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## PREFACE

The ISFS2017 is aimed to bring leading academics, scientists, researchers, policy makers and industry leaders on a single platform to build a dynamic network for exchanging the ideas, learning from each other, and working collaboratively on sustainable development concepts and approaches to ensure the supply of safe, nutritious, and sustainable food products. The symposium is themed around following key topics:

- Feeding swelling population in Asia
- Science to improve food security
- Sustainable agriculture
- Food safety in supply chain
- Climate change and food security
- Management and compliance for food supply
- Future trends in food production
- Policies and initiatives to improve regional food security

*Following events are planned to be held in conjunction with ISFS2017:*

1. 4<sup>th</sup> Asia-Pacific Probiotics and Health Symposium 2017 (22 November 2017)
2. Technical Short Course: Risk Assessment in Meat and Seafood Industry: Farm to Fork Approach (24-25 November 2017).

The two-days scientific and poster presentation sessions will provide multiple opportunities for experts and participants to discuss key food safety, and sustainable development issues. Experts from governmental organizations, international organizations, entrepreneurs and universities from different countries will be able to share their ideas, address challenges, and discuss strategies and collaborative programs to enhance the continuing global efforts to deliver safe foods for a better health and environment of the people of the developing countries.

After symposium, the abstracts will be selected to publish with full paper in the Columella - Journal of Agricultural and Environmental Sciences ([www.columella.mkk.szie.hu](http://www.columella.mkk.szie.hu)), Asia-Pacific Journal of Food Safety and Security (APJFSS) (<http://apjfss.wixsite.com/apjfss> and Journal of Science and Technology - Industrial University of HCMC (<http://iuh.edu.vn/vi/tap-chi-khoa-hoc-va-cong-nghe-s103.html>)). All paper will be go through peer-review critically.

The symposium contains papers submitted by speakers from different countries based on presentation made in the conference. The views expressed are those of the authors, and the editorial committee takes no responsibility for the contents or comments, or the views of the Asia Pacific Institute of Food Professionals (APIFP). However, it is believed that book will act as a good source for relevant information in relation to food safety and sustainable development.

The editorial committee is thankful to Ho Chi Minh City Department of Science and Technology, the Asia Pacific Institute of Food Professionals (APIFP), The National Foundation for Science and Technology Development (NAFOSTED), the Center of Analytical Services and Experimentation of HCM City (CASE) for giving the permission and financial support to organize the symposium and to publish the abstract book.



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## The 4<sup>th</sup> Asia – Pacific Probiotics and Health Workshop 2017 (APPW2017)

### Workshop Program

The 22<sup>nd</sup> November 2017

<b>Plenary Session</b>	
<b>8:00 - 9:00</b>	<b>Registration and opening ceremony</b>
<b>9:00 - 9:10</b>	<b>Welcome Address by University Official</b>
<b>9:10 - 9:20</b>	<b>Symposium Chairman Address (Prof. Sirichai Kanlayanarat)</b>
<b>9:20 - 9:30</b>	<b>Address by Prof. Takashi Uemura, Osaka Prefecture University, Osaka, Japan</b>
<b>9:30 - 9:40</b>	<b>An Overview of Asia-Pacific Probiotics Workshops</b> Dr Malik A. Hussain, Executive Director, Asia-Pacific Institute of Food Professionals (APIFP)
<b>9:40 – 10:00</b>	<b>Group photo</b>
<b>10:00 – 10:30</b>	<b>Tea Break</b>
<b>Technical Session A</b>	
<b>Theme 1-2: Scientific advances in probiotics and Innovative probiotics food products</b>	
<b>Session Chairs:</b> Professor Ida Idayu Muhamad and Dr Marzieh Hosseini-zhad	
<b>10:30 - 11:00</b>	<b>OP-01: Keynote Speech: Encapsulation of probiotics: recent developments and perfectives</b> <i>Prof. Quang Duc Nguyen,</i> Erika Bujna, Mai Anh Tran, Mai Sao Dam, Judit M. Rezessy-Szabo Dean of the Department of Brewing and Distilling, Faculty of Food Science, Szent Istvan University, Hungary
<b>11:00 – 11:30</b>	<b>OP-02: Keynote Speech: Stress, stability and performance of probiotic strains</b> <i>Dr Malik A. Hussain</i> Executive Director, APIFP and Adjunct Senior Lecturer, Lincoln University, Christchurch, New Zealand
<b>11:30 – 12:00</b>	<b>OP-03: Keynote Speech: Evaluate the prebiotic efficiency of garlic polysaccharides using <i>in vitro</i> and <i>in vivo</i> assessment</b> <i>Professor Xi-yang Kent Wu,</i> Professor of Food Microbiology, Department of Food Science & Engineering, Jinan University, China



<b>12:00 – 13:00</b>	<b>Lunch Break</b>
<b>13:00 – 13:30</b>	<b>Short tour in the Industrial University of Ho Chi Minh City</b>

<b>Technical Session B</b>	
<b>Theme 3-4: Novel applications of probiotics and Regulation of probiotics products</b>	
<b>Session Chairs: Professor Ravi Gooneratne and Professor William Riley</b>	
<b>13:30 - 14:00</b>	<b>OP-04: Production of probiotic with high cell-<math>\beta</math>-glucosidase activity</b> <i>Prof. Ida Idayu Muhamad, Kok Fook Seng</i> Dept. of Bioprocess & Polymer Engineering, Faculty of Chemical and Energy Engineering, UTM, Malaysia
<b>14:00 - 14:30</b>	<b>OP-06: Solid state fermentation technology for biofortification of low-grade cereal based functional food</b> <i>Prof. Shahjahan Baig,</i> Mushtaq A. Saleem, Muhammad Azmat Ullah Khan and Rubina Nelofar, Faculty of Life Sciences, University of Central Punjab, Pakistan
<b>14:30 – 15:00</b>	<b>OP-07: Lactic acid bacteria as natural preservatives and their impact on food security</b> <i>Dr Marzieh Hosseini-zhad,</i> Associate Professor and Director of International Scientific Cooperation Office, Research Institute of Food Science and Technology, Iran.
<b>15:00 – 15:30</b>	<b>Tea Break</b>
<b>15:30 – 16:00</b>	<b>OP-08: Soursop fruit (<i>Annona muricata</i>) situation and prediction products processing in Vietnam</b> Assoc. Prof. Dam Sao Mai, Institute of Biotechnology and Food Technology, Industrial Uni. Of HCM City, Vietnam
<b>16:00 – 16:30</b>	<b>OP-09: The effect of poly lactic acid films containing different concentrations of <i>Cuminum cyminum</i> essential oil and ethanolic extract of propolis on some foodborne pathogens</b> <i>Zohreh Mashak, Ali Khanjari, Amirreza Saadati, Yasaman Saadati,</i> Islamic Azad University; Tehran University, Iran
<b>16:30 – 17:30</b>	<b>Panel Discussion</b>
<b>17:30 – 18:00</b>	<b>Closing Ceremony</b>
<b>18:00</b>	<b>Welcome party</b>

## International Symposium on Food Security and Sustainable Development 2017 (ISFS2017)

### Symposium Program

**The 23<sup>rd</sup> November 2017**

<b>Plenary Session</b>	
<b>7:30 - 8:30</b>	<b>Registration and opening ceremony</b>
<b>8:30 - 8:40</b>	<b>Welcome Address by The Rector of IUH (Dr. Nguyen Thien Tue)</b>
<b>8:40 - 8:50</b>	<b>Symposium Chairman Address (Prof. Sirichai Kanlayanarat)</b>
<b>8:50 - 9:00</b>	<b>Symposium Chairman Address (Dr. Nguyen Chi Hieu)</b>
<b>9:00 - 9:10</b>	<b>An Overview of Food Security Activities in Asia-Pacific</b> <i>Dr Malik A. Hussain</i> Executive Director, Asia-Pacific Institute of Food Professionals (APIFP)
<b>9:10 – 9:30</b>	<b>OS-01: Keynote Speech: Food Security on the African Continent: The Whole World’s Problem</b> <i>Professor William Riley</i> Professor of Food Quality, International School, Jinan University, China and Executive Member of APIFP
<b>9:30 – 9:50</b>	<b>OS-02: Keynote Speech: Advanced hydrogel food packaging</b> <i>Prof. Petr Saha</i> Director of the Tomas Bata University of Zlin, Czech Republic
<b>9:50 – 10:10</b>	<b>OS-03: Keynote Speech: Food safety challenges in the supply chain and sustainable solutions</b> <i>Dr. Md. Latiful Bari</i> Center for advanced Research in Sciences, University of Dhaka, Bangladesh
<b>10:10 – 10:30</b>	<b>Tea Break</b>

<b>Technical Session A (Room: 01)</b>	
<b>Theme 1: Feeding swelling population</b>	
<b>Session Chairs: Prof. Petr Saha, Prof. Adnan A. Bekhit, Dr. Sunil Kumar Ghosh</b>	
<b>10:30 - 11:00</b>	<b>OS-04: Invited speaker: Feeding the world through production and supply of sustainable food products</b> <i>Dr Malik Altaf Hussain,</i> Executive Director, APIFP and Adjunct Senior Lecturer, Lincoln University, New Zealand

<b>11:00 - 11:30</b>	<b>OS-05: Invited speaker: Strategic direction and Initiatives in Agrifood development strategy and initiatives of Mekong institute</b> <i>Dr. Antonio Acedo Jr,</i> Maria Theresa S. Medialdia, and Watcharas Leelawath Agricultural Development and Commercialization Department, Mekong Institute Khon Kaen, Thailand
<b>11:30 - 11:50</b>	<b>OS-06: Invited speaker: Food security situation and food demand in Vietnam by 2030</b> <i>Assoc. Prof. Dam Sao Mai,</i> Huynh Van Kiet, Nguyen Le Phuong Lien Institute of Biotechnology and Food Technology, Industrial Uni. of HCM City, Vietnam
<b>11:50 - 12:10</b>	<b>OS-07: Development of Food Trends and Food Safety in Turkey</b> <i>Prof. Erdogan Gunes,</i> Ankara University, Turkey
<b>12:10 - 13:30</b>	<b>Lunch Break</b>
<p><b>Theme 2: Science to improve food security and food safety</b>  <b>Session Chairs:</b> Prof. Nguyen Duc Luong, Dr Malik Altaf Hussain and Dr Trinh Ngoc Nam</p>	
<b>13:30 – 13:50</b>	<b>OS-08: Invited speaker: Gut microbiota: Nutrient metabolism, microbial resistance to antibiotics and food safety and security</b> <i>Prof. Ravi Gooneratne,</i> Professor of Toxicology, Lincoln University, New Zealand
<b>13:50 – 14:10</b>	<b>OS-09: Invited speaker: Development of methods for trace of palinka-s</b> <i>Prof. Quang Duc Nguyen,</i> Gáborné Panyik, L.Nagygyörgy, Tuan M. Pham, Á. Hoschke Dean of the Department of Brewing and Distilling, Faculty of Food Science, Szent Istvan University, Hungary.
<b>14:10 – 14:30</b>	<b>OS-10: Invited speaker: Recognising and sustainable using poisonous, edible and pharmacological marco fungi of Vietnam</b> <i>Prof. DSc. Trinh Tam Kiet,</i> Tam Anh Trinh Mycological Research Center, Hanoi State University, Vietnam
<b>14:30 – 14:45</b>	<b>OS-11: Effect of ozone treatment on cucumber and tomato quality during simulated retail storage</b> <i>Dr.Lien Nguyen Le Phuong,</i> Mai Sao Dam, L. Sz. Horváth, Tamás Zsom, Géza Hitka Szent Istvan University, Hungary

14:45 – 15:00	<p><b>OS-12: Effect of harvest time, delay in de-stemming and desapping treatment on the latex volume and quality of ‘carabao’ mango fruit</b>  <i>Leizel Secretaria,</i>                  Emma R. V. Bayogan, Christine D. S. Lubaton, A. Maria, Carmela C. Majomot, Jenny Ekman, Adam Goldwater                  University of the Philippines Mindanao, Philippines</p>
15:00 – 15:15	<p><b>OS-13: Effect of CaCl<sub>2</sub> on the Yield and Antioxidants of Chinese kale Microgreens</b>  <i>Naruchon Tantharapornrerk,</i>                  Chairat Techavuthiporn, Panida Boonyaritthongchai, Taweerat Vichitsoonthonkul, Songsin Photchanachai                  King Mongkut’s University of Technology Thonburi, Thailand</p>
15:15 – 15: 30	<p><b>Tea Break</b></p>
<p><b>Theme 3: Sustainable agriculture</b>  <b>Session Chairs: Prof. DSc. Trinh Tam Kiet, Assoc. Prof. Marzieh Hosseinienezhad, Dr. Eman Kadhum</b></p>	
15:30 – 15:50	<p><b>OS-14: Invited speaker: Indicators and descriptors of life sciences sustainable higher education in Bulgaria - case study in University of Forestry</b>  <i>Prof. DSc.Nidal Thabit Shaban,</i>                  Vladislav Todorov, Iman Mussa Kadhum, Vesna Weingerl                  Department of Horticulture, University of Forestry Sofia, Bulgaria.</p>
15:50 – 16:10	<p><b>OS-15: Invited speaker: Sustainable control of red spider mite (<i>Tetranychus urticae</i>) infesting eggplant (<i>Solanum melongena</i>) using bio-pesticides and safe vegetable production.</b>  <i>Sunil Kumar Ghosh,</i>                  Dept. of Agricultural Entomology, Bidhan Chandra Krishi Viswavidyalaya (BCKV) - Ag. University – India.</p>
16:10 – 16:25	<p><b>OS-16: In vitro technology for medicinal plants, their products and beyond</b>  <i>Prof. Bijaya Pant,</i>                  Central Department of Botany, Tribhuvan University, Kirtipur, Kathmandu, Nepal</p>
16:25 – 16:40	<p><b>OS-17: Soiless Agriculture as Climate-Smart Farming Technique for Vegetable Crops Production</b>  <i>Chito Sace and Ar-Jay Aquino,</i>                  Central Luzon State University, Philippine</p>

<b>16:40 – 16:55</b>	<b>OS-18: Incorporation of Fiber from Agricultural By-Product Into Bread and Its Properties</b> <i>Mahfuzah Mustapha,</i> Norhayati Pa'e and Ida Idayu Muhamad Food and Biomaterial Research Group (FoBERG) Dept of Bioprocess & Polymer Eng., Faculty of Chemical and Energy Engineering, Universiti Teknologi Malaysia
<b>16:55 – 17:10</b>	<b>OS-19: Mechanical and release properties of polylactic acid based packaging incorporated with graphene and cellulose nanofiber</b> <i>Mohd Harfiz Salehudin and Ida Idayu Muhamad,</i> Uviversiti Teknologi Malaysia, Malaysia
<b>Poster section</b> <b>17:10 – 17:45</b> Section Evaluation: Prof. Adnan A. Bekhit, Dr. Sunil Kumar Ghosh, Prof. Nguyen Duc Luong, Dr Malik Altaf Hussain, Prof. Ravi Gooneratne, Prof. Quang Duc Nguyen, DSc.Nidal T Shaban, Prof. William Riley, Assoc. Dr. Nobutaka Nakamura, Assist.Prof. Chaleeda Borompichaichartkul, Dr. Latiful Bari, Prof. Phan Tai Huan, Prof.Sirichai Kanlayanarat, Prof. Ida Idayu Muhamad, Assoc. Prof. Dong Thi Thanh Thu	
<b>Closing Ceremony</b> <b>17:45 – 18:30</b> <ul style="list-style-type: none"> <li>- Best Oral presentation award</li> <li>- Best Poster presentation award</li> <li>- Thank you speech Address by University Official</li> <li>- Thank you speech Address by chairman</li> </ul>	
<b>Gala dinner</b> <b>18:30 – 21:30</b>	

<b>Technical Session B (Room: 02)</b> <b>Theme 4: Food safety in supply chain</b> <b>Session Chairs:</b> Prof. Ravi Gooneratne, Prof. Quang Duc Nguyen, Prof. Sirichai Kanlayanarat	
<b>10:30 - 10:50</b>	<b>OS-20: Invited speaker: Future trends and challenges of food production and supply chain sustainability</b> <i>Prof. Ida Idayu Muhamad,</i> Dept. of Bioprocess & Polymer Engineering, Faculty of Chemical and Energy Engineering, UTM, Malaysia.

<b>10:50 - 11:10</b>	<b>OS-21: Invited speaker: Food hygiene control of fresh cut or lightly fermented vegetable</b> <i>Dr Yasuhiro Inatsu,</i> Dam Sao Mai, Chiraporn Ananchaipattana, Borarin Bungtong Food Research Institute, National Agriculture and Food Research Organization (NARO), Japan.
<b>11:10 - 11:25</b>	<b>OS-22: Enhancing microbiological safety and quality during storage of ‘Super Hot’ Chili (<i>Capsicum annuum</i> L.) using washing solutions</b> <i>Angelyn Lacap,</i> Songsin Photchanachai, Emma Ruth V. Bayogan King Mongkut’s, University of Technology Thonburi , Thailand
<b>11:25 - 11:40</b>	<b>OS-23: Influence of insemination depth, sperm concentration and length of semen storage on reproductive performance of sows (<i>Sus domesticus</i>, L.)</b> <i>Rudy Flore,</i> Ernesto D. Supan Peninsula State University City of Balanga, Philippine
<b>11:40 - 11:55</b>	<b>OS-53: The effects of different salts of organic acids on some chemical, sensory and shelflife attributes of black tiger shrimp (<i>Penaeus monodon</i>) during 0°C storage</b> Le Nhat Tam, <i>Phan Thuy Xuan Uyen,</i> Huynh Nguyen Que Anh, Dam Sao Mai, Tran Thi Van Thi, Chu Van Hai, Charles Odilichukwu R. Okpala Institute of Biotechnology and Food Technology, Industrial Uni. of HCM City, Vietnam
<b>11:55 - 12:10</b>	<b>OS-24: The role of food additives in quality of fried fish cake processed from snakehead fish (<i>Channa striata</i>) surimi</b> <i>Vo Hoang Ngan,</i> Tran Thanh Truc, Nguyen Van Muoi. Can Tho University, Vietnam
<b>12:10 - 13:30</b>	<b>Lunch Break</b>
<b>Theme 5: Climate change and food security</b>	
<b>Session Chairs: Dr.Zulkifli Khair, Prof. DSc.Nidal T Shaban, Prof. William Riley</b>	
<b>13:30 – 13:50</b>	<b>OS-25: Invited speaker: Greenhouse gas emissions from agricultural production in Vietnam</b> <i>Assoc. Prof. Le Hung Anh,</i> Institute of Environmental Science and Technology, Industrial Uni. of HCM City, Vietnam
<b>13:50 – 14:10</b>	<b>OS-26: Invited speaker: Analysis and enhancement of astaxanthin accumulation in <i>Haematococcus pluvialis</i> by stress conditions</b> <i>Dr. Trinh Ngoc Nam,</i> Truong N. B. Tran, Huynh T. Hieu, Nguyen T. D. Hien, Tran T. B. Lien Institute of Biotechnology and Food Technology, Industrial Uni. of HCM City, Vietnam

<b>14:10 – 14:25</b>	<b>OS-27: Role of tropical and subtropical fruits for crop diversification, biodiversity, environmental protection in changing climates, nutritional food security and poverty reduction in Bangladesh</b> <i>M. A. Rahim,</i> F. Islam, N. Naher, S. E. Bilkis, M. S. Alam, Farzana Rahman Department of Horticulture, BAU, Mymensingh, Bangladesh
<b>14:25 – 14:40</b>	<b>OS-28: Quality characteristic and antioxidant properties of purple sweet potato as a bakery product ingredient</b> <i>Azni A. Aziz,</i> Alyani Mohd Padzil, Ida Idayu Muhamad, Universiti Teknologi Malaysia, Malaysia
<b>14:40 – 14:55</b>	<b>OS-29: Antimicrobial activity of preservatives in food technology</b> <i>Le Pham Tan Quoc,</i> Institute of Biotechnology and Food Technology – Industrial University of Ho Chi Minh City, Vietnam
<b>14:55 – 15:10</b>	<b>OS-30: Metabolomic profiling of cationic metabolites in root of the sheath blight-resistant rice genotype 32R under cold stress</b> <i>Huynh Van Kiet,</i> Institute of Biotechnology and Food Technology – Industrial University of Ho Chi Minh City, Vietnam
<b>15:10 – 15:30</b>	<b>Tea Break</b>
<b>Theme 6: Management and compliance for food supply</b>	
<b>Session Chairs:</b> Assoc. Prof. Le Van Tan, Prof. Ida Idayu Muhamad, Assoc. Prof. László Baranyai	
<b>15:30 – 15:50</b>	<b>OS-32: Invited speaker: Food safety and hygiene in restaurant system in Ho Chi Minh City</b> <i>Vo Thi Thu Thuy,</i> Faculty of Trade and Tourism, Industrial Uni. Of HCM City, Vietnam
<b>15:50 – 16:10</b>	<b>OS-33: Invited speaker: Food security and sustainable development</b> <i>Dr. Eman Kadhum</i> Nidal Shaban Agricultural Academy Sofia, Bulgaria
<b>16:10 – 16:30</b>	<b>OS-34: Invited speaker: What affected to the quality of coffee in vietnam: From-Bean-To-Cup Point Of View</b> <i>Dr. Nguyen Ba Thanh,</i> Institute of Biotechnology and Food Technology – Industrial University of Ho Chi Minh City, Vietnam
<b>16:30 – 16:50</b>	<b>OS-35: Motivations of everyday food choices</b> <i>Dr. Phan Thuy Xuan Uyen,</i> Edgar Chambers IV Institute of Biotechnology and Food Technology – Industrial University of Ho Chi Minh City, Vietnam

<b>16:50 – 17:10</b>	<b>OS – 54: Postharvest quality of ‘carabao’ mango as affected by different bagging materials</b> <i>Leizel B. Secretaria, Christine Diana S. Lubaton, Emma Ruth V. Bayogan, Jenny Ekman, and Adam Goldwater</i> University of the Philippines Mindanao Mintal, Philippines
<b>Poster section</b> <b>17:10 – 17:45</b> <b>Section Evaluation: Prof. Adnan A. Bekhit, Dr. Sunil Kumar Ghosh, Prof. Nguyen Duc Luong, Dr Malik Altaf Hussain, Prof. Ravi Gooneratne, Prof. Quang Duc Nguyen, DSc.Nidal T Shaban, Prof. William Riley, Assoc. Dr. Nobutaka Nakamura, Assist.Prof. Chaleeda Borompichaichartkul, Dr. Latiful Bari, Prof. Phan Tai Huan, Prof.Sirichai Kanlayanarat, Prof. Ida Idayu Muhamad, Assoc. Prof. Dong Thi Thanh Thu</b>	
<b>Closing Ceremony</b> <b>17:45 – 18:30</b> - Best Oral presentation award - Best Poster presentation award - Thank you speech Address by University Official - Thank you speech Address by chairman	
<b>Gala dinner</b> <b>18:30 – 21:30</b>	

<b>Technical Session C (Room: 03)</b> <b>Theme 7a: Future trends in food production (part 1)</b> <b>Session Chairs: Dr. Nobutaka Nakamura, Assist.Prof. Chaleeda Borompichaichartkul, Dr. Nguyen Ba Thanh</b>	
<b>10:30 - 10:50</b>	<b>OS-36: Invited speaker: Lactic acid bacteria as natural preservatives and their impact on food safety and security</b> <i>Assoc. Prof. Marzieh Hosseini-zhad,</i> Director of International Scientific Cooperation Office, RIFST, Mashhad, Iran.
<b>10:50 - 11:10</b>	<b>OS-37: Invited speaker: Analysis of joule heating of fish fillets and pork sausages</b> <i>Assoc. Prof.László Baranyai,</i> L. De Vivo, M. Magnucz, E. Vozáry and F. Marra Szent Istvan University, Hungary
<b>11:10 - 11:25</b>	<b>OS-38: Influence of some technical parameters of heat-moisture treatment on enrich resistant starch (RS) from potato starch</b> <i>Nguyen Thi Mai Huong, Pham Thi Quyen, Pham Van Hung</i> Institute of Biotechnology and Food Technology – Industrial University of Ho Chi Minh City, Vietnam



11:25 - 11:40	<p><b>OS-52: Optimization of the extraction conditions for total flavonoid from <i>Moringa oleifera</i> Lam</b>  <i>Doan Nhu Khue</i>, Nguyen Ngoc Tuan, Phan Thuy Xuan Uyen                  Institute of Biotechnology and Food Technology, Industrial University of Ho Chi Minh City, Vietnam</p>
11:40 - 12:55	<p><b>OS-39: Granulation in ‘Magallanes’ pummelo [<i>Citrus maxima</i> (Burm. ex Rumph.) Merr.] fruit as influenced by fruit size and 1-Methycyclopropene</b>  <i>Emma Ruth Bayogan</i>,                  Leizel B. Secretaria, Geeflor S. Panong, and Mairén M. Lacerna                  College of Science and Mathematics, University of the Philippines, Philippine</p>
12:55 - 13:10	<p><b>OS-40: Isolating free fatty acids from virgin coconut oil using lipases from different sources</b>  <i>Nguyen Thi Ai Van</i>,                  Le Dang Truong, Phan Ngoc Hoa, and Tran Bich Lam                  Institute of Biotechnology and Food Technology, Industrial University of Ho Chi Minh City, Vietnam</p>
12:10 - 13:30	<p><b>Lunch Break</b></p>
<p><b>Theme 7b: Future trends in food production (part 2)</b>  <b>Session Chairs: Dr. Latiful Bari, Prof. Phan Tai Huan, Prof. Sirichai Kanlayanarat</b></p>	
13:30 – 13:50	<p><b>OS-41: Invited speaker: Synbiotic film from natural biopolymer to enhance the accessibility of functional foods</b>  <i>Assist. Prof. Chaleeda Borompichaichartkul</i>,                  Patthasanun Pruksarojanakul, and Sarn Setthachaimongkon                  Department of Food Technology, Faculty of Science, Chulalongkorn University, Bangkok, Thailand</p>
13:50 – 14:10	<p><b>OS-42: Invited speaker: Novel and traditional technologies for the production of safe meat products: what we know and what we don’t know</b>  <i>Dr. Alaa El-Din A. Bekhit</i>, FNZIFST,                  Food Science Department, University of Otago, Dunedin, New Zealand.</p>
14:10 – 14:25	<p><b>OS-43: Invited speaker: Drug-food interactions: the not-so-great escape</b>  <i>Prof. Adnan A. Bekhit</i>,                  Pharm. Chem. Dept. Faculty of Pharmacy, Alexandria University, Egypt</p>
14:25 – 14:40	<p><b>OS-44: Production of bioactive extract of black garlic for protecting liver from damages induced by tetracarbon chloride</b>  <i>Dr. Tran Gia Buu</i>,                  Nghia-Thu T. Le, Kim-Dang T. Truong, Bich-Nga T. Nguyen, Thanh- Huyen T. Nguyen, and Ngoc-Buu Tran                  Institute of Biotechnology and Food Technology, Industrial University, Vietnam</p>

<b>14:40 – 14:55</b>	<b>OS-45: Control of chilling injury and decay index of peach fruits by hot water, 1-MCP, calcium chloride and salicylic acid during cold storage</b> <i>Abdul Sattar Shah, Said Wahab, Malik Muhammad Hashim and Abdul Basir</i> Department of Food Science and Technology, The University of Agriculture Peshawar, Pakistan
<b>14:55 – 15:10</b>	<b>OS-46: Using natural additives and ultrasound treatment to improve the batter for making Egg- free sponge cakes</b> <i>Dr.Nguyen Thi Minh Nguyet, Huynh Nguyen Que Anh</i> Institute of Biotechnology and Food Technology, Industrial University, Vietnam
<b>15:10 – 15: 30</b>	<b>Tea Break</b>
<p><b>Theme 8: Policies and initiatives to improve regional food security</b>  <b>Session Chairs:</b> Dr Yasuhiro Inatsu, Assoc.Prof. Le Hung Anh, Dr. Alaa El-Din A. Bekhit,</p>	
<b>15:30 – 15:50</b>	<b>OS-47: Invited speaker: Exploring food insecurity experiences among undergraduate students</b> <i>Rayen Sarajevo, Dr Zulkifli Khair,</i> Senior Lecturer, Faculty of Management, UTM, Malaysia.
<b>15:50 – 16:10</b>	<b>OS-48: Invited speaker: Evaluation of distribution conditions of fresh produce during exportation from Japan to Hong Kong and Singapore.</b> <i>Dr. Nobutaka NAKAMURA, Tomoko Kaneta, Hiroaki Kitazawa, Masayasu Nagata, Eriko Yasunaga, Fumio Fukuda, and Ryuhei Nakano</i> Food Research Institute, National Agriculture and Food Research Organization (NARO), Japan.
<b>16:10 – 16:30</b>	<b>OS-49: Invited speaker: Food safety in hospitality industry - the key to identification of critical control points.</b> <i>Dr S Gokul Shankar,</i> Faculty of Medicine, AIMST University, Malaysia
<b>16:30 – 16:50</b>	<b>OS-50: New development in Daklak province (Vietnam) to improve sustainable agriculture</b> <i>Phan Thi Thuy, Le Duc Niem, Philippe Lebailly</i> Tay Nguyen University, Vietnam
<b>16:50 – 17:10</b>	<b>OS-51: Quality and safety issues for horticulture produce in Bangladesh</b> <i>M.A. Rahim,</i> F. Islam, N. Naher, S. E. Bilkis, M. S. Alam, and Farzana Rahman Department of Horticulture, BAU, Mymensingh, Bangladesh

**Poster section**

**17:10 – 17:45**

**Section Evaluation: Prof. Adnan A. Bekhit, Dr. Sunil Kumar Ghosh, Prof. Nguyen Duc Luong, Dr Malik Altaf Hussain, Prof. Ravi Gooneratne, Prof. Quang Duc Nguyen, DSc.Nidal T Shaban, Prof. William Riley, Assoc. Dr. Nobutaka Nakamura, Assist.Prof. Chaleeda Borompichaichartkul, Dr. Latiful Bari, Prof. Phan Tai Huan, Prof.Sirichai Kanlayanarat, Prof. Ida Idayu Muhamad, Assoc. Prof. Dong Thi Thanh Thu**

**Closing Ceremony**

**17:45 – 18:30**

- Best Oral presentation award
- Best Poster presentation award
- Thank you speech Address by University Official
- Thank you speech Address by chairman

**Gala dinner (necessary to register)**

**18:30 – 21:30**

**The 24<sup>th</sup> November 2017**  
**Technical and Sight Seeing Tour**  
**(6:30)**  
**(Necessary to register)**

## LIST OF POSTER PRESENTATION

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P-02	<i>Vibrio tasmaniensis</i> CYTOTOXIC METALLOPROTEASES ARE CONTROL BY A COMPLEX REGULATORY NETWORK INVOLVING RPOS, QUORUM SENSING AND THE CSRA!CSRB PATHWAY An Ngoc Nguyen, Elena Disconzi, Guillaume M Charriere, Delphine Destoumieux-Garzon, Philippe Bouloc, Frederique Le Roux, Anouck Jacq
P-03	QUALITY OF CHAYOTE [ <i>Sechium edule</i> (JACQ.) SW.] FRUIT AT AMBIENT CONDITIONS USING 1-METHYLCYCLOPROPENE AND PASSIVE MODIFIED ATMOSPHERE PACKAGING Beryl Encabo and Emma Ruth Bayogan
P-04	STUDY ON EXTRACTION TIME OF PECTIN FROM LIME ( <i>Citrus latifolia</i> ) PEELS Borey Ngeth and Rithy Chrun
P-05	Isolation and selection of protease producing bacteria from aquaculture water and sediments Bui hong quan, luu huyen trang, nguyen duc luong
P-06	EFFECT OF DIFFERENT ACIDS ON THE EXTRACTION OF PECTIN FROM POMELO ( <i>Citrus grandis</i> ) PEELS Chanpisey Dara and Rithy Chrun
P-07	Livestock traceability models in northern vietnam Dang thi minh luyen
P-08	PRODUCTION OF BIOETHANOL FROM COFFEE PULP ( <i>Coffea robusta</i> ) IN VIETNAM Do Viet Phuong, Pham Van Tan, Le Nguyen Doan Duy
P-09	Reaserch on dyeing process for cotton with aqueous extracted from coffee leaves Hong phuong pham thi, ngoc linh bui hua
P-10	Combined effects of commercial alcalase enzyme and flavourzyme on protein hydrolysis in shrimp heads ( <i>Litopenaeus vannamei</i> ) Ha Thi Thuy Vy, Nguyen Van Muoi
P-11	Ants (insecta: hymenoptera: formicidae) - a potential human food resource in vietnam Ha Tra My, Lai Thu Hien, Sakkouna Phommavongs, Sonexay Rasphone, Nguyen Thi Ha, Vu Quang Manh

P-12	Hazard assessment of commonly used aquacultural antibiotics on aquatic ecosystems Hijran yavuzcan, phan van quy, sertel secer
P-13	APPLICATION OF DRIED CARROT ( <i>Daucus carota</i> L.) POWDER IN WHEAT BREAD PRODUCTION Nguyen Thi Hoang Yen and Ho Xuan Huong
P-14	EFFECT OF COLD TEMPERATURE ON PLANT GROWTH AND ACCUMULATION OF RUBISCO CONTENT IN RESISTANT-SHEATH BLIGHT RICE LINE 32R ( <i>Rhizoctonia solani</i> Kuhn) Huynh Van Kiet
P-15	EFFECT OF 1-METHYLCYCLOPROPENE ON THE POSTHARVEST QUALITY OF BITTER GOURD ( <i>Momordica charantia</i> L.) FRUIT STORED IN LOW TEMPERATURE Jamaica Meralles, Dominica Dacera and Emma Ruth Bayogan
P-16	OPTIMIZATION OF NUTRITIONAL COMPOSITION FOR CULTURE OF <i>Cordyceps</i> spp CULTIVARS IN VIETNAM Khac Ky Lam, Minh Hiep Dinh, Truong Kieu Hoa
P-17	RESEARCH ON PRODUCTION PROCESS OF SHRIMP FLAVOR SOAP FROM WASTE SHRIMPS Le Huong Thuy
P-18	BIOCHEMICAL, SENSORY, AND MICROBIOLOGICAL ASSESSMENT OF BLACK TIGER SHRIMP ( <i>Penaeus monodon</i> ) Le Nhat Tam , Huynh Nguyen Que Anh, Tran Thi Van Thi
P-19	OPTIMIZING DECAFFEINATION CONDITIONS FROM COFFEE PULP IN VIETNAM ( <i>Coffea robusta</i> ) USING HOT WATER EXTRACTION Do Viet Phuong, Pham Van Tan, Le Nguyen Doan Duy
P-20	STUDYING TO MADE WINE FROM MULBERRY Le Van Nhat Hoai
P-22	OPTIMIZATION OF PROTEASE PRODUCTION FROM <i>Bacillus subtilis</i> SIAMB79 USING RSM-CCD Luu H. Trang, Dao C. Thuan, Pham A. Tuan, Bui H. Quan, Nguyen D. Luong
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	BANGLADESH M. A. Rahim, F. Islam, N. Naher, S. E. Bilkis, M. S. Alam, Farzana Rahman
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P-27	CONSUMER WILLINGNESS TO USE FOR SOFT DRINK: A VIETNAMESE CASE STUDY Ngo Ngoc Hung, Dam Sao Mai, Lien Le Phuong Nguyen, Linh Thi Hong Ngo, Tran Manh Tuan, Le, D.T. Anh
P-28	CONSUMER WILLINGNESS TO USE FOR VEGETARIAN FOOD PRODUCTS IN VIETNAM Ngo Thi Hong Linh, Le D T Anh, Dam Sao Mai, Huynh Van Kiet, Ngo Ngoc Hung
P-29	CASPASE-9b DIRECTLY INTERACTS WITH cIAP1 TO DRIVE NF-κB ACTIVATION AND TUMORIGENIC SIGNALING Ngoc T. Vu
P-30	RESEARCH PROCESS OF YOGURT <i>Caulerpa lentillifera</i> PRODUCTION Nguyen Dac Truong
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P-39	THE EFFECT OF ULTRASOUND ON HYDROLYSIS OF STARCH FROM DEFATTED RICE BRAN Nguyen Thi Huong
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P-41	PRODUCTION OF EGG YOLK IMMUNOGLOBIN (IgY) AGAINST <i>Vibrio parahaemolyticus</i> Nguyen Thi Kim Cuc and Nguyen Thi Ngoc Dung
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P-44	EFFECT OF DIFFERENT CHITOSANS ON THE QUALITY OF VACUUM-PACKED DRIED SEASONING PANGASIUS ( <i>Pangasius hypophthalmus</i> ) DURING STORAGE AT AMBIENT TEMPERATURE Nguyen Thi Thanh Binh
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P-49	RESEARCH AND APPLICATION OF CHITOSAN FLIM OF DEACETYL 80% COMBINES SILVER NANO WAS PRESERVED HOA LOC MANGO Nguyen Huynh Dinh Thuan, Pham Thi Quyen
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P-64	EFFECT OF LACTIC ACID AND LYSOZYME ON QUALITY OF CATFISH FILLETS Lien Nguyen L. P., A. Tóth, B. Salamon, B. Csehi, G. Jónás and L. Friedrich
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## **MESSAGE FROM THE RECTOR OF IUH**

**Dr. Nguyen Thien Tue**

*Rector of Industrial University of Ho Chi Minh City,*

It is my great pleasure and honor to extend the gratitude on the grand opening of “The International Symposium on Food Security and Sustainable Development 2017 (ISFS2017)” and “The 4th Asian – Pacific Probiotics Workshop 2017 (APPW2017)” in the presence of many distinguished guests.

The passions of some scientists in ASIA who believe that bio-science, food science and biotechnology contribute to improvement in the quality of life and welfare of human beings of the world and know the importance of co-laboratory works and direct exchange of idea and information made this series of Symposium start.

Sustaining of our passion, by holding the Symposium, has been supported by private and public institutes/organizations of Ho Chi Minh City Department of Science and Technology, Industrial University of Ho Chi Minh City (IUH, the Asia Pacific Institute of Food Professionals (APIFP), The National Foundation for Science and Technology Development (NAFOSTED), the Center of Analytical Services and Experimentation of HCM City (CASE) as the host, as well as by students, volunteers and financial supporters, and many distinguished guests have strongly encouraged us. I express my sincere thank to all those hosts and supporters.

This International Symposium is qualitatively improving as an international meeting; researchers from 19 different countries join in this Symposium, where higher level of research works will be presented and hot discussions will be expected.

Hopefully, I want to give the opportunity as many as possible for young researchers to attend the international meeting. Our endless voyage for obtaining tomorrow’s higher QOL and welfare of human beings by bio-science, food science and biotechnology necessitates continuous supply of fresh and innovative wisdom in sustainable development.

Thank you all very much

**Dr. Nguyen Thien Tue**

## **AN OVERVIEW OF FOOD SECURITY ACTIVITIES IN ASIA-PACIFIC**

*Dr Malik Altaf Hussain*

Executive Director, Asia-Pacific Institute of Food Professionals (APIFP)

Very warm welcome to all Distinguished guests, Honorable Speakers, Delegates and Participants. I am delighted to be here for the 4<sup>th</sup> Asia-Pacific Probiotic Workshop 2017 and the International Symposium on Food Security and Sustainable Development 2017. A week full of scientific and technical activities at the Industrial University of Ho Chi Minh City (IUH) is the result of joint efforts by IUH, APIFP and several other reputable institutes and organisations.

A unique feature of this year's event is to run Asia-Pacific Probiotics Workshop and Food Security Symposium in conjunction, thus bringing more vibrant and extensive learning experience and knowledge sharing opportunities for all of us. Historically, both events were organised by APIFP in collaborations with partners at different locations in the Asia-Pacific region at different time of the year. Probiotics and food security are among the top 10 hottest topics within the discipline of food science and technology.

APIFP is pleased to be part of International Symposium on Food Security and Sustainable Development 2017 (ISFS2017) held at Industrial University of Ho Chi Minh City, Vietnam. The symposium is continuity of our efforts to create awareness about food safety, food security and sustainability in the Asia-Pacific region. Several symposiums and workshops on food security were successfully held over last few years. A snapshot is presented below:

2017: Asia-Pacific Food Security Symposium 2017 was held on 16 June 2017 (in conjunction with Food Innovation Asia Conference 2017) at BITEC, Bangkok, Thailand

2016: International Workshop on Sustainability of Food Resources and Supply Chain was held on 20th November 2016 at Universiti Teknologi Malaysia Kuala Lumpur, Malaysia.

2016: 'International Symposium on Green Technology 2016 (ISGT2016)' was held on 22-23rd August 2016 at Industrial University of Ho Chi Minh City, Vietnam.

2015: Food Safety and Security Workshop 2015 at Chulalongkorn University, Bangkok, Thailand

2015: Inaugural Asia-Pacific Symposium on Food Safety 2015 held at National University of Singapore.

2015: Asia-Pacific Food Safety and Security Workshop 2015, Dong Nai District, Vietnam

2015: International Food Safety and Security Workshop 2015 at UTM, Johor Bahru, Malaysia.

Probiotics represent one of the fastest growing industrial sector. The global probiotics market was estimated at a value of USD 32.06 billion in 2013 and is expected to reach USD 52.34 billion by 2020. Probiotics are becoming important for both biotech and food companies; however, the growth of the food industry is pushing higher demand of probiotics food market. Therefore, several areas including government regulations, technological barriers, and health claim awareness need urgent attention to drive probiotics market in the near future. Asia-Pacific probiotics workshops are regularly held to better understand the challenges probiotics industry is (will be) facing and address them by developing a joint regional strategy. I hope ‘the 4<sup>th</sup> Asia-Pacific Probiotics Workshop 2017’ will be another concrete step to further strengthen the efforts.

There is no doubt that food security in Asia and the Pacific presents a frustrating paradox. Although several initiatives and efforts were put together in the past half century in bringing most of the population out of poverty and hunger, but still large pockets of food-insecure populations remain in the region, especially in South Asia. Despite rapid economic growth in the region, Asia remains home to 67% of the world's hungry people (over 550 million). This situation dictates that much more effort and commitments are required to eradicate hunger from the region. ‘The International Symposium on Food Security and Sustainable Development 2017’ will provide us an excellent platform to evaluate and re-assess scientific and technical aspect of this challenging global issue.

I would like to thank all individuals, committees, organisations, supporters and sponsors who played an important role in organising the events this week, especially the host organisation (the Industrial University of Ho Chi Minh City) and its management. I would also like to extend my special appreciation to the APIFP executives and professional members for their continuous participation, efforts, and commitments.

Finally, on behalf of APIFP, I wish you a productive time over next three days and a pleasant stay in Ho Chi Minh, City. I hope you enjoy the scientific activities, networking and socialising opportunities, and achieve long lasting collaborations.

**THE 4<sup>TH</sup> ASIA – PACIFIC PROBIOTICS  
AND HEALTH WORKSHOP 2017  
(APPW2017)**

## OP-01:

# ENCAPSULATION OF PROBIOTICS: RECENT DEVELOPMENTS AND PERFECTIVES

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### Abstract

Nowadays, the concept of food use to promote a state of well-being, improved health, and reduced risk of disease has become a new frontier in the nutritional sciences and related fields. Furthermore, this concept is particularly important in light of the increasing cost of health care, the steady increase in life expectancy, and the desire of elderly people for an improved quality of life. Moreover, the emphasis has moved from a medication dogma to a prevention dogma. In this context, the development and contribution of functional foods – prebiotics, probiotics and synbiotics – must receive high impact and should be key pillars of the health care system. A wide range of foods have been enriched in probiotics to be evaluated as possible carriers of these beneficial microorganisms and to be placed on the market. Most common probiotic strains added to foods belong to several species of *Lactobacillus* and *Bifidobacterium*, but others such as *Saccharomyces cerevisiae* (*boulardi*), *Enterococcus*, *Bacillus* and *Escherichia* are also used. Many factors (composition of food matrices, pH value, oxygen level, food manufacturing conditions and storage time, as well as type of culture, growth properties, etc.) have to be considered, which can affect the behaviour and robustness as well as the achievement of the probiotic compounds during processing and in the intestine. Therefore, the loss in probiotic viability during gastrointestinal transit, where the principal stressors are the shifting pH and the presence of bile, is to be considered as hurdles that probiotics have to overcome to fulfill their biological role. There is no doubt that probiotics must survive and retain their functional features during the entire food processing operation, including storage. In this regard, different strategies have been developed to improve probiotic technologies and their gastrointestinal robustness, including microencapsulation. Microencapsulation is defined as a technology that achieves the coating and protection of sensitive compounds or living cells, and which attests to the real potential to sustain probiotic viability during processing (biomass production, lyophilisation, storage, application in food) up to their consumption and passage through the gastrointestinal tract. In this review, recent developments and perspectives of probiotic encapsulation technology are discussed.

**Keyword:** Probiotic encapsulation, Microencapsulation, developments, technology

**OP-02:**  
**STRESS, STABILITY AND PERFORMANCE OF PROBIOTICS STRAINS**

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**Abstract**

Probiotics are health benefitting microorganisms commonly found in various foods and feed products. The manufacture of probiotics and probiotic products requires production and storage processes that are likely to alter the structural and functional integrity of cells and could compromise microbial stability. A range of stress conditions are faced by probiotic strains in a typical food system. Some examples of stresses include low temperature stress, low pH stress, heat stress, osmotic stress, nutritional stress, high pressure stress and bile stress. The viability of probiotic bacteria is an important measure of efficacy of probiotic food products, which means the number of viable and active cells per gram or milliliter of these products at the time of consumption is the most critical value. Microbial stability of probiotic products, determined by a high survival rate of the bacteria both during production and over the product's shelf life, is important to ensure the effectiveness and maintaining the consumer confidence. Scientific reports recommend the ingestion of  $10^8$  -  $10^9$  viable cells per day of probiotics to develop health beneficial effects on humans. Probiotic strains are generally selected based on their robustness to tolerate adverse environmental (stressful) conditions, maintain high viability and deliver physiological as well as technological functions. Therefore, the stability of microbial cells is vital for their successful performance that requires the maintenance of high viability of probiotic strains in the products and their survival after exposure to gastrointestinal tract conditions. This presentation will discuss stress responses in probiotic bacteria, stability of microbial cells and performance in different food products.

**Keyword:** stress conditions, probiotic strains, probiotic performance, probiotic stability

**OP-03:**

**EVALUATE THE PREBIOTIC EFFICIENCY OF GARLIC  
POLYSACCHARIDES USING *IN VITRO* AND *IN VIVO* ASSESSMENT**

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**Abstract**

Garlic is a traditional condiment and traditional Chinese medicine. Garlic mainly contains alliin, garlic neuraminidase, naphtha, saponins, polysaccharides and trace elements. Among them, garlic polysaccharide is one of important chemical components, and one of pharmacodynamic material bases of garlic. With a relative molecular mass ranging between 9-10 kDa, garlic polysaccharide belongs to a type of small molecule heteropolysaccharide mainly contains fructose and glucose. Garlic polysaccharide content is more than 70%, and can be extracted through refluxing extraction, ultrasonic extraction and enzymatic method. This study evaluated the prebiotic efficiency of garlic polysaccharides using *in vitro* and *in vivo* assessments, in order to explore new prebiotics and increase the value of garlic by product.

**Keywords:** garlic, efficiency, polysaccharides, prebiotic



**OP-04:**  
**PRODUCTION OF PROBIOTIC WITH HIGH CELL-  $\beta$ -GLUCOSIDASE  
ACTIVITY**

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**Abstract**

The fermentation process is strategized for the production of probiotic with high cell- $\beta$ -glucosidase (CBG) activity using *Lactobacillus Rhamnosus* NRRL 442 as model microbe. The fermentation processes were monitored in 2L bioreactor under anaerobic condition, and CBG activity was measured using the standard substrate of O-nitrophenyl- $\beta$ -D-glucopyranoside (O-NPG) and investigated using factor-by-factor optimization strategy. The cell pellet from shake flask culture was used in the determination of optimum testing condition for measurements of CBG activity. The condition at 46<sup>o</sup>C and pH 6.5 was found optimum, which was applied in later measurements of CBG activity. The strategy began with the optimization of the fermentation condition for the maximum production of biomass and CBG activity in batch system. Four fermentation parameters were investigated *i.e.* pH, temperature, type of nitrogen source, and type of carbon source. The fermentation condition at pH 6 and 40 <sup>o</sup>C, using yeast extract and glucose as nitrogen and carbon source respectively, provided maximum biomass yield, high CBG activity, and low production cost. In addition, the glucose suppression effect on CBG activity was confirmed in the bacteria strain studied. Under this primary optimized condition in batch system, the growth kinetics study was performed based on Monod equation. The maximum specific growth rate,  $\mu_{max}$ , saturation constant,  $K_s$ , yield of biomass,  $Y_{x/s}$ , and doubling time,  $\tau_d$ , were 0.4672 h<sup>-1</sup>, 1.128 g glucose/l, 0.313 g dcm/g glucose, and 1.483 h respectively. Based on this profile, three direct factors including specific growth rate, starvation, and yeast extract concentration were investigated using the proposed operating tool of Chemostat. The study found that the CBG activity increased with the increase of specific growth rate, decrease of feeding glucose concentration (starvation), and increase of feeding yeast extract concentration. Using this strategy, an improved specific CBG activity of 11.24 UE/g dcm (7.5 folds increase in activity compared to control) was obtained at maximum specific growth rate of 0.264 h<sup>-1</sup>, low feeding glucose concentration of 20g/l, and high feeding yeast extract concentration of 60 g/l. The kinetics properties of maximum specific rate of enzymatic reaction,  $V_m$ , and Michaelis-Menten constant,  $K_m$  were 21.35 UE/g dcm and 0.501 mM of O-NPG respectively. As conclusion, the study has successfully strategized the bioprocess system for the production of *L. rhamnosus* NRRL 442 with high CBG activity.

**Keywords:** Fermentation, Probiotics, Glycosidase Activity, Growth Rate.

## OP-05:

# COMPARATIVE METABOLOMIC PROFILING OF YOGHURT FERMENTED BY DIFFERENT COMBINATIONS OF STARTER CULTURES AND PROBIOTICS

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### Abstract

The application of metabolomic-based technology has shown to be very effective for determining a wide range of metabolites related to microbial activity during fermentation and storage of fermented food products. This information is important, since the metabolites formed by microbial activity may directly contribute to the organoleptic quality of product. The objective of this study was to investigate the influence of incorporation of two probiotic strains, *Lactobacillus rhamnosus* GG and *Bifidobacterium animalis* subsp. *lactis* BB12, on metabolite formation in set-yoghurt. Changes in bacterial population and milk acidification were monitored during fermentation and refrigerated storage. Biochemical changes associated with microbial metabolism were characterized in terms of volatile and non-volatile metabolite profiles of yoghurt. A complementary metabolomics approach using headspace-SPME-GC/MS and  $^1\text{H-NMR}$  resulted in the identification of 35 volatile and 43 non-volatile metabolites, respectively. Although, incorporation of the two probiotic strains did not significantly influence acidity and concentrations of the key-aroma volatiles of yoghurt, high-throughput analyses revealed that their presence induced significant changes in the overall molecular profile of product. Finally, multivariate analysis enabled to distinguish yoghurts fermented by different types of starter combinations and durations of storage according to their metabolomic profiles. This finding provides new insights regarding the impact of probiotics on the metabolome of yoghurt.

**Keywords:** probiotic, *Lactobacillus rhamnosus* GG, *Bifidobacterium animalis* subsp. *lactis* BB12, metabolomics,

## OP-06:

### SOLID STATE FERMENTATION TECHNOLOGY FOR BIOFORTIFICATION OF LOW-GRADE CEREAL BASED FUNCTIONAL FOOD

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#### Abstract

World hunger is the most threatening issue of the modern world. About 400 million people are either deprived of food or suffering from malnutrition. Most of them are living in the region where the poverty prevails. More importantly, half of this suffering population are the children that are under the age of five. The only way to eradicate this hunger is to provide cheap and nutritionally enriched functional foods. These functional foods contain a significant level of biologically active compounds that impart health benefits beyond basic needs of low income people for sufficient calories, essential amino acids, minerals and vitamins such as A, B, C and D.

The utilization of staple food e.g., wheat, rice maize, millet, barley, sweet potatoes, beans and cassava can be biotechnologically processed to improve their nutritional profile and also increase energy density. In addition, soy bean can also contribute as an excellent source of soluble fiber, magnesium, phosphorus, vitamin K, riboflavin, thiamin, folic acid isoflavins and other flavonoid compounds. These constituents exert strong antioxidants capable of preventing non-transmissible chronic degenerative diseases such as cancer and tumors. The bio- fortification of these composite food material can also be beneficial as they inherently contain essential nutrients.

The application of High-throughput Solid-State Fermentation Technology can play a significant role for the improvement of nutritional profile. The seeding of food grade yeasts and living biomass of edible mushrooms can be best utilized in bioprocess development through this technology. The process of fermentation will result in the biodegradation of complex ingredients and biotransformation as well as metabolic modification of cereals constituents to satisfy the physiological need of people suffering from malnutrition. The attractive packaging of finished products can withstand the hygiene and biosafety standards as well as market competition.

**Keywords:** Fermentation, Biofortification, Functional food, Nutritional profile

**OP-07:**

**LACTIC ACID BACTERIA AS NATURAL PRESERVATIVES AND THEIR  
IMPACT ON FOOD SAFETY AND SECURITY**

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**Abstract**

Food security exists when all the people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. The growing demand for food security and food safety as key elements of health and well being of mankind has prompted the development in food preservation technology. Given the recognized importance of improved food safety and quality for food security, biopreservation refers to increasing the shelf life and safety of foods by using various naturally derived constituents such as essential oils, flavonoids, phenolic compound, natural microflora, their microbial metabolites and antimicrobial products. Preventing the decomposition of products by using natural antimicrobials, inhibition of microbial growth, oxidation and certain enzymatic reactions occurring in the foodstuffs are the mode of action of these bio-preservatives. Lactic acid bacteria can be seen as an interesting tool in the development of novel bio- preservatives for food industry. The antimicrobial agents derived from LAB are gaining attention not only as alternative therapeutics in the pharmaceutical industry but also as a bio-preservative in food industries. Application of Bio-preservatives and bacteriocins derived from LAB has been confirmed to be a natural, residue free and safe method in increasing the shelf life of food products, therefore it can be considered as a highly efficient method in providing food security, improving the nutritional status and income generation. Development, knowledge creation, industrialization, and curation of indigenous knowledge in particular in traditional fermentation methods of applying LAB is a matter of major focus of this presentation.

**Keywords:** Biopeservation, LAB, food safety, food security

**OP-08:**  
**SOURSOP FRUIT (*Annona muricata*) SITUATION AND PREDICTION  
PRODUCTS PROCESSING IN VIETNAM**

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**Abstract**

Soursop fruit (*Annona muricata*) is native to the tropical regions and widely propagated. This fruit has a flavor as a combination of strawberry and pineapple with sour citrus taste under the creamy texture. In Vietnam, this tree is grafted with custard apple (*Annona reticulata*) to be planting on the salted field and planted much in the South of Vietnam.

The soft pulp and fiber of the fruit are used for beverages, desserts, smoothies, and candy, as well as a wealth of traditional medical treatments that are used in many parts of the world. But most products are prepared with fresh fruit and consume immediately. Only some products can preserve long time like candy, dried fruit, pulp can.

To improve the Soursop fruit chain it is necessary to establish the processing method to raise the product varieties from soursop's fruit and leaves. All processing method needs to find the way to prolong the shelf life time.

This topic is to clear the soursop situation in Vietnam and explain the way to produce new products from this fruit like beverages, probiotics, cake, tea, candy,... that are suitable in the pilot scale with applicable equipment for farmer.

**Key words:** Soursop fruit (*Annona muricata*), situation, food products, processing.

## OP-09

# THE EFFECT OF POLY LACTIC ACID FILMS CONTAINING DIFFERENT CONCENTRATIONS OF *Cuminum cyminum* ESSENTIAL OIL AND ETHANOLIC EXTRACT OF PROPOLIS ON SOME FOODBORNE PATHOGENS

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### Abstract

Antimicrobial packaging is a new technology that is based on the presence of active compounds in the polymer background. Release of these compounds in food products or packaging environments has shown to improve the quality and safety of food. So, in this study the effect of poly lactic acid films containing different concentrations of *Cuminum cyminum* essential oil (0, 0.3, 0.6, 0.8, and 1%) and ethanolic extract of propolis (0 and 2%) on growth inhibition of *Staph. aureus* (ATCC: 36454) and *V. parahaemolyticus* (ATCC: 43996) by disc diffusion method was investigated. Statistical analysis was done by One-way ANOVA and Tukey test. The results of the study indicated that the inhibition of the PLA alone on two bacteria. Only the use of 2% propolis plus PLA on *Staph. aureus* had an inhibitory effect ( $23.0 \pm 2.0$ ). However, the inhibitory effect increased with the use of high concentrations of *Cuminum cyminum* essential oil (0.8%) and PLA on *Staph. aureus* with consideration of organoleptic properties. while in *V. parahaemolyticus* bacteria, the inhibition effects of poly lactic acid with only 1% *cuminum cyminum* essential oil content was observed ( $p \leq 0.05$ ).

**Keywords:** Antimicrobial packaging; Poly lactic acid films

**INTERNATIONAL SYMPOSIUM ON  
FOOD SECURITY AND SUSTAINABLE  
DEVELOPMENT 2017 (ISFS2017)**

**OS-01:**  
**FOOD SECURITY ON THE AFRICAN CONTINENT:**  
**THE WHOLE WORLD'S PROBLEM**

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**Abstract**

Africa currently represents ~17 percent of the world's population, but by the year 2050, it will be home to ~26 percent of the people who inhabit the planet. That fact by itself should give pause to those who are concerned about the sustainability of the world food supply, but when one also considers that Africa represents much of the undeveloped world, where malnourishment, stunting of growth, and food borne diseases are a constant threat to its inhabitants, the problem looms even larger. Much of the population of Africa is now consuming less than maintenance levels of energy, protein and other essential nutrients, and the consequence is seen in high infant mortality, poor maternal health, and a lifetime of acute and chronic diseases. The human and economic costs are immense. Currently, only four of the top twenty most populated countries in the world are African, but by the year 2100, ten of the top twenty most populated countries will be African, according to the United Nations. This prediction seems counter intuitive, given the degree of poverty that exists throughout Africa, but high population growth is an inevitable consequence of conditions such as those that exist in Africa. Families produce more and more children in response to the high infant mortality and in an attempt to produce more "hands" to help the family produce income through the manual and/or agrarian labour that supports their existence. Cultural and religious edicts contribute to the high birth rates as well. As well, most of the African continent is not blessed with the best of agronomical advantages. There are considerable hectares of desert and jungle spread across the vast landscape, and this land is unsuitable for growing basic crops or raising food animals needed to sustain the population. Climate change, with its increased average temperatures, has resulted in longer and more severe droughts, making agricultural production even more problematic. There can be little argument that the rest of the world has long profited from what Africa has to offer – whether it be its people (slavery) or its resources (minerals, rubber, oil, etc.). It is difficult to argue that these "benefits" have been returned in kind. Thus, addressing the challenges that Africa faces in providing the sustenance of life over the remainder of the 21<sup>st</sup> century is in part a moral imperative of a world that has found it fit to extract wealth from this continent. Had more of this wealth been retained by the African people themselves, perhaps the problems would be more manageable at the local level. But, they are, for the most part, not. The need, then, is for solutions and assistance from developed countries, that have the knowledge and resources to address this pressing issue of food security in the most vulnerable of people.

**Keywords:** Food security, African continent, population, malnourishment



**OS-02:**  
**ADVANCED HYDROGEL FOOD PACKAGING**

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**Abstract**

Food packaging materials should fulfil at least three functional properties such as mechanical protection of food product during transport and storage, air and moisture barrier and protection against contamination by microorganisms. The concept of hydrogel food packaging is relatively new like green or sustainable packaging, it has not yet come to the forefront for its use in practice. The hydrogel can offer new opportunities for the design and desirable properties like durability, biodegradability, mechanical properties when prepared with carboxymethylcellulose and polyvinylpyrrolidone (PVP-CMC) as base polymers. PVP-CMC packaging has excellent results keeping the fruits and vegetables long time fresh and protected from spoilage. Further, the PVC-CMC films are easy processable, transparent, flexible, hydrosopic and breathable having a transient junction with it. Antibacterial properties of the hydrogel could be improved by suitable additives like Nisin which is produced as a by-product of whey in a milk industry.

**Keywords:** Food packaging materials, Antibacterial properties

### OS-03:

## FOOD SAFETY CHALLENGES IN THE SUPPLY CHAIN AND SUSTAINABLE SOLUTIONS

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### **Abstract**

Food Safety is a multi-disciplinary, multi-dimensional and multi-sectoral issue. Ensuring safe and healthy food is an important precondition of food security and is essential for good health in all countries, whether developed or developing. In contrast, food safety negatively affects people's life and imposes high economic and social costs. In addition, current modes of food production are seen as a major driver of environmental problems such as deforestation, desertification, eutrophication and fisheries collapse. All of this is the backdrop of a booming world population, rapid urbanization, diminishing natural resources, and critically stressed ecosystems. Food companies are increasingly becoming aware of these challenges and are looking for sustainable and accountable ways to adapt their business models. One approach is to incorporate sustainability into business strategy and planning. Sustainability is a conceptual framework, it integrates ecology, economics, politics, and culture. Given the connection to the entire food production process from farm to fork, food safety professionals are poised to lead in sustainability. Many of the systems already developed to detect, prevent, and trace contamination can be retooled and applied toward sustainability. Elements of preventive food safety programs could be adapted to cover environmental and social benchmarks. Partnering to solve any challenges sustainably from the way we operate, to the products we develop, to how we serve consumers, our safety goal should be zero: zero accidents, zero incidents and zero environmental releases. Thus, balancing food safety and sustainability goals has become a vital element of produce industry management throughout the supply chain. Co-management is science-based, adaptive and collaborative way offers solutions by minimizing the risk of fecal contamination and the resulting microbiological hazards associated with food production while simultaneously conserving soil, water, air, wildlife and other natural resources. It is a decision-making.

**Keywords:** Food safety, supply chain, sustainable solution, challenge

**OS-04:**

**FEEDING THE WORLD THROUGH PRODUCTION AND SUPPLY OF  
SUSTAINABLE FOOD PRODUCTS**

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**Abstract**

Food insecurity is a global crisis and exists at various levels throughout the world today. Human beings do not need to wait until 2030 or 2050, as millions of us are living with food shortage every day. Estimates suggest that about 795 million people face hunger on a daily basis. Malnutrition is present in most societies; however, it is prevalent in severe form in some specific parts of the world. Many developing nations in Africa and Asia face a malnutrition threat. More than 2 billion human beings lack vital micronutrients (iron, zinc, vitamin A) in their diets. Efforts to meet global food security targets seem to fail. One of the important parts in ensuring global food security is to develop food systems that produce and supply sustainable food products. It is important to understand the concept of sustainable food products, which does not mean the same thing as organic foods or healthy foods. Sustainable food products have many measurable attributes, such as low emissions, water efficiency, energy efficiency, humane and ethical production practices, eco-friendly packaging, transparency and traceability. Sustainability of food products is observable and measurable through economic profit, social benefits for the community and environmental conservation. This presentation will highlight the value of feeding the world through the production and supply of sustainable food products.

**Keywords:** Food insecurity, Feeding the world, Developing nations

## OS-05

# AGRIFOOD DEVELOPMENT STRATEGY AND INITIATIVES OF MEKONG INSTITUTE

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### **Abstract**

The Greater Mekong Subregion (GMS) is a dynamic and rapidly changing region that experienced dramatic economic rise and poverty fall in the past two decades. However, wide disparities persist, with China and Thailand having more developed economies while Cambodia, Lao PDR, Myanmar and Viet Nam (CLMV) having lower levels of development which is a big challenge to regional (ASEAN Economic Community) and subregional (GMS Program) integration. The agrifood sector is a priority integration factor in both AEC and GMS Programs. The agrifood sector needs innovative solutions to enhance the capacity of small producers and SMEs to improve product quality, postharvest systems and market competitiveness; effectively engage in collective actions particularly contract farming; and participate in regional and global value chains. Mekong Institute (MI), an intergovernmental organization established in 1996 by the six GMS governments, launched its Strategic Plan 2016-2020, with agrifood development objective of contributing to achieving the GMS vision as a leading producer of safe food, using climate-friendly agricultural practices and integrated into global markets through regional economic corridors. Led by MI's Agricultural Development and Commercialization Department, knowledge-based agrifood systems are enhanced to develop capacity and facilitate linkages that enable farmers and SMEs to take advantage of modern commercial farming and integrate into regional and global value chains. Support activities are conducted, including regional policy development, research and field studies, and development projects. Since 2016, several regional and country initiatives have been implemented focusing on food safety, contract farming and crossborder value chains with support from various donors. Details of these initiatives will be presented.

**Keywords:** Agricultural Development and Commercialization, Food Security, Poverty Alleviation, Regional Integration, Greater Mekong Subregion, ASEAN

**OS-06:**  
**FOOD SECURITY SITUATION AND FOOD DEMAND IN VIETNAM BY  
2030**

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**Abstract**

Nowadays, the agricultural produce market is highly competitive because consumers pay more attention to health, hence the food quality is essential, particularly in the EU, US... market. Though there are many advantages including geography, favorable climate and large agriculture areas that are suitable for cultivation, the Vietnamese agriculture is still facing various challenges and difficulties. Possible barriers for the competition of agricultural commodity currently might be a poor and inconsistent quality, insufficient food safety, high prices or the lack of availability and trading. In this context, there are interesting questions about the existing consumer needs, expectations towards agricultural produce and which quality attributes are important and therefore have an influence on consumers' food choice.

Total supply of rice in Vietnam is stable since the 1990s, however, Vietnam's population is expected to reach 130 million by 2030. The nation's rice consumption is estimated to reach 38-41 million tons per year and 60.000 hectares of rice land are converted to non-agricultural purposes. In addition, rice land also decreases due to the results of climate change, such as the sea level rise will cause flooding and reduce the quality of most of the cultivated area of the Red River Delta and Mekong Delta. Here, we analyzed the current food supply situation and impacts of climate change to food demand for Vietnam's population in future.

**Keywords:** Food security, food demand, Vietnam, Climate change

## OS-07:

### DEVELOPMENT OF FOOD TRENDS AND FOOD SAFETY IN TURKEY

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#### **Abstract**

Turkey is the 7th largest producer of agricultural products in the world, and largest one in Europe with USD 62 billion revenues. The country is the top producer many of agricultural products in the world such as apricots, hazelnuts, figs, quinces, sweet and sour cherries. Due to climate change and agricultural production activities, food manufacturing industry and food retail have grown at varying rates; 18.9% of Turkey's Gross Domestic Product (GDP) is contributed by the food and beverage industry. Food and beverage export of Turkey were grown at 15% per year, and imports were grown at 14% per year on the average between 2003 and 2012. In 2014, Turkey's revenue because of food and beverage export was \$11.1 billion, and her import spending was \$5.6 billion. Turkey continues to provide large trading volumes in the world food sector. After the privatization period in Turkish food sector in the 2000's, private property-based businesses have become dominant. Factors based on internal and external trends have influenced food industry in Turkey. The country has a young and fast increasing population, rising income levels, improving standard of life, and healthier food choices trends. In addition, growing tourism, emerging modern production facilities in food manufacturing, increasing number of female workers in this sector and increasing consumer demand for packaged fresh agricultural products have created new trends of production and marketing. During this process, the majority of the firms in the food sector emphasized growth. On the other hand, a large number of consumers have shown a great interest in food safety in Turkey. Nowadays most of the consumers and producers are paying a lot more attention to food quality and safety rules. However, Turkey is located on a vast geography area and there are many production facilities having different food safety levels. While some of the plants on food industry operate based on healthy production, that even exceed those of the EU, there are many other facilities that, unfortunately, exercise a production type called "under the counter" production. Thus, it is quite possible to find a product with different food safety levels at the same time in the market.

In this study, the development of food industry in Turkey will be evaluated based on economic and social -indicators. The research aims to reveal the development and make suggestions to improve the food sector for both producers and consumers in Turkey.

**Keywords:** Food, Industry, safety, Turkey.

## OS-08:

# GUT MICROBIOTA: NUTRIENT METABOLISM, MICROBIAL RESISTANCE TO ANTIBIOTICS AND FOOD SAFETY AND SECURITY

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### Abstract

Vertebrate gut microbiome often underpins the metabolic capability and provides many beneficial effects on their hosts. The diverse microbial community that inhabits the gut complements the activity of enzymes in the liver and gut mucosa and includes functions essential for host digestion. As such, the gut microbiota is a key factor in shaping the biochemical profile of the diet and therefore, its impact on host health and disease. The important role that the gut microbiota play in metabolism and health has stimulated research into the identification of specific microorganisms involved in different processes. Principal Component Analysis (PCoA) tests have shown that gut bacterial communities of carnivorous and herbivorous formed distinctly different clusters in PCoA space. Our studies have shown that host trophic level influences the structure and composition of gut microbiota, metabolic capacity and gut content enzyme activity. Microbial resistance to antibiotics is now widespread in both humans and animals. In USA alone, it is estimated that over 2 million people become infected with bacteria that are resistant to AB and the spread of these have been not only from humans and animals directly but also from the food. *Salmonella* and *Campylobacter*, two of the many bacteria commonly transmitted through food, cause an estimated 410,000 AB-resistant infections in the USA each year. Of these, at least 23,000 people of them die as a direct result of these infections. Therefore, to prevent spread of AB-resistant pathogens requires new thinking including an understanding of ‘gut microbiome’ (10<sup>10</sup> – 10<sup>12</sup> bacterial cells per gram of gut contents, with more than 1000 species) which plays an important role in human and animal health by modulating the immune system, improving nutrient utilization, and excluding pathogens.

**Keywords:** Vertebrate gut microbiome, Gut microbiota, Immune system

## OS-09:

### DEVELOPMENT OF METHODS FOR TRACING PALINKA-S

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#### Abstract

Fruit spirits are widely consumed in European countries, such as France, Spain, Italy, Germany and Austria, as well as in the USA, Canada and China, but “Palinka” are double-distilled fruit brandies produced in all of Hungary and four regions of Austria. Moreover, some types of Palinkas (szabolcsi almapálinka, szatmári szilvapálinka, békési szilvapálinka, kecskeméti barackpálinka, gönci barackpálinka, újfahérvői meggy-pálinka, göcseji körte-pálinka és pannonhalmi törköly-pálinka) are registered by Protected Geographical Indication. Until now, in Hungary, no systems are available to qualify individual Palinkas from geographical protected regions, thus development and application of relevant systems must have high impacts on both national economic and authentic points of view. In 2009, a consortium with one academic institution and three industrial partners was formed to carry out comprehensive research on the scientific and technical background to trace the source of the palinka, thus herein the brief results of this project are summarized.

**Keywords:** Fruit spirits, Palinkas, Protected Geographical Indication



**OS-10:**  
**RECOGNISING AND SUSTAINABLE USING POISONOUS, EDIBLE AND  
PHARMACOLOGICAL MARCO FUNGI OF VIETNAM**

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**Abstract**

Vietnam is considered as one of countries in the world with high level of biodiversity. Until 2014, about 3000 fungal species were reported, including 1830 species of macro fungi (Kiet. 2011 - 2014). The macro fungi of Vietnam have high resource value with edible species, pharmaceutical species. However, we can also find many dangerous toxic mushrooms. In this case, we would like to give some information about recognising and sustainable using Poisonous, Edible and Pharmacological Marco Fungi of Vietnam.

**Keywords:** Biodiversity, fungal species, edible species

## OS-11

### EFFECT OF OZONE TREATMENT ON CUCUMBER AND TOMATO QUALITY DURING SIMULATED RETAIL STORAGE

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#### Abstract

This study was aimed to investigate the effect of ozone treatment on postharvest life of cucumber and tomato at 20°C and 14°C, 95% relative humidity. Cucumber and tomato samples were stored with gaseous ozone approximately 0.1ppm. Ozone treatment could postpone the senescence of cucumber and tomato by reducing ethylene concentration in the storage chambers. Samples stored with ozone retained firmness. In addition, ozone treatment decreased decay incidence of vegetables during storage. Moreover, the use of ozone maintained green surface of cucumber compared to the control after 16 days of storage. No chilling injury was observed throughout storage at 14°C. By the combination of cold temperature and ozone treatment better results were achieved than by other treatments during the 16 days of shelf-life. Results presented a potential of using ozone in storage room where ethylene-producing and ethylene-sensitive vegetables were stored together.

**Keywords:** cucumber, ethylene, absorber, tomato, ozone

## OS-12

# EFFECT OF HARVEST TIME, DELAY IN DE-STEMMING AND DESAPPING TREATMENT ON THE LATEX VOLUME AND QUALITY OF 'CARABAO' MANGO FRUIT

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### Abstract

The latex or sap injury in mango reduces fruit quality as it causes skin blemish during harvesting and postharvest handling. Latex volume and quality of 'Carabao' mango as affected by different harvest times during the day, delay in cutting (hourly up to 6h) of the pedicel at either the pedicel base or at the abscission zone and different desapping agents were assessed. Latex volume ranged from 0.06 to 0.27 mL fruit<sup>-1</sup>. The lowest latex volume was recorded in fruit harvested in the afternoon between 1300 and 1700 while the highest volume was noted at 0700 and 1000. Relative humidity of the air was highest at 0700 AM. Better quality at table ripe stage was noted in mango fruit harvested at 1300-1400 and 1600-1700. Latex injury at different harvest times did not vary. Although latex volume was similarly reduced as the time to destemming was delayed, the overall latex production was not affected by the delayed cutting of the pedicel and location of cut. After harvest, cutting at the base tended to give a slightly higher latex volume relative to cutting at the abscission zone of the pedicel. All desapping treatments, 1% alum, 1.0% detergent, 0.5 % lime and water, were able to control sap injury. Water then is sufficient to reduce latex damage. Hence harvesting later in the day, delaying de-stemming and washing mangoes with water can reduce latex damage in 'Carabao' mango.

**Keywords:** desapping agent, latex injury, visual quality.

## OS-13

### EFFECT OF CaCl<sub>2</sub> ON THE YIELD AND ANTIOXIDANTS OF CHINESE KALE MICROGREENS

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#### Abstract

This study evaluated the effect of calcium chloride (CaCl<sub>2</sub>) on antioxidants in Chinese kale microgreens. Seeds were sown in a plastic tray containing coconut coir and sprayed with distilled water or 5, 10 and 15 mM CaCl<sub>2</sub> solution. The samples were placed in a growth chambers at 25°C. Microgreen were harvested after four and seven days for determination of yield, vitamin C, total phenolic compounds, 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity and total glucosinolates. There was an increase in yield and total phenolic contents on the seventh day when decreases in vitamin C and DPPH radical scavenging activity were observed. CaCl<sub>2</sub> treatment improved the yield of the microgreens at fourth day but not at seventh day. The four-day old microgreens had higher vitamin C content than those harvested after seven days, particularly those sprayed with 5 and 10 mM CaCl<sub>2</sub>. On the seventh day, the total phenolic content of those treated with 5 mM CaCl<sub>2</sub> was the same as the control. On the other hand, the different concentrations of CaCl<sub>2</sub> did not affect the DPPH radical scavenging activity and total glucosinolates. Therefore, using 5 mM CaCl<sub>2</sub> promoted yield and vitamin C contents at the fourth day and total phenolic compounds at the seventh day in Chinese kale microgreens.

**Key words:** Chinese kale, calcium chloride (CaCl<sub>2</sub>), total phenolic compounds, DPPH radical scavenging activity, vitamin C

**OS-14:**  
**INDICATORS AND DESCRIPTORS OF LIFE SCIENCES SUSTAINABLE  
HIGHER EDUCATION IN BULGARIA - CASE STUDY IN UNIVERSITY OF  
FORESTRY**

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**Abstract**

The present paper discusses the problems of implementation of the concept of Sustainable Development (SD) in Life Sciences Higher Education in a comprehensive way. The different aspects concerning the implementation of SD in higher education and developing both research activities and specific tools and devices that can be utilised by the wider sector to facilitate ESD are analysed. There are present some activities of the project "Innovation in the teaching of Sustainable Development in Life Sciences in Europe" that have to bring together stakeholders from Europe that have already introduced the concept of SD in their curricula and wish to transfer the knowledge to the other partners of the network, or wish to introduce the concept of SD in the curricula of their institutions; to build new knowledge and to develop the necessary tools for knowledge transfer and providing the instruments to facilitate and support such kind of education. Due to an analysis, carried out from the researchers and the selection of criteria has been done in accordance with the presence of innovation were selected from existing Innovation Practices in many European Higher Education Institutions. Some Innovation Practices are discussed and presented in form of indicators and descriptors. The objective of this article is to present and explain these indicators and descriptors and their implement in Higher Education Institutions (HESD) Europe and partially in Life Sciences Education in University of Forestry. Some HESD indicators are discussed in the paper such as: New technologies, Holistic approach, Collaboration, Critical thinking, Project base learning, Creativity, Network building capacity, Internationalization, Interdisciplinarity, Motivation aspects, Transferability, Innovation activities (present) Indicators. Some HESD Descriptors are shown in the article such as: Content, Tools, Method and Outcome.

**Keywords:** higher education, innovation, sustainable development education, indicators, descriptors

## OS-15:

# SUSTAINABLE CONTROL OF RED SPIDER MITE (*Tetranychus urticae*) INFESTING EGGPLANT (*Solanum melongena*) USING BIO- PESTICIDES AND SAFE VEGETABLE PRODUCTION

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### Abstract

Eggplant or brinjal (*Solanum melongena* L.) crop is susceptible to various insect and mite pests of which red spider mite, *Tetranychus urticae* (Tetranychidae: Acarina) is the most predominant. *Tetranychus urticae* was most active during May i.e., 22-24 Standard Meteorological Week (SMW) and September to October i.e., 40-43 SMW. The highest mite population (22.87/leaf) was recorded on 42<sup>nd</sup> SMW (first week of October). Sudden fall of population was found in last week of June because of heavy rains. The mite population always recorded higher on the upper canopy (52.75% population) of the plant as compared with the middle (30.64% population) and lower canopy (16.61% population). This result implies that mites were most densely populated in the young and new leaves of eggplant. The mite population had significantly positive correlation with temperature, minimum and average relative humidity where as non-significant positive correlation with maximum relative humidity and weekly total rainfall. Among the seven treatments evaluated microbial toxin- avermectin resulted in the best suppression of mite population (87.10 % suppression), closely followed by chemical insecticide, fenazaquin and mixed formulation of botanical pesticide, azadirachtin with botanical extract, *Spilanthes* (79.24% and 70.66% suppression). Spectrophotometric scanning of crude methanolic extract of *Spilanthes* flower showed strong absorbance wavelength between 645-675 nm. Considering the level of peaks of wavelength the flower extract contain some important chemicals of which polysulphide compounds are important and responsible of pest control. azadirachtin and botanical extract individually did not produce good results (moderate mite suppression) but when azadirachtin is used as a mixture with botanical extracts provided better results recording more than 65% suppression. Microbial toxin, plant extracts and botanical insecticide are biopesticides having less or no hazardous effects on human health and the environment, and therefore, they can be incorporated in IPM programmes and organic farming.

**Keywords:** Bio-pesticides, organic farming, seasonal fluctuation, vegetable IPM.

**OS-16:**  
**IN VITRO TECHNOLOGY FOR MEDICINAL PLANTS, THEIR PRODUCTS  
AND BEYOND**

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**Abstract**

Nepal is one of the Asian countries, which produce the medicinal plants in commercial quantities. Trade of medicinal plants is an important source of revenue to the Government of Nepal and to the economy of the country as a whole. Medicinal plants are used as a main source of natural products such as flavor, insecticides, pharmaceuticals and have also cultural, religious and aesthetic significance. Most of rural people use the medicinal plants for their primary health care. According to IUCN, many medicinal plants are under threat as a result of rapid agricultural and urban development, deforestation, over-collection and destructive harvesting practices. So, it is high time to develop the technologies for their conservation and utilization. Research has been carried out on *in vitro* culture technique and *ex situ* conservation for important native species. Protocols have been developed for different aspects of tissue culture such as micropropagation, callus culture, somatic embryogenesis, artificial seed technologies hairy root production, phytochemical production in *in vitro* grown plants. Successful *in vitro* propagation has been achieved in more than 70 species of medicinal plants such as *Rawolfia serpentina*, *Valeriana jatamansii*, *Neopicrorhiza scrophularifolia*, *Asparagus recemosus*, *Withania somnifera* and different species of medicinal orchids such as *Dendrobium*, *Cymbidium*, *Vanda* etc, which are high priority plants for conservation and commercial cultivation. Mass scale production of *in vitro* plants and their domestication and cultivation will be helpful for their promotion, conservation and sustainable utilization. It would be one of the most suitable alternative tools to maximize the commercial production and minimize the pressure on natural plant population.

**Keywords:** Medicinal plants, *in vitro* culture, orchids, conservation, commercialization.

## OS-17:

# SOILLESS AGRICULTURE AS CLIMATE-SMART FARMING TECHNIQUE FOR VEGETABLE CROPS PRODUCTION

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### **Abstract**

Despite advances of agriculture in farm mechanization, modern irrigation systems, protected structures and plant genetics, food production is still at the mercy of nature and subject to various destructive elements of the changing climate. The Philippines is one of the most vulnerable countries in the world that suffers from consequences of extreme weather events and combined effects of man-made and natural calamities which significantly complicated crop production, food distribution, and sustainability. Aware of these issues, a team of researchers from Central Luzon State University in the Philippines embarked in one of the pro-active solutions by establishing a demonstration farm and experimental station to promote climate-smart agriculture. With a budget of P12.2 million from the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development of the Department of Science and Technology, the facility aims to advance hydroponics and aquaponics as adaptation techniques against the impact of climate change. Different production models were fabricated in tropical greenhouses and have proven that indeed these technologies are able to produce more, cleaner, fresher and safer vegetables and can be adopted in unproductive space and even with limited resources such as energy and water. Package of technologies for selected crops such as tomato, cucumber, melon, pepper, leafy green and herbs were crafted and shared through training workshops to capacitate interested stakeholders in various parts of the country. The station also serves as a venue for research and education and has become a favourite agri-tourism destination in the region. Promotion is sustained through social media and production of educational materials and videos. With persistent efforts and relentless passion, researchers at the station believed that, as optimistically predicted by the Food and Agriculture Organization, there will be abundant food supply in the future only if high-technology farming methods combined with computerized equipment are utilized.

**Keywords:** Soilless agriculture, hydroponics, aquaponics, climate change, climate-smart agriculture, adaptation techniques.



**OS-18:**  
**INCORPORATION OF FIBER FROM AGRICULTURAL BY-PRODUCT  
INTO BREAD AND ITS PROPERTIES**

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**Abstract**

Bread is one of the popular staple foods that is available in all part of the world. At the same time, increasing number of people are being diagnosed with diseases related to food make people to become more educated and health conscious. In consequence, the development of foods with high fiber content should be desirable. From previous study, cereal and wheat are used as a source of dietary fiber in bread. This study was conducted to assess the potential use of agricultural by-product such as coconut and pineapple waste in producing bread enriched with fiber. Bread samples were prepared with addition of 3% and 5% of each type of fibers (coconut and pineapple). Analyses were done in order to study the effect of fiber addition to physical properties, moisture content, shelf life and sensory properties. The results showed that the use of coconut waste material was suitable for making bread enriched with fiber. Addition of 5% coconut fiber to enrich bread has lower firming rate, high moisture content, good surface coloration and texture, longer shelf life and have higher sensory acceptability. On the other hand, addition of 3% and 5% pineapple fiber has higher firming rate, low moisture content, uneven surface coloration, big porosity in the texture and a shorter shelf life. This study suggests that 5% coconut fiber enriched bread could be a suitable commercial product.

**Keywords:** bread, by-product, coconut fiber, pineapple

## OS-19:

# MECHANICAL AND RELEASE PROPERTIES OF POLYLACTIC ACID BASED PACKAGING INCORPORATED WITH GRAPHENE AND CELLULOSE NANOFIBER

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### Abstract

It was reported that millions of illness caused by contaminated foods that can be introduced at different stages of food chain including food production, processing, distribution and to end users. Nanomaterial such as graphene oxide (GO) and cellulose Nanofiber (CNF) can be applied using various incorporation mode including direct addition to polymer matrix in order to control the release or reaction of active compound. Both nanofiller, when applied into matrix for an example PLA, can be manipulated as potential vehicle or regulator for various active compound release for specific functions. It comprises pathogen killing characteristic to prolong food shelf life and regulation of volatile compound release for pest repellent. The unique structure of nano graphene sheet was obtained via simple synthetic route ;modified Hummer's Method. Cellulose nanofiber from Oil Palm Empty Fruit Bunch (OPEFB) fiber was prepared using acid hydrolysis method. In preparation of active Polylactide based nanocomposite film, fixed ratio of 0.5 wt% cellulose nanofiber (CNF) and 10wt% of thymol whereas graphene oxide (G.O) was varied from 0-1.5 wt% were added. The mechanical properties that includes tensile, percent elongation and Young's Modulus, were investigated. The release of thymol from PLA based packaging were analyzed for 10 days. Results shown that the maximum Tensile, elongation percentage and Young's modulus were 25.07 MPa, 83.82%, and 1.97 GPa with the addition of 1.0%, 0.25% and 0.75% respectively. For release properties, the GO were shown to be able to control the release of thymol. It was found that the thymol was release slowly and steadily until it reached saturation point. The finding proposed that the incorporation of graphene into PLA packaging film can improve the mechanical properties as well as regulating the release of active compound that finally can manipulated to serve specific functions.

**Keywords:** Graphene oxide, Cellulose Nano fiber, polylactic acid, package

## OS-20:

# FUTURE TRENDS AND CHALLENGES OF FOOD PRODUCTION AND SUPPLY CHAIN SUSTAINABILITY

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### **Abstract**

Several key conclusions can be drawn from the analysis of the global trends that are influencing food security, poverty and hunger, and the sustainability of agriculture and food systems. First, overall demand for food will continue to increase, and will do so in the context of increasing scarcity of natural resources and important changes in the structural composition of the demand for food and agricultural products. Climate change and increased competition for natural resources will continue to contribute to natural resource degradation and insufficiency, with negative impacts on people's livelihoods and food security. Problems of extreme poverty, hunger, food insecurity and undernourishment will persist, along with increases in overweight, obesity and diet-related chronic diseases. Natural disasters are increasing in number and intensity and, along with climate change-related extreme weather events, are expected to deepen the global need for humanitarian assistance and resilience building for farmers and rural households. Alongside, transboundary plant pests and diseases and other emerging threats continue to provoke crises in agricultural and food systems and impact productivity and human health. Dynamic rural transformation is happening in most low-income countries and is expected to continue to have impacts on agricultural production systems, employment, nutrition and migration. This will present society with the challenge to include everyone in the development process. Rapid changes and transitions in food systems increasingly call for effective national and international governance systems. More investment in agriculture and agri-food systems, including increased spending on research and development, is needed to enhance agricultural productivity and promote innovation for sustainable agriculture, rural prosperity and food security. Based on the inferences of the analysis of global and regional trends, there is a set of challenges that are the most pertinent to our mission to eradicate hunger and malnutrition, achieve food security for all, improve rural livelihoods, and make agriculture activities and their natural resource base more resilient, productive and sustainable.

**Keywords:** Food trend, food production, challenge, supply chain

## OS-21: FOOD HYGIENE CONTROL OF FRESH CUT OR LIGHTLY FERMENTED VEGETABLE

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### **Abstract**

Food hygiene is one of the most important and challenging issues all over the world. “Food chain approach” and “Risk analysis based food safety policy” is now commonly accepted concept to improve food hygiene condition in the most of countries. It addresses Good Agricultural Practices (GAP) on farm and Good Manufacturing Practices (GMP) in food factories that will help control microbial, chemical and physical hazards associated with all stages of the production of foods from primary production to packing of the final products. It is quite important to adopt the “process control” strategy instead of “endpoint checking” strategy to ensure the safeness of “all” of the products upper than the expected limit. The HACCP system, one of the typical one based on the process control strategy, must be used with the suitable general hygiene practices (GHP). Some important findings (including the topics of irrigation water and the efficacy of surface washing of vegetable) those can be evidences for preparing GAP program or HACCP plan for fresh cut or lightly fermented vegetables will be presented.

**Keywords:** Food hygiene, GAP, GMP, process control.

**OS-22:**  
**ENHANCING MICROBIOLOGICAL SAFETY AND QUALITY DURING  
STORAGE OF 'SUPER HOT' CHILI (*Capsicum annuum* L.) USING  
WASHING SOLUTIONS**

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**Abstract**

Chili is susceptible to a high level of microbial contamination due to poor control of handling processes and lack of sanitization treatments. This study evaluated the effect of various washing solutions in reducing the microbial loads in fresh chili and its quality after storage. Chili fruit were washed with distilled water, 1.0% NaCl, 0.1% CH<sub>3</sub>COOH, 0.02% NaOCl, 0.1% NaHCO<sub>3</sub> or 0.001% KMnO<sub>4</sub> for 20 min, air-dried and stored under ambient conditions (31±1°C, 65±11%RH) for four days. After storage, the number of bacteria and fungi as well as the quality were evaluated. Results showed that the washing solutions, especially 0.001% KMnO<sub>4</sub>, reduced bacterial and fungal population in chili by 70 to 93%. Furthermore, 0.001% KMnO<sub>4</sub> and 0.02% NaOCl maintained the aerobic plate count in chili below the maximum limit of 5x10<sup>6</sup> CFU mL<sup>-1</sup>. Washing with KMnO<sub>4</sub> at a very low and diluted concentration also resulted in lower weight loss, better visual quality, less shriveling and yellowing on the surface, and reduced browning in the pedicel. On the other hand, firmness and decay incidence were not affected by the washing agents. Based on this study, washing with 0.001% KMnO<sub>4</sub> for 20 min maintained better quality longer and is a good sanitation treatment in reducing microbial growth even up to four days after washing.

**Key words:** chili, microbial contamination, sanitation treatments, KMnO<sub>4</sub>, storage quality.

## OS-23

# INFLUENCE OF INSEMINATION DEPTH, SPERM CONCENTRATION AND LENGTH OF SEMEN STORAGE ON REPRODUCTIVE PERFORMANCE OF SOWS (*Sus domesticus*, L.)

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### Abstract

This study evaluated the reproductive performance of 36 (large white x landrace) F1 sows' using the following parameters; recycle percentage, conception rate, premature birth, farrowing rate, litter size born, still births and birth weight as affected by insemination depth (intra-uterine vs intra-fallopian tube), sperm concentration (approximately- 0.5 billion, 1.0 billion and 1.5 billion per dose) and length of semen storage (24 h vs 48 h) using a modified boar semen extender. A three-factorial experiment in a Completely Randomized Design was conducted from August 2016 to January 2017. Significantly higher conception and farrowing rates were achieved using intra-fallopian tube insemination as compared to intra-uterine insemination when semen was stored for more than 24 h. It was found that sperm concentration can be reduced to 0.5 billion per 100 ml semen extender as long as the semen is deposited farther into the sows' fallopian tubes. Boar semen with modified formulation of extender and stored under 17<sup>0</sup>C at 48 h was revealed to be still viable for both intra-uterine and intra-fallopian tube insemination. The study showed that depth of insemination significantly affected abortion rate and farrowing rate ( $P<0.01$ ) whereas depth and sperm concentration significantly improved the farrowing rate and litter size, respectively ( $P<0.05$ ).

**Key words:** insemination depth, intra-fallopian tube, intra-uterine, length of semen storage, semen extender, sperm concentration

## OS-24

# THE ROLE OF FOOD ADDITIVES IN QUALITY OF FRIED FISH CAKE PROCESSED FROM SNAKEHEAD FISH (*Channa striata*) SURIMI

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### Abstract

This research work was conducted to determine the role of some food additives in quality of fried fish cake processed from cultured snakehead fish (*Channa striata*) surimi. The study investigated the effect of modified starch supplementation on the quality of fried fish cake made from snakehead fish surimi, by evaluating the interaction between salt and water addition to product quality. At the same time, the study also investigated the effect of supplemental chitosan on the gel and microbiological properties of this product. Results showed that the addition of 3% modified starch in the cutting process helped to improve the quality of fried fish cake from snakehead fish surimi. The study confirmed that there is a correlation between the water and salt addition to fried fish cake quality, the optimum ratio of water and salt was 6.17% and 1.32%, respectively. In addition, research has shown that chitosan plays a very important role in fried fish cake, which improves gel properties while inhibiting the growth of microorganisms on the product. According to the study, the addition of chitosan at a ratio of 75 mg/100 g of surimi in the cutting process resulted in improved gel properties and limited microbial growth.

**Keywords:** Surimi, modified starch, NaCl, chitosan, snakehead fish cake.

**OS-25:**  
**GREENHOUSE GAS EMISSIONS FROM AGRICULTURAL  
PRODUCTION IN VIETNAM**

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**Abstract**

Vietnam is an agricultural country thanks to the convenient natural conditions such as tropical climate, river system and alluvial fertile land. Agricultural activities are expanding on large scale to meet the food demand of increasing population, but without proper management due to the limitations of technology and regulations. There is a reversible relationship between agriculture sector and greenhouse gas emissions. Agricultural production is significantly influenced by climate change due to its considerable dependence on weather conditions and atmospheric composition especially water vapor, carbon dioxide and oxygen, and vice versa, greenhouse gases mainly water vapor, carbon dioxide, methane, nitrous oxide released from various kinds of agricultural waste and residues have caused global warming which is the largest consequences of greenhouse gas emissions. Typical phenomena which can be easily seen are many piles of straw left on the paddy field after harvest, extra nitrogen-based *fertilizer* on crops, and untreated cattle manure anywhere in the rural areas of Vietnam. Such kinds of agricultural residues and waste actually contribute to greenhouse effects over time due to the release of greenhouse gases, mainly carbon dioxide and methane from the gradual degradation of organic substances under the activities of microorganisms, ambient temperature and light conditions. Indeed, the national statistics shows a surprising figure that greenhouse gases emitted from agriculture sector accounts for up to 50%. Therefore, the continuity of uncontrolled agricultural activities puts a high pressure on environment and raises the alarm for the development of an action plan to minimize pollution from agriculture in Vietnam. This paper highlights the agricultural sources of greenhouse gas emission and the consequences of greenhouse effects as well as the methods to reduce the greenhouse gas emissions from agricultural production in the world and Vietnam in particular.

**Keyword:** Green house gas, Agricultural activities, gas emission, Vietnam



**OS-26:**  
**ANALYSIS AND ENHANCEMENT OF ASTAXANTHIN  
ACCUMULATION IN *Haematococcus pluvialis* BY STRESS  
CONDITIONS**

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**Abstract**

The unicellular microalgae, *Haematococcus pluvialis*, is one of the potential organisms with ability to produce astaxanthin. Astaxanthin is a high value ketocarotenoid, which is widely used as antioxidant in food, pharmaceutical, and natural colorant in aquaculture. *H. pluvialis* accumulates large amounts of astaxanthin under stress conditions. This study was conducted to determine the optimal medium for biomass production and factors that influenced the astaxanthin accumulation by *H. pluvialis*. Investigation of media Bold's Basal, OHM (optimal *Haematococcus* medium), RM (Rudic medium), f/2 Guillard and Walne showed that *H. pluvialis* grew well in RM medium. The maximum cell density of  $6.97 \times 10^5$  cfu/ml was achieved in RM medium after 18 days. Nitrogen starvation by removing nitrate or reducing nitrate source in the culture medium induced astaxanthin production. Under high light conditions (4 klux and 8 klux) and high concentration of carbon dioxide, an increase in astaxanthin accumulation was observed. Analyses using thin-layer chromatography (TLC) and high-performance liquid chromatography (HPLC) confirmed the presence of astaxanthin in *H. pluvialis* cell extract. Furthermore, liquefied dimethyl ether (DME) can be used to extract astaxanthin directly from *H. pluvialis* with high moisture content.

**Keywords:** astaxanthin, bioreactor, dimethyl ether, high performance liquid chromatography, microalgae *Haematococcus pluvialis*

## OS-27:

# ROLE OF TROPICAL AND SUBTROPICAL FRUITS FOR CROP DIVERSIFICATION, BIODIVERSITY, ENVIRONMENTAL PROTECTION IN CHANGING CLIMATES, NUTRITIONAL FOOD SECURITY AND POVERTY REDUCTION IN BANGLADESH

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### Abstract

Bangladesh economy is predominantly dependent on agriculture. So, the importance of horticulture in the national economy has been well justified. The Horticultural crops, particularly fruits, vegetables and spices, play a vital role in crop diversification, human nutrition, the economy and the environment, with an ultimate goal of a balanced diet, good malnutrition, food self-sufficiency, biodiversity, environmental protection and poverty alleviation. In Bangladesh, around 40 million peoples are suffering from micronutrient deficiency-the hidden hunger. Moreover, almost 70% of the population is below the poverty level. Our Government has put much emphasis on rice, but not on fruit, vegetable, spice and flowers production, as our diet is based on rice. Although there has been considerable success in variety development and technology generation in fruits and vegetables, their application is not adequate. Improved varieties of fruits, such as mango, guava, jackfruit, litchi, pineapple and banana are available in Bangladesh. The paper deals mainly with achievements, constraints and opportunities of horticultural crops (fruits) in Bangladesh for plantations and climate change. They also contribute to better nutrition and poverty alleviation, since land is scarce, malnutrition prevalent, and many people are poor. Bangladesh Agricultural University established the largest fruit repository, including a number of underutilized, tropical, subtropical, indigenous and temperate fruits here in Mymensingh. The contribution of the horticultural crops to mitigating the effects of climate change, the nutrition of poor people, and the alleviation of poverty in coastal (saline), hunger prone (monga) and flood affected areas is also addressed. The cultivation of underutilized fruit ber (Jujube) cv. BAU Kul 1 contributes greatly to poverty reduction and natural soil reclamation from saline to non-saline conditions. Finally, this paper focuses on the future policy development for horticultural crops in Bangladesh to improve the economy, nutrition, food security, poverty alleviation and sustainable development of the country.

**Keywords:** Bangladesh horticulture, Crop diversification, biodiversity, environmental protection, malnutrition, poverty alleviation

## OS-28:

# QUALITY CHARACTERISTIC AND ANTIOXIDANT PROPERTIES OF PURPLE SWEET POTATO AS A BAKERY PRODUCT INGREDIENT

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### Abstract

Purple sweet potato (PSP) is known to be rich in colour, flavour and packed with nutritional benefits. The aim of this work is to investigate the effect of adding PSP in the form of flour and paste as an ingredient in bakery product. Analysis was performed on the characteristics of the different processed PSP, levels of bioactive compounds (anthocyanin and phenolic compounds) and antioxidant capacity. The analysis was conducted on samples, before and after the addition of PSP in the bakery product. The experimental results indicated that total anthocyanin content in PSP paste is significantly higher than in PSP flour at 52.48 mg CyE/100 g dw and 38.90 mg CyE/100 g dw respectively. Conversely anthocyanin content of bakery product added with PSP flour showed a higher amount than addition with PSP paste. In bakery product, cake added with PSP lost about 25–34% of its antioxidant capacity while in biscuit significantly lower at only 11–14%. Both processed PSP also exhibit natural purple colour when added into the product. Based on these findings, PSP in the form of flour and paste not only could be utilized in bakery products to improve the colour and flavour but also can become a source for the production of foods with health benefits.

**Keyword:** purple sweet potato, cake, biscuit, phenolic, anthocyanin, antioxidant capacity

## OS-29

# ANTIMICROBIAL ACTIVITY OF PRESERVATIVES IN FOOD TECHNOLOGY

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### **Abstract**

The aim of this study is to determine the antibacterial activity of some preservatives in food industry by minimum inhibitor concentration (MIC) and the paper disc diffusion method for antibiotic susceptibility testing. Some preservatives were chosen as sodium bisulfite, potassium sorbate and sodium benzoate. The determination of antibacterial activity of these preservatives against gram-negative *Escherichia coli* (ATCC 25922), *Salmonella enteritidis* (ATCC 13076), gram-positive: *Staphylococcus aureus* (ATCC 25923), *Bacillus subtilis* (ATCC 11774) were investigated. The results show that MIC of sodium bisulfite for *E.coli*, *S.enteritidis* were 1.56 mg/mL, 3.125 mg/mL for *B.subtilis* and 6.25 mg/mL for *S.aureus*; while MIC of potassium sorbate for *E.coli*, *S.aureus* were 400 mg/mL, 800 mg/mL for *B.subtilis* and no effect on *S.enteritidis*. MIC of sodium benzoate for *E.coli*, *S.aureus* and *B.subtilis* were 400 mg/mL and no effect on *S.enteritidis*.

**Keywords:** Antibacterial, Potassium sorbate, Preservatives, Sodium hydrosulfite, Sodium benzoate

**OS-30**  
**METABOLOMIC PROFILING OF CATIONIC METABOLITES IN ROOT  
OF THE SHEATH BLIGHT-RESISTANT RICE GENOTYPE 32R  
UNDER COLD STRESS**

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**Abstract**

The rice genotype 32R is sheath blight-resistant, with high yield potential but poor root growth in response to cold stress. To clarify the root-metabolic mechanism, profiling of root-metabolomics of 32R at 4<sup>th</sup> leaf stage was examined by using CE-TOF/MS. Total 81 cationic metabolites were identified. Of these, 48% metabolites belong to groups of amino acids, peptides and analogues. Contents of metabolites were higher in cold stress than in non-cold stress and showed lower in 32R than in 29S. Various metabolites controlling the process of nitrogen assimilation, storage and transport, cold tolerance, osmo- and cell membrane-protection and inhibited root growth were investigated. These results suggest that existing a ShB-resistant gene encoding cytokinin-*O*-glucosyltransferase in 32R has caused to inhibit the expression of genes that encode amino acid transporters in the nitrogen metabolism leading to change the function of root in many metabolic processes under cold stress, thus causing poor root growth of 32R in comparison with that of 29S.

**Keyword:** Cationic metabolites, Cold stress, Rice root, Sheath blight resistance, Metabolomic profiling, Rice root metabolomics.

## OS-31: SUSTAINABILITY OF SMALLHOLDER FARMERS AND FOOD SECURITY IN SOUTHEAST ASIA

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### **Abstract**

Food security, closely linked with environmental problems, has become one of the most important contemporary issues in Asia. Especially in recent decades, ecological degradation such as sedimentation, water quality degradation and frequent flood occurrence, many of which are enhanced by climate change impacts, is expanding in many Southeast Asian countries. Such degradation is affecting negatively the amount and conditions of food supply and safety. The basic issue here is whether and how Asian agriculture and fisheries can supply sufficient amount and quality of food stably to meet with the rapidly growing population, without jeopardizing natural and environmental resources.

Although agriculture supplies wide-ranged ecosystem services, not only marketed goods such as food and fiber, but also non-marketed services such as flood regulation, disease control, water purification and scenic view. People generally assume that such non-marketed ecosystem services, which are not traded in the traditional market, have no economic significance (Daily 1997). It should be noted that because Asian agriculture has experienced significant land and soil degradation due to urbanization, non-agricultural practices, deforestation and overexploitation of agricultural resources as a result of population growth, the level of non-marketed ecosystem services has also drastically reduced with ecological risks.

Based on our international collaborative research conducted by RIHN (Research Institute for Humanity and Nature, Kyoto) in collaboration with University of Lampung (UNILA) and the University of Philippines (UPLB), we have examined the recent changes of such environmental degradation and ecosystem services. Our study demonstrates that non-marketed ecosystem services from sustainable land use in agriculture would provide significant economic and ecological values, and developing mechanism for the payment for ecosystem services is crucial in enhancing sustainable agricultural development. It is also demonstrated that sustainable agriculture and water resource management will provide significant economic benefits to the farmers and local people, and that developing mechanism for the payment for ecosystem services is crucially important for enhancing sustainable agricultural development.

**Keywords:** Ecosystem services, soil degradation, agroforestry, sustainable agriculture, eco-certification, Southeast Asia

**OS-32:**  
**FOOD SAFETY AND HYGIENE AT RESTAURANT IN HO CHI MINH CITY**

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**Abstract**

Food poisoning is widespread and affecting customers' health at restaurants in Vietnam. This study was conducted to identify pollution sources from the environment, processing areas, and food poisoning agents in the restaurant service industry in Ho Chi Minh City, Vietnam. The results are measures to prevent food poisoning and ensure food hygiene and safety. This research is based on the theory of food hygiene and safety. Research methods include collecting information and data on food poisoning and surveying restaurants in Ho Chi Minh City. The results showed that the main sources of contamination of common ingredients used in Vietnamese cuisine such as pork, chicken, beef, and fish are unidentified and foreign substances from the surrounding environment. In addition, improper handling, storage and processing procedure also increase the possibility of cross-contamination of food ingredients. As a result, food safety and hygiene at restaurants in Ho Chi Minh City should be ensured by staff training of personal hygiene, work uniform, transporting regulations, storing and processing of foods.

**Keywords:** Food poisoning, Food safety and hygiene, Storing and processing of foods

## OS-33: FOOD SECURITY AND SUSTAINABLE DEVELOPMENT

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### Abstract

Food security exists when all people, all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Food security as foundation should have sustainable agri-food systems to promote means of livelihood, competitiveness and ensuring staple supply of food. Towards long-term food security, Sustainable Agri-food Systems (SAS) regarded as the long-term sustainable approach (in its social, economic and environmental dimensions). Socio-economic contribution of legumes to livelihood in the world means more sustainable activities to keep soil fertility- it is imperative to save soils, which is a non- renewable resource. It takes up to a thousand years for just one centimeter of topsoil to form, nutrition-enhancing development for healthy generation, integrated food chain. Legumes present main element from organic farming, which helps maintaining of the health of soils as it retains higher levels of essential organic matter. And there is more to organic farming than reducing the use of pesticides. It also includes crop rotation, intercropping and composting. Legumes are typically grown on marginal land in the form of green manuring, intercropping and alley cropping with the aim of nutrient cycling through biological nitrogen fixation (BNF), leaf fall and root exudates. Consistently high yields are not possible without the accumulation of substantial amounts of N and P in the crop. Intercropping is popular among farmers on smallholdings because of the flexibility of sowing and planting dates, profit maximization, risk minimization, soil conservation, soil fertility maintenance, weed control and nutritional reasons. Intercropping involving cereals and legumes is common practice (Singh et al, 1990). Intercropped legume, besides increasing the total productivity of the system, also plays an important economic role in resource use, especially of nitrogen (Saraf et al, 1990). The major consideration for N management in intercropping systems is to quantify the 'direct transfer' of N from legume to non-legume components. Save legume diversity, *in situ* and *in vitro* will provide rich resources to sustainable management and food security. Regional consolidation of good soil and nutrient management practices, as well as standards, is a very important area of cooperation.

**Key words:** Legumes, food security, regional consolidation, livelihood, sustainable agri-food system



**OS-34:**  
**WHAT AFFECTED TO THE QUALITY OF COFFEE IN VIETNAM:  
FROM-BEAN-TO-CUP POINT OF VIEW**

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**Abstract**

The coffee and climate change are the major issues in the world nowadays. The world's output of *Coffea arabica* will be decreased to half of current production by 2050. Vietnam is the world's second largest coffee producer and its production will be affected in the future. The issue of quality and quantity is always two opposite traits and to maintain the stable quality is one of the important challenges for coffee producers and processors in the world and Vietnam. The global warming threatens largest coffee-producing regions of the world and could lower the quality of coffee. This paper firstly makes a brief overview of Vietnamese coffee production and provides a multidimensional perspective on Vietnamese coffee from bean to cup in the last 15 years (2002-2017). Secondly, the state policies are carried out such as the establishment of certification marks and geographical indications of coffee areas in Vietnam connected to authenticity and traceability that help to improve the brand name and added values in the coffee market. And finally, the outlines of the risk factors that influence the coffee processing and production as well as the suggestions to improve the quality of coffee with sustainable development are discussed in the changing context of the world coffee industry from commercial coffee to specialty coffee products.

**Keywords:** Vietnam coffee, climate change, *Coffea arabica*, specialty coffee

## OS-35: MOTIVATIONS OF EVERYDAY FOOD CHOICES

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### Abstract

This study aimed to explore and validate the motivations underlying food choice using the Food Choice Map technique. The study included one hundred one-on-one interviews, in which the respondents were asked to build a map of all the foods and beverages they typically eat in a usual week for morning, midday, snack and evening meals. The respondents also provided the reasons and the eating context for each of the choice on their map. The individual food and beverage items were then categorized into the corresponding food groups. The reasons were classified into fifteen motivation constructs, i.e. *liking, habits, need and hunger, convenience, health, pleasure, traditional eating, sociability, price, weight control, affect regulation, social norms, social image, choice limitation, and variety seeking*. Correspondence Analysis was used to identify the motivational drivers of consumption for both eating occasions and food groups. Meal was found to be different from snack both in food motivations and food patterns. *Pleasure* was the driving factor for snack but not that important for meal. Different food groups were also chosen with different motivations. Grain, pasta and meats were linked to *convenience, variety seeking, traditional eating, and price* while nuts, seeds and legumes were associated with *need and hunger, health, and weight control*. The findings of the study could be used as inputs when dietary changes are desired, whether those changes are related to new or revised products being promoted by industry or are dietary changes that result from government or social policy issues.

**Keywords:** food choice, motivation, food category, eating context

**OS-36:**  
**LACTIC ACID BACTERIA AS NATURAL PRESERVATIVES AND  
THEIR IMPACT ON FOOD SAFETY AND SECURITY**

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**Abstract**

Food security exists when all the people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. The growing demand for food security and food safety as key elements of health and well being of mankind has prompted the development in food preservation technology. Given the recognized importance of improved food safety and quality for food security, biopreservation refers to increasing the shelf life and safety of foods by using various naturally derived constituents such as essential oils, flavonoids, phenolic compound, natural microflora, their microbial metabolites and antimicrobial products. Preventing the decomposition of products by using natural antimicrobials, inhibition of microbial growth, oxidation and certain enzymatic reactions occurring in the foodstuffs are the mode of action of these bio-preservatives. Lactic acid bacteria can be seen as an interesting tool in the development of novel bio- preservatives for food industry. The antimicrobial agents derived from LAB are gaining attention not only as alternative therapeutics in the pharmaceutical industry but also as a bio-preservative in food industries. Application of Bio-preservatives and bacteriocins derived from LAB has been confirmed to be a natural, residue free and safe method in increasing the shelf life of food products, therefore it can be considered as a highly efficient method in providing food security, improving the nutritional status and income generation. Development, knowledge creation, industrialization, and curation of indigenous knowledge in particular in traditional fermentation methods of applying LAB is a matter of major focus of this presentation.

**Keywords:** Biopreservation, LAB, food safety, food security

## OS-37: ANALYSIS OF JOULE HEATING OF FISH FILLETS AND PORK SAUSAGES

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### Abstract

Joule heating, also called ohmic heating, is a promising technology for cooking. It is expected to be rapid and economic since no transfer medium is required, electrical energy is directly affecting foodstuff. Additionally, cooking is induced by current stream and started inside food. This reverse direction compared to the traditional technique needs different considerations, such as cold point calculation and expected final surface temperature. In this study, fish fillets and Viennese type smoked pork sausages were acquired in retail. Adjustable AC power supply of 0-240 V (1000 VA, 50 Hz) was applied to control current and voltage. Infrared thermometer (GM320, Benetech, China) was used to record temperature data at three positions along the sample surface. Thermal images were captured during cooking using a MobIR® M4 camera (Wuhan Technology, China) with the spectral range of 8-14  $\mu\text{m}$ . Both infrared thermometer and thermovision camera had the same accuracy of  $\pm 2\%$ . Two parallel samples were cooked during experiments. Measurements were performed in 3 replicates. Three levels of voltage were applied (50 V, 125 V and 200 V). Low level was considered inefficient and too slow, while high level did burn meat around electrode easily. Kinetics of current and surface temperature were analyzed and compared. Based on the temperature change, optimal cooking protocol can be suggested in order to warm up quickly and cook safe food without burning and decreasing its value. Calculations were performed using software COMSOL Multiphysics ®. According to the results, Joule heating treatment is an effective way of cooking and easy to control. In spite of the fact that technique is investigated from different aspects, there are still open questions and issues before deployment into everyday practice.

**Keywords:** Joule heating, Fish fillets, Pork sausages

**OS-38:**

**INFLUENCE OF SOME TECHNICAL PARAMETERS OF HEAT-MOISTURE TREATMENT ON ENRICH RESISTANT STARCH (RS) FROM POTATO STARCH**

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**Abstract**

The objective of the present study was to determine the technical parameters of the heat moisture treatment in the resistant starch (RS) enrichment from potato starch (TO03). The findings indicated that the moisture content, temperature and time in the heat-moisture treatment had significant effects on the increase of the RS content from 20.09% to 30.30%. The highest RS content was achieved at the moisture of 20%, temperature of 105°C and treatment time of 8 hours. This result was also observed by the scanning electron microscope (SEM) image with a smoother surface, with virtually no visible slits or grooves on the surface. Besides, the X-ray graph showed that the crystal structure moved from B-type to C-type when using heat-moisture treatment for potato starch.

**Keywords:** structure, properties, potato starch, resistant starch, heat moisture.

**OS-39:**

**GRANULATION IN 'MAGALLANES' PUMMELO  
[*Citrus maxima* (BURM. EX RUMPH.) MERR.] FRUIT AS  
INFLUENCED BY FRUIT SIZE AND 1-METHYLCYCLOPROPENE**

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**Abstract**

Granulation, a common physiological disorder in citrus fruit, is characterized by discolored, dry and hardened juice vesicles. It lowers the overall quality of the fruit. This research assessed two nondestructive methods for determining granulation and the degree of granulation., physico-chemical characteristics and electrolyte leakage of small, medium, and large 'Magallanes' pummelo and fruit treated with 1-methylcyclopropene (1-MCP) for 8 hours at 0, 50 or 500 nL L<sup>-1</sup> stored in ambient conditions. The two non-destructive methods tested i.e. flotation and a capacitance-based technique, did not correctly determine granulation in pummelo and thus cannot be used to detect granulation. Though degree of granulation did not differ, the percentage of granulation was greater in large fruit (91.48%) at nine weeks of storage. Granulation developed further with storage. During this period, large fruit exhibited greater pH while TA and TSS declined. Color (a\*, chroma, hue) decayed, weight loss, and juice content did not vary. Thus, fruit size can be used as determining factor in granulation particularly during ambient storage wherein large fruits were more granulated. The rind color of both control and 1 MCP-treated fruit became more yellow as L\*, a\*, b\* and hue values gradually increased during storage. Granulation was most frequently observed initially in the middle and styler-end sections of the fruit segment. Granulated samples exhibited higher pH and lower TSS than the non - granulated segments. Application of 1-MCP at 50 and 500 nL L<sup>-1</sup> did not influence the yellowing and granulation of 'Magallanes' pummelo fruit but maintained good fruit visual quality for three weeks longer than untreated fruit.

**KeyWords:** granulation, pummelo, quality

## OS-40:

# ISOLATING FREE FATTY ACIDS FROM VIRGIN COCONUT OIL USING LIPASES FROM DIFFERENT SOURCES

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### Abstract

In this study, virgin coconut oil (VCO) was hydrolyzed by two kinds of lipase: lipase from *Candida rugosa* (CRL) and lipase from porcine pancreas (PPL). The hydrolysis process was controlled under four parameters: VCO to buffer ratio, lipase concentration, pH condition and temperature. In term of CRL, the best conditions for hydrolysis reaction was 1:5 VCO to buffer ratio, 1.5% lipase (w/w oil), pH 7 and at 40°C. And for PPL was 1:4 VCO to buffer ratio, 2% lipase (w/w oil), pH 7.5 and at 40°C. Hydrolysis degree (HD) of VCO which was catalyzed by CRL reached 79.64%. Whereas, HD value as using PPL to hydrolyze VCO was only achieved 27.94%, less than approximately three times compared to CRL. Moreover, hydrolysis reaction for CRL also took less time than PPL. The length of hydrolysis time was 16 hours and 26 hours, respectively. FFAs were obtained from hydrolyzed products and it was obvious that each composition in FFAs had the equivalent percentage in which lauric acid (C12) that took the biggest contribution to FFAs content (47.23% for CRL and 44.23% for PPL).

**Keywords:** Virgin coconut oil, Lipase *candida rugosa*, Lipase porcine pancreas, Hydrolysis degree, Free fatty acids.

## OS-41:

# SYNBIOTIC FILM FROM NATURAL BIOPOLYMER TO ENHANCE THE ACCESSIBILITY OF FUNCTIONAL FOODS

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### Abstract

Synbiotic is a co-application of probiotic and prebiotic elements with an expectation that synergism between these two elements will favor rapid adaptation and colonisation of probiotic in the gastrointestinal (GI) tract. Probiotics are live microorganisms that help in maintaining a good balance and composition of intestinal microflora and increase the resistance against the invasion of pathogens while prebiotics are non-digestible carbohydrates which are able to selectively stimulate growth and/or metabolism of those health-promoting bacteria (such as *Bifiobacteria* and *Lactobacilli*) in the GI tract. The most successful probiotic and synbiotic foods have been dairy products. As for non-dairy products, there are many challenges when it comes to development of a synbiotic food. Incorporation of prebiotic ingredients into food can be accomplished easily whereas many factors associated with survival of probiotics should be taken into account when adding probiotics into food (such as processing methods and compatibility with food characteristics, and storage conditions) This makes it complicated to directly apply probiotic in foods. To overcome these constraints, edible films and coatings are alternative approach to deliver and sustain viability of probiotics and broaden the supplementation of probiotics through different food products and different forms. They also provide more choices for vegans and consumers with diet restrictions (e.g. allergies to ingredients in milk, lactose-intolerance, cholesterol restriction, glycemic index control and disfavor of fermented foods) to get probiotics and prebiotics. Konjac glucomannan (KGM) is water-soluble dietary fiber used widely in food industry. It has good film forming properties, health-promoting functions, and ability to entrap bioactive compounds. Therefore, considering all the reasons as stated above, this study aimed to use edible film derived from konjac glucomannan (KGM) to serve as a synbiotic carrier. The survival of probiotic cells was also assessed during film formation. The mechanical properties and performance of the developed symbiotic film from KGM are also evaluated.

**Keywords:** Probiotics, Prebiotics, Synbiotic food, Functional foods, Survival



## OS-42:

# NOVEL AND TRADITIONAL TECHNOLOGIES FOR THE PRODUCTION OF SAFE MEAT PRODUCTS: WHAT WE KNOW AND WHAT WE DON'T KNOW

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### **Abstract:**

A worldwide interest in production of safe and nutritious food led to rapid development of a range of new technologies, such pulsed electric field, high pressure treatment, microwave dielectric, irradiation, and ohmic heating, that have been coined as “emerging technologies” in literature. Most of these technologies have been investigated for their effects on sensory, nutritional and microbiological properties of meat products and to a lesser extent for their toxicological effects. Some of these technologies indeed have several clear advantages that make them appealing for commercial use. Parallel to the increased interest in these novel technologies, a decline in the use of more traditional preservation methods, such as the use of natural products for preservation, appear to be evident from research outputs. These research directions appear to be serving communities that are capable of supporting the use of these novel technologies in terms of cost, technology, on-going maintenance and troubleshooting, while oversight the needs of less developed societies, where food safety is a prevalent problem. Furthermore, the safety risks of some of these technologies are not completely profiled and more information is needed before commercialization. This presentation will discuss some of the critical issues related to both novel and traditional technologies with the aim of highlighting urgent research needs for safer meat products.

**Keywords:** novel technologies, traditional technologies, meat products, food safety

## OS-43:

# DRUG-FOOD INTERACTIONS: THE NOT-SO-GREAT ESCAPE

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### **Abstract**

Prescription and over-the-counter medications are used to treat and overcome the burden of acute and chronic illnesses. Research and technology are constantly improving available medicinal drugs and paving the way for the discovery of new ones. The general pathway for drug development process involves standard 5 steps/phases that start with a “Discovery and Development” phase and end with a “Post-Market Safety Monitoring” phase. Food is a heterogeneous complex material that may have compounds interact with medicine leading to treatment failure, drug toxicity or altered bioavailability of active compound or nutrients. Classic cases known for this type of interactions are the chelating effects of di- and trivalent cations in food (such as dairy products) and fluoroquinolone antibiotics, the interaction between grapefruit and calcium channel blockers and several other cardiovascular disease medications, and mercaptopurine and milk. Given the wide culinary practices and the enormous number of foods that are consumed worldwide, our understanding of this topic is limited to mostly few items from the Western diet. This presentation will describe several scenarios for food-drug interactions and will provide evidence that support a greater need to include food-drug interaction as part of the drug development process, especially with ethnic foods, for better efficacy and safety use of medication.

**Keywords:** drug-food, ethnic foods, safety, medication

## OS-44:

# PRODUCTION OF BIOACTIVE EXTRACT OF BLACK GARLIC FOR PROTECTING LIVER FROM DAMAGES INDUCED BY TETRACARBON CHLORIDE

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### Abstract

Garlic (*Allium sativum*) is a traditional functional food and well-known herbal spices in Vietnam and Asian cuisines. It has been documented that garlic possesses many bioactive compounds, which exert many health benefits. In recent years, several processed garlic products have been introduced into market such as garlic powder, garlic oil, garlic supplement capsules, aged garlic, and black garlic. Scientific reports have suggested hepatoprotective effect of black garlic, which is generated by fermentation process at high temperature and high humidity. However, hepatoprotective effect of single-clove black garlic has not been elucidated yet. In this study, we prepared single-clove black garlic extract and investigated its hepatoprotective effect on liver injury in carbon tetrachloride (CCl<sub>4</sub>) intoxicated mice.

Eight-week old mice were randomly divided into four groups: control, extract control, CCl<sub>4</sub> intoxicated, co-administrated CCl<sub>4</sub> and extract group. Liver injury in mice was induced by orally administrating 1 ml/kg body weight of CCl<sub>4</sub> twice a week for 28 days. The hepatoprotective effect of black garlic in mice co-treated with CCl<sub>4</sub> and black garlic extract (200 mg/kg body weight) was evaluated via gastric gauge for 30 days. Black garlic extract could improve changes of body weight, liver weight, and relative liver weight as compared to CCl<sub>4</sub> intoxicated mice. Black garlic extract also ameliorated the elevation of the plasma triglyceride, total cholesterol, LDL-cholesterol and increased HDL-cholesterol levels in CCl<sub>4</sub> and black garlic co-administrated mice. Furthermore, black garlic treatment attenuated the elevation of alanine transaminase (ALT) and aspartate transaminase (AST) level in plasma as compared to CCl<sub>4</sub> intoxicated mice. Histological studies revealed that black garlic treatment could ameliorate liver injury induced by CCl<sub>4</sub>.

In conclusion, our results suggested that single clove black garlic extract may be a promising medicinal food that could provide the beneficial effect on liver injury and liver disease.

**Keywords:** Black garlic, Antioxidant, Hepatoprotective, Medicinal food, Carbon tetrachloride, Animal model.

## OS-45:

# CONTROL OF CHILLING INJURY AND DECAY INDEX OF PEACH FRUITS BY HOT WATER, 1-MCP, CALCIUM CHLORIDE AND SALICYLIC ACID DURING COLD STORAGE

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### Abstract

The aim of this study was to compare and investigate the effects of hot water, 1-MCP, calcium chloride with hot water, 1-MCP, salicylic acid on chilling injury, decay index, fruit firmness and overall quality of peach fruit during the cold storage. The samples were stored for 40 days at 0°C ±1°C with 90% ± 5% RH during the postharvest storage period and were analysed after an interval of 10 days for chilling injury, decay index, fruits firmness Vitamin C, beta carotene, total phenolic compound and overall quality of peach fruits. The combine effect of hot water, 1-MCP and calcium chloride effectively inhibited the chilling injury, decay index and delayed the softening of fruit during storage followed by hot water, 1-MCP and salicylic acid. These treated fruits also have significant effects on Vitamin C, beta carotene, total phenolic compound and overall quality of peach fruits. Physiochemical and sensory analyses reflected that hot water +1-MCP + calcium chloride were the best treatment, in maintaining fruit firmness, reduced the chilling injury, decay index and overall quality followed by hot water+1-MCP +salicylic acid during the 40 days of storage intervals.

**Keywords:** B Chilling injury, decay index, 1-Methylcyclopropene (1-MCP), calcium chloride, salicylic acid, storage life

**OS-46:**  
**USING NATURAL ADDITIVES AND ULTRASOUND TREATMENT  
TO IMPROVE BATTER FOR MAKING EGG-FREE SPONGE  
CAKES**

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**Abstract**

In this study, soymilk, natural additives and ultrasound treatment were used to produce egg-free sponge cakes suitable for patients who are allergic to egg proteins. In this study, soymilk solutions replaced eggs at various concentrations in the presence of different levels of table salt and lemon juice, and they were whipped for different periods of time. Soymilk showed desirable performance in the partial replacement of eggs in making cakes. The treatment where 80% wheat flour and 20% cornstarch were mixed together resulted in a better cake compared to the control cake made from 100 % wheat flour. The structure of the egg-free cakes was best when 120% soymilk (v/wt. mixed flour) was substituted for eggs. High performance and efficiency of table salt and lemon juice was achieved at levels of 0.7 % (wt./wt. mixed flour), 0.6% (v/wt. mixed flour), respectively. Ultrasound treatment of the egg-free cakes at 20 KHz for 20 min at 30<sup>0</sup>C produced a significant effect on the texture measurement of the batters ( $P < 0.05$ ) compared to the control. These results may help producers formulate better egg-free cake systems.

**Keywords:** Egg -free cakes, Cornstarch, Lemon juice, Ultrasound treatment, Soymilk

**OS-47:**  
**EXPLORING FOOD INSECURITY EXPERIENCES AMONG  
UNDERGRADUATE STUDENTS**

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**Abstract**

Main purpose of this qualitative study was to explore food insecurity experiences among undergraduate students. Food insecurity is a condition of having a difficult time to get food and to eat a proper nutritionally balanced food. A total of eight respondents were involved in this study, through semi- structured interview, and analyzed by using open and axial coding. Our findings show that there are three major risk factors that can cause food insecurity; financial resource, financial management and financial expenditure. Besides, two outcomes in terms of academic activity, which are negative effect and no effect, two outcomes in terms of psychological effect which are intrapersonal issue and interpersonal issue, and two types of coping strategies being applied by the respondents in order to cope with the food insecurity; food related coping strategy and non-food related coping strategy.

**Keywords:** food insecurity, undergraduate students, financial resource, financial management, financial expenditure

## OS-48:

# EVALUATION OF DISTRIBUTION CONDITIONS OF FRESH PRODUCE DURING EXPORTATION FROM JAPAN TO HONG KONG AND SINGAPORE.

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### Abstract

In recent years, Japanese food has become globally prevalent backed by economic growth in regions such as Asian countries. Japanese government is promoting export of agriculture and marine products and food, and aim to increase amount of export of fresh fruit and vegetable to around triple till 2020, compare with that in 2012. However, some perishable fruits (for example strawberry, peach etc..) are easy to lose their quality during transportation, especially marine transportation that takes long period. To reduce transportation loss, it is highly required to analyze distribution conditions related to quality change of fresh produce. In this study, we measured transportation conditions (temperature, humidity and acceleration) during transportation from Japan to Hong Kong and Singapore by marine transportation, and found out that temperatures inside transportation box are vary greatly depend on vertical loading position in the reefer container. And we simulated preliminary the effect of temperature changes on accumulated respiration and firmness change of Japanese peach, as indexed of physiological metabolism and ripeness, respectively.

**Keywords:** Japanese food, Hong Kong, Singapore, transportation

**Acknowledgements:** This work was supported by the special scheme project on regional developing strategy from BRAIN.

## OS-49:

# FOOD SAFETY IN HOSPITALITY INDUSTRY - THE KEY TO IDENTIFICATION OF CRITICAL CONTROL POINTS

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### Abstract

The hospitality industry is made up of thousands of exciting organizations including hotels, restaurants, food service management, fast food outlets, coffee shops and pubs, bars and nightclubs, theme parks, transportation, cruise line and other additional fields in tourism industry. Transnational trade; travel; and migration and globalization of food production, manufacturing, and marketing pose greater risk of cross-border transmission of infectious diseases and food-borne illness. The risk is higher especially with small food outlets and road side vendors which are generally not monitored by any health authorities.

In the United States and Europe over the past several years, the people have begun eating more meals in restaurants. It is the same trend in people all over the world including countries like India and Malaysia.

With the rapid rise of food poisoning incidents in catering industry, Hotel and hospitality industries realize the importance of food safety which is the key success of protecting their brand

Deadly outbreaks of food-borne illnesses over the past few years have focused increased attention on food safety and preparation. Food safety includes food hygiene, hazard related to food and the management of its risks. Microbiological hazard is the most considerable and increasing interest in the food safety programs as the outbreaks are world wide and also can be a transnational issue.

The horrifying food-borne illnesses that struck Europe in the spring of 2011 served as a reminder that even the most "healthy" foods can sicken and potentially be lethal. It was a huge surprise when the culprit ultimately was identified as 'bean sprouts'. The Center for Science in the Public Interest has offered a simple formula "2 hours -- 2 inches -- 4 days" for ensuring left-over food safety.

HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product. Richard Bonne *et al* are working on a simplified HACCP plan for practical and easy implementation.

In most cases, the identification of critical control points is a challenge. The present talk shall highlight the keys to identify the critical control points based on the speaker's experience with hospitality industries in India and Malaysia.

*All that is clean is not hygiene! HACCP is way forward for healthy cuisine!*

**Keywords:** HACCP, food safety, outbreaks, food-borne illnesses



## OS-50:

### NEW DEVELOPMENT IN DAK LAK PROVINCE (VIETNAM) TO IMPROVE SUSTAINABLE AGRICULTURE

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#### **Abstract**

The perennial crops are known as a capital importance in Vietnam's Central Highland as well as Dak Lak province. They are to improve income, abolishing starvation and reducing poverty, of which coffee pepper and rubber are driving force crops. The cultivation areas, productivity and export have been increasing gradually from 1986 till now. Recently, population explosion problem due to spontaneous migration from delta and other regions has created a pressure for farmers in agricultural production. Additionally, as households always face climate change and unstable market, the economic efficiency is still not high. Therefore, farmers try to find solutions to reduce risk such as by applying perennial intercropping system. This study analysed the economic performance of coffee and pepper intercropping (CPI) in Quang Hiep commune, CuMgar district, Dak Lak province. A household survey of 50 of CPI farmers and key informants interviews were conducted in 2015. Results show that CPI brought economic performance to farming household. Particularly, although the investment cost spends 165.7 million VND per hectare and the annual cost occupies 53.9 million VND, the gross product reaches 358.4 million VND. After accounting for intermediate cost, the farmer receives over 304.4 million VND of mixed income. Furthermore, this system is highly cost-effective investment because the ratio cost of gross product and value added are 10 % and 11.3 %, respectively. The income per family labor is 0.9 million VND. In order to propose the scientific solutions to sustainable development for perennial crops in the whole Dak Lak province, a study about perennial crop systems in Dak Lak (Vietnam): practice and socioeconomic analysis will be implemented to compare and analyse deeply the situation of perennial crop systems in Dak Lak province.

**Key words:** Sustainable agriculture, economic performance, perennial crop, Dak Lak.

**OS-51:**  
**QUALITY AND SAFETY ISSUES FOR HORTICULTURE PRODUCE IN  
BANGLADESH**

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**Abstract**

Fruits and vegetables are rich sources of vitamins, minerals, and dietary fibre. The *per capita* consumption of fruits and vegetables is still lower (212 g day<sup>-1</sup>) than desirable (400 g day<sup>-1</sup>). There exists food-phobia in our society. Consumption of fruits and vegetables has decreased due to perceived health risks from consuming adulterated or unsafe foods. There are also reports of rejection of export consignments. Postharvest loss is substantial. Assurance of quality and safety is a challenge in the context of nutrition security, public health and export. Presence of chemical residues in food is a major food safety concern. Food Safety Act 2013 and establishment of BFSa are noticeable steps to deal with this deep-rooted problem. Consumption of safe fruits and vegetables and the expansion of exports can only be achieved if quality and safety controls are in place. Quality and safety issues in the horticultural chain should be prioritized for domestic marketing and export. Postharvest loss is substantial. The present paper deals with safe horticultural production and policy.

**Keywords:** Food safety, policy, horticultural produce, chemical residue

**OS-52:**  
**OPTIMIZATION OF THE EXTRACTION CONDITIONS FOR TOTAL  
FLAVONOID FROM *Moringa oleifera* LAM**

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**Abstract**

Quercetin is the major flavonoids of the *Moringa oleifera* Lam leaf, which has high biological value. In order to collect and protect the activity of its bioactive, the optimal extraction conditions of the fresh *Moringa oleifera* Lam leaf were investigated with independent variables including the effect of solvent (methanol, ethanol, ethyl acetate), the ratio of materials and solvents, temperature (40-70 °C), extraction time (1-4 h), and number of extracts (1-4 times). The extraction efficiency was determined by the presence of high levels of quercetin and antioxidant activity. The results showed that there was a simultaneous interaction between the experimental factors and the extraction efficiency. Methanol extracting the highest flavonoids yield was also the most suitable solvent for quercetin extraction (HPLC test). The highest extraction effect was achieved in the condition of 3-hour period, temperature of 60 °C, extraction times of 2 and the material/solvent (methanol) ratio of 1/20 corresponding to a flavonoid content of 17,199 (mgQE / gDB). At this level, the antioxidant activity (DPPH test) was 0.63 mg vitamin C / gDB.

**Keywords:** Quercetin, Flavonoid, Antioxidant, *Moringa oleifera* Lam

**SO-53:**

**THE EFFECTS OF DIFFERENT SALTS OF ORGANIC ACIDS ON SOME CHEMICAL, SENSORY AND SHELF LIFE ATTRIBUTES OF BLACK TIGER SHRIMP (*Penaeus monodon*) DURING 0 °C STORAGE**

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**Abstract**

Studies that applied salts of organic acids to Crustacea products and examined chemical, sensory and shelf attributes, to our best knowledge, appear very scanty. Supplementing extant information, three different solutions of organic salts, that is, 2.5% sodium acetate (NaA), 2.5% sodium citrate (NaC), and 2.5% sodium lactate (NaL), applied to black tiger shrimp (*Penaeus monodon*) to improve some of its chemical, sensory and shelflife attributes during 0 °C storage. Chemical parameters included hypoxanthine (Hx), histamine, total volatile nitrogen (TVB-N), trimethylamine (TMA-N), whereas sensory attributes were determined via quality index method (QIM). Histamine, Hx, TVB-N and TMA-N values reduced significantly as QI sensory scores changed in treated compared with control samples ( $P < 0.05$ ). NaC, NaL, and NaA treatments improved shelf-life to ~ 10, 11, and 12 days, respectively, compared with control (8 days). Particularly, NaA treatment promises better quality shelf of *P. monodon* shrimp of this study.

**Keywords:** Histamine, Hypoxanthine, Quality Index Scoring, Trimethylamine-nitrogen, Total volatile basic- nitrogen, *Penaeus monod*

## SO-54:

### POSTHARVEST QUALITY OF 'CARABAO' MANGO AS AFFECTED BY DIFFERENT BAGGING MATERIALS

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#### Abstract

A safe alternative tool to address various production problems in mango is the use of bagging materials. 'Carabao' mango fruits at 55 days after flower induction (DAFI) were bagged with three bagging materials: old newspaper, spun-bonded high density polyethylene (SHDPE, DuPont™ Tyvek® Homewrap, 0.15 mm thick) and non-woven spunbond polypropylene (NSPP, 0.03mm thick). Bagged mango fruits were harvested at 118 DAFI. At harvest, NSPP bagging material resulted in better quality of fruit compared to newspaper and SHDPE. Advanced color change was observed both in newspaper and SHDPE at 4 and 8 days after harvest (DAH). There was slower color change in fruit bagged with NSPP up to 8 DAH. Degree of anthracnose did not differ among bagging materials. Higher degree of stem end rot (SER) infection was noted in newspaper at table ripe stage (TRS). Onset of SER was delayed by about a day in NSPP and SHDPE. At 8 DAH, lowest weight loss was observed in mango bagged with newspaper. Longer shelf life was noted in NSPP-bagged fruit. Shelf life was slightly reduced in newspaper which may be attributed to fruit reaching TRS faster by a day and earlier onset of SER. TSS in newspaper was higher during storage while firmness showed decreasing trend but this did not vary among bagging materials. NSPP has potential as bagging material that can maintain better quality of 'Carabao' mango fruit.

**Keywords:** Bagging, Non-woven spun bond polypropylene, Stem end rot

# POSTER SECTION

**P-01:**

**MICROWAVE-ENCAPSULATION OF PURPLE SWEET POTATO  
EXTRACT: OPTIMIZATION OF DRYING CONDITIONS ON THE  
CHROMATIC PROPERTIES AND ANTHOCYANIN CONTENT**

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## **Abstract**

Purple sweet potato is rich in anthocyanin and categorized as potential natural colorant due to its attractive and intense of purple colour as well as offer great health benefits. Since anthocyanins were highly susceptible to chemical degradation through processing and storage, an encapsulation process may improve to its stability. In this study, microwave encapsulation method was used for the encapsulation of purple sweet potato extract (PSPE). The aims were to use a response surface methodology (RSM) in optimizing the drying time (255s, 315s, and 375s) and maltodextrin (MD) concentration (15%, 25% and 35%) for encapsulation of PSPE. Chromatic parameters, lightness ( $L^*$ ), redness ( $a^*$ ) blueness ( $b^*$ ), and total monomeric anthocyanin content (MAC) were evaluated as independent variables. Concentration of maltodextrin as wall material and microwave drying time was significantly ( $P < 0.05$ ) affected the chromatic parameters ( $L^*$ ,  $a^*$ , and  $b^*$ ) and MAC. The results showed that the highest desirability (0.809) was achieved with the optimum conditions at MD concentration of 23.83% and drying time 293 s. Under such condition, the encapsulated PSPE had high values for MAC (102.17 mg/L), Lightness,  $L^*$  (49.91), redness,  $a^*$  (38.58) and blueness,  $b^*$ (-9.0).

**Keywords:** Sweet potato, Anthocyanin, Dying

**P-02:**

***Vibrio tasmaniensis* CYTOTOXIC METALLOPROTEASES ARE  
CONTROLLED BY A COMPLEX REGULATORY NETWORK  
INVOLVING RPOS, QUORUM SENSING  
AND THE CSRA!CSR B PATHWAY**

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Interactions Hotes-Pathogenes- Environnements (IHPE), UMR 5244, CNRS, Universite de Montpellier, Ifremer, Universite de Perpignan Via Domitia, Montpellier, Francec; Sorbonne Universite, UPMC Paris 6, CNRS, UMR 8227, Integrative Biology of Marine Models, Station Biologique de Roscoff, Roscoff, Pranced

\* A.N.N. and E.D. contributed equally to this work

**Abstract**

*Vibrio tasmaniensis* LGP32 has been found to be associated with oyster summer mortality events compromising the sustainability of the *Crassostrea gigas* oyster-growing industry. CsrBs in *vibrios* are structurally-conserved multiple-copy small non-coding regulatory RNAs that play important roles in cell physiology and, especially, virulence. They are known to be regulated by the VarSNarA two-component system and quorum sensing (QS). Interestingly, *V. tasmaniensis* LGP32 was found to be the only species bearing 4 copies of *csrB* as compared to 2 to 3 copies in other *vibrios*. We have shown that the extra copy of *csrB4* is functional, and *csrBJ* expression is independent of the VarSNarA system. Importantly, our data suggest that a complex regulatory network involving CsrBs, QS, and the sigma factor RpoS provides redundant control, but differentially, the production of the two metalloproteases Vsm and PrtV represent the extracellular products that are cytotoxic against oysters.

**Keywords:** *vibrios*, oyster-growing, cytotoxic against oysters



**P-03:**

**QUALITY OF CHAYOTE [*Sechium edule* (JACQ.) SW.] FRUIT AT AMBIENT CONDITIONS USING 1-METHYLCYCLOPROPENE AND PASSIVE MODIFIED ATMOSPHERE PACKAGING**

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**Abstract**

Bitter melon is a highly perishable fruit vegetable crop. Its postharvest deterioration is associated with seed development, tissue softening, yellowing and fruit splitting. This study evaluated the effect of Newly harvested, medium-sized chayote (*Sechium edule*) fruit were treated with 500  $\mu$ L L-1-methylcyclopropene (1-MCP) for 24 hours, covered with cling wrap or a combination of 1-MCP + cling wrap then stored for 25 days at ambient conditions (26.3°C and 81.1% RH). At 15 days from treatment, fruit in cling wrap and fruit treated with 1-MCP + cling wrap significantly reduced weight loss by 51%. There was no consistent trend in the total soluble solids. Visual quality, days to sprouting and shelf-life did not vary, although fruit wrapped with cling wrap tended to have the longest shelf-life (19 days) and days to sprouting (17 days) due to delayed sprout growth as roots emerged first before the shoot. Decay did not vary but tended to be slightly less in the control fruit. The treatment with 1-MCP and cling wrap generally slowed down shoot emergence but not decay.

**Keywords:** 1-methylcyclopropene, passive modified atmosphere packaging, *Sechium edule*, sprout growth

**P-04:**  
**STUDY ON EXTRACTION TIME OF PECTIN FROM LIME (*Citrus latifolia*) PEELS**

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**Abstract**

Pectin is a complex polysaccharide group that can be found in the primary cell wall of higher plants, commonly obtained from peels of citrus fruits which can be used in pharmaceutical, and also used as food additive in food industries. In Cambodia present, lime is a kind of citrus fruit that Cambodian people always use as food ingredient but they just use the juice and they dispose of peels so there are many raw materials to extract pectin to sell in markets. In addition, pectin does not produce and sell in the market yet so the research on “study on extraction time of pectin from lime (*Citrus latifolia*) peels” was mentioned in the present study. The main objective of this research is to determine a suitable extraction time which can increase the amount of pectin from lime peels and analyze the chemical compounds in the final product. The experiment was studied on four different treatments. All treatments, dried weight peels 100g were first blended with distilled water and further acidified with the volume of citric acid to pH 1.5 and then boil at temperature 100<sup>0</sup>c but different extraction time 15, 30, 45, and 60 minutes. The result showed that the highest yield of pectin is 14% was obtained in 60 minutes extraction and contained 217.80 g/mol equivalent weight, 10% methoxyl content, 2% ash content, 10.87% moisture content, 29.33 mPa.s viscosity and the degree of esterification is 41.35% which can indicate that pectin obtained is low methoxyl pectin. By the object of this research study, it concluded that the treatment with boiling time 60 minutes, temperature 100<sup>0</sup>c and pH 1.5, is very suitable for extract pectin to get high yield and using in the food industries such as jam, jelly, beverage, ice cream, sauce and conserve products.

**Keywords:** Lime peels, Extraction time, Pectin

**P-05:**

**ISOLATION AND SELECTION OF PROTEASE PRODUCING BACTERIA FROM AQUACULTURE WATER AND SEDIMENTS**

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**Abstract**

This study focuses on the isolation of protease producing bacteria from aquaculture ponds and the optimization of protease production by the selected strain. There was a total of 16 strains isolated, of which 9 showed protease production ability. Four of these strains were identified as *Bacillus mesentericus*, *Bacillus subtilis*, *Micrococcus luteus*, and *Proteus vulgaris*. *Bacillus subtilis* gave the highest protease production (24.97 U/mL). Using RSM-CCD, it was found that protease production from this strain was optimal at 25.47 U/mL when the levels (%) of casein, inoculum size, and K<sub>2</sub>HPO<sub>4</sub> were 1.41, 2.90, and 0.24, respectively.

**Keywords:** protease production, *Bacillus subtilis*, RSM CCD

**P-06:**  
**EFFECT OF DIFFERENT ACIDS ON THE EXTRACTION OF PECTIN  
FROM POMELO (*Citrus grandis*) PEELS**

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**Abstract**

Pectin is a group of heteropolysaccharide which is a component of the plant cell and can be found in the middle lamella and primary cell wall. Pectin is such an important raw material for food, pharmaceutical, and cosmetic products as well. So the topic which talks about “Effect of different acids on the extraction of pectin from pomelo (*Citrus grandis*) peels” was mentioned in the present study. For the aim of the studying on this topic is that finding a suitable type of acid which can increase pectin’s yield from extraction process and determine other chemical compounds in the final product. There are three types of acid (citric, acetic and hydrochloric acid) were used as an extracting agent in this experimental research. This experiment was specifically studied on four different treatments (T<sub>0</sub> without using acid, T<sub>1</sub> using citric acid, T<sub>2</sub> using acetic acid, T<sub>3</sub> using with hydrochloric acid) with dry weight of pomelo peel 100g at pH value 1.5 during 60 minutes of boiling. Through the result of this experiment and chemical analysis, the result indicates that a treatment (T<sub>1</sub>) with using citric acid significantly affects the yield of pectin and it was obtained 14.49%, DE= 30.53% (low methoxyl pectin-LMP), Equivalent weight (EW) = 277.23 g/mol with a low viscosity. As a conclusion, the study proved that the use of citric acid as a solvent with pH value 1.5 during 60 minutes of boiling give a better result and also increase the quantity of pectin in comparison to another treatment.

**Keywords:** Pomelo peels, Acid types, Pectin

**P-07:**  
**LIVESTOCK TRACEABILITY MODELS IN NORTHERN VIETNAM**

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**Abstract**

The study was conducted in two Vietnam northern delta provinces, Hai Phong and Thai Binh. The surveyed sampling was selected on the basis of the maximization of traceability model. Some traceability models have been established, which show the differences between small scale production, large production and outsourcing. Traceability is taken place at independent actors and the actors who are ready to set up a traceability system in livestock chain in the future.

**Keywords:** Livestock, Traceability, Vietnam

**P-08:**  
**PRODUCTION OF BIOETHANOL FROM COFFEE PULP (*Coffea robusta*) IN VIETNAM**

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**Abstract**

Coffee pulp is the first waste product obtained during the wet processing of coffee bean. Coffee pulp represents 40% of the total weight of the coffee cherry. The coffee pulp contains 25.88% cellulose, 3.6% hemicellulose and 20.07% lignin. Coffee pulp is considered an ideal substrate of lignocellulose biomass for microbial processes for the production of value-added products (especially ethanol production). In this study, the coffee pulp was alkaline pretreated with NaOH (0.2 g/g biomass) at 120°C for 20 min in microwave treatment time gave the best results: 71.25% cellulose remaining, 46.11% hemicellulose removing and 76.63% lignin removing. After that, the pretreatment biomass was hydrolyzed with enzyme Viscozyme Cassava C (enzyme loading was 19.27 FPU/g) at 50 °C for 72 h. Under these conditions maximum reducing sugars and glucose concentration production was 38.21 g/L and 30.36 g/L. Then hydrolysis solution was fermented by yeast *S. cerevisiae* (3.10<sup>8</sup> cells/mL) at 30°C for 72 h. The maximum production of 11.28 g/L ethanol was obtained. The results indicate that being available in plentiful amounts and non-edible material, the coffee pulp will be a potential feedstock for bioethanol production in Vietnam.

**Keywords:** Bioethanol, coffee pulp, *Coffea robusta*, lignocellulose biomass, hydrolysis, pretreatment.

**P-09:**

## **REASERCH ON DYEING PROCESS FOR COTTON WITH AQUEOUS EXTRACTED FROM COFFEE LEAVES**

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### **Abstract**

In this study, cotton fabrics were dyed with aqueous extracts from coffee leaves. Aqueous extracts from coffee leaves were extracted with a water solution at 80°C, 90 mins and ratio of coffee leaves to water is 1/7. Investigate the influence of dyeing temperature, dyeing time and metal salts to the colour strength of dyed cotton fabric. The aqueous extracts from coffee leaves and dyed cotton fabric were characterized by UV-visible absorption spectroscopy, scanning electron microscopy (SEM), FT-IR spectroscopy and LC-MS. The results showed that dyed cotton fabric obtained color strength and fastness properties to be very good level 4–5. With the result obtained, we can make use of coffee leaves as natural dyestuff for textile materials., It contributes a small portion of natural dye technology in Vietnam and could be environment friendly, sustainable and valuable technology.

**Keywords:** cotton, natural dyes, Coffee leaves

## P-10

### COMBINED EFFECTS OF COMMERCIAL ALCALASE ENZYME AND FLAVOURZYME ON PROTEIN HYDROLYSIS IN SHRIMP HEADS (*Litopenaeus vannamei*)

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#### Abstract

The aim of this study was to investigate the potentials of using commercial preparations of alcalase enzyme and flavourzyme for protein hydrolysis in shrimp heads. Hydrolysis conditions were optimized by using a response surface methodology (RSM). The optimum concentration for combining the two commercial enzymes was tested in 11 experimental units together with three affecting factors i.e., reaction temperature, pH and time of hydrolysis. Enzyme combinations were investigated in 17 independent experiments. The results showed a hydrolysis efficiency of 90.19%, and an antioxidant activity of 86.16%. Hydrolytic activity was found to be optimal with an alcalase concentration of 19.42 U/g and at a flavourzyme concentration of 32.09 U/g. In addition, in order to obtain an hydrolysed protein solution with a high antioxidant activity, hydrolysis was found to be optimum at pH 7.01 and at a temperature of 54.94°C for a 2.96 h reaction time.

**Keywords:** Antioxidation, enzyme concentration, hydrolysis, response surface methodology (RSM), shrimp head meat.



## P-11

### **ANTS (INSECTA: HYMENOPTERA: FORMICIDAE) - A POTENTIAL HUMAN FOOD RESOURCE IN VIETNAM**

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#### **Abstracts**

The exploitation of ant larvae or ant eggs for food has been known for a long time in Vietnam. There are many species of ants in the natural world, but the eggs of ants would not be edible. Currently the eggs of some ant species like black ants (*Formica fusa* Linnaeus, 1758) and the black thorn ant (*Polyrhachis dives* Smith, 1857) are being used as food in our country, is considered precious and nutritious. According to the results from several studies the ant eggs are source of many valuable microelements, contain high levels of certain vitamins and many trace elements. More importantly they have an effect in tonic health. The collection of ant eggs from the wild in a certain time (March to May) of the year would be practically difficult and the number will not be large. Therefore, developing a technical process to acquire ant eggs through breeding could ensure regular supply,

**Keywords:** nutrition, ants (Hymenoptera: Formicidae), ant eggs, Vietnam.

## P-12:

# HAZARD ASSESSMENT OF COMMONLY USED AQUACULTURAL ANTIBIOTICS ON AQUATIC ECOSYSTEMS

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### Abstract:

The main objective of this study was to assess the hazards associated with the use of four common aquaculture antibiotics; Oxytetracycline, Erythromycin, Florfenicol and Sulfadiazine on aquatic ecosystems, using their LC50 values on the *Artemia nauplii*. *Artemia* were selected as an indicator organism to assess the hazard level to aquatic ecosystems and the effect on customers by consuming fish and other aqua products.

We conducted the experiments in the Laboratory of Fish Health, Department of Aquaculture, University of Ankara, Turkey. The *Artemia* cysts were commercially obtained, and the antibiotics came from the fish farm in Turkey. The cysts were decapsulated in water with artificial sea salt (30 g artificial sea salt/l water, pH: 8-8.5) for 24 h at 28 °C in the Lab Incubator. After harvesting the *Artemia*, the weak ones were eliminated and the good ones (fast moving) were retained and placed into 2 ml of antibiotic (10 *Artemia* each) for doses of: 5 mg/l, 10 mg/l, 25 mg/l, 50 mg/l, 75 mg/l, 100 mg/l, 150 mg/l, 200 mg/l, 250 mg/l, 300 mg/l, 350 mg/l, 400 mg/l, 450 mg/l of each antibiotic. Each test was replicated 3 times to reach a mean mortality rate for the *Artemia* at 24 h, 36 h and 48 h.

According to "The Chemical Hazard Classification and Labeling" (Comparison of GHS) of the United States Environmental Protection Agency (US EPA): **Category 1:** LC50 < 0.05 mg/L danger, Skull and crossbones Fatal if inhaled; **Category 2:** LC50 > 0.05 mg/L < 0.5 mg/L warning, no symbol, may be fatal if inhaled; **Category 3:** LC50 > 0.5 mg/L < 2.0 mg/L caution, no symbol harmful if inhaled; **Category 4:** LC50 > 2 mg/L, no label elements required, registrant may choose to use Category III labeling. We following obtained the results: LC50 for Oxytetracycline = 14,08 mg/l, Erythromycin = 23,68 mg/l, Florfenicol = 20,57 mg/l, LC50 for Sulfadiazine = 246,98 mg/l. So, all LD50s were higher than 2 mg/l, meaning no label elements are required, no symbol indicating "harmful if inhaled", and "no danger". If these four antibiotics are used in aquaculture in the normal range, and considering their LC50 values, they can be considered as non hazardous antibiotics to aquatic ecosystems, based on the GHS.

**Keywords:** antibiotics, aquatic ecosystems

**P-13:**

## **APPLICATION OF DRIED CARROT (*Daucus carota* L.) POWDER IN WHEAT BREAD PRODUCTION**

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### **Abstract**

In this study, carrot powder was prepared from fresh carrots with a diameter of 80 mm by cutting them into 2 mm thick slices, followed by hot air drying at 60°C for 1 h and grinding dried slices to a particle size of 0.125 mm. The carrot powder had a moisture content of 12.95% and carotenoids 12.03 mg/ g on dry weight basis. The objective of this study was to compare the chemical, physical and texture properties of bread samples supplemented with carrot powder. Five bread samples with varying percentages of carrot powder (0%, 2.5%, 5%, 7.5%, and 10%) were prepared. All samples were analysed for moisture contents, carotenoids, loaf volume, density, color and texture. The result showed that the addition of carrot powder at concentrations up to 5% (w/w) had the highest moisture content (47.61%), the maximum loaf volume (287.25 ml), the lowest density (0.28 g/ml) and the lowest hardness force. There is a progressive increase in carotenoids (0.21 mg/g) in sample with 5% carrot powder.

**Keywords.** Bread, carrot bread, carrot flours, carotenoids.

**P-14:**

**EFFECT OF COLD TEMPERATURE ON PLANT GROWTH AND  
ACCUMULATION OF RUBISCO CONTENT IN RESISTANT-SHEATH  
BLIGHT RICE LINE 32R (*Rhizoctonia solani* KUHN)**

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**Abstract**

The rice line 32R is resistant-sheath blight and high-yield potential, but poor growth under low temperature. We examined the plant growth rate and accumulation of Rubisco content in leaf of 32R in comparison with those of the susceptible-sheath blight rice line 29S and the model japonica rice variety Nipponbare under low temperature. The seedlings of the 4<sup>th</sup> leaf stage exposed to 14/14°C and 19/14°C (day/night) for 5, 10 and 15 days. Plant height, stem length, leaf area, dry biomass, content of chlorophyll and ribulose 1,5-bisphosphate carboxylase/oxygenase (Rubisco) were recorded. Plant height, leaf area, chlorophyll content, Rubisco content, RGR, NAR and RMR of 32R, 29S and Nipponbare were the lowest in 14/14°C and showed lower in 32R than in both 29S and Nipponbare. Plant height, stem length, leaf area, chlorophyll content, RGR and NAR correlated with Rubisco content strongly. In addition, two-way ANOVA indicated that temperature and time course influenced the leaf area, rubisco content, RGR and NAR. Temperature, time course and variety influenced leaf area and Rubisco content. These results suggest that a lowering of Rubisco content in 32R is major factor that induced to limit plant growth rate under low temperature.

**Keywords:** Low temperature, Rubisco content, Sheath blight disease, Rice line 32R, Plant growth rate

**P-15:**  
**EFFECT OF 1-METHYLCYCLOPROPENE ON THE POSTHARVEST  
QUALITY OF BITTER GOURD (*Momordica charantia* L.) FRUIT  
STORED IN LOW TEMPERATURE**

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**Abstract**

Bitter gourd is a highly perishable vegetable and postharvest deterioration is associated with seed development, tissue softening, yellowing and fruit splitting. This study evaluated the effect of various concentrations of 1-methylcyclopropene (0, 10, 100, 1000 nL·L<sup>-1</sup>) for 12 h, an ethylene antagonist, on the ascorbic acid content and postharvest characteristics of bitter gourd fruit packed in polyethylene bags and stored in a refrigerated cabinet (9.5°C-13.6 °C C, 56%-81% RH) for 7 or 14 days then in ambient (27.8 °C -29.9 °C, 61%-70% RH) for an additional 3 days. Weight loss, pH, total soluble solids, ascorbic acid, visual quality and decay did not vary. The green fruit color with the absence of chilling injury symptoms characterized the samples in low temperature storage for 7 days but not those held for 14 days. The transfer from low temperature storage to ambient conditions led to faster deterioration of bitter gourd. 1-MCP tended to reduce yellowing when transferred to ambient after 7 days. It did not however alleviate chilling injury.

**Keywords:** Chilling injury, Refrigerated display cabinet, Yellowing

**P-16:**  
**OPTIMIZATION OF NUTRITIONAL COMPOSITION FOR CULTURE OF  
*Cordyceps* spp CULTIVARS IN VIETNAM.**

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**Abstract**

*Cordyceps* fungus - a parasitic fungus on insects, is known as a precious medicine in traditional medicine. In Vietnam, some strains of *Cordyceps* sp are found in Langbiang, Lam Dong by Việt nam research group. How to obtain the highest biomass of domestic precious source of medicine in the country to protect public health (high antioxidant and anti-inflammatory) in artificial conditions to take the initiative in research source as well as production is very important and necessary. In this study we analyse and survey some of the culture medium and culture conditions of fungal biomass in order to find the best culture. Mushroom biomass was obtained by static liquid culture on different types of culture and culture conditions combined with screening by software-biology to select the best culture and culture conditions. Mushroom biomass obtained by static liquid culture on other types of media combined with screening using IBM SPSS Statistics 2.0 software with Anova one way function to select the best culture environment. Results obtained 200g potatoes, 20g saccharose, 10gYeast extract, 1g K<sub>2</sub>HPO<sub>4</sub>. We then proceeded to test the antioxidant abilities of the ABTS method with an IC<sub>50</sub> of 1434.418398. With these results, we can proceed to determine their biological activity in tissues and cells.

**Keywords:** *Cordyceps* spp, Nutritional Composition.

**P-17**

## **RESEARCH ON PRODUCTION PROCESS OF SHRIMP FLAVOR SOAP FROM WASTE SHRIMPS**

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### **Abstract**

In the process of processing frozen shrimp peeled to produce one ton of shrimp products will be released into the environment 0.75 tons of waste. These wastes have been used primarily for animal feed, but the process of processing is consuming very much energy, polluting the environment and the economic value is not high. There have been several studies on the extraction of chitin compounds, chitosan has been applying for production but the processes used are chemical processes and only focus on the recovery of chitin without recovery of protein, enzyme, astaxanthin in shrimp waste causes loss of waste. In this paper, we present results of research work on production of shrimps flavor soap from waste of shrimp by alcalase and flavourzyme enzyme compounds. Step 1, hydrolysis process using alcalase enzyme 0.2%, hydrolysis temperature 60°C, pH 6.5, retention time 2 handstep 2, with flavorzyme enzyme at concentration 0.1%, hydrolysis temperature 50 °C, pH 6.5, retention time 1 h. Protein hydrolysis from shrimp head is mixed with spices: 2% salt, 9% sugar, 2.5% salt, 0.5% citric acid, 0.5% garlic powder, 0.5% chili, 0.5% sweet powder, which are created flavor soap of shrimp flavored shrimp flavor, sweet taste and met current food safety standards.

**Keywords:** alcalase, Flavourzyme, Hydrolysis, Shrimp waste, Soap, Protein

**P-18:**

**BIOCHEMICAL, SENSORY, AND MICROBIOLOGICAL ASSESSMENT  
OF BLACK TIGER SHRIMP (*Penaeus monodon*)**

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**Abstract**

Biochemical, microbiological and sensory changes of black tiger shrimp (*Penaeus monodon*) during 10 days of ice storage were determined. Quality index method (QIM) was developed to assess the freshness and shelf life of shrimp. Total visible count (TVC), total volatile base nitrogen (TVB-N), trimethylamine (TMA-N), and pH values in shrimps were determined each day. The results showed that shelf life of shrimp storage in ice was 8 days; specifically,  $QI = 14.50$ ,  $TPC = 5.832 \log cfu/g$ ,  $TVB-N = 28.168 \text{ mg N}/100g$ ,  $TMA-N = 7.365 \text{ mg N}/100g$ , and  $pH = 7.433$ . There were positive linear correlations between quality indices (QI), TVB-N, TMA-N, pH values and storage time at significant level. The values of indices can be calculated by using correlation linear equations. The qualities of black tiger shrimps can be classified into four main types: special – good – moderately acceptable and just acceptable.

**Keywords:** black tiger shrimp, Hypoxanthine, QIM



**P-19:**

**OPTIMIZING DECAFFEINATION CONDITIONS FROM COFFEE PULP  
IN VIETNAM (*Coffea robusta*) USING HOT WATER EXTRACTION**

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**Abstract**

This study focused on determining the optimal extraction conditions of caffeine from coffee pulp (*Coffea robusta*) using hot water extraction method and response surface methodology (RSM). Extraction process consisted of three independent factors, namely, solvent/material ratio  $X_1$  (30/1-50/1), extraction temperature  $X_2$  (70-90°C) and extraction time  $X_3$  (90-150 min) that influenced the response of caffeine extraction efficiency (CEE, %).

The results of the research indicated that the best extraction conditions were solvent/material ratio ( $X_1$ ) at 38.6/1, extraction temperature ( $X_2$ ) at 82.9°C and extraction time ( $X_3$ ) at 136.7 minutes which yielded the CEE at 88.1%. The predicted values of CEE was in agreement with the experimental values, thus indicating the suitability of RSM in optimizing the extraction conditions.

**Keywords:** Caffeine, caffeine extraction, coffee pulp, *Coffea robusta*, hot water extraction.

**P-20:**  
**STUDYING TO MADE WINE FROM MULBERRY**

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**Abstract**

Fruit wines are known as natural products of fermentation process with 9 ÷ 15% alcohol, they contain many vitamins, mineral substances. Fruit wines are used to being made from grapes, but today various fruit are use, in which mulberry is being considered as a feasible material to product high quality of wine. In Vietnam, planning mulberry tree to product silk has existed for a long time but mulberry has not been used to made industrial products. Therefore, in this thesis, we focus on studying to made wine from mulberry. By many preliminary tests, we choose a suitable kind of yeast for the fermentation process of mulberry, then we studied the influences of the content of soluble ingredients (°Bx), pH, percent of yeast, time. In the optimization experiment, the results are as follow: the percent of yeast is 6.78%, pH is 3.75%, and soluble ingredient is 21°Bx of fermentation environment.

**Keywords:** Fruit wine, Fermentation, Grapes, Optimization

**P-22:**

**OPTIMIZATION OF PROTEASE PRODUCTION FROM *Bacillus subtilis* SIAMB79 USING RSM-CCD**

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**Abstract**

*Bacillus spp.* have been widely used for the large-scale industrial protease. These bacterial strains can efficiently secrete protease into the culture medium using the general secretion pathway. In this study, six strains of *Bacillus spp.* were studied for their protease production, and the strain *Bacillus subtilis* SIAMB79 - which showed highest protease productivity - was subjected to the optimization of protease production using RSM-CCD design. Results showed that the optimized medium for maximum protease production of this strain included (g/L) meat extract (1.0), peptone (0.3), gelatin (5.0), glucose (0.05), NaCl (1.0) MgSO<sub>4</sub> (0.1), K<sub>2</sub>HPO<sub>4</sub> (1.0), KH<sub>2</sub>PO<sub>4</sub> (1.0), and (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> (1.0). The maximum protease yield of 146,172 UI/ml was obtained in 36 hours of incubation in the optimized medium at pH 7, 35°C.

**Keywords:** Optimization, *Bacillus subtilis* SIAMB79, Protease yield

**P-23:**

**BAU GERMLASM CENTER (GPC) FRUIT TREE IMPROVEMENT PROGRAM (FTIP)-A ONE STOP SERVICE FOR FRUIT DEVELOPMENT, CONSERVATION, BIODIVERSITY, PRODUCTION, EXTENSION AND RESEARCH**

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**Abstract**

The Fruit Tree Improvement Project (FTIP) is the largest depository/germplasm center for fruits, medicinal plants and agroforestry in Bangladesh. Initially, the project was established on one acre of land in 1991 funded by the Swiss Agency for Development and Cooperation (SDC), whose mission was to establish a seed bank and extension of technologies among farmers. Over the past 26 years, FTIP has developed a vast array of improved and conserved resources and science-based appropriate technologies for fruit tree propagation and management. Currently it has occupied 32 acres of land with the objectives being to: i) maintain the germplasm centre (GPC) as a facility for education, research and training; ii) conserve germplasm resources (fruit tree, medicinal plants and associated agroforestry sp.); iii) supply quality plant materials to various organization (DAE, BRAC, Proshika, World Vision Bangladesh, BADC, etc.). FTIP possesses 300 varieties of mango, 55 varieties of guava, 25 varieties of litchi, 48 varieties of citrus, 94 accessions of Jackfruit, 67 species of minor fruits, 18 species of exotic fruits collected from 52 countries, including 97 species of medicinal plants. FTIP has released total varieties of fruits. Recent achievement at FTIP developed 'BAU KUL (*Ziziphus Mauritiana*)' which has been in great demand all over the country. Another achievement is the polyembryonic saplings of mango, by which we can get easily authenticate quality planting material (QPM) without vegetative propagation. A different systematic approach, like sapling distribution, exchange visits, motivational tours, and demonstrations were performed to implement this project. In total, 250 MS and 41 Ph.D. students have completed their course of study. and presently 20 Ph.D. and 50 MS students are conducting research here from different disciplines. FTIP helps to educate, conduct research, and to propagate and disseminate improved germplasm and other technologies

**Keywords:** Germplasm centre, Vegetative propagation

**P-24:**  
**QUALITY AND SAFETY ISSUES FOR HORTICULTURE PRODUCE IN BANGLADESH**

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**Abstract**

Fruits and vegetables are rich sources of vitamins, minerals, dietary fibres. per capita consumption is still lower ( $212 \text{ g day}^{-1}$ ) than desirable amount ( $400 \text{ g day}^{-1}$ ). There exists food- phobia in the society. Consumption of fruits and vegetables have been dropped due to perceived health risks due to consumption of adulterated or unsafe foods. There are also reports of rejection of export consignments. Postharvest loss is substantial. Assurance of quality and safety is a challenge in the context of nutrition security, public health and export. Presence of chemical residues in food is a major food safety concern. Food Safety Act 2013 and establishment of

BFSA are noticeable steps to deal with this deep-rooted problem. Consumption of safe fruits and vegetables and expansion of export can only be achieved if quality and safety controls are in place. Quality and safety issues in horticultural chains to be prioritized for domestic marketing and export. Postharvest loss is substantial. The present paper deals with the safe horticultural production and policy.

**Keywords:** Food safety, Policy, Horticultural produce, Chemical residue

**P-25:**

**STUDY ON THE CHARACTERISTICS OF STRONG HYDROGEN BONDS IN AQUEOUS SOLUTIONS OF AMINO ACIDS AND GUANIDINE-ACETATE COMPLEXES USING COMBINED PHYSICO-CHEMICAL METHODS**

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**Abstract**

Intermolecular H-bonds play a leading role in the self-organization of molecular systems at condensed state and in the solvation of proteins and peptides. In particular, the formation of strong intermolecular H-bonds is one of the most important stages in the proton-transfer process. The investigation of strong H-bond characteristics for amino acid solutions and biomedicines makes it possible to supplement current knowledge about the nature of intermolecular interactions in proteins and peptides. It is known that there are various physicochemical methods used to study strong H-bonds. Each method has its own strengths and weaknesses. An analysis of previous studies showed that the most promising approach may be the combined use of experimental (IR-spectroscopy) and calculation (quantum chemistry and molecular dynamics) methods. In addition, despite a large number of studies on the spectral properties of proteins and peptides, the frequency range of  $1900 - 2800 \text{ cm}^{-1}$  is rarely considered. The present work is devoted to the study of structure and spectral properties of strong intermolecular  $\text{N-H}^+ \dots \text{O}$  in aqueous solutions of zwitterion-ions of amino acids and guanidine- acetate complexes in the range of  $1900 - 2800 \text{ cm}^{-1}$  by the combined use of methods: IR- spectroscopy, dynamic density functional theory and MD. The results showed that the combined use of the indicated methods is an effective way to evaluate characteristics of strong H-bonds. The spectrum of solutions studied was successfully obtained with the presence of specific peaks corresponding to vibrations of  $+\text{N-H}$  groups, forming strong intermolecular  $\text{N-H}^+ \dots \text{O}$  bonds in guanidine-acetate complex in the range of  $2100 - 2300 \text{ cm}^{-1}$ .

**Keywords:** Hydrogen bonds, Amino acids

**P-26:**

**IN VITRO PROPAGATION OF *Codonopsis javanica* BY CALLUS CELLS FROM THE YOUNG STALKS**

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**Abstract**

*Codonopsis javanica* is a precious herb that contains many useful compounds for human health, and there is currently much interest in the propagation and planting of this crop. *In vitro* culture of *Codonopsis javanica* by the regeneration of callus cells improves the propagation coefficient much more than do other methods. The young stalks of *Codonopsis javanica* were sterilized with a 0.1% HgCl<sub>2</sub> solution for 15 minutes, then they were cultured for callus formation on an MS medium supplemented with 30 g/l sucrose, 8 g/l agar and 2 mg/L 2,4-D, which achieved the highest rate of callus at 97.33%. The calli that were produced were cultured in medium containing 1.0 mg/L 2, 4-D followed by culture of shoot regeneration on MS medium supplemented with 30 µg/l sucrose, 8 g/l agar and 1.5 mg/l BA. The addition of adenine sulfate to the culture medium had a pronounced stimulatory effect, which increased the ability to induce shoot regeneration from calli of *Codonopsis javanica*. At a concentration of 2 mg/l adenine sulfate had the highest efficiency, the number of the new shoots were 67.8 buds, height 8.3 cm with 1 to 6 layers of leaves. *In vitro* full regeneration process was completed when using 0.5 mg/l NAA as an inducer of rooting for the best rooting efficiency, reached 5.13 roots with a length of 3.4 cm after 6 weeks of culture.

**Keywords:** callus culture, shoot regeneration, *Codonopsis javanica*. *in vitro* propagation

**P-27:**  
**CONSUMER WILLINGNESS TO USE FOR SOFT DRINK:  
A VIETNAMESE CASE STUDY**

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**Abstract**

A survey of soft drink consumption was conducted in Ho Chi Minh City – the largest City in Vietnam. This study was aimed to explore the determinants of soft drink consumption in Vietnam with a specific focus on the bean juices, carbonated drinks, artificial mineral drinks, fruit-vegetable juices, ready to drink tea, ready to drink herb tea, acid fermented drinks trade and the consumer's behavior. In this study, 4335 customers were surveyed in 19 districts in Ho Chi Minh City of Vietnam in randomly selected places, and consumers' willingness to use soft drinks was measured. This work investigated the soft drink consumption habit of respondents about: product type, consumption time, consumption places, frequency, consumption purpose, brand, nutrition, price, packaging, taste, product characteristics and food safety according to different ages. Questions about liking, beneficial effects, willingness to use and price estimates for purchasing were asked. In addition, we also surveyed how the consumers knew products trend. Carbonated drink is consumed the most whereas the fruit/vegetable based juice consumption begins to increase rapidly. Food safety of the beverages strongly affected the willingness to use them. The price respondents were willing to pay for the beverages of 100-500 ml soft drink from 10.000 to 20.000 VND (~ 0.43 – 0.87 USD).

**Keyword:** soft drink, consumer, willingness to use, gender, age, price, Vietnam.



**P-28:**

## **CONSUMER WILLINGNESS TO USE FOR VEGETARIAN FOOD PRODUCTS IN VIETNAM**

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### **Abstract:**

A survey concerning vegetarian food products consumption was conducted in Ho Chi Minh City – the largest City in Viet Nam. This study seeks to explore the determinants of vegetarian food products consumption in Vietnam with a specific focus on the ready-to-eat products, soy-based products, vegetable-based products, mushroom-based products, precooking products, starch based-products, vegetarian foods forming meat products, and others. Parallel the consumer's behavior also is studied. In this study, 2109 customers (43.3% male and 56.6% female) were surveyed from 19 districts in Ho Chi Minh City of Vietnam in randomly selected places, and consumers' willingness to use vegetarian food products was measured. This work investigated the vegetarian food products consumption habit of respondents about: product type, consumption time, consumption places, frequency, consumption purpose, brand, nutrition, price, packaging, taste, product characteristics and food safety according to different ages (from under 18 to 65 years old). The result showed that most people use vegetarian foods at least one time a week or more than one time a week. In the abstinence day, the people chose more vegetarian foods than other time. The surveyors like the soy-based food products than others. In addition, we also surveyed how the consumers behave to the vegetarian food products trend. Now a day, people chose the vegetarian food products not only because of their religion (29.1%), but also because of their health (32.7%). Our survey will be helped the food product producer to improve their innovation.

**Key words:** Vegetarian food products, Consumer, Vietnam, Food market, Consumption habit

**P-29:**

## **CASPASE-9B DIRECTLY INTERACTS WITH CIAP1 TO DRIVE NF-KB ACTIVATION AND TUMORIGENIC SIGNALING**

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### **Abstract**

Caspase-9b (C9b), an anti-apoptotic isoform of caspase-9, has been reported to augment the anchorage independent growth (AIG) and tumorigenic capacity of non-small cell lung cancer (NSCLC) cells. The mechanism of this biological observation was revealed in this study. Specifically, C9b was demonstrated to activate the canonical arm of the nuclear factor  $\kappa$ B (NF-  $\kappa$ B) pathway in human NSCLC cells and tumors. Further mechanistic studies demonstrated that C9b activates this pathway via direct interaction with cellular inhibitor of apoptosis 1 (cIAP1) and subsequent induction of the E3 ligase activity of this IAP family member. Lastly, this protein : protein interaction was required for C9b to promote the viability, AIG and tumorigenicity of NSCLC cells and broadly translate to diverse NSCLC genotypes. Hence, small molecule inhibitors of this interaction may lead to a new generation of effective therapeutics for the treatment of NSCLC.

**Keywords:** Caspase-9b, anti-apoptotic isoform, Tumorigenic signaling

**P-30:**  
**RESEARCH PROCESS OF YOGURT *Caulerpa lentillifera***  
**PRODUCTION**

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**Abstract**

This article presents the results of research on the creation of yogurt *Caulerpa Lentillifera*, with the intent to increase the sensory value and nutritional value (mineral Mg and P) from the raw materials *Caulerpa Lentillifera*. Yogurt is a rich, nutritious and delicious product, and a common choice of consumers. The yogurt market becomes more active, when competitive yogurt products appear in the market. This will bring more variety of yogurt products to Vietnam. Research results provide the following values: proportion *Caulerpa Lentillifera* and water in the process of granulation is 1:2; content of sodium alginate of granulation 1.5%; proportion of seed *Caulerpa Lentillifera* to yogurt is 20%; the storage time of yogurt *Caulerpa Lentillifera* is 14 days at 2-6°C.

**Keywords:** Yogurt, *Caulerpa Lentillifera*, Nutrition, Seed *caulerpa Lentillifera*, Preservation, Mineral.

**P-31:**

**RESEARCH AND APPLICATION OF CHITOSAN FLIM OF DEACETYL  
80% COMBINES SILVER NANO WAS PRESERVED HOA LOC  
MANGO**

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**Abstract**

The purpose of this research was to create chitosan flim of deacetyl 80% combine with silver nano and increase the shelf life of hoa loc mango. Through research content, the elements to create silver nano chitosan membrane accordances as: chitosan concentration studied (0,5%; 0,75%; 1%; 1,25%; 1,5%), pH (2,9; 3,0; 3,1; 3,2; 3,3), silver nitrat concentration create silver nano (10-3M, 5x10-3M, 10-2M, 15x10-2M), silver nano content which combines silver nano with chitosan (50ppm; 75ppm; 100ppm). Result of tentative got chitosan 0,75%, pH 3,3, nitrat silver 10-3M and silver nano 75ppm were the best which made chitosan – silver nano flim. From the results obtained, which survey factors such as storage temperature, storage time, control sample. After 28 days, Hoa Loc mango was preserved by silver nano – chitosan flim to limite dehydration, maintain fruit color and slow microbial spoilage that the better use chitosan film.

**Keywords:** Silver nano, Mango, Chitosan

## P-32:

# FORMULATION OF ANTIMICROBIAL EDIBLE FILM BASED ON GELATIN AND LEMONGRASS ESSENTIAL OIL

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### Abstract

The results showed that the most suitable concentration of gelatin in film-forming solution was 8% (W/V). At this concentration, the film exhibited a water vapor permeability of  $14.90 \times 10^{-10} \text{g}\cdot\text{m}^{-1}\cdot\text{s}^{-1}\cdot\text{Pa}^{-1}$ ; a tensile strength of 0.91 MPa, an elongation at break of 6.48%; and an elastic modulus of  $1.13 \times 10^9 \text{N m}^{-2}$ . Besides, LEO obtained from the steam distillation was resistant to all of the tested microorganisms including *Bacillus subtilis*, *Staphylococcus* sp., *Escherichia coli* and *Aspergillus niger*. The MIC value of LEO for all tested microorganisms was 2%. Based on these results, the proportion of LEO incorporated in film forming solution would be varied from 4-8% (V/V). However, at these levels, the films obtained were almost not resistant to the tested microorganisms. The antimicrobial activity of the films only exhibited when the proportions of LEO were ranging from 10% or more. Therefore, to determine the most suitable proportion of LEO, physical properties of these antibacterial films were examined. The results showed that LEO proportion for antimicrobial film that possessed appropriate physical properties was 14%. With this proportion of LEO, the film obtained exhibited a tensile strength of 0.18 MPa, a percentage of elongation of 2.53% and an elastic modulus of  $0.88 \times 10^9 \text{N m}^{-2}$ . In addition, the water vapor permeability of the film in this case was reduced to  $2.19 \times 10^{-10} \text{g}^{-1}\cdot\text{s}^{-1}\cdot\text{Pa}^{-1}$ . The change in antibacterial activity of the films obtained from the above process over time was monitored in two different conditions i.e., storage in plastic bags or directly exposed to the laboratory environment. The results showed that antibacterial activity of the films stored in plastic bags was maintained up to 25 days after film manufacturing whereas that of the films directly exposed to laboratory environment was up to 20 days.

**Keywords:** gelatin, lemongrass essential oil, LEO.

**P-33:**  
**RESEARCH ON PRODUCING THE BEVERAGE FROM THE WASTE  
OF ASPARAGUS (*Asparagus officinalis L*)**

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**Abstract**

This research work was aimed to find the suitable parameters in the processing of asparagus juice from asparagus waste (small part, root and old part). Based on the results of the survey, the extracted ratio of fresh asparagus waste and water was 1: 4 or 1: 5. At a 1: 4 extraction ratio, the maximum reducing sugar content was  $2.4610^{\pm 0.0248}$  (mg/g). At the extraction ratio of 1: 5, the highest mineral content was obtained at  $0.5838^{\pm 0.0074}$  (%). At the extracted time 20-25 min, the highest protein content was  $0.1444^{\pm 0.0052}$  mg/g. The extraction temperature was fixed at 100°C. The pasteurization temperature was 90°C within 20 min (based on the time that core temperature of product reaches 90°C). The product showed a good sensory characteristics and can be produced commercially.

**Keywords:** Asparagus, Beverage, Food product, Waste, Beverage processing, *Asparagus officinalis L*

**P-34:**  
**A HOPANE TRITERPENOID FROM THE MYCELIUM OF *Isaria japonica* IN VIETNAM**

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**Abstract**

A hopane triterpenoid (11 $\beta$ , 22-dihydroxyhopane) was isolated from the methanol extract of the mycelium of *Isaria japonica* in Vietnam. The structure of this compound was elucidated using a combination of 1D and 2D NMR techniques (<sup>1</sup>H-, <sup>13</sup>C-NMR, COSY, HSQC and HMBC). In the study, we reported the comprehensive <sup>1</sup>H- and <sup>13</sup>C-NMR spectral data of 11 $\beta$ , 22-dihydroxyhopane for the first time.

**Keywords:** *Isaria japonica*, Triterpenoid, 11 $\beta$ , 22-dihydroxyhopane, NMR technique, Mass spectrometry.

## P-35:

# APPLICATION OF SOLID-STATE FERMENTATION: AN OVERVIEW

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### **Abstract**

Large amount of wastes is generated every year from the industrial processing of agricultural raw materials. Most of these wastes are used as animal feed or burned as alternative for elimination. However, such wastes usually have a composition rich in sugars, minerals and proteins, and therefore, they should not be considered “wastes” but raw materials for other industrial processes. Solid-state fermentation (SSF) has built up credibility in recent years in biotech industries due to its potential applications in the production of biologically active secondary metabolites, apart from feed, fuel, food, industrial chemicals and pharmaceutical products and has emerged as an attractive alternative to submerged fermentation. The presence of carbon sources, nutrients and moisture in these wastes provides conditions suitable for the development of microorganisms, and this open up great possibilities for their reuse in SSF processes.

Bioremediation, bioleaching, bio-pulping, bio-beneficiation, etc. are the major applications of SSF in bioprocesses, which have set another milestone. Utilization of agro-industrial residues as substrates in SSF processes provides an alternative avenue and value-addition to these otherwise under- or non-utilized residues. The reuse of agro-industrial wastes in SSF processes is of particular interest due to their availability and low cost, besides being an environment friendly alternative for their disposal.

This review describes the state-of-art scenario in totality on SSF although the focus is on the most recent developments on SSF processes and products developments. The characteristics of SSF systems and variables that affect. Potential applications of agro-industrial wastes in SSF processes for the obtainment of value-added compounds are described.

**Keywords:** Bioreactors, enzyme production, food processing industry, solid-state fermentation



**P-36:**

**THE DEAD-BOX PROTEIN CshA IN *Staphylococcus aureus*  
CONTAINS ATP-INDEPENDENT DNA STRAND ANNEALING AND  
EXCHANGE ACTIVITIES**

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**Abstract**

DEAD-box proteins (DBPs) that are usually RNA helicases have important roles in eukaryotic and bacterial RNA metabolism. Recent studies have reported that certain prokaryotic DBPs exhibit ATP-independent nucleic acid displacement and annealing activities. We investigated one putative RNA helicase, CshA DEAD-box protein, from vancomycin-resistant *Staphylococcus aureus* strain Mu 50 for ATP-independent activities on nucleic acids. We herein report that CshA has two novel ATP-independent activities—annealing of complementary single-stranded DNA (ssDNA) and strand exchange on short double-stranded DNA (dsDNA). These DNA strand annealing and exchange activities are independent of Mg<sup>2+</sup> ion or ATP binding and hydrolysis. CshA binds to dsDNA containing diverse end structures with various affinities: forked dsDNA > tailed dsDNA > blunt-end dsDNA. The rate and efficiency of CshA-catalyzed ssDNA annealing and DNA strand exchange is negatively correlated with the binding affinities of CshA to the dsDNA product. ssDNA annealing activity with tailed dsDNA substrates as well as versatile DNA strand exchange activity of CshA suggests a possible role in dsDNA break repair processes.

**Key words:** DEAD-box, nucleic acid, CshA-catalyzed

**P-37:**

**ULTRASOUND-ASSISTED EXTRACTION USED FOR THE  
ISOLATION OF TOTAL TRITERPENOID SAPONINS FROM  
*Gomphrena celosoides***

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**Abstract**

In this paper, a method of ultrasound-assisted extraction (UAE) was used to extract total triterpenoid saponins from *Gomphrena celosoides*. The extracts were directly determined by colorimetric method without any further treatment. Several factors affecting the UAE extraction rate were also discussed, such as extraction time, temperature, ratio of solvent to material. Optimal conditions of UAE can be concluded as follows: 32.32 min at 74.99°C, the ratio of solvent to material is 25.73 by using 70% ethanol as the solvent, and the highest yield of triterpenoid saponins were 1.75% (DW).

**Keywords:** Ultrasound-assisted extraction, Triterpenoid saponins, *Gomphrena celosoides*.

**P-38:**

**OPTIMIZING THE EXTRACTION WITH ACETONE OF PHENOLIC COMPOUNDS AND ANTIOXIDANT CAPACITY FROM FRESH LEAVES OF *Moringa oleifera***

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**Abstract**

The purpose of the study is to determine the optimal extraction conditions for fresh *Moringa oleifera* leaves using Soxhlet extraction method and response surface methodology (RSM). Extraction process consists of three independent factors: extraction temperature (X1: 55 – 65°C), acetone solvent (70% V)/material ratio (X2): 30/1 – 40/1, and extraction time (60 – 120 minutes), which were optimized by two responses including the total polyphenol content (TPC) and antioxidant capacity (AC). The results showed that the best extraction conditions were obtained at temperature of 59.61°C, solvent/material ratio (X2) of 35.48/1 and extraction time (X3) of 102.04 min. At this optimal condition, TPC and AC were 26.47 mg gallic acid equivalent (GAE)/g dried weight (DW) and 467.64 µmol Trolox/g DW, respectively. The predicted values of TPC and AC were in agreement with the experimental values, hence indicating the suitability of RSM in optimizing the extraction conditions.

**Keywords:** Soxhlet extraction method, phenolic antioxidant capacity, phenolic compound, total polyphenol, *Moringa oleifera* leaves

**P-39:**  
**THE EFFECT OF ULTRASOUND ON HYDROLYSIS OF STARCH  
FROM DEFATTED RICE BRAN**

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**Abstract**

The study was conducted to survey the influence of high-power ultrasound in hydrolysis of starch from defatted rice bran. Ultrasonic processing including temperature (30, 45, 60, 75, and 90°C), ultrasonic power (7.5 W/mL, 9.4 W/mL, 11.3 W/mL, and 13.1W/mL), and time (30, 60, 90, and 120 s). The results indicated that ultrasound reduced strongly particle size distribution of rice bran starch. Therefore, ultrasound improved the hydrolytic yield of rice bran starch. Specifically, the conditions of ultrasonic treatment were as follows: ultrasonic power of 9.4 W/mL, temperature of 60 °C, and sonication time of 90 s. Under these conditions, the hydrolytic yield of rice bran starch increased 18.2% in comparison with that in the control sample.

**Keywords:** Hydrolysis, Rice bran, Starch, Ultrasound

**P-40:**  
**ANTIFUNGAL ACTIVITIES OF NEEM LEAVE EXTRACTS AGAINST**  
***Magnaporthe oryzae* IN VITRO**

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**Abstract**

Effect of aqueous extracts of neem leaves on *in vitro* growth of *Magnaporthe oryzae* was investigated. Fungi were culture on potato dextrose agar plates. Neem leave extract with ratio 1:5 (w/v) in distilled water provide high inhibition to *M. oryzae* and prolong the same quality after a month storing at 4<sup>0</sup>C. Further dilution to 10<sup>4</sup> from the stock still against mycelial growth of *M. oryzae* effectively. Sporulation growth was restricted completely with 50 time diluted extract solution. Soaking leaves in water for 5 days before processing to obtain extract showed a higher effect to against fungi. Results from this study suggest the potential use of neem leave extract to prevent *M. orryzae*, a pathogen that causes disease in some plants.

**Keywords:** *Magnaporthe oryzae*, Mycelium, Neem leave extract, Sporulation

**P-41:**  
**PRODUCTION OF EGG YOLK IMMUNOGLOBIN (IgY) AGAINST**  
***Vibrio parahaemolyticus***

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**Abstract**

Egg yolk immunoglobulin (IgY) is a unique type of immunoglobulin found in egg yolks and its applications in prophylactic, therapeutic, detection of microbial contaminants has been widely studied. In this study, egg yolk immunoglobulin IgYs were produced by using formalin inactivated immunogens of *Vibrio parahaemolyticus* (10<sup>9</sup> CFU/mL). Egg yolk IgY was purified by water dilution- ammonium sulfate precipitation method and the specific activity was determined by enzyme- linked immunosorbent assay (ELISA). SDS-PAGE analysis of purified IgY under reducing condition revealed at about 68-70 kDa as a heavy chain and 23-25 kDa as a light chain of IgY. The result of ELISA and Western blot indicated that the produced IgY specifically targeted *V. parahaemolyticus* and two other *Vibrio* strains which were isolated in sea bass (*Lates calcarifer*). These results suggested the application potentials of IgYs antibodies for the treatment and prophylactic purposes of *V. parahaemolyticus* infection in aquatic animals.

**Key words:** Egg yolk immunoglobulin, IgY, immunogens, *Vibrio parahaemolyticus*, water dilution

**P-42:**

## **REDUCTION OF HEAVY METAL RESIDUE IN *Basella alba* L. USING NANO-SIZED HYDROXYAPATITE**

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### **Abstract**

This study is devoted to the synthesis of nano-sized hydroxyapatite (e.g., Pb<sup>2+</sup>, Cd<sup>2+</sup>). Calcium-deficient hydroxyapatite was obtained by precipitation from an aqueous solution. The powder samples were characterized by TEM, SEM, XRD, FT-IR and BET methods. According to the above-experimental results, it was found that all the hydroxyapatite particles in hydrogel were nano-sized rod-like crystals with a width of 20-30 nm and a length of 200-250 nm. The phase of synthesized powders was that of hydroxyapatite structure, having the space group P63/m, lattice constants  $a = b \sim 9.421\text{\AA}$ ,  $c \sim 6.873\text{\AA}$  and crystal size about  $90.09\text{\AA}$ . In the white powder form, the samples have developed a surface area of  $171\text{ m}^2/\text{g}$  and characterized groups for hydroxyapatite such as OH<sup>-</sup>, PO<sub>4</sub><sup>3-</sup>. The nano-sized hydroxyapatite was then tested for the capacity of reducing heavy metals residue in *Basella alba* L., growing in Pb, Cd-contaminated cultivated soil and artificial water sources. Heavy metals residues in vegetables were determined by the ICP-MS method. According to the results, it was found that the synthesized n-HAp has a good removal capacity for those heavy metals and it might be considered as a promising material for reducing heavy metal residue in vegetables.

**Keywords:** Nano-sized hydroxyapatite, Rod-like crystals, Developed surface area, reduction of, Heavy metal ions, *Basella alba* L.

**P-43:**

## **EVALUATION OF WHEAT STARCH SUBSTITUTION WITH ENRICHED-RESISTANT BANANA STARCH IN BREAD AND SUCROSE-FREE COOKIES PRODUCTION**

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### **Abstract**

The objective of this study was to find the highest replacement percentage for wheat flour with enriched-RS banana starch (containing resistant starch of 45%) without altering the quality of Vietnamese bread and sucrose-free cookies. This replacement percentage was investigated in the range of 0-20%. Bread was evaluated for quality through physical characteristic including weight, volume, and elasticity. Quality of cookies were measured through the characteristics such as breadth, stiffness, and color. Chemical expenditure was assessed equally in both types including resistant starch content, protein, lipid, glucide, ash and moisture content. The results showed that substituting 20% of wheat flour with the enriched-RS banana starch in Vietnamese bread production (80 g dough type) has resulted in the equivalent of weight (67.2 g), elasticity (61N) and volume (293.3 cm<sup>3</sup>) compared to the control sample. Stevia sugar cookie replaced by 25% enriched-RS banana starch had hardness of 6.89N, and had no difference in volume, color but significantly improved hardness when compared to the control sample (without banana starch and using sucrose). The RS contents of cookies and bread products were quite high, with 3% for cookies and 9% for breads and achieved quality standards. Therefore, enriched-RS banana starch with appropriate quantity improved the hardness of sucrose-free cookies and did not have negative effect on the quality of Vietnamese bread.

**Key words:** Bread, Cookies, Banana starch, Resistant starch, Physical characteristics.



**P-44:**

**EFFECT OF DIFFERENT CHITOSANS ON THE QUALITY OF VACUUM-PACKED DRIED SEASONING PANGASIUS (*Pangasius hypophthalmus*) DURING STORAGE AT AMBIENT TEMPERATURE**

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**Abstract**

This study aims to evaluate the effect of chitosan 90% degree of deacetylation in different molecular weight: medium molecular weight (DD90-MMWT), chitosan 90% degree of deacetylation, low molecular weight (DD 90-LMWT) and chitosan hydrochloride (CTS-Cl) modified from DD 90-LMWT on preserving of vacuum-packed dried seasoning Pangasius fillet during two month storage at ambient temperature. Six samples were marinated with different seasonings: adding DD90-MMWT, adding DD90-LMWT, adding CL-CTS, adding Vitamin C (Vit C), adding Potassium Sorbate (Kali Sorbate), and control sample. All samples were then dried, vacuum packed and stored at ambient temperature. Thiobarbituric acid reactive substances (TBARS), peroxide (PV), Total Plate Count (cfu/g), total molds (cfu/g), and ammonia nitrogen contents of all samples were periodically determined every two weeks. After 60 days of storage, the results showed that the sample seasoned with chitosan 90% degree of deacetylation, low molecular weight (DD 90-LMWT) had highest antioxidant resistant capability with PV value of 4.2 meq/ kg and TBARS content of 1.541 mg MDA/ kg which were significantly lower ( $p < 0.05$ ) than that of other samples, while chitosan hydrochloride (CL-CTS) had highest antimicrobial capability and highest protein hydrolysis prevention with TPC was  $7.9 \times 10^3$  cfu/g, molds less than  $10^2$  CFU/g and ammonia nitrogen content of 168 mg/kg. Chitosan low molecular weight contributes to retarding the lipid oxidation reaction while chitosan hydrochloride slow down the growth of molds and bacteria as well as protein hydrolysis in dried seasoned Pangasius fish.

**Keywords:** Chitosan, Low molecular weight, Chitosan hydrochloride, Dried seasoning Pangasius, Thiobarbituric acid reactive substances.

**P-45:**  
**THE EFFECT OF TEMPERATURE TO DISTRIBUTION OF TOTAL  
POLYPHENOL CONTENT AND THE POSSIBILITY OF *Annona  
squamosa* PEEL**

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**Abstract**

*Annona squamosa* peel have long been recognized as a source of antioxidants. The objectives of this study were to investigate the effect of drying temperatures (50°C, 55 °C, 60 °C, 65 °C and 70 °C) on total polyphenol content and antioxidant activities of *Annona squamosa* peel via reducing power and DPPH radical scavenging activity. The different drying temperatures showed significant differences in total polyphenol content and antioxidant activities.

**Keywords:** *annona squamosa*, polyphenol, DPPH

**P-46:**

**CULTIVATING CALLUS CELLS FROM LONGJACK (*Eurycoma longifolia*) AND QUANTIFICATION OF *Eurycomanone***

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**ABSTRACT**

Longjack (*Eurycoma longifolia*) is a medicinal plant with anti-inflammatory, anti-malaria, inhibited the proliferation of cancer cells, anti-aging, replenished energy for the body, increased the body's immunity, increased sexual ability, increased muscle endurance, reduced anxiety and stress. In the cell extracts of *Eurycoma longifolia* contain more than 65 compounds belonging to the diterpenoids, alkaloids, steroids, flavonoids, saponins, quasinolignosins, especially eurycomanone, eurycomaoside and eurycomanol. The 3-year-old young leaves of *Eurycoma longifolia* were sterilized with 0.1% HgCl<sub>2</sub> solution for 15 minutes, then were cultured for callus formation on MS medium supplemented with 30 g/l sucrose, 8 g/l agar, 3 (mg/L) NAA achieved the highest rate of callus was 88.10%. The bright yellow porous calli that formed were further cultured in MS medium supplemented with 30 g sugar, 8 g agar, NAA 3 mg / l, and 0.5 ml / l BA, achieving the highest fresh weight of 18, 6 g (equivalent to 2.02 g dry weight) after 6 weeks of culture. Eurycomanone content reached 134.8 mg / g accumulation in the calli extract determined by HPLC.

**Keywords:** Longjack, callus, *Eurycoma longifolia*, Eurycomanone

**P-47:**

**CHANGES IN COMPOSITION OF PROTEIN AND TISSUE  
MICROSTRUCTURE IN SALTED MANTLES FROM SQUID *Loligo  
formosana* DURING SALTING FERMENTATION**

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**Abstract**

Salted squid is a traditional fermented product of the Central Vietnam. During salting fermentation, the impact of high salt concentration, the presence of different microbial groups would make features of the fermented product. In this study, firstly, we extracted, quantitatively and qualitatively fractionated and compared the protein composition from mantles of fresh and salted squid *Loligo formosana* using Sodium Dodecyl Sulfate - Polyacrylamide Gel Electrophoresis (SDS-PAGE). 1-D SDS-PAGE banding patterns of protein extract in fresh squid showed that myofibrillar protein fraction was composed of 13 protein bands with the molecular weights ranging from 251 KDa to 18.2 KDa ; sarcoplasmic protein fraction was composed of 13 protein bands from 259 KDa to 8.0 KDa; and alkaline soluble protein fraction was composed of 9 protein bands from 254 KDa to 28 KDa. Interestingly, distinct differences in the number and the intensity of the bands were observed between fresh and salted squid. There was the decrease in the salted squid: myofibrillar protein fraction did not contain any bands; sarcoplasmic protein fraction contained 4 bands from 110 -38 KDa; and alkaline soluble protein fraction contained only 1 band with about 37 KDa. Secondly, we used Scanning Electron Microscopy (SEM) to reveal tissue structural alterations in squid mantle which had been salted. We also found the significant difference between the tissue microstructure of fresh squid and salted squid. Thirdly, we found that lactic acid bacteria presented at all nine salted squid samples and 15 strains of bacteria were isolated. Based on the morphological, physiological and biochemical characteristics and the sequence analysis of 16S rDNA, the strains were identified as *Bacillus thuringiensis*, *B. amyloliquefaciens*, *B. subtilis*, *B. atrophaeus*, *B. licheniformis*, *B. megaterium*; *B. Tequilesis*, *B. Siamensis*, *B. Methylophilus*, *B. Vallis mortis*, *Lactobacillus acidophilus*, *L. plantarum* and *Brochothrix thermosphacta*.

**Keywords:** Salted squid, Scanning Electron Microscopy, 16SrDNA, Bacteria

**P-48:**  
**SURVEY THE ANTHOCYANINS EXTRACTION FROM SHALLOT SKIN**  
**(*Allium ascalonicum* L.)**

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**Abstract**

In this work, the influence of factors such as alcohol content, ratio of solvent to material, temperature and time on anthocyanins extraction from the skin of shallot (*Allium ascalonicum* L.) was studied. The extracted anthocyanin content was determined by the differential pH method and recorded as g/100 g dry matter. The planning equation and the optimal point were determined by using the Response Surface Method (RSM). The results indicated that when anthocyanins were extracted from the shallot skin with a 50.5% alcohol solution, solvent-to- material ratio of 70 ml/g, at an extraction temperature of 60 ° C for 40 minutes, the highest extracted anthocyanin content was  $0.255 \pm 0.002$  g/100 g dry matter.

**Keywords:** *Allium ascalonicum* L, shallot skin, extraction, anthocyanin

**P-49:**

**RESEARCH AND APPLICATION OF CHITOSAN FLIM OF DEACETYL  
80% COMBINES SILVER NANO WAS PRESERVED HOA LOC  
MANGO**

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**Abstract**

The purpose of this research was to create chitosan flim of deacetyl 80% combine with silver nano and increase the shelf life of hoa loc mango. Through research content, the elements to create silver nano chitosan membrane accordances as: chitosan concentration studied (0,5%; 0,75%; 1%; 1,25%; 1,5%), pH (2,9; 3,0; 3,1; 3,2; 3,3), silver nitrat concentration create silver nano (10-3M, 5x10-3M, 10-2M, 15x10-2M), silver nano content which combines silver nano with chitosan (50ppm; 75ppm; 100ppm). Result of tentative got chitosan 0,75%, pH 3,3, nitrat silver 10-3M and silver nano 75ppm were the best which made chitosan – silver nano flim. From the results obtained, which survey factors such as storage temperature, storage time, control sample. After 28 days, Hoa Loc mango was preserved by silver nano – chitosan flim to limite dehydration, maintain fruit color and slow microbial spoilage that the better use chitosan film.

**Keywords:** Silver nano, Mango, Chitosan

**P-50:**

**RICE HMB4, A WOX HOMEOTIC GENE IS ACTIVE IN VASCULAR TISSUE AND TRIGGERS EARLY FLOWERING IN RICE**

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**Abstract**

The WOX13 orthologous group is the most conserved among the clade of WOX homeodomain containing proteins and found to have function in organ initiation and development in Arabidopsis, most likely by preventing premature differentiation. In this study, we isolated and characterized HMB4/OsWOX13, a homolog of AtWOX13, from rice. HMB4 was regulated spatially in vegetative organs but temporally in flower and seed. Protein binding microarray and EMSA analyses suggested ATTGATTG as the putative cis-element binding of HMB4. Over-expression of HMB4 in rice under rab21 promoter resulted in 7-10 days early flowering transgenic plants. Screening of gene expression profile in transgenic panicles suggested the effect of HMB4 on biological process which responds to oxidative stress. Moreover, among 7 groups of functional genes whose promoter contain at least 1 repeat of ATTGATTG and were preferentially expressed in transgenic plant, the majority was related to cell defense and rescue. Those results implied the possibility of a stress-induced flowering. Besides, the activation of Hd1-like and enhancement of Osc6, OsCP1 in panicles of transgenic plant suggested HMB4 as a regulator in flowering pathway and development of rice anther.

**Key words:** WOX, rice, vascular tissue, early flowering, oxidative stress, defense and rescue, Hd1

**P-51:**  
**OSWOX13 ENHANCES ABIOTIC STRESS TOLERANCE IN RICE BY  
ACTIVATING OSDREB1 GENES**

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**Abstract**

Abiotic stresses negatively affect plant survival, biomass production and crop yield. To produce stress tolerance plant, transfer of genes, including those that encode for transcription factor, has been widely used. In our previous study, OsWOX13 was isolated from rice and found to bind *in vitro* to ATTGATTG DNA-sequence. Promoter regions of OsDREB1A and OsDREB1F, which were reported to enhance abiotic stresses tolerance in rice, contain this motif. In this study, we tested whether plants over-expressing OsWOX13 were related to abiotic stresses response. Plants over-expressing OsWOX13 showed less rolling and wilting leaves during salt and drought stresses. After exposure to stress, these plants also recovered faster and had higher survival rate compared to non-transgenic plants. Analysis of gene expression showed an increased level in transgenic plants of OsDREB1A and OsDREB1F, which might be regulated by OsWOX13 due to the present of OsWOX13's cis-acting element in their 2kb promoter regions. Thus, OsWOX13 enhances tolerance to salt and drought in rice by activating OsDREB1A and OsDREB1F.

**Keywords:** OsWOX13, OsDREB1A, OsDREB1F, salt, drought



**P-52:**

**CONTROL ETHYLENE PRODUCTION TO EXTEND AVOCADO BOOTH7 STORAGE PERIOD BY 1-METHYL CYCLOPROPENE AND LDPE BAG COMBINATION**

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**Abstract:**

To extend the storage time of avocado, 1-methylcyclopropene and polyethylene bag can be used individually or in combination with modified atmosphere during storage to prohibit the production of ethylene and to reduce water loss. Our study investigated the effects of the combination of 1-MCP and polyethylene pack-bag on the postharvest storage time of avocado Booth7. The harvested Booth7 avocados were classified, washed by filter water then dried at room condition (25°C) before treated with 1-MCP, packaged and stored at 8°C and  $\text{O}_2 = 80\text{-}90\%$ . The quality of avocado during storage period was evaluated through parameters of respiration rate, ethylene production, ACC oxidase activity, lipid, firmness, weight loss and color ( $^{\circ}\text{Hue}$ ) of fruit and flesh. The results indicated that the increase of 1-MCP concentrations caused the delay in respiration rate, ethylene production, and ACC oxidase activity to get their own peaks. Fruits treated by 1-MCP at 500 ppb or 700 ppb illustrated almost equally expectation results. Both treatments extended storage period of Booth7 avocado up to 27 days, 6 days longer than control, at good quality. The observation criteria illustrated at day 27 after storage including respiration rate at 46.23 mL CO<sub>2</sub>/kg/h, ethylene production at 15.32  $\mu\text{mol C}_2\text{H}_4/\text{g/h}$ , ACC oxidase activity at 15.05 nmol C<sub>2</sub>H<sub>4</sub>/g/h, lipid 15.22 % (w/w), firmness of fruit and flesh at 8.67 N and 3.14 N, weight loss at 2.91%, color of fruit and flesh at 99.83 and 85.54  $^{\circ}\text{Hue}$ , respectively.

**Keywords:** 1-MCP, ethylene production rate, respiration rate, Avocado Booth7, LDPE

**P-53:**

## **PRELIMINARY ASSOCIATION MAPPING OF 25,500 SNPS TO WINTER WHEAT GRAIN TRAITS**

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### **Abstract**

Complementary advances in documentation of molecular polymorphisms and development of analytical tools to deal with the vast amounts of data now being produced present new options in the breeding of plants for which fully sequenced and annotated genomes are not yet available. Genome-Wide Association Studies (GWAS) can process thousands of single nucleotide polymorphisms (SNPs) against phenotypes conditioned by quantitative traits to detect statistical associations indicating candidate loci for further study. The project objective is to identify candidate SNPs for grain protein content, grain ash content, kernel hardness, and kernel diameter in a panel 299 hard winter wheat cultivar formerly and currently grown in the United States Great Plains region or in the testing phase of cultivar development for this region. The association mapping panel was grown using augmented designs with 2 repeated check cultivars in four environments (at Colorado's LIRF and ARDEC with irrigated and rainfed treatments). Genotypic data for 25,581 SNPs from the 90K assay and the consensus genetic map were used for genome-wide association scans. GWAS was conducted for traits in each environment separately using the CLMM method implemented in GAPIT, first with settings for model selection and then with parameters deemed optimal for each trait. Eight SNPs with false-discovery-rate (FDR)-adjusted p-values below 0.05 were found in the ARDEC rainfed environment. One SNP for grain protein content was found on chromosome 4A. Seven SNPs for grain hardness were found -- two that mapped to chromosome 2B, one that mapped to chromosome 5A, three that mapped to chromosome 7B, and one that is unmapped. Association Mapping with GAPIT can be a useful technique for discovering loci associated with important traits in wheat. The found SNPs should be further investigated for candidate genes or breeding programs.

**Keywords:** GWAS, SNPs, Association mapping, Hard winter wheat cultivars

**P-54:**  
**CRYSTALLIZATION AND PRELIMINARY X-RAY  
CRYSTALLOGRAPHIC ANALYSIS OF CYP107L2 FROM  
*Streptomyces avermitilis***

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**Abstract**

*Streptomyces avermitilis* contains 33 cytochrome P450 genes in its genome, many of which play important roles in the biosynthesis process of antibacterial and antiparasitic agents. CYP107L2 protein was expressed and purified from *Escherichia coli*. Purified proteins exhibited the typical CO-binding spectrum of P450 enzyme with a maximum absorption at 449 nm. The crystal structure of CYP107L2 was determined at a resolution of 2.5 Å. The overall structure of CYP107L2 is well conserved with the general structures of P450 enzymes, and the crystal structure of CYP107L2 with lauric acid was determined at a resolution of 2.4 Å showed putative binding pocket for the long hydrophobic substrate was observed above the distal side of heme in the active site of CYP107L2 structure. This study of CYP107L2 from *S. avermitilis* can help a better understanding of clinically important P450 enzymes as well as their optimization and engineering for synthesizing novel antibacterial agents and other pharmaceutically important compounds.

**Key words:** *Streptomyces avermitilis*, CYP107L2, Protein, Crystallography.

**P-55:**

**ADAPTATION STRATEGIES TO CLIMATE CHANGE FOR  
SUSTAINABLE DEVELOPMENT OF AGRICULTURE IN THE LONG  
XUYEN QUADRANGLE**

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**Abstract**

Climate change is expected to adversely affect agricultural production in Long Xuyen Quadrangle area, which has the largest agricultural and fishery production in the country. Currently, the rise of sea water, the reduction of runoff from the Upper Mekong River, the increase of droughts, and salinity intrusion are clearly shown and have not been tended to stop. Therefore, it is necessary to have measures to minimize and overcome these impacts on the Long Xuyen Quadrangle. Using data from a survey of hundreds farm households in Long Xuyen Quadrangle area, including An Giang and Kien Giang provinces, this study presents the adaptation strategies used by farmers and analyzes the factors influencing the decision to adapt. We found that the most common adaptation strategies include the use of different crops or crop varieties, changing time of planting, soil conservation, and irrigation. Factors influencing farmers' decision to adapt include behaviours of agricultural production, information on market, information on climate change, and policies of government.

**Keywords:** Adaptation strategies, Climate change, Agricultural production, Long Xuyen Quadrangle area.

**P-56:**

**CHANGES ON THE TUBER CHARACTERISTICS, ANTHOCYANIN  
AND STARCH CONTENTS OF SWEET POTATO DURING  
HARVESTING PERIODS**

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**Abstract**

Sweet potato (*Ipomoea batatas* L.) is a popular crop in Vietnam. The sweetness, nutritive substances and variety in color of sweet potato provide high appetizing taste and increase commercial values. Nutrition and biochemical properties of sweet potato depend on the tuber development process. Harvesting at the appropriate periods is an important factor in determining the quality of sweet potato. This study investigated the effects of harvesting time on tuber characteristics, yield, starch content and anthocyanin content in ‘Tim Nhat’ sweet potato grown in Binh Tan district, Vinh Long province, Vietnam. ‘Tim Nhat’ sweet potatoes were harvested in February and March 2016. The tubers were harvested on 120 days after planting and then harvested for 5 days intervals until 160 days. The results showed that the tuber weight and diameter increased gradually until 155 days. No significant differences in tuber weight and diameter were found on day 155 and 160. The tuber yield was highest on day 140, after that it was reduced due to the injury caused by the crack in the tuber and due to the damage caused by insect (*Cylas formicarius*). The anthocyanin content increased with harvesting time, reaching the highest on day 140 then rapidly decreasing. The starch content increased gradually until the last day of harvest, reaching the highest on day 160. The results of this study provided the data for sweet potato producers to select the appropriate harvesting time to meet the marketing requirements.

**Key words:** *Ipomoea batatas* L., days after planting, weight, diameter, yield, marketing, requirement

**P-57:**

**OPTIMIZATION OF MANGIFERIN EXTRACTION FROM MANGO  
(*Mangifera Indica* L.) LEAVES USING ULTRASOUND-ASSISTED  
METHODOLOGY**

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**Abstract**

In the present study, an ultrasonic- assisted extraction method was developed for the effective extraction of mangiferin from mango leaves with ethanol solvents. Mangiferin extraction from mango leaves was investigated by single experiments with optimal conditions: solvent concentration 700, w /v, solid-to-liquid ratio 1:30, 80% amplitude, cycle 0.8 seconds, ultrasonic time 20 minutes and optimized using the Box Behnken model and DOE software. The regression equation expressing the relationship between optical absorption and independent variables is as follows:  $Y = 0.66223 - 0.03525X_1 + 0.05X_2 - 0.021X_3 - 0.05482X_1^2 - 0.09132X_2^2 + 0.02750X_1X_3$  where Y is optical absorption, X1 is the solvent concentration, X2 is the w/ v (g/ ml) ratio and X3 is the ultrasonic time (minutes). The optimal conditions for the highest extraction efficiency were calculated: 66.3° ethanol, the solid-to-liquid ratio was 1:30, and extraction time for 17.1 min under ultrasound irradiation of 200 W with a 0.8 seconds cycle, 80 % amplitude. Under the optimal conditions the optical absorption of the extract is 0.7204 Abs. The presence of the mangiferin in the extract was confirmed using high performance liquid chromatography. Under optimal conditions of ultrasonic-assisted extraction, the yield of mangiferin was 59.427 mg/g, significantly higher than that of Soxhlet extraction and microwave – assisted extraction.

**Key words** - Mangiferin, Ultrasonic-assisted extraction, Mango leaves, Box Behnken, Response surface methodology, HPLC.

**P-58:**

**ESTABLISHMENT OF MODELS BREED EARTHWORM (*Perionyx excavatus*) FROM FOOD HYACINTH (*Eichhornia crassipes*) INCUBATION**

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**Abstract**

Wormwood culture is used for animal feed as a fertilizer for crops and a closed cycle for agricultural production. Using root, stem and leaf hyacinth leaves as food in raising wormwood to reduce the harms of water hyacinth and reduce the cost of livestock. The study was carried out with 5 treatments of roots, stalks, leaves, water hyacinth (*Eichhornia crassipes*) incubation with earthworm (*Perionyx excavatus*) from An Phu vetiver farm. 117 Ap Binh Hamlet, An Phu Commune, Cu Chi District, Ho Chi Minh City. The growth and development of earthworm was measured by weighing method, stem length measurement, worm biomass balance, cocoon count and hatching ratio. In multiple linear regression analysis, target weight and body length of wormwood were independent and significant predictors. The increase in weight, body length in mother and baby worms accounted for a difference of 33% in experiment 1 (hyacinth roots incubation) and experiment 2 (hyacinth stalk, leaves incubation), difference of 45 % in experiment 1 and negative correlation (flesh), 52% positive correlation (fresh cow manure). Rate of cocoon production and hatching rate 38% in experiment 1 and 2; rate 58% positive correlation and 67% positive correlation. These data suggest that food for wormwood from hyacinth stalk, leaves incubation have higher nutritional value from hyacinth roots incubation. The use of fresh water hyacinth as a food in worm raising to reduce harm caused traffic congestion, reduce environmental pollution.

**Keywords:** Earthworm, Hyacinth, Models

**P-59:**

## **THE STORY OF PROTEIN N<sup>α</sup>-TERMINAL ACETYLATION IN PLANT CHLOROPLAST**

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### **Abstract**

Protein N<sup>α</sup>-terminal acetylation is catalyzed by N<sup>α</sup>-acetyltransferases (Nats) and represents one of the most abundant protein modifications in higher eukaryotes. In humans, six ribosomes attached Nats (NatA-NatF) are responsible for the acetylation of approximately 80% of the cytosolic proteins. However, N-terminal protein acetylation has not been evidenced in organelles of metazoans. In higher plants, N<sup>α</sup>-terminal acetylation is a widespread modification not only in the cytosol but also in the chloroplast. In this study, we identified and characterized the first organellar localized Nat in eukaryotes. A primary sequence-based search in the genome of *Arabidopsis thaliana* revealed seven putatively plastid localized Nats. Homology modeling of the putative acetyltransferases uncovered a significant conservation of the acetyl-CoA binding pocket in At2g39000 (NAA70) and At1g24050 (NAA80). Ectopic expression of full-length NAA70 or NAA80 fused to YFP revealed the exclusive localization of both proteins in plastids of *Arabidopsis*. A newly established LC-MS/MS based Nat-activity test demonstrates the acetylation activity of NAA70 and NAA80 on protein N<sup>α</sup>-termini *in vivo* after expression of the respective protein in *E. coli*. The broad substrate specificities of the here characterized plastid Nats provides an explanation for the majority of protein N-termini acetylation events evidenced in higher plants' chloroplasts. Interestingly, NAA70 displays in addition to the N<sup>α</sup>- acetyltransferase activity also N<sup>ε</sup>-acetyltransferase activity on three internal lysine residues like human NAA50.

**Key words:** *Arabidopsis thaliana*, Chloroplast, N<sup>α</sup>- acetyltransferase



**P-60:**

**INVESTIGATING THE FACTORS AFFECTING TO THE EFFICIENCY  
OF RECEIVING POMEGRANATE'S FRESH FRUIT WHEN  
COMBINING WITH ENZYME CELLULASE AND PECTINASE FROM  
*Aspergillus niger***

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**Abstract**

The pomegranate has scientific name as *Punica granatum*, English name is Pomegranate, belongs to Punicaceae plant. It is selected from F1 short-high pomegranate originated from the Di Linh area of Lam Dong province, the seeds which contains fruit pulp were collected and heated to 90°C in 5 min, cooled by thermal shock method. Hydrolysis is carried out in sequence of enzyme cellulase first and then is enzyme pectinase, at different condition marks. The results were as follows: the rate of fruit pulp and added water were  $60 \pm 0.0001$  g and  $43 \pm 0.0001$  g respectively, enzyme cellulase concentrations were 0.006%, pH 5.3, 37.5 °C, time is 125 min and enzyme pectinase concentration 0.004%, corresponding to pH 4.2, temperature 50°C, time is 90 min. The efficiency of receiving the fresh fruit is  $90.24 \pm 0.05\%$ .

**Keywords:** *Punica granatum* (pomegranate), Fruit pulp, Fresh fruit (fresh fruit), Receiving efficiency

**P-61:**  
**THE NEW RANGES OF THREE AROID SPECIES (*Araceae*)  
RECORDED IN SOUTH OF VIETNAM**

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<sup>3</sup> *Southern Institute of Ecology, Vietnam Academy of Science and Technology, 1 Mac Dinh Chi, District 1, Ho Chi Minh City, Vietnam*

**Abstract**

Two species of the family Araceae which were formerly recorded only in North of Vietnam and one species recorded in South of Vietnam with unclear distribution are now confirmed in new ranges in South of Vietnam. Accordingly, *Amorphophallus paeoniifolius* Nicolson is recorded in Phuoc Binh National Park (Ninh Thuan Province), *A. tonkinensis* Engl. & Gehrm. is found in Kon Ka Kinh National Park (Gia Lai Province) and *Homalomena pierreana* Engl. & K. Krause in Phu Quoc National Park (Kien Giang province).

**Keywords:** *Amorphophallus paeoniifolius*, Phuoc Binh National Park, Phu Quoc National Park

**P-62:**

**EFFECT OF CHITOSAN ON THE QUALITY OF SHRIMP  
(*Metapenaeus ensis*) ACCORDING TO THE STORAGE TIME**

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**Abstract**

The effect of chitosan on the change of sensory quality, the content of NH<sub>3</sub>, TMA-N of the raw shrimp (*Metapenaeus ensis*) according to the storage time was studied. The results showed that the shrimp was treated by chitosan with the 97% degree of deacetylation at 1.5% concentration still had the sensory quality, the content of NH<sub>3</sub>, trimethylamine (TMA-N), and the amount of microorganism by VN codex standards after 9 days kept at 5°C. The results also showed that the effect of the chitosan with higher degree of deacetylation was stronger than the chitosan with lower degree of deacetylation on shrimp quality.

**Keywords:** chitosan, sensory, shrimp quality, storage time

**P-63:**

**RESEARCH ON ABILITY OF SEED DEPULPING FROM WILD  
BANANA (*Musa balbisiana* L.)**

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**Abstract**

This work aimed at develops a seed depulping process to obtain banana seed using in the production of banana seed tea bag. Different methods of seed depulping were investigated. First at all, pulp fermentation with yeast addition in proportions of 0,5; 1,0; 1,5; and 2,0 % was conducted. After 24h of fermentation, the sample with 2,0 % of yeast added displayed the highest proportion of depulped seeds that was 95 %. However, the polyphenol content in the seed was lower then other treatments. The seed depulping by hydrolysis method was investigated using 3 kinds of enzymes: pectinase, viscozyme and amylase. A screening experiment for these 3 enzymes has been designed using a 2k factorial method. It was found that the effect of pectinase on the proportion of depulped seeds was the highest followed by viscozyme. The binary combination of 0.25 % of pectinase and 0.15 % of viscozyme gave highest proportion of depulped seeds that reached 99 %. Inversely, the effect of amylase was negligible. Therefore, this mixture of enzyme s was used to study the optimal conditions for seed depulping. The reaction time, temperature and pH were used to study the effect of each factor on the seed depulping efficiency. The results showed that the appopriate time for seed depulping was 120 minutes and it was retained for further experiments. Subsequently, reaction temperature and pH was used to design the CCD (central composite design) experiment using a response surface method. The effect of reaction temperature and pH was showed by regression equation:  $Y = 91.1731 - 3.6333X_1 - 5.4075X_1X_2 - 7.2159X_1^2 - 11.8459X_2^2$  in which  $X_1$  was temperature and  $X_2$  was pH. It was also found that the highest proportion of depulped seeds was reached when the reaction temperature was 40.34 0C and pH was 4.86.

**Keywords:** Seed depulping, *Musa balbisiana*

**P-64:**

**EFFECT OF LACTIC ACID AND LYSOZYME ON THE MICROBIAL QUALITY OF CATFISH FILLETS**

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**Abstract**

The aim of the presented work was to evaluate the effects of lactic acid or lysozyme combining with chlorine treatment on quality of catfish fillets. Skinless catfish fillets were washed in 100 ppm chlorine solution and then treated with 2.5% lactic acid or 0.5% lysozyme, whereas control samples were washed with tap water. After treatment, catfish fillets were vacuum-packed and stored at 2°C for 10 days. The effectiveness of treatment on mesophilic aerobes was determined. Considering food safety, microbiological results were primarily evaluated. Treated catfish fillets had decline microbial counts in comparison with control. Treatment with chlorine followed by lysozyme or lactic acid reduced contamination to 1.4 and 1.7 log CFU/cm<sup>2</sup>, respectively, compared to control samples. Number of microbes on catfish fillets treated with lysozyme or lactic acid after 10 days were 1.9 and 2.5 log CFU/cm<sup>2</sup>, respectively, still less than that of control. The results indicated that the combination of chlorine and lysozyme or lactic acid was beneficial in controlling the growth of mesophilic aerobes on catfish fillets during storage.

**Keywords:** Catfish, Chlorine, Lactic Acid, Lysozyme, Mesophilic aerobes

**P-65:**

## **EXTRACTION OF ESSENTIAL OIL FROM LEMONGRASS (*Cymbopogon citratus*) BY STEAM DISTILLATION PROCESS**

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### **Abstract**

Lemongrass (*Cymbopogon citratus*, Stapf) essential oil is used in many aspects, such as flavouring industry, medicinal material and food technology. Steam distillation process is modern method with several advantages and easy applying from small scale to large scale for farmers. In this study, we complete the protocol from harvesting the raw material of lemongrass to modifying the method of extraction using steam distillation process and we discuss the effective economic of protocol lemongrass essential oil extraction.

**Keywords:** Essential oil, Lemongrass essential oil, Protocol lemongrass essential oil extraction

## **OVERVIEW THE INSTITUTIONS**



## THE INDUSTRIAL UNIVERSITY OF HO CHI MINH CITY

Industrial University of Ho Chi Minh City was formerly Go Vap Vocational School founded by Don Bosco priests on November 11, 1956 at Hanh Thong commune, Go Vap District, Gia Dinh Province. In 1968, the school was renamed as the Don Bosco Private Junior High School of Technology. Until January 31, 1970 the school was upgraded to be the Don Bosco Private Junior High School of Technology, shortly referred to as the Don Bosco High School of Engineering. After the day of peace and reunification, the Southern Liberation Army took over the school and on December 19, 1975 the School was handed over to the General Department of Metallurgy Engineering and Electronics. In 1978, the School was renamed as the School of Engineering IV belonging to The Ministry of Mechanical Engineering and Metallurgy. By 1994, the school was merged with the Chemical High School II in Bien Hoa City to become the Industrial Engineering School IV under the management of The Ministry of Industry. In March 1999, the school was upgraded to become Industrial College IV and in December 2004 the college was upgraded to become Industrial University of Ho Chi Minh City according to the Decision of 214/2004/QĐ - TTg by the Prime Minister. The university is currently one of the big educational and training institutions in Vietnam.

### The campuses:

#### Main Campus (Ho Chi Minh City):

- Address: 12 Nguyen Van Bao Street, Ward 4, Go Vap District, HCMC
- Tel: (08) 38940390 Fax: (08) 38946268
- Website: <http://www.iuh.edu.vn>
- Email:
  - Office of Planning and Finance: [PhongKHTC@hui.edu.vn](mailto:PhongKHTC@hui.edu.vn)
  - Office of Human Resources and Administration: [PhongTCHC@hui.edu.vn](mailto:PhongTCHC@hui.edu.vn)
  - Office of Academic Affairs: [PhongDaotao@hui.edu.vn](mailto:PhongDaotao@hui.edu.vn)
  - Office of Admission: [Tuyensinh@hui.edu.vn](mailto:Tuyensinh@hui.edu.vn)

#### Quang Ngai Campus:

- Address: 938 Quang Trung Street, Quang Ngai City
- Tel: (055) 3250075, (055) 3713858- Fax: (055) 3713858
- Website: <http://www.qn.iuh.edu.vn>

#### Thanh Hoa Campus:

- Address: Quang Tam Commune, Thanh Hoa City, Thanh Hoa Province
- Tel: (037) 3675092 – Fax: (037) 3675350
- Website: <http://www.iuh.edu.vn/thanhhoa/>



Industrial University of Ho Chi Minh City (IUH) is known as one of the largest educational and training institutions in Vietnam. IUH has 1476 staff members, including 1103 lecturers. The University provides 39 undergraduate programs, 12 Master programs and 01 Doctoral program in engineering and business. A lot of lecturers have taken part in research projects of the university, ministry, city and state level.

In the recent years, IUH has gathered a young scientific and technological staff with professional competence, good teaching skills, which is potential resource of supplement to IUH teaching staff of excellence, devotion and passion and at the same time IUH core staff for the process of development and quality improvement in training.

The university has 800 big and cool theoretical rooms and lecture halls, 120 practical workshops with modern equipment, over 400 laboratories of all kinds and 940 subjects of all training levels. The programs and textbooks are designed and edited according to articulation orientation. The dormitory provides nearly 20,000 accommodations for boarders. A healthy and cafeteria canteen is one of the most remarkable of support services. With criteria of delicious, nutritious, and affordable, the canteen serves thousands of students every day. The university library now has nearly 300,000 kinds of books. The university has installed the Internet system on campuses. Students can access the Internet and search information for their study. They can also search information for their study, the university, faculties or contact with the lecturers.

Canteen, dormitory, traditional room, multifunction gym, electronic library, practical workshops system, laboratory and lecture rooms and lecture halls have increasingly been perfected in accordance with international standards. All the facilities in the university are networked and the Internet is increasingly being used widely.

***Institutes and Faculties:***

1. Institute of Biotechnology & Food Technology; Majors: Biotechnology, Food Engineering Technology, Nutrition and Food Science, Food safety and Quality management
2. Institute of Science, Technology & Environmental Management; Majors: Environmental Technology, Environmental Management
3. Faculty of Electricity Engineering; Majors: Electrical engineering technology, Automatic control technology;
4. Faculty of Electronics Engineering; Majors: Electrical Technology, Electronics & Communication, Computer Electronics;
5. Faculty of Mechanical Engineering; Majors: Mechanical Engineering, Mechatronics,
6. Faculty of Automotive Engineering;
7. Faculty of Heat and Refrigeration engineering
8. Faculty of Chemistry Engineering; Majors: chemical technology, petrochemical technology, Chemical analysis;

9. Faculty of Information Technology; Majors: Computer science, software technology, information systems, computer networks, Web development;
10. Faculty of Finance and Banking; Majors: Banking, Corporate Finance
9. Faculty of Accounting - Auditing; Majors: Accounting
10. Faculty of Business Administration; Majors: Business Administration
11. Faculty of Trade and Tourism; Majors: International business, tourist business, restaurant and hotel management, travel management;
12. Faculty of Fashion-Garment Technology; Majors: Garment/Fashion technology design;
13. Faculty of Foreign Languages; Majors: English. Short-term training levels A, B, and C;
14. Faculty of Fundamental Science;
15. Faculty of Political Theory
16. Faculty of Postgraduate training: MSc, PhD program

## **INSTITUTE OF BIOTECHNOLOGY AND FOOD TECHNOLOGY**

### **Overview**

The Institute of Biotechnology and Food Technology was established according to Decision No. 1277 / QĐ – DHCN dated 28/12/2007 by the Rector of the Industrial University of Ho Chi Minh City, formerly was the Experimental Center of Food Technology – Biology – Environment. In nearly 10 years of establishment and development, the Institute of Biotechnology and Food Technology rose to become one of the university leading units in training, science, technology, and international cooperation.

**Objectives:** *The overall objective is to ensure the quality of training for students, to link training with research and practical application.*

Therefore, the Institute has good relations with businesses and production facilities; carry out research collaboration and activities in student training, consultancy, technology transfer, introduction of new products, etc.

The institute offers undergraduate and graduate degree programs in Biotechnology, Food Technology, Quality Control and Food Safety, Nutrition and Food Science.

In nearly 10 years of establishment and development, the Institute has trained 8 generations of students with over 10,000 highly qualified engineers in the food industry and biotechnology in Vietnam. More than 76% of the graduates have the right job.

The Institute focuses on supporting the academic training by professional activities. By 2017, the Institute has organized the “Product development contest” for 8 times, with the participation of all universities in the South which have the degree program of food technology. This contest has resonated in the scientific and industrial communities.

### **Strategy**

- Improving the qualification of the faculty and staff; By 2020, the Institute will have at least 50% of the faculty who hold a doctoral degree, and by 2025, 100% faculty will have a doctoral degree.
- Continuously improving the quality of the degree programs to meet the needs of the society; working towards accreditation by ABET for the two programs of biotechnology and food technology by 2020; striving for all of the institute’s degree programs to be accredited by ABET by 2025.
- Broadening the network of scientific and training cooperation nationally and internationally, to become a leading institute for science, technology, application and education as well as an analytical center specialized in testing in the field of Biotechnology and Food Technology.

### **Facilities**

- The laboratory system at the Institute of Food and Biotechnology is located in building F and T, with an area of over 2800 m<sup>2</sup>.

- The Institute of Biotechnology and Food Technology has close connection with the laboratory system of other research universities such as the Faculty of Chemical Engineering at Polytechnics University, Department of Biology University at Ho Chi Minh City University of Sciences, Institute of Tropical Biology, the Center of Analytical Services and Experimentation of HCM City, the Institute Materials Sciences and so al.
- The laboratory system of the Institute consists of 31 specialized laboratories and an experimental garden for research and training.

Website: <http://ibf.iuh.edu.vn/>



## **DEPARTMENT OF SCIENCE AND TECHNOLOGY OF HO CHI MINH CITY (DOST)**

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Email: [skhcn@tphcm.gov.vn](mailto:skhcn@tphcm.gov.vn)

### **I. ROLES AND FUNCTIONS**

Ho Chi Minh City's Department of Science and Technology (DOST) is a specialized agency under the City People's Committee. It has the functions of assisting the People's Committee in managing scientific and technological activities including science and technology activities; development of science & technology potentials; standards, metrology, and quality; intellect property; applications of radiation and radioisotopes; radiation and nuclear safety; and management and organization of public services in the fields that are within DOST's in accordance with legal provisions.

### **II. OPERATION METHODS AND HEAD OFFICE:**

Ho Chi Minh City's Department of Science and Technology has a legal entity and its own seal and account at the State Treasury of Ho Chi Minh City. It follows Ho Chi Minh City's People's Committee's orders and directions in terms of its organization and operation as well as the Ministry of Science and Technology's orders, directions, instructions, and inspections in terms of its professional duties and tasks.

### **III. RESPONSIBILITY AND AUTHORITY:**

#### **RESPONSIBILITY**

1. Report to Ho Chi Minh City's People's Committee:

- a) Draft decisions, decisions, directives, planning, and yearly, 5-year and long-term plans, and themes and projects of science and technology; programs and measures to organize and implement the State's administrative reform tasks in the field of local science and technology;
- b) Mechanisms, policies, and measures to promote science research and technology development; technology transfers; science and technology market development; potential development; and applications of science and technology advances into life and production;
- c) Draft documents of specific regulations on functions, responsibilities, authority, and organizational structure of DOST;
- d) Draft documents of the regulations of requirements and standards for titles for the chiefs and deputy chiefs of Ho Chi Minh City's People's Committee; standards for the titles of leadership and management in the field of science and technology of the Economics Division or the Division of Economics and Infrastructure under the People's Committees of districts.

2. Report to the Chairman of Ho Chi Minh City's People's Committee:

a) Draft decisions on the establishment, merger, and dissolution of the units under DOST in compliance with legal provisions; the establishment of Science and Technology Consultancy Council under the provisions of the Law on Science and Science and instructions of Ministry of Science and Technology;

b) Draft decisions on the handover of the rights to own and use science & technology development and research results funded by the State budget within authority to organizations and individuals according to legal provisions;

c) Draft decisions on the decisions and directives within the authority of the Chairman of the City's People's Committee in the field of science and technology;

d) Draft decisions on the establishment and regulations on the organization and operation of the local science and technology development fund according to legal provisions;

đ) Drafts on the documents regulating the relationships and coordination of DOST and concerned departments, committees, sectors and the People's Committees of districts;

3. Guide, inspect, and organize the implementation of legal documents, planning, plans, projects, mechanisms, and policies of science and technology after they are introduced and approved; take charge of information, propaganda, guidance, dissemination, education, and supervision of the execution of science and technology law in localities; guide departments, committees, sectors, and the People's Committees of districts, and local science and technology organizations of science and technology management.

4. Manage and organize the appraisal, registration, adjustment, confiscation, and renewal of permits, certificates, registration papers, diplomas, certificates within its functions and assigned tasks according to assigned authority of the City' People's Committee and the Chairman of the City's People's Committee.

5. In charge of making the City's People's Committee proposals on how to give guidance on making plans and estimating the budget for the City's Science and Technology, making plans and estimating the budget on investment and development and spending on science and technology funded by the annual State budget for the field of science and technology on the basis of compiling all the estimates of the departments, committees, sectors, and the People's Committees of districts, and concerned agencies; monitor and check the use of the State budget for the field of the City's science and technology according to the regulations of the State budget Law and the Science and Technology Law.

6. In terms of the management of science research and technology development:

a) Identify and order the selection, direct transfer, evaluation, and review science and technology tasks; transfer the rights to own and use the results of science research and technology development funded by the State budget for organizations and individuals;

b) Monitor, check, and supervise the implementation and post-assessment of the science and technology tasks funded by the State budget;

c) Receive and apply as well as assess the efficiency of the application of the results of implementing science and technology tasks proposed or ordered by the City's People's

Committee after being assessed and accepted;

d) Assess and accept the results of science research and technology development of the organizations and individuals in the City without using the State budget;

đ) Cooperate with the departments, committees, sectors and concerned agencies to propose the list of the science and technology tasks funded by the State budget at the national, inter-sector, and inter-region level for local socio – economic development.

e) Establish the science and technology consultancy councils according to legal provisions at the Science and Technology, as assigned, and based on the authorization of the City's People's Committee Chairman.

7. In terms of developing science & technology markets, and science & technology businesses, organizations, and potentials.

a) Make surveys, check, and assess the level of technology, and science & technology market development; guide and check the operations of the science & technology transaction centers and exchanges, intermediate organizations of local science & technology market and businesses;

b) Guide the organizations and individuals in the field of science & technology incubation and science & technology business incubation; build and organization the implementation of technology innovation solutions;

c) Organize, register for, and check the activities of science & technology organizations, representative offices, the branches of science & technology organizations; give guidance on how to establish and certify science & technology businesses according to legal provisions;

d) Guide and check the implementation of self-control mechanism and responsibility of science and technology organizations; establish and develop local science & technology businesses;

đ) Guide and manage the science & technology transfer in the City including technology transfer, assessment, costing, technology appraisal, intermediately, constancy on technology transfer, other technology transfer services as required; verify science basis and the technology of the investment projects, planning, socio – economic development programs and other local programs and projects within authority;

e) Propose investment projects to develop local science and technology potentials and organize the implementation after the approval of authorized agencies;

g) Organize the implementation of mechanisms and policies on how to use and select the individuals in the field of science and technology; training for local science & technology human resources.

8. Carry out research, apply science and technology advances; exploit, announce, and disseminate science research results, science research, technology development, and other science & technology activities; coordinate to implement national science and technology tasks funded by local State budget.

9. In terms of intellectual property:

a) Organize the implementation of support measures to develop industrial property activities;

give professional guidance on industrial property to organizations and individuals in the City; manage geographical indications and others for the origin of local specialties;

b) Guide and assist organizations and individuals to complete the procedures of industrial property; host and coordinate with concerned agencies to protect the industrial ownership rights and deal with violations of industrial property;

c) Host and coordinate to disseminate and encourage and promote the inventions and initiatives in localities; assess and recognize the innovations funded by the State and with materialistic and technical facilities as prescribed by law;

d) Assist the City's Peoples' Committee to perform the State management of intellectual property in related areas prescribed by law, as assigned, or authorized by the City's People's Committee.

10. In terms of standards, metrology and quality:

a) Organize construction and participate in the construction of local technical regulations;

b) Organize the popularization of the application of technical regulations with national standards, international standards, regional standards, and foreign standards; apply appropriate assessment methods towards technical standards and regulations; provide guidance on how to build basic standards for local organizations and individuals; check the obedience of legal provisions on local standards and regulations;

c) Organize, manage, and instruct organizations and individuals doing business to announce the applicable standards towards the products, commodities, services, processes, and environment as assigned and authorized by the State agencies with authority;

d) Receive declarations on standard conformity from local business organizations and individuals; receive declarations on regulation conformity in the assigned field;

đ) Provide information and answer questions about standards, measurement, quality and technical barriers in the area;

e) Organize the implementation of the tasks related to the activities to improve productivity and quality of products and goods;

g) Organize a network of appraisal, standardization, measurement, testing and calibration; perform measurement verification and calibration services in the approved fields;

h) Receive the declarations the use of quantitative stamp; certify the facilities that are eligible for using the quantitative stamp on pre-packaged products as prescribed by law;

i) Organize the implementation of testing measurement towards metrology standards, measurement devices, pre-packaged goods, calibration, adjustment, testing of measurement as prescribed by law; organize the implementation of measures for those with concerned authority and responsibility; check the implementation of measurement methods and devices and goods quality;

k) Conduct testing according to the requirements of the State management and the demand of the organizations and individuals in terms of product and goods quality in the City;

l) Chair and coordinate with relevant agencies to organize the inspection of quality of products and goods that are imported and circulated in localities, labels, numbers, and bar



codes as assigned or authorized by authorized agencies;

m) Organize the implementation and application of the Vietnam ISO-9001 based quality management system into the operations of the agencies and organizations in the state administrative system as prescribed by law.

11. In terms of the application of radiation and radioisotopes, radiation safety and nuclear safety

a) Regarding the application of radiation and radioisotopes:

- In charge of programs, projects and measures to promote the application of radiation and radioisotopes; in charge of activities to apply radiation and radioisotopes in the economic and technical sectors in the area;

- In charge of monitoring environmental radiation in the area;

- Provide technical services related to the application of radiation and radioisotopes;

b) Regarding radiation safety and nuclear safety

- Organize the registration of radiation and nuclear safety as prescribed by law or as assigned or authorized by the City's People's Committee;

- Manage the declaration and statistics of radioactive sources, radiation equipment, radioactive waste in the area as prescribed by law;

- In charge of controlling and handling radiation and nuclear incidents in the area;

- Develop and integrate with the national database on the control of radiation and nuclear safety in localities

12. In terms of science & technology information and statistics

a) Organize, guide, and implement the collection, registration, storage and announcement of the information on local science & technology tasks;

b) Build and develop science & technology information infrastructure; join hands in building and developing the national database on science and technology, and database on local science and technology;

c) Organize, deal with, analyze, compile, and provide science & technology information for the leadership, management, research, training, production, business and socio – economic development in localities;

d) Organize the directions, instructions, and implementation of the grassroots statistics reports on local science and technology; host the implementation of statistics reports on science and technology;

đ) Conduct surveys of local science & technology statistics;

e) Manage, build and develop local science & technology information sources; participate in Vietnam Library Union in terms of science & technology information sources;

g) Organize Techmarts, direct and online technology information markets and exchanges, exhibitions, science & technology fairs; disseminate and publish the publications and provide science & technology information;

h) Organize the activities in the field of information, library, statistics, science & technology

database; printing and digitization; organize science and technology events;

13. In terms of public services:

a) Guide public-service agencies in providing public services in the field of science and technology in the area;

b) In charge of processes, procedures, and economic/technical norms in the provision of public services in the field of science and technology;

c) Instruct and facilitate organizations to provide public services in the field of science and technology as prescribed by law.

14. Help Ho Chi Minh City's People's Committee to manage enterprises, state economic organizations and private sectors; and monitor the operation of associations, non-governmental organizations in the field science and technology as prescribed by law

15. Take charge of international cooperation in the field of science and technology as prescribed by law, and as assigned or authorized by the City's People's Committee.

16. Take charge of inspecting, checking, and handling organizations' and individuals' complaints and denunciations in the field of science and technology in accordance with legal provisions and as assigned or authorized by the City's People's Committee; meeting people and following the regulations on preventing corruption and others on conducting a thrift and anti-wastefulness policy; dealing with cases within authority or asking authorized agencies to handle legal violations in the field of science and technology as prescribed by law.

17. Stipulate functions, tasks, authority, machinery organization, and relationships of the units at DOST and according to the instructions of the Ministry of Science and Technology and the regulations of the City's People's Committee.

18. Manage the organization of the machinery, civil servants, and the number of employees in the administrative units at DOST; implement the salary structure, policies, benefit policies, training, rewarding, and discipline for the civil servants and laborers under the management of DOST as prescribed by law, as assigned and as authorized by the City's People's Committee; offer refresher courses to the civil servants in charge of science and technology at the Economic Divisions or the Economics and Infrastructure Divisions of districts.

19. Guide and check the operation of the Associations and non – governmental organizations in the field of science and technology within the authority of localities as prescribed by law.

20. Manage and take responsible for finance and property of DOST as prescribed by law, as assigned, and authorized by the City's People's Committee.

21. Responsible for reporting every six months or unexpectedly about the implementation of assigned tasks as prescribed by the provisions of the City's People's Committee and the Ministry of Science and Technology.

22. Perform other duties assigned by the City's People's Committee or as prescribed by law.

#### **AUTHORITY**

1. Have the right to provide rewards or submit the City's People's Committee and the Ministry of Science and Technology decisions to reward units, organization, and individuals with their outstanding achievements in science and technology activities

2. Host and urge the departments, committees, sectors, agencies, and concerned units to coordinate in administrative inspection activities and the inspection of science and technology according to authority and legal provisions.
3. Have the right to impose administrative sanctions and bring prosecution against the organizations and individuals with violations of the observance of the laws on science and technology in localities or within the competence as delegated by the City's People's Committee
4. Urge and ask concerned departments, committees, and sectors and the People's Committees of districts to build and estimate the spending on investing in and developing science and technology; provide information and make reports on how the State budget is used in the field of science and technology in the locality as required.
5. Manage the fund for science & technology investment and development; guide the departments, committees, sectors, districts in the City, the City's administrative units in charge of the projects that use a lot of investment capital for science and technology development; coordinate with concerned agencies to compile, balance, and allocate investment capital for science & technology development; compile and report on how the fund for science & technology development is being used.
6. Propose to establish the science & technology consultancy councils according to legal provisions.
7. Be an instructor and assistant for the People's Committees of districts to carry out the science and technology activities and estimate the annual State budget for the science & technology activities in the districts.
8. Coordinate with relevant sectors to make recommendations to the City's People's Committee on specific science & technology policies and measures to achieve the City's socio-economic development goals.
9. Select justice surveyors and those in charge of justice survey in each case, conduct appraisals based on cases with experience and appropriate skills in the field of appraisal; decide on form of appraisal as individual or collective; send organizations or individuals to join in justice surveys;
10. Ask the departments, committees, sectors and concerned organizations to submit their science & technology plans based on contents, required time, and reports on the implementation of the sector's science and technology plans periodically and unexpectedly.
11. Require work evaluation of the departments, committees, sectors and the People's Committees of districts in the City in terms of the implementation of the tasks in the field of science and technology as required.
12. Take charge of personnel management, training, and implementation of benefits and policies for the officials, civil servants, and laborers in agencies as assigned and the required number of public servants and others who work in the State administrative units assigned by DOST.



## **CENTER FOR ANALYSIS SERVICE OF EXPERIMENT IN HO CHI MINH CITY**

### **VISION**

CASE aims to become one of the leading scientific and technological enterprises in Vietnam and the region in the field of testing, inspection and certification of commodity products, researches and other relevant professional fields.

### **MISSION**

Create customers' trust in CASE's analysis services.

Guarantee quality requirements on analysis quality and testing time.

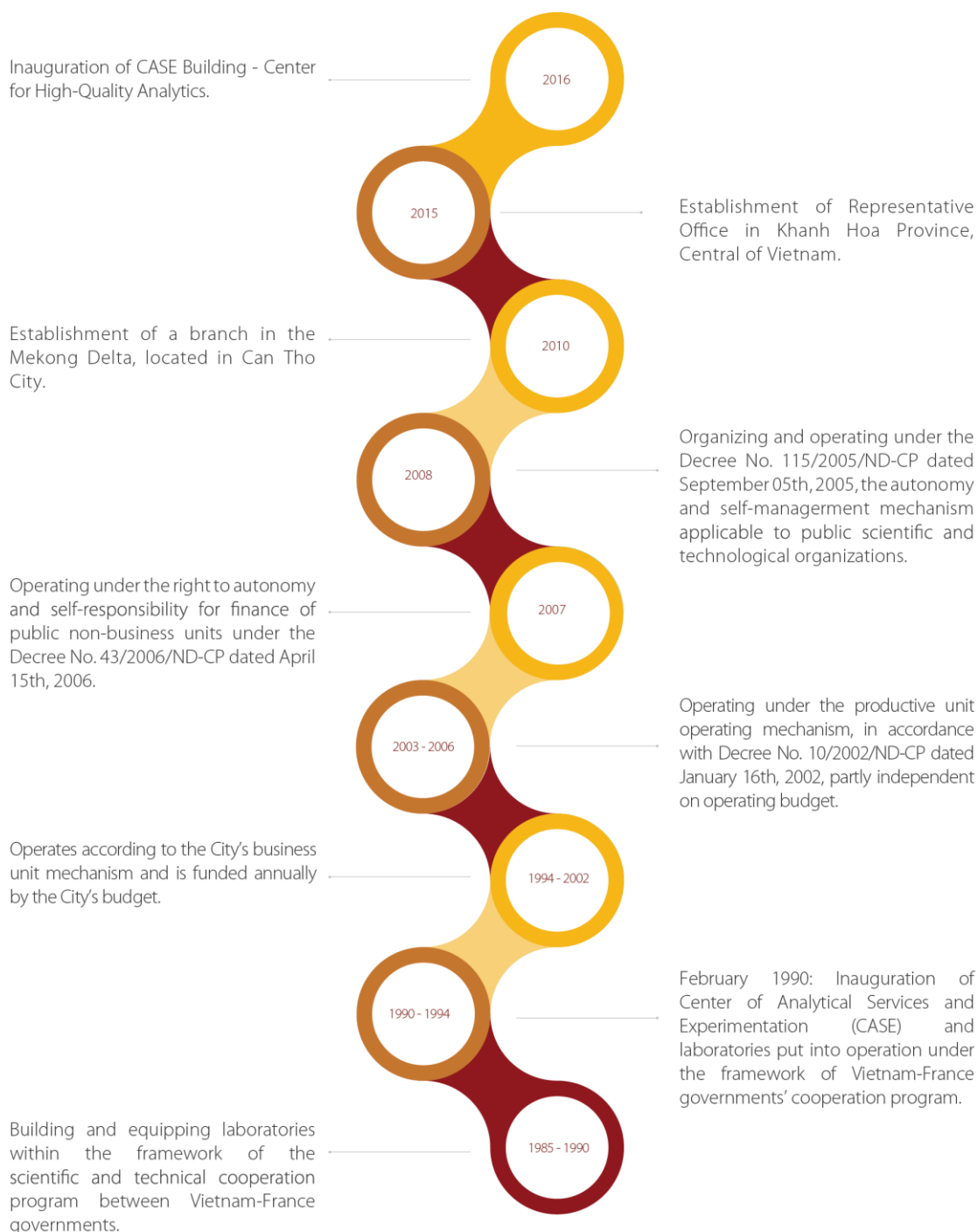
Use the results of testing; study the optimal analytical methods to serve society, community and businesses.

### **CORE VALUES**

In order to successfully implement the long-term strategy, CASE not only plans specific actions with annual growth targets but also promotes brand positioning along with awareness of its core values to lead the behavior of each individual in CASE team, that is:



### **HISTORY OF ESTABLISHMENT**



## SECTORS IN OPERATION

CASE is engaged the field of chemical, physical and chemical analysis. In addition to quality analysis for domestic and export products, quality assurance of imported feed, case also analyzes sensitive social problems such as food safety and hygiene, environmental protection, protection of public health etc. To improve the quality of products, in which some services are considered strong points of CASE, such as:

## **TESTING**

Based on the customer's requirements, CASE works on chemical, physicochemical, biological analysis and tests in the fields of:

- Food, processed food: Seafood, agricultural products, milk and dairy products, soft drinks, spices, cooking oil etc...
- Agricultural products
- Animal feed, aquatic food
- Medicine, medical products, aquatic pharmaceuticals
- Chemistry
- Fertilizer
- Industrial products
- Environment (soil, water, sludge, air etc.)
- Chemical
- Cosmetics
- Industrial products: packaging, transformed oil, ore etc.
- Identification and quantification of product.
- Microbiology, production conditions check
- Pathological and biological samples
- Essential oil, flavor

## **STANDARD CONFORMANCE**

CASE is approved by ministry of agriculture and rural development as a certification organization for agricultural and rural development conformance for the following products:

- Feed, raw materials for animal husbandry, the additive and biological product used in husbandry, cultivation and aquaculture.
- Production environment, conditions to ensure food hygiene and safety in breeding, aquaculture and cultivation.
- Imported non-food agricultural and forestry products for domestic processing and production before being exported or marketed domestically.
- Fertilizers, raw materials for fertilizer production.
- Drugs and raw materials for plant protection chemical, preservatives of agricultural and forest products, medicines and veterinary medicine materials.

## **QUALITY CONFIRMATION**

CASE designated by department of livestock as a certification organization of the quality of animal feed and poultry for export and import from 2012.

CASE is authorized to provide certificate of conformity services for animal and poultry feed products including exported and imported goods.

## **EQUIPMENT CALIBRATION, MAINTERNANCE, REPAIR**

With the experience of repairing equipment from simple to complex analysis, the staffs are trained at home and abroad, the CASE has been vilas accredited calibration office according to ISO / IEC 17025.

### **CONSULTANCY**

More than 30 years of experience in the field of test analysis, with experienced staff in practical Counselling activities.

- Build quality management system in accordance with ISO 9001 and ISO/IEC 17025.
- Set up new laboratories.
- Purchase analytical equipment.
- Solutions to improve the production process, improve the product quality.

### **RESEARCH**

Research services solving problems in production, improving product quality, replacing raw materials etc. ...

- Participating in scientific and technological research programs.
- Researching and consulting to improve product quality of customers, transferring manufacturing technology.
- Researching, applying new analytical methods, transferring to agencies, units and collaborating with other laboratories.
- Coordinating with related agencies and units in service of quality assurance of products and goods, environmental impact assessment and survey etc.
- Combining with enterprises to study the improvement of quality, reducing production costs and overcoming problems in the production process.
- Supporting, consulting the product completeness. Improving product quality for startup projects, incubators, students

### **TRAINING**

Through a joint domestic and overseas training program, case receives and guides national and international college, university, postgraduate students to perform their papers, dissertations or thesis, or helps them with the sample. In addition to the training program, CASE is also designed to:

- Train the testers for the business; improve the skills of analytical staff
- Provide intensive analytical training on the equipment of laboratories or CASE.

### **AND OTHER SERVICES**

In addition to state - above services, CASE also promotes the development of other services such as:

- Organize proficiency testing programs on food and environmental samples according to ISO 17403.
- Provide secondary and standard samples.
- Verify the analytical methods for drug targets in accordance with USP, BP etc.

- Verify methods for analysis of traceability indicators in food, fishery products, environment, etc. in accordance with regulations of FDA, EU
- Support customers on site sampling (micro samples, environment, food etc.)
- Process and repair glassware.
- Provide vibration resistant scale.

Website: [www.case.vn](http://www.case.vn)





## **THE NATIONAL FOUNDATION FOR SCIENCE AND TECHNOLOGY DEVELOPMENT**

The National Foundation for Science and Technology Development (NAFOSTED) was founded by the Decree 122/2003/NĐ-CP of the Government of Viet Nam and officially started operation in 2008.

Affiliated with the Ministry of Science and Technology (MOST), the Foundation, located in Hanoi, is a legal entity, possessing its own seal, and is allowed to open accounts at the State treasury and banks inside and outside the country.

NAFOSTED operates for non-profit purposes, functions as a financing and lending capital medium for scientific and technological projects proposed by organizations or individuals.

The National Foundation for Science and Technology Development is committed to:

- Build a durable, innovative and conducive environment to research activities at universities and institutes
- Improve the research capacity of young scientists and establish research centers that meet international standards
- Enhance the quality of scientific research and increase the number of Vietnamese research published in ISI-covered journals
- Encourage international cooperation for Vietnamese scientists to approach international research knowledge and to attract external funding to Vietnam's scientific projects
- Promote research efforts in enterprises, with focus on core technologies development contributing to national economic growth and competitiveness

Website: <http://www.nafosted.gov.vn>



## **ASIA-PACIFIC INSTITUTE OF FOOD PROFESSIONALS (APIFP)**

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

APIFP organizational structure consists of executive committee members, regional champions, institutional champions, professional members and student members.

### **APIFP executive management has nine members:**

**Dr Malik A. Hussain** - Executive Director

**Prof Shuze Tang** - Executive Committee Member

**Prof Xi-Yang (Kent) Wu** - Executive Committee Member

**Prof William W. Riley** - Executive Committee Member

**Prof Ravi Goonartne**- Executive Committee Member

**Dr Marzieh Hossieninezhad** - Executive Committee Member

**Prof Ida Idayu Muhamad** - Executive Committee Member

**Dr Dam Sao Mai** - Executive Committee Member

**Dr Chaleeda Borompichaichartkul** - Executive Committee Member

APIFP has regional champions in fifteen countries and membership throughout Asia-Pacific. All food professionals are welcome to join.

Website: <http://apifp2015.wixsite.com/apifp> Email: [info-apifp@asia.com](mailto:info-apifp@asia.com)



## **CENTRE OF SCIENCE AND TECHNOLOGY DEVELOPMENT FOR YOUTH**

Center of Science and Technology Development for Youth was established under HCM Youth Union of Ho Chi Minh city, with a purposes of gathering, encouraging and promoting the wave of creativity in science and technology among young people in the city. The center also holds award ceremonies, invests in researches, implement scientific and technological projects which produce economical benefits, implements scientific and technological activities to serve in production, to improve the knowledge in science and technology as well as in economic management.

Established in 03/08/1989 according to Agreement no. 444/QĐ-UB of People's Committee of HCMC, the center was first called "Center of Scientific and Technical Creativity for Youth", under HCM Youth Union of HCMC. In 12/08/1998, the center officially changed to "Center of science and technology development"

Center of Science and Technology Development for Youth has had 28 years of development and growth with passionate staffs and leaders, scientific officers and staff of advisors who are innovating everyday along with the development of the country.

### **TARGET**

- Recognize, select, gather and cultivate young talents for scientific and technological creativity through scientific activities.
- Train, foster and advanced scientific and technological knowledge for youth, staffs and union members.
- Collaborate, associate, connect, invest, support and apply youth' topics, scientific and technological projects to production and life.
- Study and make social and scientific projects, especially projects about youth in order to associate HCM Youth Union's activities with the social reality

### **MISSIONS**

- To host annual activities, contests, prizes, festivals involed science anf technology for objects from 6 to 35 years old
- To collaborate with domestic and foreign organizations in the field of science and technology to raise the resource and technical facilities and to study and apply science and technology advances to production...to broaden and improve the quality of scientific and technical activities of HCM Youth Union.
- To manage and effectively make use of resources, labor, capital, property of the center in accordance with both the state and People's committee policies and systems.

- Offering scientific and technological courses for students and young researchers.

## **MAIN ACTIVITIES**

To run activities with a purpose of improving the knowledge of Science and Technology among the youth in the city through contests and awards.

- **HCMC and National Young IT Competition:** held in association with Department of Science and Technology, Department of Education and Training, IT Group, Ho Chi Minh City Television since 1990. The competition was then held annually after 1990.
- **The Student Scientific Research Award - Euréka:** which is held annually in association with Ho Chi Minh city National University (since 1990) is an award to honor scientific research achievements and the creativity of students in the city. The award motivates students to study, to do scientific research, so as to come up with new ideas, specific solutions, new inventions to contribute in quality improvement in education and training, to build and develop the city and the whole country. Scientific Research Fund for Students - Eureka: established in 22/10/2003.
- **The Young Creative Science and Technology Incubator-** is to create an environment to recognize and introduce new creative ideas to experts and scientists which are fostered and developed into research topics, specific products and are then introduced to enterprises.
- **The Talent Support Fund - Quỹ Bảo trợ Tài năng trẻ:** established according to the Agreement no. 1871/ QĐ – UB in 07/12/1993 by HCMC People’s Committee, gathering all social resources to advocate young talent to develop. This fund helps young people overcome poverty to continue studying with a budget of over 2500 millions VND.

Besides, the center also hosts a lot of award ceremonies such as:

- Voluntary Young Scientific Intellectuals
- Knowledge Bus
- Academic Café
- Science and Technology Award for Youth.
- National Creative Competition for Juvenile
- HCMC Creative Science and Technology Competition
- Water Rockets Competition.
- Green Ideas Contest.
- Young Creative Ideas Contest “For a civilized, modern and developed city”

## **CONTACT DETAILS:**

Center of Science and Technology Development for Youth

Address: 1 Pham Ngoc Thach, Ben Nghe Ward, District 1, Ho Chi Minh city

Phone: 08.38.233.363 - 08.38.230.780

Email: [khoahoctre@gmail.com](mailto:khoahoctre@gmail.com)

Fanpage: <https://www.facebook.com/khoahoctre>,

<https://www.facebook.com/sinhviennckh>



## **THE NATIONAL AGRICULTURE AND FOOD RESEARCH ORGANIZATION (NARO)**

The National Agriculture and Food Research Organization or NARO is the core institute in Japan for conducting research and development on agriculture and food. Our overall mission is to contribute to the development of society through innovations in agriculture and food, by promoting pioneering and fundamental R&D. We conduct technological development to make agriculture a competitive and attractive industry, and contribute to increasing the nation's food self-sufficiency rate. To this end, we conduct R&D to increase the productivity and safety of agriculture, and lessen production costs; and to promote new markets and future industries by developing value-added agricultural products, through incorporating market needs into respective products. In addition, we conduct R&D regarding global issues such as climate change, and the utilization of local agricultural resources to maximize the multi-functionality of agriculture. We regard the contribution to recovery from the Great East Japan Earthquake, and especially R&D in relation to the aftermath of the nuclear power station accident, as an important NARO mission. Achievements and intellectual properties become meaningful only when they are promulgated throughout society. NARO aims at the speedy implementation of our achievements by promoting public relations and promulgation efforts through industry-academia-government cooperation. Our missions are summarized as follows:

### **Establishment of Regional Farming Models**

First, we set a goal to establish a regional farming model for each region, to contribute to the enhancement of production sites. Based on the research achievements of NARO, we will collaborate with national research institutes, universities and public corporations, to establish farming models adapted to each region. NARO and its regional research centers will play a major role in research on farm management, cultivation and cropping systems, ICT (Information and Communication Technology) and agricultural mechanization, livestock, horticulture, breeding, fertilizer and pest control.

### **Advancement in crop breeding using genomic selection**

Breeding new cultivars and developing new technologies are essential to vigorous agricultural production. In particular, we regard advancement in crop breeding, which exploits research achievements in genome selection, as vital. The NARO Institute of Crop Science facilitates the speedy development of novel crops with highly desirable agronomic traits. For the time being, the research focus is rice, wheat and soybeans but in future this will be expanded to a wide range of crops, to advance breeding using genomic selection.

### **Incorporating market needs into research**

The Agriculture and Food Business Research Center has been established to incorporate market needs into research, and thereby contribute to the health and quality of life. This research center will aim at enhancing research methods for industry-academia- government collaboration in developing functional products, as well as enhancing NARO's capacity to conduct consistent R&D from the production site to consumer's table.

### **Global issues and the utilization of local agricultural resources**

The plans above involve future initiatives, but we consider it necessary to immediately emphasize and pursue cooperation regarding R&D projects relating to global issues and the utilization of local agricultural resources. These tasks are fundamental to agriculture and farming communities, and a critical cornerstone of NARO's R&D. We must strengthen our R&D efforts regarding climate change, increasing the multi-functionality of agriculture and farming communities, development of biomass and reusable energy, utilization of abandoned fields and paddies, wildlife management, etc. The term 'environment', which is common to all these issues, is an important keyword for agricultural research. With the integration of the National Institute for Agro-Environmental Sciences (NIAES) into NARO, we will explore how R&D regarding the environment should incorporate environmental conservation-type agricultural R&D in the context of global issues.

### **Recovery from the Great East Japan Earthquake**

R&D for recovery from the Great East Japan Earthquake is an important cornerstone of NARO's R&D mission. In 2012, we established the Agricultural Radiation Research Center in the Fukushima Prefecture, to respond to the nuclear power station accident. Based primarily in this center, we have been contributing to the development of decontamination technologies for farmland soil, and radioactive material transfer-control technologies for agricultural products; and will continue our efforts to restore productivity to all farms which are effected by the incident.

### **Creative research organization**

Given the mission described above, NARO will aim to become a highly creative research organization, promoting gender equality and an open and comfortable working environment for our staff. At the same time, we will ensure rigorous operation, with full compliance and thorough risk management. In sum, NARO will seek to translate its goals into relevant terms for each member of its staff, while at the same time promoting a strong sense of unity and contribution to society.

Website: <http://www.naro.affrc.go.jp/english>



## TOMAS BATA UNIVERSITY IN ZLÍN, CZECH REPUBLIC

Tomas Bata University in Zlín (TBU) is a dynamically growing higher education institution comprised of six faculties offering students the possibility of studying humanities, natural sciences, technology and art. It is one of the most prominent centres of research in the Czech Republic and, in many respects, also abroad. With about 9,200 students, TBU ranks among medium-sized Czech universities

TBU follows a longstanding tradition of the **Faculty of Technology**, which was founded in Zlín in **1969** and since then has educated hundreds of highly-qualified professionals. The University is named after the originator of the shoe industry in Zlín and a world-famous entrepreneur **Tomáš Baťa (1876 – 1932)**.

At TBU, considerable emphasis is laid on teaching English and other foreign languages. The offer of its degree programs taught in English has been continually extended. Maximum support is given to all forms of international cooperation, i.e. student exchanges, lectures and teaching internships, joint research projects, etc. The University offers a three-level study based on the European Credit Transfer System. Its graduates are issued the **Diploma Supplement**, the aim of which is to enhance their position in the European labour market. It is recognized all over Europe. In 2009 the University was awarded the prestigious **Diploma Supplement Label** by the **European Commission** (for the second time), which has raised its reputation among other higher education institutions in Europe. In 2012 TBU was awarded the **ECTS Label** by the European Commission, which is the most prestigious European certificate awarded in the sphere of tertiary education. TBU is a member of numerous international organizations. Its membership in the **EUA (European University Association)**, which associates over **800 universities from 46 countries in Europe**, is one of the most prestigious ones. It enables the University to participate in all the EUA's significant activities aiming to support higher education in Europe and so to present itself to the whole of the European academic community. The University has also signed the **Magna Charta Universitatum** of Bologna, which among other things aims to support scientific development and freedom, and to remove boundaries when gaining and transferring knowledge. The Charta signatories undertake to create conditions for teacher and student mobility. TBU is also a member of the **Danube Rectors' Conference**, which associates universities in the Danube region, and of some other institutions

The University offers a wide range of attractive degree programmes, which can be studied at its six faculties:

- **Faculty of Technology (FT)**
- **Faculty of Management and Economics (FaME)**
- **Faculty of Multimedia Communications (FMC)**
- **Faculty of Applied Informatics (FAI)**
- **Faculty of Humanities (FHS)**
- **Faculty of Logistics and Crisis Management (FLCM)**

A high quality university is characterized by advanced **research and development**. Some areas of research, such as polymer engineering, chemistry or automation and technology process control, have earned TBU excellent reputation abroad.

The **Centre of Polymer Systems** is an important research unit in which more than one hundred scientists from all over the world are based; a number of these have won international awards for their work. Also the staff of the Faculty of Applied Informatics have won international acclaim for their achievements, particularly in the sphere of mathematical modelling of processing or study into non-conventional energy sources. Applied and industrial research is carried out also at the **University Institute**.

Two University **technology parks** serve to form links between research and practice. One is focused on cooperation with plastics processing and food processing companies, the other on information technology companies.

### **We Offer Equal Opportunities**

**Tomas Bata University in Zlín** supports the principle of equal opportunities, mutual respect and fair treatment for all its students and employees. So does TBU act in respect of applicants for studies and employment. No one can be discriminated against, mainly because of his/her age, gender, physical disability, ethnic or national origin, race, religion, membership in organizations. Students, employees, as well as other persons must always be treated in accordance with the principles of politeness and civil coexistence

Website: <http://www.utb.cz/>





## UNIVERSITY OF FORESTRY, BULGARIA

The development of the higher forestry education firstly performed in the Faculty of Agronomy and Silviculture at the Sofia University, then in the Faculty of Forestry at the Agricultural Academy, in the Higher Institute of Forestry and nowadays in the University of Forestry is a scientific and educational achievement of national significance. This is the result of the dedicated and responsible work of all teaching staff from the University of Forestry - the only university for training specialists with qualifications in both biological and technical aspects of forestry in Bulgaria. There is a qualitative and quantitative increase in the teaching staff, the number of specialities and the number of undergraduate students as well as graduated specialists.

The number of candidate students in the University of Forestry has significantly increased. In the last five years the average number of competitors to be placed has been 10 to 12 people.

A total number of 12000 students have graduated from the University of Forestry since 1925 including international students from Europe, Asia, Africa and America.

Thorough professionalism, dedication and science ethics of the founders of the higher forestry education in Bulgaria have always been an excellent example for the coming generations who should always remember the beginning and the road we have traveled so far. As far as the beginning was concerned, at the graduation of the first alumni Prof. Y. Mollov said: "The year 1925 will be remembered and will be written in gold letters in the history of Bulgarian forestry, as events of such crucial significance happen rarely in the history of peoples."

This statement thoroughly corresponds to the basic slogan for the present and future of the university: **"The University of Forestry - education with Bulgarian traditions and European standards"**.

### **Mission of the University of Forestry**

The mission of the University of Forestry (UF) - Sofia, as a State Higher School, is to carry out the state policy for the development of the higher education and science in the Republic of Bulgaria in a uniquely combined complex of specialties related to the management and technological provision of the use of natural resources, products and services. UF is a nationally recognized educational and scientific centre, called to provide highly qualified

specialists with higher education, as well as to develop scientific and research activities in the fields of Forestry, General Engineering, Earth Sciences, Veterinary Medicine, Plant Breeding, Plant Protection, Tourism, Administration and Management. With its highly educated academic staff of nationally recognized and internationally recognized lecturers and scientists, the University of Forestry provides personnel recruitment and scientific servicing of major branches for the country and their sectors - forestry, woodworking and furniture industry, engineering design, ecology and environmental protection, landscape architecture, agriculture, veterinary medicine, alternative tourism, etc. In this way, the main aspects of the mission of the university institution - the creation, dissemination and use of knowledge and skills for the benefit of society are covered. As an autonomous university, UF seeks to maintain and develop an academic environment in which not only the training of qualified staff is achieved, but also to educate socially responsible individuals showing entrepreneurship, adaptability and creative capabilities for successful professional realization, adopting the European values for lifelong learning and contributing to the prosperity of Bulgaria and the development of the European Union towards a "knowledge-based economy". The activity of the UF for the fulfilment of this mission is based on the country's traditions in higher education, the achievements in the above-mentioned fields with full respect for the interests of the Republic of Bulgaria and harmonization with the requirements of the European higher education and the trends in the development of the European educational and scientific space.

Website: <https://ltu.bg/en/>



## **RESEARCH INSTITUTE OF FOOD SCIENCE AND TECHNOLOGY (RIFST)**

The Research Institute of Food Science and Technology was officially established in 1385 (2006-7) by the affirmative legislation of the "Council of Higher Education Development".

As a pioneer center for scientific and innovative research, the Institute intends to meet the research needs of food science and technology across the country.

However, the center dates back to the early 1359 (1980-81) when it was acting as the Khorasan Center of "Iranian Research Organization for Science and Technology IROST".

After the affirmative legislation of the Council of Islamic Revolution, the center was founded to meet the growing demand for science and technology development and to attract the talents, researchers, inventors, innovators and entrepreneurs. Major priorities of the organization were to promote entrepreneurship and research, support innovation, and develop technology.

The Institute was functioning under the name of "Khorasan Research Center for Technology Development", until the provincial centers of the IROST were transformed to "Science and Technology Parks".

As one of the research centers affiliated to the Ministry of Science, Research and Technology and to comply with the commands of Iranian legislation, the Research Institute of Food Science and Technology redirected its mission to focus mainly on the Research and Technology in 1385 (2006-7).

In 1390 (2011-12), according to its luminous records, outstanding works in food science and the regional advantages, it received the final approval of the "Council of Higher Education Development" to start a new chapter in its history proceeding the final act of the Council entitling the Institute as an "Independent Institute".

### **Vision**

To become an excellent reference for applied research across the country in the field of food science and technology and to achieve transnational accredited status while relying upon the Iranian Islamic identity.

### **Mission**

The Institute of Food Science and Technology is a unique research organization relying on its human resources and their creative abilities and commitment to professional ethics and values of the community.

It focuses on conducting applied research and developing technological achievements in order to help commercialization of research outcomes.

The Institute trains researchers, provides expert consultancy to the production sections, industrial centers, scientific and research foundations and other relevant organizations.

The Institute avails the purposes via continuous improvement and rise of organizational efficiency with the view to constant development, translation of knowledge into sound technologies and improvement in food safety and security on both national and international scales.

### **Core Value**

- Active and wide participation in scientific and technological developments as well as playing an active role to fulfill the needs of the scientific research works of Iranian community.
- Encouraging and institutionalizing the innovation, teamwork, synergy and competitive production in a live and energetic environment.
- Establishing a constructive and effective interaction with national and international academic and research organizations.

### **Goals**

- Improving the efficiency and effectiveness of applied research, helping commercialization of the achievements, creating new research opportunities;
- Creating and developing the technical knowledge, updating and upgrading the traditional technologies, taking advantage of new technologies by localizing them in accordance with the community demand to be in compliance with environmental considerations;
- Utilizing effective management systems and playing effectively in the country's major policies in related areas;
- Developing quantitative and qualitative human resources in terms of their capability, creativity, commitment, efficiency and adherence to professional ethics;
- Diversifying and providing sustainable financial resources and increasing the financial resources through existing capacities;
- Developing effective collaboration in technological research fields with industrial, scientific and research centers and organizations of national and international levels;
- Improving organizational utilization and infrastructure, creating and extending the physical space and providing the required appropriate facilities.

### **Confidentiality policy**

At RIFST all collaboration with companies are under strict confidentiality. No details of the work with clients are made public, published or used in any way without their express permission.

Website: <http://en.rifst.ac.ir/>

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