* in Tretep Sub District was still within safe limits for consumption.

Keywords: *Aspergillus flavus*, aflatoxin B1, corn, *sekelan*, *Risk Assessment*

PP9

Detection of *Aspergillus flavus* link on commercial feeds

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ABSTRACT

This study was conducted to determine the growth of *A. flavus* on commercially produced feeds after different lengths of exposure in the market.

Serial dilution method was used to determine the *A. flavus* load of the three brands of feeds. *Selecta* got the highest average fungal load of $4x10^3$ cfu/gram at three days of exposure followed by *Purina* with $1x10^3$ and finally *B-Meg* with too few to count.

The environmental parameters gathered showed that conditions were favorable for the growth of *A. flavus.* The average temperature of feeds was 30.67°C with moisture content of 13.27% and pH of 6.34.

The test for aflatoxin revealed that *A. flavus* strain isolated from *Purina* at two days of exposure was positive of either aflatoxin B_1 or B_2. These metabolites are the most toxic and carcinogenic substance of biological origin.

Keywords: *A. flavus*, aflatoxin B_1, aflatoxin B_2, carcinogenic, pH

PP10

Antibacterial activity of *L. acidophillus* FNCC 0051 in fermented soymilk against pathogenic bacteria

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ABSTRACT

Improper food handling and food production are responsible for pathogenic bacteria contamination during fermentation process. Utilization of probiotic *L. acidophillus* FNCC 0051 as a biopreservation could inhibit or kill pathogenic bacteria in contaminated fermented soymilk. The aim of this research was to study the antibacterial activity of *L. acidophillus* FNCC 0051 in fermented soymilk against food – borne disease bacteria. *L. acidophillus* FNCC 0051 was able to inhibit food – borne disease bacteria during seven days of storage in fermented soymilk. *Salmonella typhii* cannot survive in fermented soymilk during seven days of storage at 25°C, while *E. coli* and *S. aureus* have a lower population reduction during seven days of storage (1.6 log cfu/ml and 2.6 log cfu/ml, respectively). Fermented soymilk had pH 3.4 at the initial storage and 3.1 at the end of storage. Therefore, *L. acidophillus* FNCC 0051 offered the best protection against food – borne pathogens, thus give a promising prospect as a biopreservation.

Keywords: lactic acid bacteria, fermented soymilk, pathogenic bacteria, *Lactobacillus acidophillus* FNCC 0051, food safety

PP11

Production and characterization of roselle extract nanoencapsule with β-cyclodextrin as antibacterial agents

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ABSTRACT

The liquid extract of roselle has some disadvantages such unstable on environmental changes, difficulties on material handling and transportation, and low flexibilities on food industry uses, especially for food preservation. An alternative to solve those problems are by making a nanoencapsulation form of roselle extract. Nanoencapsulation technique was an alternative way which used β-cyclodextrins as matrix agent. The aims of this research were the characterization of total phenol, antibacterial activity of nanocapsule and the stability of the extract and nanocapsule against the change of pH, temperature and boiling time.

Nanocapsules of roselle extract contain phenol 4,53 ± 0,26 mg/g, anthocyanin 2,99 ± 0,18 mg/g, vitamin C 2,77 ± 0,04 mg/g and water moisturizer 5,16 ± 0,03%. Antibacterial activity against *E. coli* dan *S. aureus* showed by clearance zone around the disc were 3,5 ± 0,5 mm and 2,5 ± 0,2 mm, respectively.

Nanocapsules were more resistance against the enviromental changes than the extract itself. The stability test against the pH change, the nanocapsules were more stable than the extract. The slope of linear regression of nanocapsules for phenols and antibacterial activity against *E. coli* and *S. aureus* were 0.111; 0.291; 0.131 lower than the extract 2.825; 1.760; 1.636.

Nanocapsules were more resistance against the temperature and boiling time than the extract itself. The stability test against the temperature and boiling time, the nanocapsules were more stable than the extract. The slope of linear regression of nanocapsules form for phenols and antibacterial activity against *E. coli* and *S. aureus* were 1.3315; 0.0439; 0.0333 lower than the extract 1.5864; 0.1783; 0.1728.

Keywords: *Nanoencapsulation, roselle, antibacterial activity, total phenols*

PP12

Development of functional beverage based on *monascus*-fermented durian seed: process optimization and *in vivo* evaluation

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ABSTRACT

Optimization of the drying temperature and hot water extraction time of *Monascus*-fermented durian seed for the monacolin K content; and effect of the product on blood cholesterol dan glucose were studied. *Monascus*-fermented durian seed was produced by inoculating the spore suspension of *Monascus* sp. KJR2 into boiled durian seed cuts and then incubated at room temperature (30ºC) for 14 days. The experimental design for optimization of drying temperature of the *Monascus*-fermented durian seed (MFDS) and extraction time was carried out using the central composite of Response Surface Methodology. The products were then extracted with distilled water (95ºC) at various extraction time. The extracts were analyzed for the monacolin K content by using HPLC. The results showed that the optimum conditions of the product containing monacolin K were drying temperature of 35ºC and extraction time of 1 minute. Effect of the product on *in vivo* lowering blood cholesterol and glucose was evaluated using male spraque dawley rats. Administration of 2 mL of product suspensions at the level of 0.05; 0.10; and 0.15 g/2 mL per day show lowering blood cholesterol and glucose in the rats. Higher level resulting more effectiveness of the lowering blood cholesterol and glucose.

Keywords: *Monascus, durian seed, monacolin K, optimization, in vivo*

PP13

Determination of sporulation and pigmentation of *Aspergillus fumigatus* and *Aspergillus flavus* cultivated in laboratory scale

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ABSTRACT

Aspergillus fumigatus and *Aspergillus flavus* are species that commonly cause food spoilage due to produce their mycotoxins. To identify the right *Aspergillus* species, one needs to know the nature of the colony, hyphae, spores, and pigments. The laboratory personnel often make mistakes in identifying the species of *Aspergillus,* because it is hard to determine the right time to detect the process of sporulation and pigmentation. If the fungi sporulation and pigmentation are not perfect, it will not reveal the actual morphology. This may result errors in identifying the species of *Aspergillus*. This study aims to determine the time of sporulation and pigmentation fungal species *Aspergillus fumigatus* and *Aspergillus flavus* after cultivated on SDA media (Sabouraud Dextrose Agar). Samples were taken from colonies of pure strains of fungal species *Aspergillus fumigatus* and *Aspergillus flavus.* Macroscopically and microscopically observation to monitor the sporulation and pigmentation time of *Aspergillus fumigatus* and *Aspergillus flavus* after cultivated in SDA media were carried out every 6 hours. The sporulation time of *Aspergillus fumigatus* occurred in 36 hours after cultivated in SDA media, while the sporulation time of *Aspergillus flavus* occurred in 48 hours. Pigmentation time of *Aspergillus fumigatus* occurred in 48 hours after being cultivated in SDA media, whereas pigmentation time of *Aspergillus flavus* occurred in 60 hours.

Keywords: *Aspergillus fumigatus, Aspergillus flavus*, sporulation, pigmentation

PP14

Effect of sub supercritical CO_2 Processing on the microbial loads in tempeh

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ABSTRACT

Tempeh is fermented soybeans product by *Rhizopus oligosporus;* even though, bacteria and yeasts were also grown during the fermentation. The microbial community structure in tempeh has to be in the proportional numbers as to produce an acceptable quality of tempeh. Carbon dioxides under supercritical condition have properties that can be applied to the inactivation of foodborne pathogens and spoilage bacteria in such foods as a nonthermal processing technology. This research was to evaluate the growth of bacteria and mold in tempeh processed by Sub Supercritical CO_2. The design of the research was a randomized block design arranged with two factors and three replications. The first factor was the high pressure CO_2 at the supercritical phase and sub supercritical phase. The second factor was holding time (*t*, minutes) at four levels. The data were analyzed using analysis of variance and Duncan Multiple test at ρ 0.05. The result showed that the high pressure CO_2 treatment can significantly reduce the number of bacteria. The treatment at 7.6 MPa and 6.3 MPa lowered the number of bacteria up to 1.70 and 1.08 log cycles, respectively. In addition, the decrease of bacterial number was getting high as the holding time increased from 5 to 20 minutes in the range of 0.42 to 1.95 log cycle. The lowest reduction number of bacteria was 0.30 log cycle reached at the treatment of 6.3 MPa and 5 minutes. Whereas, The Duncan test of the effect of pressure at 7.6 MPa on the reduction number of molds was significantly different to that of 6.3 MPa, and the effect of holding time to the reduction number of molds were different from each other of all treatments. The lowest reduction number of molds was 1.17 log cycles reached at 6.3 MPa for 5 min. The conclusions were that sub supercritical CO_2 at 6.3 MPa for 20 minutes reduced mold tempeh, and that the treatment at 6.3 MPa for 10 minutes reduced the bacteria in tempeh.

Keywords: *microflora tempeh, reduction numbers, sub supercritical CO_2, tempeh.*

PP15

Physicochemical and sensory evaluation of salted catfish (*Pangasius hypophthalmus*) with salt concentration variations and time of fermentation

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ABSTRACT

Fish protein has a privilege that beside it is more digestible, it also contains amino acid with a pattern similar to the pattern of amino acid in the human body. One of the many types of fishes consumed by people is catfish (*Pangasius hypophthalmus*). Catfish is easily damaged so there should be an effort to preserve the fish, one of them is using NaCl. The decaying process of fish can be caused mainly by the activity of enzymes found in the body of the fish itself, the activity of microorganisms, or the oxidation process in the fat body by oxygen in the air. In addition, fungi can also cause damage to the fish.

The objectives of this study are to evaluated the effect of salt concentration and fermentation time on the quality and sensory of salted (jambal) catfish. The research method use a completely randomized design with 2 factors: the concentration of salt (20%, 30% and 40%) and fermentation time (24, 36 and 48 hours). Analysis is conducted for moisture content, ash content, protein content and organoleptic test.

Research showed that the best treatment in this study is 30% salt content and 24 hours fermentation time. Characteristics of this treatment is 14.1572% moisture content, 2.8699% ash content, 5.7296% protein content and organoleptic test results for saltiness, crispness, color and the overall favorite are 3.000; 1.600; 2.5000; 2.9000, respectively. The level of preference on the best treatment is the highest which is not too salty, although the difference is not significant between treatments.

The most preferred product of salted fish is the one with salt level of 30% and 24 hours fermentation time.

Keywords: Salted fish, catfish, salt, fermentation, sensory evaluation

PP16

Black glutinous rice extract anthocyanin degradation using *Pediococcus pentosaceus* N11.16

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ABSTRACT

Previous research has been done to isolate lactic acid bacteria that have the ability to produce beta-glucosidase enzyme, an enzyme that will degrade glycoside bound in anthocyanin. Anthocyanin is the color component that can be found in the black sticky (glutinous) rice. Enzymatic degradation of anthocyanins alleged role in improving the bioavailability in the human body. The result of enzymatic degradation of anthocyanins will affect the content of phenolic compounds as a product. This study aims to monitor the degradation of anthocyanins microemulsion on black sticky rice using beta-glucosidase enzyme produced by *Pediococcus pentosaceus* N11.16. Microemulsion made using food grade emulsifier, namely Tween 80, Tween 20, and Span 20. The extraction of black sticky rice is done using a vacuum rotary evaporator with acidified methanol. The experiments were performed at different concentrations of anthocyanin, which is 5, 10, 15, 20, and 25 mM sianidin-3-glucoside. The results showed that the anthocyanins levels in modified MRS medium changes during observation. MRS medium used is modified, the MRS medium without sugar, without yeast extract, malt extract without and coupled with CaCO3 and Na azide. Even so, the phenol content was relatively stable during the incubation process.

Keywords: Anthocyanin, lactic acid bacteria, bioavailability, enzymatic degradation

PP17

Profile aflatoxin B1 in dried salted fish

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ABSTRACT

The purpose of this study is to provide relevant information related to aflatoxin B1 on dried salted fish. The samples consisted of salted fish with low-salted (unsalted anchovies and kapasan), medium-salted (teri medan and teri jengki), high-salted (sepat and gabus) taken from Java island (Banten, Jakarta, Central Java and East Java). A total of 150 samples had been analyzed for the presence of *Aspergillus flavus* and the production of their aflatoxin B1. Analyzing of *A. flavus* was conducted by using AFPA media (Pitt & Hocking, 2009). While the analysis of aflatoxin B1 was performed using ELISA kit AgraQuant. Results showed that the prevalence of *A. flavus* in dried salted fish was 9.33% (14/150) and the prevalence of aflatoxin B1 was 8% (12/150) with detectable concentrations of 10.71-33.6 ppb.

Keywords: aflatoxin B1, *A. flavus*, dried salted fish

PP18

Bacterial isolates solvents phosphate activities obtained from rice land in ring road and Gunung Sari, Salatiga

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ABSTRACT

One of essential macro elements for plants is phosphate. In general, the availability of phosphate in the soil is abundant, however 95-99% is in the form of insoluble phosphate rock and cannot be processed and used by plants. Therefore, it is necessary to seek for an alternative that involves soil microbes (bacteria solvent-phosphate). One of soil microbes, *Pseudomonas putida* has an ability to dissolve the phosphate. The previous isolation obtains two isolates of phosphate solvent. Two isolates of solvent P which have been obtained are taken from rice land in the Ring Road area of Salatiga (isolate A) and from rice field in Gunung Sari Salatiga (isolate B). The purpose of this study are (1) to determine the ability of the two bacteria in dissolving P using *Pseudomonas putida* as the comparison and (2) to determine which isolates that have the greatest ability in dissolving phosphate. Test for ability of bacteria to dissolve P was conducted on day 0, 7 and 14, repeated for three times. The results showed that on the day 14th, isolate of *Pseudomonas putida* with 0.00092 mg/l of biomass can dissolve 90.24 mg/l of phosphate, isolate A with 0.00123 mg/l of biomass can dissolve 76.61 mg/l of phosphate and isolate B with 0.00091 mg/l of biomass can dissolve 78.42 mg/l of phosphate. Based on these results, it can be concluded that the isolate A and B have lower ability to dissolve phosphate compared to isolate of *Pseudomonas putida*.

Keywords: phosphate solvent bacterium, *Pseudomonas putida*, the ability of phosphate dissolving bacteria.

PP19

Occurence of aflatoxigenic and ochratoxigenic fungi in dried chili from Yogyakarta

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ABSTRACT

Chili is one of the agriculture products in Indonesia that have perishable charateristic, therefore it needs some processing methods to increase the shelf life, one of the methods is drying. Unfortunately, chili drying in Indonesia still using traditional methods, this method allowing food spoilage by fungi contamination. One of the food spoilage fungi is *Aspergillus spp.* that produce mycotoxin, especially aflatoxin and ochratoxin. In this study were obtained 26 isolates that consisting of black *Aspergillus* and green *Aspergillus*. Black *Aspergillus* identified as *Aspergillus niger* and *Aspergillus carbonarius* that have potential to produce ochratoxin, in other hand green *Aspergillus* identified as *Aspergillus flavus* and *Aspergillus parasiticus* that have potential to produce aflatoxin.

Keywords: Chili, Drying, *Aspergillus*, Aflatoxin, Ochratoxin.

PP20

Short chain fatty acids production on yacon root (*Smallanthus sonchifolius*) fermented by *Lactobacillus plantarum* B1765

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ABSTRACT

Yacon as a source of fructans could be used as a growth media of lactic acid bacteria to produce short chain fatty acids (SCFA). The objectives of this research were to determined the growth of total lactic acid bacteria (LAB), pH and to identified the types of SCFA that were produced in yacon root fermented by *Lactobacillus plantarum* B1765. 10% of *L. plantarum* B1765 were inoculated to yacon root mixed with NaCl 3% and fermented for 48 hours. Total LAB were counted by total plate count and SCFA was identified using High Performance Liquid Chromatography. The results showed that pH reduced from 6,15 at the beginning to 3,28 at the end of fermentation, total LAB increase two log cycle from 11,17 x 10^5 to 32,5 x 10^7 CFU/mL and SCFA that were produced in yacon root fermentation were propionic acid (1182,3 mg/L), acetic acid (803,3 mg/L), butyric acid (375,4 mg/L) and lactic acid (371,0 mg/L).

Keywords: SCFA, yacon, *Lactobacillus plantarum* B1765

PP21

Mold contamination and aflatoxin B_1 (AFB_1) levels in salted fish commodities

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ABSTRACT

Salted fish is subjected to a process of salting and drying as a method of inhibiting fish spoilage. Nevertheless, salted fish can be contaminated by mold and aflatoxin B_1 which is produced by mold. The aim of this study was to determine which types of mold could contaminate salted fish and to assess the levels of AFB_1 contamination in the salted fish. The salted fish was obtained from Pasar Kenjeran, Surabaya and Pasar Beringharjo, Yogyakarta. The samples were cultivated directly in DRBC and DG-18 media and then mold enumeration were carried out based on the colonies formed. For identification purposes, the mold which grew on the surface of the sample was isolated on MEA media using the three point method. The isolates obtained were identified using macromorphology and micromorphology. The measurement of AFB_1 levels was done using ELISA (Enzymatic Linked Immuno Sorbent Assay) test. Molecular detection of aflatoxigenic genes was performed based on PCR method for amplification of several genes correlated to aflatoxin production, such as aflR, nor-1, and omtB genes. Research results showed that the molds identified as contaminants on the salted fish were *Aspergillus tamarii* and *Aspergillus flavus*, both of which are aflatoxin producing molds, *Aspergillus sydowii*, *Aspergillus niger*, *Aspergillus versicolor*, *Penicillium citrinum*, and *Penicillium chrysogenum*. *Rhizopus sp*. contamination was also found. As for the level of AFB_1, all samples were found to be positively contaminated with aflatoxin B_1, the highest contamination of a sample occurring in Lidah salted fish (75.81 ppb) and the lowest in Rese salted fish (4.38 ppb). Almost all isolates of green Aspergilli showed positive results in the presence of three genes correleted to aflatoxin production.

Keywords: salted fish, mold contamination, aflatoxin B1

PP22

Viability and antimicrobial activitity of encapsulated *Bacillus* and *Lactobacillus* in alginate, activated carbon and skim milk

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ABSTRACT

Probiotics as feed supplement have been widely recognized as an alternative method in controlling and combatting infectious diseases in aquaculture. Indeed, the viability of probiotics and their antimicrobial activity against pathogens in aquaculture are the principal requirement thus the application of probiotics can be advantageous. Probiotics preparation in the carrier material could be an alternative method to maintain the viability of bacteria and other properties. The purpose of this study was to obtain the carrier material for encapsulation or the coating of probiotics from the genus *Lactobacillus* and *Bacillus* which able to maintain the viability and the antimicrobial effect against pathogenic bacteria *Aeromonas* sp. and *Vibrio harveyi*. Encapsulation materials that were being analyzed were alginates, activated carbon and skim milk. This study was carried out experimentally using the completely randomized design (CRD). The obtained data were analyzed using ANOVA with 95% confidence level and were followed by Duncan's multiple range test when the effect in the treatment was observed. The results showed that skim milk significantly had a higher ability to maintain bacterial viability, during 4 weeks of storage time with 2.51 x 10^{14} CFU mL^{-1} of *Lactobacillus bulgaricus* bacteria, and inhibition zone of 17.0 mm against *V. harveyi*, *B. licheniformis* and *B. polymyxa*. Additionally, skim milk also had the highest antimicrobial activity against *V. harveyi* with inhibition zone of 20.7 mm. On the other hand, encapsulation of the bacteria genus *Bacillus* in the activated carbon also exhibited a high viability in a similar storage time with 3.391 x 10^{14} and 1.28 x 10^{14} CFU mL^{-1}, for *B. subtilis* and *B. licheniformis*, respectively. The observed inhibition zone formed for *B. subtilis* and *B. licheniformis* against *Aeromonas* sp. were 11 and 12.3 mm, respectively. Whereas, the inhibition zone formed against *V. harveyi* for both species were 13 and 18 mm, respectively.

Keywords: Probiotics, *Bacillus*, *Lactobacillus*, Viability, Antimicrobial activity

PP23

Cocoa bean (*Theobroma cacao* Linn.) fermentation using *Lactobacillus plantarum* HL-15 as starter culture

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ABSTRACT

Cocoa bean fermentation is one of processes in the making of cocoa product. It involves microorganisms such as yeast, acetic acid bacteria and lactic acid bacteria (LAB) but not mold. The existence of mold in cocoa bean fermentation is undesired because it defects the cocoa product and potentially produces mycotoxin. Recent study has successfully isolates LAB with ability to inhibit the growth of mold from fermented cocoa bean. However, that LAB has not been used as inoculum for cocoa bean fermentation. Therefore, the objectives of this study are to know the ability of that LAB inoculum on cocoa bean fermentation and inhibit the growth of mycotoxigenic fungi. The materials of this study are: *Lactobacillus plantarum* HL-15 isolate from recent study; harvested cacao fruit from Gunung Kidul, Yogyakarta; and mycotoxin-producing *Aspergillus niger* YAC-9. The results of this study are *Lactobacillus plantarum* HL-15 able to ferment the cocoa bean and inhibit the growth of mycotoxigenic fungi. The cocoa bean which is fermented by *Lactobacillum plantarum* HL-15 has good appearance such as brittle texture, brown-purple color, and bitter with less astringent taste.

Keywords: Cocoa bean fermentation, anti-fungal growth, lactic acid bacteria, *Lactobacillus plantarum* HL-15

PP24

Development of *Lactobacillus plantarum* HL-15 as culture starter for cocoa bean (*Theobroma cacao* Linn.) fermentation

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ABSTRACT

Cocoa bean fermentation is one of processes in the making of cocoa product. It involves microorganisms such as yeast, acetic acid bacteria and lactic acid bacteria (LAB) but not fungi. The existence of fungi in cocoa bean fermentation is undesired because it defects the cocoa product and potentially produces mycotoxin. Recent study has successfully isolates LAB with ability to inhibit the growth of fungi from fermented cocoa bean. That LAB isolate can be used as cocoa bean fermentation starter culture and can be formed as dried starter since it is easier to be handled and distributed. Culture starter drying methods that are already known are freeze and spray drying methods. Unfortunately, both methods have been known to increase the production cost of inoculum production. Therefore, the objective of this study is producing dried LAB inoculum by oven drying method and analysis its viability. The materials of this study are: *Lactobacillus plantarum* HL-15 isolate; modified media made of table sugar, coconut water, sprout, tomato and hydrolyzed grounded beef; and tapioca and rice flour as matrix. While this study steps are: LAB culture growing in modified media; oven drying of inoculum using matrix; viability analysis in before and after oven drying; and water content analysis. The results of this study are viability of oven drying of inoculum using tapioca flour is 10.17% while by using rice flour, the viability is 11.96%. Therefore, rice flour is more recommended as matrix than tapioca flour for making of dried culture starter for cocoa bean fermentation.

Keywords: Cocoa bean fermentation, lactic acid bacteria, *Lactobacillus plantarum* HL15, anti-fungal growth, dried culture starter

PP25

Influence of various rice type to form *nata de leri*

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ABSTRACT

Rice water (leri) has the potential to be used as a basic ingredient for making nata, because it has the necessary nutrients for *A. xylinum* metabolism. Thiamin in leri assists the release of energy, amino acid aids in the regulation of metabolites, whereas lysine role is the oxidation of long chain fatty acid as well as a substance essential for living things. The purpose of this research is to get the best type of rice for the manufacture of *Nata de Leri*. The type of rice used in this research is *C4*, *Umbul* and *Pandan Wangi*. This research was conducted with the RAL model with the type of rice to be the factor. Rice water (leri) as *A. xylinum* medium obtained from first rice washing. Measurement parameters used include wet weight, thick, pH measurement and determination of the fiber content. Hedonic test also conducted in this study. The best nata is gained from *Pandan Wangi* leri with 0.61 cm thick followed by *Umbul* and *C4* type of 0.54 cm and 0.45 cm, respectively. Highest fiber content owned by nata from *Pandan Wangi* rice by 0.04%, followed by *Umbul* and *C4* of 0.025% and 0.02%, respectively. The hedonic test showed *Pandan Wangi* nata is preferable in terms of taste. On the other hand, *C4* and *Umbul* nata are not preferable in terms of taste. Overall, *Pandan Wangi* nata has the best quality and it can be seen from some of the parameters and from the hedonic test.

Keywords: leri, type of rice, nata de leri

PP26

Identification of *MPB64* gene used *Polymerase Chain Reaction* (PCR)

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ABSTRACT

Liquid medium MGIT 960 has the advantages of accurate, sensitive and rapid detection of Mycobacterium complex. MGIT containing supplements good for growing mycobacteria especially *Mycobacterium tuberculosis* and sensor for oxygen contained in the bottom of the tube MGIT also help speed up the detection of mycobacteria. *MPB64* gene is a gene that is conserved and has 683 base pairs and specific for *Mycobacteriun tuberculosis*. This study aims to determine the *MPB64* gene in patients with tuberculosis can be amplified using the PCR method. Samples in this study were 10 DNA isolates collected from TB patients with MGIT positive and analyzed by PCR and electrophoresis. The results showed that band of 240 bp similar to positive control was found only in 6 samples while MGIT was positive for all samples. This different phenomenon indicated that *MPB64* gene specific for *Mycobacterium tuberculosis* is not always presumed exist in the MGIT culture. Based on the results of the *MPB64* gene identification study, it was concluded that out of the 10 samples contain 6 samples indicating the presence of band on the size of 240 bp using the PCR method.

Keywords: MGIT, *MPB64* gene, PCR, *Mycobacterium tuberculosis*, DNA

PP27

Effect of adding Carboxymethyl Cellulose (CMC) snake fruit kernel and commercial CMC on chemical, physical and organoleptic properties of soy-snake fruit drinks

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ABSTRACT

Soy-snake fruit drink is one kind of drinks that was made from mixing soybean extract and snake fruit extract. Characteristics of soy-snake fruit drink can be affected by adding Carboxy Methyl Cellulose (CMC). The aim of this study is to determine the effect of adding commercial CMC and snake fruit kernel CMC in various concentration on chemical, physical and organoleptic characteristics of soy-snake fruit drink.

First step of this research is snake fruit extract and soy drink production. After that, 25% snake fruit extract is mixed with soy drink and then homogenized for 3 minutes. CMC was added into soy-snake fruit drink while homogenization process occured. Heating is done in 10 minutes while adding sugar (8%). Characteristics that were analyzed from soy-snake fruit drink were chemicals (moisture content, proteins, total sugar, total phenolic, and antioxidant activity), physicals (viscosity and total soluble solid) and organoleptic properties (color, viscosity, beany flavor, flavor, overall). This research used randomized block design 2 factorial. Factorial 1 is two type of CMC used in this research (commercial CMC and snake fruit kernel CMC) and factorial 2 is concentration of CMC (0.05%; 0.10% and 0.15%). Obtained data were analyzed by analysis of variance (ANOVA) and continued by Duncan's Multiple Test in significance level 5%.

The results showed that by adding commercial CMC and snake fruit kernel CMC in various concentrations will decrease the moisture content, proteins, total sugar and total phenolic on soy-snake fruit drinks. On the other hand, antioxidant activity was increased by adding snake fruit kernel CMC. Viscosity and total soluble solid of soy-snake fruit drink with commercial CMC were higher than the snake fruit kernel CMC. In addition, the addition of CMC had no effect on soy-snake fruit drink organoleptic properties.

Keywords: soy-snake fruit drink, CMC, snake fruit kernel

PP28

The growth response of aflatoxigenic *Aspergillus flavus* isolated from cassava for feed: influence of interacting climate change factors

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ABSTRACT

This study examined the impact of interacting environmental factors between water activity (a_w), temperature and elevated CO_2 on lag phase prior to growth and growth rate of aflatoxigenic *Aspergillus flavus* on a cassava milled-based medium for the first time. The strain was isolated from cassava for feed in Thailand. Statistical analysis indicated that all three studied stress factors significantly affected lag phase and growth rate within the range used in this study ($P<0.05$). The similar profile for growth over the 20-40°C, 0.90-0.98 a_w and CO_2 350-1200 ppm ranges was observed. The lag phase was <2 days at 0.95-0.98 a_w and 25-30°C and were significantly increased (>6 days) at water stress conditions (0.90 a_w) with elevated temperature (40°C) regardless CO_2 used. The optimal condition for growth was found to be around 0.98 a_w and 30°C, while the growth responses were less affected by elevated CO_2 exposure. The combined factors showed statistical interaction for lag phase and growth rate ($P<0.05$). Growth rate with elevated CO_2 conditions (750-1200 ppm) showed higher interaction effects of combined factors (CO_2 x temperature and CO_2 x a_w) on the responses. Growth rate under optimal conditions (30°C, 0.98 a_w), slightly inhibitory effect was observed at CO_2 1200 ppm. Ecophysiological growth pattern of strain have been developed providing the boundary conditions of interacting a_w x temperature x CO_2 for growth which will be useful in understanding the impact of combined effect of these three stresses factors on cassava for feed attempting to minimize fungal contamination.

Keywords: *Aspergillus flavus*, water activity, elevated CO_2, growth, cassava

PP29

Effect of lauric acid and glycine on color value and citrinin of angkak by *Monascus purpureus*

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ABSTRACT

Angkak is an important source of natural food pigments produced by *Monascus purpureus* on cooked rice. *M. purpureus* produces six pigments, two pigments for red, two pigments for orange and two pigments for yellow. However, along with pigments production, *Monascus* excretes a mycotoxin, namely citrinin as a secondary metabolite. Pigments and citrinin are synthesized from the polyketide pathway and the biosynthesis of them is branched on a tetraketide. The biosynthesis of pigments may arise from an esterification of the polyketide chromophore and β-ketoacid from fatty acid synthase pathways. Furthermore, the red pigments are synthesized by a combination of orange pigments with an amino acid. The aims of this research were to evaluate lauric acid and glycine added effect on color values and to measure citrinin content of angkak. Fermentation was carried out for 14 days and the products were grounded after dried at 45˚C for around 16 hours. The color values were determined as lightness, hue angle and chromacity using chroma meter CR 400. The absorbance of red pigment yields were determined using spectrophotometer at λ 510 nm. The citrinin content of products was examined by HPLC method. There was significant different for hue angle but not for lightness, chromacity and red pigment yields. The hue angle decreased to 32.65% for combination treatment of lauric acid – glycine. Meanwhile, the citrinin content decreased to 34.18%, 42.81% and 46.95% for treatment of lauric acid, glycine and lauric acid-glycine, respectively.

Keywords: Lauric acid, glycine, angkak, color value, citrinin, *Monascus purpureus*.

PP30

Microflora in fermentation of cocoa bean (*Theobroma cacao* Linn.) in Gunung Kidul, Yogyakarta

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ABSTRACT

Indonesia is the third highest cocoa producing country with almost 95% of cocoa is produced by private cocoa farmer. Most of produced cocoa bean has low quality because of the not-optimized cocoa bean fermentation process. Usually, micro-organisms that has role in cocoa bean fermentation are lactic acid bacteria, yeast and acetic acid bacteria which occurs spontaneously. As consequence, fungi can grow on it and interrupt the fermentation process. The fungi itself can produce mycotoxin that are harmful when consumed by human. Therefore, the objective of this study is to explore the microflora of cocoa bean fermentation. The material of this study is fermented cocoa bean from cocoa farmer in Gunung Kidul, Yogyakarta. The results of this study are: 5 lactic acid bacterias are successfully isolated and 3 of them are identified as *Lactobacillus plantarum*, 5 yeasts are successfully isolated and 2 of them are identified as *Candida famata* and 1 of them is *Candida boudinii,* 5 acetic acid bacterias are successfully isolated and all of them are identified as *Acetobacter sp*.

Keywords: Cocoa bean fermentation, lactic acid bacteria, yeast, acetic acid bacteria

PP31

Lactic acid bacteria from fermented cocoa bean (*Theobroma cacao* Linn.) and their potency as anti-fungal growth

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ABSTRACT

Cocoa bean is raw material for making cocoa product. One of the processes to make cocoa product is fermentation. The purpose of cocoa bean fermentation is to increase the flavor and quality of cocoa product. Microorganisms that have role in cocoa bean fermentation are yeast, acetic acid bacteria and lactic acid bacteria (LAB). Unfortunately, some mold have ability to contaminate the process, give defect to the cocoa bean and potentially produce mycotoxin in it. Some LAB is known for its ability to inhibit the growth of fungi that potentially produce mycotoxin. Therefore, the objective of this study is to obtain isolates of lactic acid bacteria that have the ability to inhibit the growth of fungi from fermentation of cocoa bean as well as its characteristics and identification. The samples of this study are cocoa bean from cacao farmer in Gunung Kidul, Yogyakarta and mycotoxin-producing *Aspergillus niger* YAC-9. The study steps are : LAB isolation by streak plate in MRS with $CaCO_3$ media and its confirmation test using Catalase test and Gram Staining; Anti-fungal activity was carried out by growing LAB cultures in MRS media overlaid with PDA innoculated 3 points with *Aspergillus niger* YAC-9. Indentification of LAB was done using API 50 CHL kit test. The results are: 5 confirmed LAB strains are isolated and all of them have the ability to inhibit growth of fungi. However, 3 of them have the highest anti-fungal growth activity. These 3 isolates are HL15, HL14 and HL17 and identified as *Lactobacillus plantarum.*

Keywords: Cocoa bean fermentation, lactic acid bacteria, *Lactobacillus plantarum*, anti-fungal growth

PP32

Hypoglycemic effect of annealed breadfruit flour evaluated in normal and diabetic treated rats

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ABSTRACT

Efforts to diversify the raw material for staple food not only aimed for maintaining Indonesian food security, but also to determine the commodities that are nutritious, safe and able to prevent the disease. Investigation on the chemical characteristics of breadfruit revealed the presence of starch, flavonoid, phenols and dietary fiber, so it is potentially used as a substitute of rice. Breadfruit flour production often involves soaking prior to drying (annealing process) that led to an increase in the regularity of the starch crystal and facilitate interaction between polymeric molecules. Change in starch configuration may influence the digestibility thus can be positively and negatively associated with glycemia-related health issue. The aim of this study was to investigate the effect of a breadfruit flour-based diet on blood glucose (after or without a glucose load) of alloxan-induced diabetic rats and the production of short chain fatty acid (SCFA) in their cecum. A total of 20 rats including 16 diabetic and 4 normal rats were used for this study. Diabetes was induced in male Wistar rats by intraperitoneal injection of alloxan at 80 mg/kg body weight. After being confirmed diabetic, rats were fed with breadfruit flour- based feed for 4 weeks. The weight and blood glucose level were measured daily while SCFA in their cecum were analyzed on the last day of experiment. The result showed that breadfruit flour-based diets significantly reduced the blood glucose level and fermented by intestinal microbiota in colon and produced SCFA.

Keywords : Annealing, Hyperglycemia, Resistant starch, SCFA, Bread fruit flour

PP33

Quantitative evaluation of deoxynivalenol in wheat and wheat flour

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ABSTRACT

In order to have a quantitative detection of the deoxynivalenol (DON) in wheat and wheat flour, a gold immunochromatographic assay quantitative test strip has been applied. 20 crushed samples were taken. Weigh the samples 5g and input 30ml water for extraction. After standing, take the supernatant for detection. 4 parallel experiments have done for each sample. The total reaction time is 4mins. The results of the test are clear. Both control lines and test lines are continuing, not intermittent. The color and the width of the lines have shown high consistency. According to the values from the reader, the method by using the test strip is stable and reproducible. Compared to the HPLC test results, the test strip has high accuracy. According to the coefficient of variation, the test strip is capable of high precision. It is better to apply the same batch of test strips to one experiment, and the test strip cannot be reused.

Keywords: wheat and wheat flour, Mycotoxins, Deoxynivalenol (DON), Quantitative test, Rapid testing

PP34

Performance vannamei shrimp (*Litopenaeus vannamei*, Boone, 1931) through the formulations of consortium *Bacillus a*nd *Lactobacillus* probiotic in dry preparation

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ABSTRACT

The used of probiotics in shrimp farming is one of the efforts to control the disease, improve immune response, contributing to the nutritional and enzymatic digestion of the host, and improve water quality. Probiotic preparations in the feed will be more effective when encapsulated in a dry preparation, so it is more durable and efficient in storage. This study aims to determine the effect of dried preparations probiotic of the consortium *Bacillus* and *Lactobacillus* in skim milk carrier material to the performance of vannamei shrimp. The method used is descriptive experimental, ie. applying four different formulations dried probiotic preparations in fish feed shrimp vanamei. The bacterium used is *Bacillus* group consisting of *Bacillus licheniformis*, *Bacillus polymyxa* and *Bacillus subtilis* and *Lactobacillus* group consisting of *Lactobacillus bulgaricus* and *Lactobacillus curvatus*. Tests were carried out on four weeks shrimp larvae vanamei PL12 with a stocking density 20 individu/L. Probiotic treatment is done by mixing commercial diets with probiotic bacteria that have been encapsulated as much as 2 g / kg of commercial feed is used. Feed provided *ad-libitum* with a frequency of three times a day. Parameters tested include Daily Growth Rate (DGR), survival and Feed Conversion Ratio (FCR). The results showed that administration of a consortium of probiotic *Bacillus licheniformis, Bacillus polymyxa, Bacillus subtilis, Lactobacillus bulgaricus* and *Lactobacillus curvatus* showed the highest daily growth rate, which is 0.16%. The survival of shrimp larvae with probiotic *Lactobacillus* consortium reached 92.5%, and a value of feed conversion (FCR) vannamei shrimp larvae to reach 1.46.

Keywords: Probiotics, *Bacillus, Lactobacillus*, Skim Milk, vannamei shrimp performance

PP35

Multidrugs resistance of *Salmonella* isolated from fresh seafood products from local market in DKI Jakarta and Bogor (West Java), Indonesia

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ABSTRACT

High incidences of *Salmonella* in seafoods have been reported worldwide in association with outbreaks of fever, nausea, vomiting and diarrhea. This research aimed to identify prevalence of *Salmonella* isolated from fresh seafood samples, consisting of 110 samples of shrimp, 23 samples of fish, 4 samples of cephalopod, and 4 samples of shellfish. The samples were collected randomly from selected local market in DKI Jakarta and Bogor (West Java), Indonesia during March 2013 until October 2014. Isolation and phenotypic characterization were carried out using ISO 6579-2002 and antimicrobial susceptibility pattern was tested by disc diffusion method. The prevalence of *Salmonella* was found 36.88% (52/141 samples) in fresh seafood products. The isolates were resistant to at least one antibiotic, respectively 31% of erythromycin, 11% of amoxicillin clavulanic acid, 4% of tetracycline, and each 2% of doxycycline and nalidixic acid. Two isolates possessed multidrugs resistance from five antibiotic agents (tetracycline, erythromycin, nalidixic acid, amoxicilin clavulanic acid, and doxycycline). The results showed that the fresh seafood samples from local market in Jakarta and Bogor, Indonesia were contaminated with potentially pathogenic *Salmonella* and could threat public health.

Keywords: *Salmonella* spp, antibiotic resistance, fresh seafood products, local market, food safety

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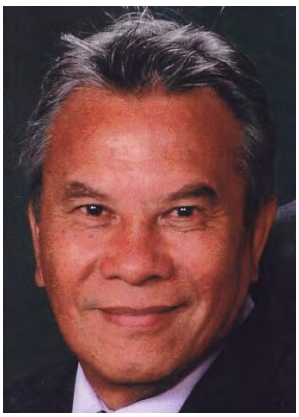
5		**Robert Archibald Samson, Prof. Dr.** CBS Fungal Biodiversity Centre Uppsalalaan 8, 3584 CT Utrecht, The Netherlands r.samson@cbs.knaw.nl ; rasamson@zonnet.nl
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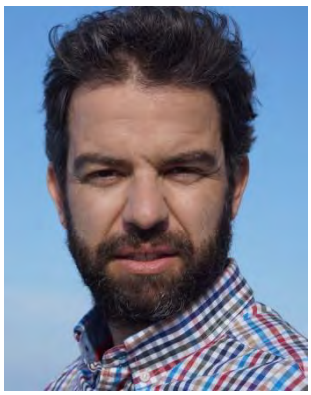
8		**Vasilis Valdramidis, Dr.** Faculty of Health Sciences, Department of Food Studies and Environmental Health, University of Malta vasilis_valdramidis@um.edu.mt

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Notes