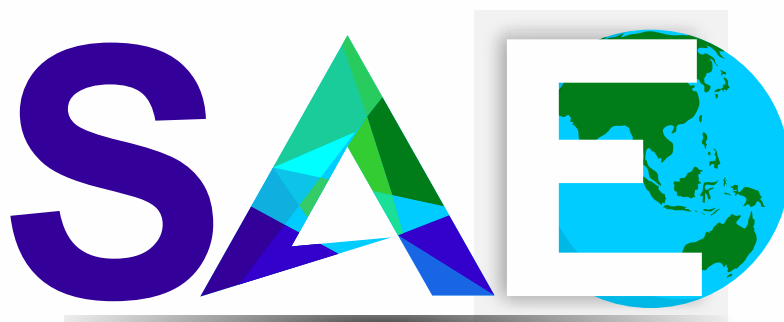




N L U - 2 0 2 2
BOOK OF ABSTRACTS

THE 4th INTERNATIONAL CONFERENCE ON SUSTAINABLE AGRICULTURE AND ENVIRONMENT

Innovative Approaches in Agriculture in Adapting to Climate Change





BOOK OF ABSTRACTS

THE 4th INTERNATIONAL CONFERENCE ON SUSTAINABLE AGRICULTURE AND ENVIRONMENT

November 18, 2022

Nong Lam University Ho Chi Minh City,
Vietnam

Organized by:



© 2022 Nong Lam University
Published by
Scientific Research Management Office
Thien Ly Building
Nong Lam University
Linh Trung Ward, Thu Duc District, Ho Chi Minh City
Phone: +84 2838963340
Email: pqlnckh@hcmuaf.edu.vn



WELCOME MESSAGE

Distinguished Guests and Participants,

On behalf of Nong Lam University – Ho Chi Minh City (NLU), it is my honor to welcome all of you to the 4th International Conference on Sustainable Agriculture and Environment (SAE 2022).

The International Conference on Sustainable Agriculture and Environment (SAE) is an important conference organized by Nong Lam University – Ho Chi Minh City (NLU-HCMC) every two years, addressing the United Sustainable Development Goals, and is intended to be a forum and discussion, to exchange ideas, to establish new connections and partnerships and to share the achievements and networking places for academics, scientists, researchers, experts, entrepreneurs and graduate students to meet and exchange valuable information and build up the network for future collaboration in the context of climate change which is a major concern in our society today.

Several challenges in the current context have an impact on agricultural activities and food security such as climate change, shrinkage and degradation of land, lack of freshwater, abnormality of weather, and environmental pollution...along with the multifaceted crisis from the COVID-19 pandemic. The above issues pose a requirement to find suitable solutions to adapt and transform in essential agricultural activities and become a link of a new ecosystem of the digital technology, digital conversion. Therefore, the International Conference on Sustainable Agriculture and Environment 2022 (SAE 2022) is co-organized among NLU, National University of Kaohsiung (Taiwan), Jenderal Soedirman University (Indonesia) and Okayama University (Japan), with the focus of the conference being **“Innovative Approaches in Agriculture in Adapting to Climate Change”**.

It is our great pleasure to welcome all of you to the 4th International Conference on Sustainable Agriculture and Environment. We do hope that the collaboration among Nong Lam University - Ho Chi Minh City and other local and oversea partners, universities, institutes and agencies will be strengthened and new research ideas will be developed after this conference.

I would like to express my sincere thanks for your participation and wish you all productive time and wonderful experience at Nong Lam University – Ho Chi Minh City.



Assoc. Prof. Dr. Huynh Thanh Hung

Acting President of Nong Lam University, Ho Chi Minh City
Chairman of the 4th International Conference on Sustainable Agriculture and Environment



ORGANIZING COMMITTEE

Executive Board

No	Name	Office	In board
1	Assoc. Prof. Dr. Huynh Thanh Hung	Acting President Nong Lam University, Ho Chi Minh City, Vietnam	Chair
2	Assoc. Prof. Dr. Nguyen Tat Toan	Vice President, Nong Lam University, Ho Chi Minh City, Vietnam	Vice Chair
3	Assoc. Prof. Dr. Nguyen Phu Hoa	Head, Scientific Research Management Office Nong Lam University, Ho Chi Minh City, Vietnam	Member
4	Dr. Nguyen Ngoc Thuy	Head, Office of International Cooperation, Nong Lam University, Ho Chi Minh City, Vietnam	Member
5	MSc. Nguyen Van Cong Chinh	Head, Facility Management Office Nong Lam University, Ho Chi Minh City, Vietnam	Member
6	MSc. Nguyen Van Minh	Head, Planning and Financing Office Nong Lam University, Ho Chi Minh City, Vietnam	Member

Standing Organizing Committee

No	Name	Office	In board
1	Assoc. Prof. Dr. Nguyen Tat Toan	Vice President Nong Lam University, Ho Chi Minh City, Vietnam	Chair
2	Assoc. Prof. Dr. Nguyen Phu Hoa	Head, Scientific Research Management Office Nong Lam University, Ho Chi Minh City, Vietnam	Member
3	Assoc. Prof. Dr. Do Tien Duy	Vice Head, Scientific Research Management Office Nong Lam University, Ho Chi Minh City, Vietnam	Member

No	Name	Office	In board
4	Dr. Nguyen Ngoc Thuy	Head, Office of International Cooperation, Nong Lam University, Ho Chi Minh City, Vietnam	Member
5	Dr. Huynh Tien Dat	Faculty of Chemical Engineering & Food Technology, Nong Lam University, Ho Chi Minh City, Vietnam	Member
6	Dr. Truong Quang Binh	Faculty of Fisheries Nong Lam University, Ho Chi Minh City, Vietnam	Member

Organizing Committee

No	Name	Office	In board
Nong Lam University – Ho Chi Minh City, Vietnam			
1	Assoc. Prof. Dr. Nguyen Huy Bich	Dean, Faculty of Engineering and Technology, Nong Lam University, Ho Chi Minh City, Vietnam	Member
2	Assoc. Prof. Dr. Phan Tai Huan	Dean, Faculty of Chemical Engineering & Food Technology, Nong Lam University, Ho Chi Minh City, Vietnam	Member
3	Assoc. Prof. Dr. Le Quang Thong	Dean, Faculty of Animal Science and Veterinary Medicine, Nong Lam University Ho Chi Minh City, Vietnam	Member
4	Dr. Nguyen Duy Nang	Dean, Faculty of Agronomy, Nong Lam University, Ho Chi Minh City, Vietnam	Member
5	Dr. Tang Kim Hong	Dean of Faculty of Forestry, Nong Lam University, Ho Chi Minh City, Vietnam	Member
6	Assoc Prof. Dr. Nguyen Nhu Tri	Dean, Faculty of Fisheries, Nong Lam University, Ho Chi Minh City, Vietnam	Member
7	Assoc Prof. Dr. Nguyen Tri Quang Hung	Dean, Faculty of Environment and Natural Resources, Nong Lam University, Ho Chi Minh City, Vietnam	Member
8	Dr. Nguyen Van Du	Dean, Faculty of Information Technology, Nong Lam University, Ho Chi Minh City, Vietnam	Member
9	Dr. Le Cong Tru	Dean, Faculty of Economics, Nong Lam University, Ho Chi Minh City, Vietnam	Member
10	Dr. Nguyen Thi Mai	Dean, Faculty of Science, Nong Lam University, Ho Chi Minh City, Vietnam	Member

No	Name	Office	In board
11	MSc. Dao Duc Tuyen	Acting Dean, Faculty of Foreign Language, Nong Lam University, Ho Chi Minh City, Vietnam	Member
12	Dr. Dinh Xuan Phat	Dean, Faculty of Biological Science, Nong Lam University, Ho Chi Minh City, Vietnam	Member
13	MSc. Nguyen Ngoc Thy	Vice Dean, Faculty of Land and Real Estate Management, Nong Lam University, Ho Chi Minh City, Vietnam	Member
14	MSc. Nguyen Van Tron	Head, Department of Political Theory, Nong Lam University, Ho Chi Minh City, Vietnam	Member
Jenderal Soedirman University, Indonesia			
15	Dr. Erwin Riyanto Ardli	Director, International Office of Universitas Jenderal Soedirman	Member
16	Dr. Amin Fatoni	Editor, indexed-Scopus journal, Universitas Jenderal Soedirman	Member
17	Dr. Condro Wibowo	Department of Food Technology Universitas Jenderal Soedirman, Head of Task Force for International Collaboration	Member
National University of Kaohsiung, Taiwan			
18	Dr. Yueh-Tuan Chen	President, National University of Kaohsiung	Member
19	Prof. Dr. Hsing-Hao Wu	Department of Economic and Financial Law, National University of Kaohsiung	Member
20	Assoc. Prof. Dr. Kuei-Ju Tsai	General Education Center, National University of Kaohsiung	Member
21	Prof. Dr. Wan-Yu Liu	Department of Forestry, National Chung Hsing University	Member
Okayama University, Japan			
22	Prof. Dr. Yoshiyuki Murata	Dean, Graduate School of Environmental and Life Science, Okayama University, Japan	Member
23	Prof. Dr. Yasushi Mori	Vice Dean, Graduate School of Environmental and Life Science, Okayama University, Japan	Member

No	Name	Office	In board
24	Prof. Dr. Tanjuro Goto	Vice Dean, Graduate School of Environmental and Life Science, Okayama University, Japan	Member
25	Ms. Yu Tsuha	UGA Global Engagement Office (OUGEO, Okayama University, Japan	Member

Scientific Board

No	Name	Office	In board
1	Assoc. Prof. Dr. Nguyen Tat Toan	Vice President, Nong Lam University, Ho Chi Minh City, Vietnam	Chair
2	Prof. Dr. Yoshihiko Hirai	Okayama University, Japan	Member
3	Dr. Vo Thai Dan	Faculty of Agronomy Head, Academic Affairs Office, Nong Lam University, Ho Chi Minh City, Vietnam	Member
4	Dr. Nguyen Chau Nien	Head, Plant Genetics and Breeding Department, Faculty of Agronomy, Nong Lam University, Ho Chi Minh City, Vietnam	Member
5	Prof. Dr. Nguyen Kim Loi	Director, Research Center for Climate Change (RCCC), and Head of Department of GIS and Natural Resources, Nong Lam University, Ho Chi Minh City, Vietnam	Member
6	Dr. Ardhini Rin Maharning	Jenderal Soedirman University, Indonesia	Member
7	Assoc. Prof. Dr. Le Quoc Tuan	Head, Department of Environmental Science, Faculty of Environment and Natural Resources, Nong Lam University, Ho Chi Minh City, Vietnam	Member
8	Dr. Condro Wibowo	Department of Food Technology, Jenderal Soedirman University, Indonesia	Member
9	Prof. Dr. Takashi Akagi	Okayama University, Japan	Member
10	Assoc. Prof. Dr. Le Anh Duc	Head, Department of Processing and Postharvest Machinery, Faculty of Engineering and Technology, Nong Lam University, Ho Chi Minh City, Vietnam	Member

No	Name	Office	In board
11	Prof. Dr. Doo-Chul Kim	Okayama University, Japan	Member
12	Assoc. Prof. Dr. Dang Thanh Ha	Faculty of Economics, Nong Lam University, Ho Chi Minh City, Vietnam	Member
13	Dr. Istiqamah	Jenderal Soedirman University, Indonesia	Member
14	Assoc. Prof. Dr. Hiroaki Somura	Okayama University, Japan	Member
15	Assoc. Prof. Dr. Nguyen Huy Bich	Dean, Faculty of Engineering and Technology of the Nong Lam University Ho Chi Minh City, Vietnam	Member
16	Assoc. Prof. Dr. Kha Chan Tuyen	Vice Dean, Faculty of Chemical Engineering & Food Technology, Nong Lam University, Ho Chi Minh City, Vietnam	Member
17	Prof. Dr. Hsing-Hao Wu	Department of Financial and Economic Law, Dean, Office of International Affairs, National University of Kaohsiung, Taiwan	Member
18	Distinguished Prof. Dr. Wan-Yu Liu	Department of Forestry, National Chung Hsing University, Taiwan Deputy Dean, International College of Innovation and Industry Liaison, National Chung Hsing University, Taiwan	Member
19	Prof. Dr. Naoki Nishino	Okayama University, Japan	Member
20	Assoc. Prof. Dr. Le Quang Thong	Dean, Faculty of Animal Science and Veterinary Medicine, Nong Lam University, Ho Chi Minh City, Vietnam	Member
21	Assoc. Prof. Dr. Nguyen Quang Thieu	Vice Dean, Faculty of Animal Science and Veterinary Medicine, Nong Lam University, Ho Chi Minh City, Vietnam	Member
22	Assoc. Prof. Dr. Nguyen Phu Hoa	Head, Scientific Research Management Office, Nong Lam University, Ho Chi Minh City, Vietnam	Member
23	Assoc. Prof. Dr. Do Tien Duy	Vice Head, Scientific Research Management Office, Nong Lam University, Ho Chi Minh City, Vietnam	Member

Secretariat Board and Logistics

No	Name	Office	In board
1	Assoc. Prof. Dr. Do Tien Duy	Vice Head, Scientific Research Management Office, Nong Lam University, Ho Chi Minh City, Vietnam	Chair
2	Dr. Huynh Tien Dat	Faculty of Chemical Engineering & Food Technology, Nong Lam University, Ho Chi Minh City, Vietnam	Vice chair
3	MSc. Hoang The Vinh	Vice Head, Information and Communication Office, Nong Lam University, Ho Chi Minh City, Vietnam	Member
4	Ms. Pham Thi Phuong Quy	Vice Head, Planning and Financing Office, Nong Lam University, Ho Chi Minh City, Vietnam	Member
5	Mr. Nguyen Quoc Cuong	Facility Management Office Nong Lam University, Ho Chi Minh City, Vietnam	Member
6	Mr. To Tan Long	Scientific Research Management Office, Nong Lam University, Ho Chi Minh City, Vietnam	Member
7	MSc. Dinh Thi My Loan	Scientific Research Management Office, Nong Lam University, Ho Chi Minh City, Vietnam	Member
8	Mr. Luu Thanh Quang	Scientific Research Management Office, Nong Lam University, Ho Chi Minh City, Vietnam	Member
9	Mr. Ngo Cong Hau	Ho Chi Minh Communist Youth Union, Nong Lam University, Ho Chi Minh City, Vietnam	Member

PROGRAM AT A GLANCE

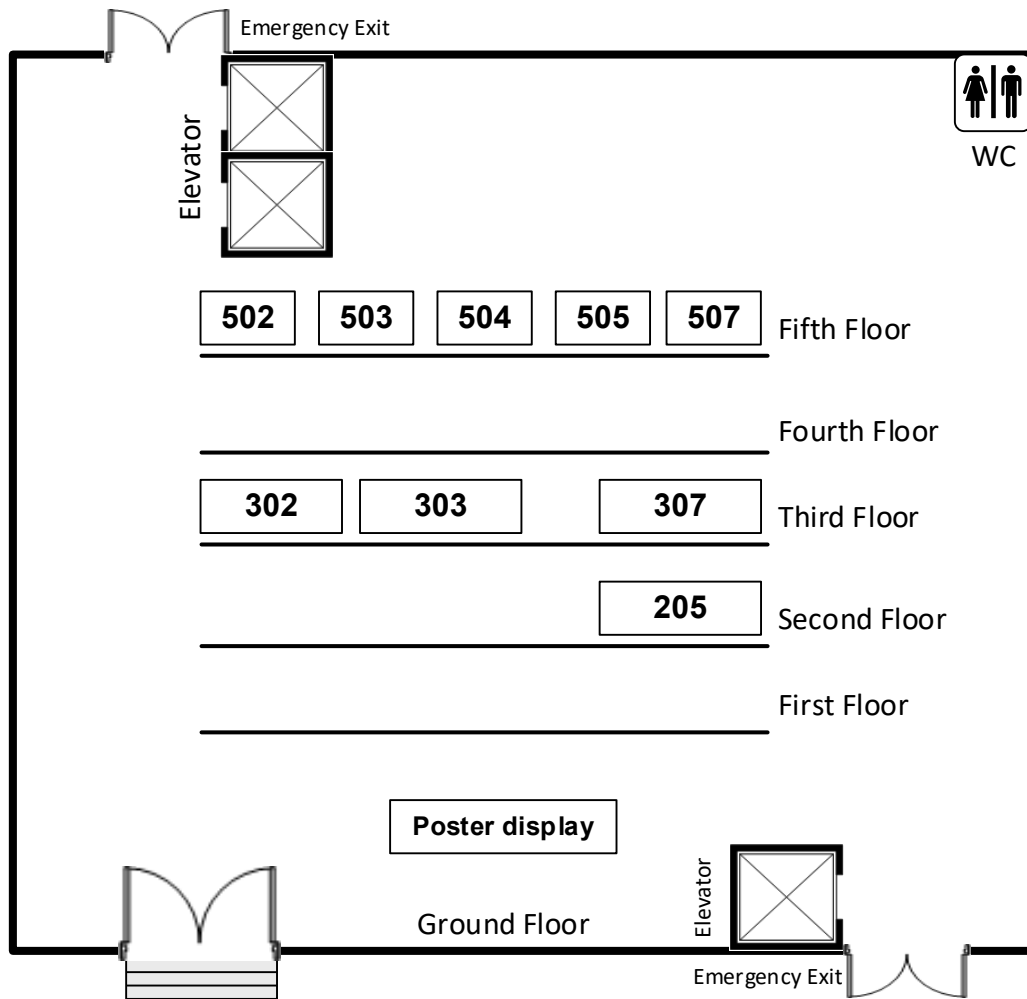
Venue (onsite/virtual): Nong Lam University HCMC

Address: Quarter 6, Linh Trung Ward, Thu Duc City, HCMC, Vietnam

Conference date: November 17 – 19, 2022

Date	Time	Program
DAY 1 November 17, 2022 THURSDAY	13:30 – 14:30	Pre-conference activities: Co-organizers' meeting [Room 205 , Thien Ly Building]
	14:30 – 16:30	Pre-conference activities: Networking Discussion [Room 205 , Thien Ly Building]
DAY 2 November 18, 2022 FRIDAY	07:30 – 08:30	Onsite Registration [Hall PV100, Phuong Vy Building]
	08:30 – 08:45	Opening ceremony [Hall PV100, Phuong Vy Building]
	08:45 – 09:45	Plenary with keynote lectures [1st turn]
	09:45 – 10:15	Tea/coffee break
	10:15 – 11:15	Plenary with keynote lectures [2nd turn]
	11:15 – 12:00	Panel discussion
	12:00 – 13:20	Lunch time [Thien Ly Building] Poster display [Ground Floor, Thien Ly Building]
	13:20 – 14:40	Parallel with 7 scientific sessions [1st turn] Session 1, 2, 3, 5 [5 th Floor, Thien Ly Building: Room 502 , Room 503 , Room 504 , Room 505 , Room 507] Session 4, 7 [3 rd Floor, Thien Ly Building: Room 302 , Room 303 , Room 307] Session 6 [2 nd Floor, Thien Ly Building: Room 205]
	14:40 – 15:20	Tea/coffee break Poster display [Ground Floor, Thien Ly Building]
	15:20 – 16:40	Parallel with 7 scientific sessions [2nd turn] Session 1, 2, 3, 5 [5 th Floor, Thien Ly Building: Room 502 , Room 503 , Room 504 , Room 505 , Room 507] Session 4, 7 [3 rd Floor, Thien Ly Building: Room 302 , Room 303 , Room 307] Session 6 [2 nd Floor, Thien Ly Building: Room 205]
	17:00 – 18:00	Closing ceremony [Room 303 , Thien Ly Building]
	18:30 – 20:30	Gala dinner
DAY 3 November 19, 2022 SATURDAY	08:30 – 14:30	Twin event: The 67 th anniversary of NLU - HCMC and Vietnamese Teachers' Day celebration [Hall PV100, Phuong Vy Building]
	08:30 – 17:30	Field trip: Ho Chi Minh City Tour [Tour by event company, if available]

FLOOR PLAN



DETAILED PROGRAM

DAY 1: November 17, 2022 [Pre-conference activities]		
13:30 – 14:30	Pre-conference activities: Co-organizers' meeting [Room 205 , Thien Ly Building]	Assoc. Prof. Dr. Nguyen Tat Toan Nong Lam University HCMC Vietnam
14:30 – 16:30	Pre-conference activities: Networking Discussion [Room 205 , Thien Ly Building]	Dr. Nguyen Ngoc Thuy Nong Lam University HCMC Vietnam

DAY 2, MORNING: November 18, 2022 [Opening ceremony, Plenary sessions]		
07:30 – 08:30	Onsite Registration	[Hall PV100, Phuong Vy Building]
08:30 – 08:45	Opening ceremony	[Hall PV100, Phuong Vy Building]
Plenary with keynote lectures [1st turn] Chair: Assoc. Prof. Dr. Nguyen Huy Bich, Nong Lam University –HCMC, Vietnam Co-chair: Prof. Dr. Hsing-Hao Wu, National University of Kaohsiung, Taiwan		
08:45 – 09:15	Greenhouse Gas Emissions in Agricultural Fields Affected by Soil Structure and Water Management	Prof. Dr. Yasushi Mori Vice Dean, Graduate School of Environment and Life Science, Okayama University
09:15 – 09:45	Innovative Approaches for Agriculture and Food Production in Adapting to Climate Change	Assoc. Prof. Dr. Phan Tai Huan Dean, Faculty of Chemical Engineering & Food Technology, Nong Lam University HCMC, Vietnam
09:45 – 10:15	Tea/coffee break	[Hall PV100, Phuong Vy Building]
Plenary with keynote lectures [2nd turn] Chair: Assoc. Prof. Dr. Nguyen Huy Bich, Nong Lam University – HCMC, Vietnam Co-chair: Prof. Dr. Hsing-Hao Wu, National University of Kaohsiung, Taiwan		
10:15 – 10:45	An Introduction to Net-zero Emission Policy in the Agriculture Sector: Taiwan's Experience	Prof. Dr. Hsing-Hao Wu Department of Financial and Economic Law, National University of Kaohsiung, Taiwan
10:45 – 11:15	Improving Livestock Production System for Sustainable Rural Development in Indonesia	Prof. Dr. Akhmad Sodik Rector, Jenderal Soedirman University, Indonesia
11:15 – 12:00	Panel discussion	All keynote speakers
12:00 – 13:20	Lunch time Poster display	[Thien Ly Building] [Ground Floor, Thien Ly Building]

DAY 2, AFTERNOON: November 18, 2022 [Parallel sessions]		
Session 1. Adapting Agricultural Production to Climate Change		
[1 st turn]: 13:20 – 14:40		
Chair: Dr. Vo Thai Dan, Nong Lam University HCMC, Vietnam		
Co-chair: Prof. Dr. Yoshihiko Hirai, Okayama University, Japan		
13:20 – 13:40	[O-101] Effects of Water Use Efficiency on Plant Dry Matter in Nerica and Japanese Rice Cultivars under Drought Conditions	Nguyen T. T. Hien , Hiroto Yamanaka, Tohru Kobata, Yoshihiko Hirai and Kuniyuki Saitoh
13:40 – 14:00	[O-102] Hydrogel for Improving Water Use Efficiency of Capsicum annuum Crops in Topsoil	N. A. Hasan , Khaini M. H. A., M. Y. Rafii and N. J. Sidik
14:00 – 14:20	[O-103] Bolting and Flowering of Delphinium grandiflorum var. sinensis Not Affected by Sowing Time but Root Zone Volume	Kawai Mika , Kai Reimi, Kitamura Yoshikuni, Yasuba Ken-ichiro, Yoshida Yuichi and Goto Tanjuro
14:20 – 14:40	[O-104] Diversity Evaluation of <i>Cordyceps</i> spp. in Bidoup Nui Ba, Lam Dong Province	Tran M. Hien, Nguyen T. Mai and Huynh V. Biet
Tea/coffee break Poster display and extra exhibition		[Ground Floor, Thien Ly Building]
[2 nd turn]: 15:20 – 16:40		
Chair: Dr. Vo Thai Dan, Nong Lam University HCMC, Vietnam		
Co-chair: Dr. Nguyen Chau Nien, Nong Lam University HCMC, Vietnam		
15:20 – 15:40	[O-105] Influence of Different Hydroponic Units on Fish and Plant Performance and Water Quality in a Snakehead Fish-Mint Aquaponics System	Nguyen P. C. Tu , Tran Q. Nhan, Nguyen N. Ha, Thai T. T. Thuy and Nguyen N. Tri
15:40 – 16:00	[O-106] Effects of Planting Density, Fertilization and the Growing Season on the Nutritional Composition of Ten Quinoa Varieties Grown in the Central Highlands of Vietnam	Nguyen V. Minh and Hoang V. Chuyen

Speakers have 15 minutes to present their presentations and 5 minutes to answer questions.

DAY 2, AFTERNOON: November 18, 2022 [Parallel sessions]		
Session 2. Ecological Health and Climate Change		
[1st turn]: 13:20 – 14:40		
Chair: Prof. Dr. Nguyen Kim Loi, Nong Lam University HCMC, Vietnam		
Co-chair: Dr. Ardhini Rin Maharning, Jenderal Soedirman University, Indonesia		
13:20 – 13:40	[O-201] Evaluation of Methane Reduction and Electricity Production for Farm-Scale Anaerobic Piggery Wastewater Digesters in Taiwan	Hsing-Lung Lien and Tai-Lin Lin
13:40 – 14:00	[O-202] A Preliminary Study and Review of the Methane Emission Factor in Rice Cultivation Using an Adjusted Water Management Practice in Taiwan	Hsing-Lung Lien and Tai-Lin Lin
14:00 – 14:20	[O-203] Investigation and Assessment of Occupational Noise Exposure: Case Study in mechanical factories in Ho Chi Minh City, Vietnam	Vu X Dan , Nguyen N. H Mai, Phung D. Nhat, Hoang T. D. Phuong, Quach T. Thinh, Nguyen M Ky, Nguyen K. Hue and Nguyen T. Q. Hung
14:20 – 14:40	[O-204] Population Structure of <i>Parasesarma brevicristatum</i> and <i>Parasesarma semperi</i> As An Indicator of Mangrove Replanted Forest Condition in Bintuni Bay, Indonesia	Fika N. Falah , Moh. H. Sastranegara and Erwin R. Ardli
Tea/coffee break Poster display and extra exhibition		[Ground Floor, Thien Ly Building]
[2nd turn]: 15:20 – 16:40		
Chair: Prof. Dr. Nguyen Kim Loi, Nong Lam University HCMC, Vietnam		
Co-chair: Assoc. Prof. Dr. Le Quoc Tuan, Nong Lam University HCMC, Vietnam		
15:20 – 15:40	[O-205] Ca Mau Province's Mangrove Forest Ecosystem in the Face of the Effects of Climate Change	Pham T. Hai
15:40 – 16:00	[O-206] Evaluation of Sterilization Methods to Decontaminate Environment and Items from the Coronavirus SARS-CoV-2	Nguyen T. Hiep , Huynh T. Nhut, Nguyen C. Manh, Nguyen T. M. Anh, Nguyen M. Ky and Nguyen T. Q. Hung
16:00 – 16:20	[O-207] Nematode Community as a Baseline to Monitor the Ecosystem Health of Kembangkuning Mangrove Forest, Indonesia	Ardhini R Maharning , Erwin R. Ardli and Romanus E. Prabowo
16:20 – 16:40	[O-208] Assessment of Biofouling on Lobster Cages in Xuan Dai Bay, Phu Yen Province, Vietnam	Nguyen P. Hoa , Tran. T. K. Nhung, Pham T. Luu and Dang T. T. Hoa

Speakers have 15 minutes to present their presentations and 5 minutes to answer questions.

DAY 2, AFTERNOON: November 18, 2022 [Parallel sessions]		
Session 3. Trends and Advances in Food Science and Post-harvest Technology		
Sub-Session 3A. Trends and Advances in Food Science		
[1st turn]: 13:20 – 14:40		
Chair: Dr. Condro Wibowo, Jenderal Soedirman University, Indonesia		
Co-chair: Assoc. Prof. Dr. Kha Chan Tuyen, Nong Lam University HCMC, Vietnam		
13:20 – 13:40	[O-301] Optimization of Formulation for Spray-Dried Gac Milk Blend Powder by Response Surface Methodology	Bui T. P. Huong , Nguyen S. B. H. Long and Kha C. Tuyen
13:40 – 14:00	[O-302] Comparison of Thai and Japanese Fermented Milk Produced by Potential Probiotic Lactic Acid Bacteria Isolated in Thailand	Jirayu Jitpakdee , Hiroshi Kanzaki, Teruhiko Nitoda and Duangporn Kantachote
14:00 – 14:20	[O-303] Stirred Maceration Extraction of Custard Apple (<i>Annona squamosa</i> L.) Peel	Nguyen T. Trang and Phan T. Huan
14:20 – 14:40	[O-304] Optimization of Hydrolysis Conditions for Yellowfin Tuna (<i>Thunnus albacares</i>) Heads Using Alcalase Enzyme	Musiige Denis , Pham D. Hung and Nguyen V. Minh
Tea/coffee break Poster display and extra exhibition		[Ground Floor, Thien Ly Building]
[2nd turn]: 15:20 – 16:40		
Chair: Dr. Condro Wibowo, Jenderal Soedirman University, Indonesia		
Co-chair: Assoc. Prof. Dr. Kha Chan Tuyen, Nong Lam University HCMC, Vietnam		
15:20 – 15:40	[O-305] Developing Freeze-Dried Snack Bites from Kefir Milk	Doan T. U. Nhi , Nguyen T. Y. Linh, Hoang T. Thu and Cao T. T. Loan
15:40 – 16:00	[O-306] Structure Analysis of Antifungal <i>Sesterterpene ophiobolin</i> K and Its Analogs Produced by <i>Aspergillus ustus</i>	Nguyen T. K. Ngoc, Natthapat Sohsomboon, Terumi Ichimiya, Teruhiko Nitoda and Hiroshi Kanzaki
16:00 – 16:20	[O-307] The Changes in Gamma-Aminobutyric Acid And Polyphenols in Mung Beans During the Germination	Vu T. Anh , Kha C. Tuyen and Phan T. Huan

DAY 2, AFTERNOON: November 18, 2022 [Parallel sessions]		
Session 3. Trends and Advances in Food Science and Post-harvest Technology		
Sub-Session 3A. Trends and Advances in Food Science		
16:20 – 16:40	[O-308] Ultrasound-Assisted Extraction of the Xiao Tam Phan (<i>Paramignya trimera</i> (Oliver) Guillaum) Root	Nguyen T. N. Thao , Do A. Quan, Trinh T. Tan, Le H. Nghia, Phan P. Hien, Phung V. Trung and Nguyen M. X. Hong
16:40 – 17:00	[O-309] Influence of Dehydration Conditions on Physicochemical, Phytochemical and Antioxidant Properties of Medicinal Plant Day Thuong Xuan (<i>Hedera helix</i> L.)	Nguyen V. Tang , Nguyen T. Van, Tran T. Giang, Le T. L. Hang, Dang T. M. Le, Dao V. Hung and Le T. C. Nhung

Speakers have 15 minutes to present their presentations and 5 minutes to answer questions.

DAY 2, AFTERNOON: November 18, 2022 [Parallel sessions]		
Session 3. Trends and Advances in Food Science and Post-harvest Technology		
Sub-Session 3B. Trends and Advances in Post-harvest Technology		
[1 st turn]: 13:20 – 14:40		
Chair: Prof. Dr. Takashi Akagi, Okayama University, Japan		
Co-chair: Assoc. Prof. Dr. Le Anh Duc, Nong Lam University HCMC, Vietnam		
13:20 – 13:40	[O-310] Bio-Based and Biodegradable Packaging Materials: Current Applications and Perspectives for Sustainable Food Packaging	Hoang V. Chuyen
13:40 – 14:00	[O-311] Impact of Maltodextrin and Temperature on Spray Dried Red Flesh Dragon Fruit (<i>Hylocereus polyrhizus</i>) Powder	Duong T. N. Diep , Tran T. N. Trang and Hoang Q. Binh
14:00 – 14:20	[O-312] Experimental Determination of Guava Leaf Drying Technology	Nguyen T. Phong and Le A. Duc
14:20 – 14:40	[O-313] Microencapsulation of Agarwood (<i>Aquilaria crassna</i>) Essential Oil by Spray Drying	Truong T. Vy and Truong Vinh
Tea/coffee break		[Ground Floor, Thien Ly Building]
Poster display and extra exhibition		

DAY 2, AFTERNOON: November 18, 2022 [Parallel sessions]		
Session 3. Trends and Advances in Food Science and Post-harvest Technology		
Sub-Session 3B. <i>Trends and Advances in Post-harvest Technology</i>		
[2nd turn]: 15:20 – 16:40		
Chair: Prof. Dr. Takashi Akagi, Okayama University, Japan		
Co-chair: Assoc. Prof. Dr. Le Anh Duc, Nong Lam University HCMC, Vietnam		
15:20 – 15:40	[O-314] Characteristic of Biodegradable Film Produced from the Canna Starch with Various Types of Plasticizers	Condro Wibowo , Rumpoko Wicaksono, Pepita Haryanti, Susanto B. Sulistyo and Amin Fatoni
15:40 – 16:00	[O-315] Effect of Packaging Method and Storage Temperature on the Quality of Fresh Snakehead Fish (<i>Channa striata</i>) Fillets	Sonkarlay Karnue and Nguyen V. Minh
16:00 – 16:20	[O-316] Investigation of Chitin Recovery from Shrimp Waste by Yeast Fermentation	Ta T. M. Ngoc , Bui H. Hung, Trinh T. T. Nhung and Nguyen T. M. Nhu
16:20 – 16:40	[O-317] Drying Kinetics of Black Soldier Fly (BSF) Larvae for use in Fish or Poultry Feed	Nguyen T. Nghi , Tran V. Tuan and Le Q. Vinh

Speakers have 15 minutes to present their presentations and 5 minutes to answer questions.

DAY 2, AFTERNOON: November 18, 2022 [Parallel sessions]		
Session 4. Social Economics in Sustainable Agriculture		
[1st turn]: 13:20 – 14:40		
Chair: Prof. Dr. Doo-Chul Kim, Okayama University, Japan		
Co-chair: Assoc. Prof. Dr. Dang Thanh Ha, Nong Lam University HCMC, Vietnam		
13:20 – 13:40	[O-401] Legal Analysis of Agricultural Market Land Policies to Support Farmer Economic's Welfare in Indonesia	Sri Wahyu Handayani , Kartono and Tedi Sudrajat
13:40 – 14:00	[O-402] Consumer Acceptability of Alternative Foods: A Study of Processed Cricket-Based Foods in Vietnam	Hoang H. Anh and Kha C. Tuyen
14:00 – 14:20	[O-403] Analysis of Consumer Preferences on Hondje Tea	Icuk Rangga Bawono , Rifda Naufalin and Poppy Arsil
14:20 – 14:40	[O-404] Assessing the Vulnerability to Drought of the Households in Ninh Thuan Province, Vietnam	Chau T. Luc , Hoang H. Anh and Dang T. Ha
Tea/coffee break Poster display and extra exhibition		[Ground Floor, Thien Ly Building]
[2nd turn]: 15:20 – 16:40		
Chair: Prof. Dr. Doo-Chul Kim, Okayama University, Japan		
Co-chair: Dr. Istiqamah, Jenderal Soedirman University, Indonesia		
15:20 – 15:40	[O-405] Price Transimission in Shrimp Production of Vietnam	Truong N. Hao , Le C. Tru and Pham T. Thuyen
15:40 – 16:00	[O-406] Determinants of Relationship Quality Between Coffee Farmers and Purchasing Agents: A Case Study in the Central Highlands of Vietnam	Ha T. T. Hoa , Nguyen B. Dang, Dang L. Hoa and Pham T. H. Nhung
16:00 – 16:20	[O-407] Consumer's Willingness to Pay for Safe Pork in Southeast Region, Vietnam	Mai D. Quy , Pham T. Phuong and Dang T. Ha
16:20 – 16:40	[O-408] An Analysis of Consumers' Knowledge, Awareness and Willingness to Pay for E-Waste Recycling: A Case Study in Vietnam	Pham T. Thuyen , Lam P. M. Thanh, Dang L. Hoa and Pham T. Nhen

Speakers have 15 minutes to present their presentations and 5 minutes to answer questions.

DAY 2, AFTERNOON: November 18, 2022 [Parallel sessions]		
Session 5. Innovative Technology in Agriculture		
[1st turn]: 13:20 – 14:40		
Chair: Assoc. Prof. Dr. Nguyen Huy Bich, Nong Lam University HCMC, Vietnam		
Co-chair: Assoc. Prof. Dr. Hiroaki SOMURA, Okayama University, Japan		
13:20 – 13:40	[O-501] Investigating the Usefulness of A Hydrological Model to Support Water Resources Assessment Across Vietnamese Basins	Hong X. Do and Le H. Tu
13:40 – 14:00	[O-502] Impacts of Mechanization in Rice Farming On Greenhouse Gas Emission: Case Study in Mekong Delta, Vietnam	Nguyen T. Nghi and Nguyen H. Bich
14:00 – 14:20	[O-503] Effects of Bokashi and Compost Extracts on Yield of Japanese Watercress (<i>Nasturtium officinale</i>)	Pham T. H. Thuan and Nguyen T. Binh
14:20 – 14:40	[O-504] The Effect of Addition Bioactive Compounds of Kecombrang (<i>Etlingera elatior</i>) on Characteristics of Kefir	Rifda Naufalin , Erminawati and Popi Nurhopipah
Tea/coffee break Poster display and extra exhibition		[Ground Floor, Thien Ly Building]
[2nd turn]: 15:20 – 16:40		
Chair: Assoc. Prof. Dr. Nguyen Huy Bich, Nong Lam University HCMC, Vietnam		
Co-chair: Assoc. Prof. Dr. Hiroaki SOMURA, Okayama University, Japan		
15:20 – 15:40	[O-505] Study on Plastic Bio-Degradation Potential By Larvae of Wax Moth <i>Galleria mellonella</i>	Le T. D. Trang and Nguyen H. V. Phu
15:40 – 16:00	[O-506] Selection of Non-Flower Fading <i>Dahlia variabilis</i> ‘Nessho’ Plants Based on Flavone Synthase Gene (<i>DvFNS</i>) Expression Patterns	Edna K. Muthamia , Misaki Ando, Ken-ichiro Yasuba, Yuichi Yoshida, Tanjuro Goto and Yoshikuni Kitamura
16:00 – 16:20	[O-507] Extraction of Anthraquinone and Salicylic Acid from <i>Aloe barbadensis</i> Miller	Luong V. M. Trang , Nguyen T. P. Thuy, Nguyen T. N. Lan, Tran T. T. Tra, Nguyen P. T. Nhan and Mai H. Cang
16:20 – 16:40	[O-508] Effect of NPK 12:12:17:2+TE Fertilizer and Coconut Husk Ash on Photosynthesis of Oil Palm Seedlings	Fathurrahman F. , Qhairil Fajar, Siti Zahrah, Febri Doni, Maizar and Zaldi Arman

Speakers have 15 minutes to present their presentations and 5 minutes to answer questions.

DAY 2, AFTERNOON: November 18, 2022 [Parallel sessions]		
Session 6. Emerging Issues in Agricultural Transformation		
[1st turn]: 13:20 – 14:40		
Chair: Prof. Dr. Wan-Yu Liu, National Chung Hsing University, Taiwan		
Co-chair: Prof. Dr. Hsing-Hao Wu, National University of Kaohsiung (NUK), Taiwan		
13:20 – 13:40	[O-601] Fate Of Sulfonamides in Plant – Soil Systems: A Case Study with Sulfamethazine and Sulfamethoxazole	Huynh V. Khang and Dawn M. Dechand
13:40 – 14:00	[O-602] Investing in Internet of Things Technology: Case studies of Smart Alternate Wetting and Drying Irrigation	Pham V. Bang
14:00 – 14:20	[O-603] Insect Trap with Vibrational Energy Device	Bryan H. H. Chiang and M. C. Liang
14:20 – 14:40	[O-604] The Impact of Covid-19 on Altering Household Food Consumption: A Study Case in Ho Chi Minh City, Vietnam	Hoang H. Anh , Tran M. D. Hanh, Doan Q. Vang and Nguyen N. Thuy
Tea/coffee break Poster display and extra exhibition		[Ground Floor, Thien Ly Building]
[2nd turn]: 15:20 – 16:40		
PARALLEL sub-Session: GOLF Workshop		
Chair: Dr. Dong Li, Management School, University of Liverpool		
Co-chair: Dr. Nguyen Ngoc Thuy, Nong Lam University HCMC, Vietnam		

Speakers have 15 minutes to present their presentations and 5 minutes to answer questions.

DAY 2, AFTERNOON: November 18, 2022 [Parallel sessions]		
Session 7. Recent advances in Animal Health and Animal Biosciences		
Sub-session 7A. <i>Recent advances in Animal Biosciences</i>		
[1st turn]: 13:20 – 14:40		
Chair: Prof. Dr. Naoki Nishino Okayama, University, Japan		
Co-chair: Assoc. Prof. Dr. Nguyen Quang Thieu, Nong Lam University HCMC, Vietnam		
13:20 – 13:40	[O-701] The Applicability of LCA Guidelines to Model the Effects of Feed Additives on the Environmental Footprint of Animal Production	DSM/BIOMIN
13:40 – 14:00	[O-702] Redistribution of PLCZ1 in Frozen Bull Spermatozoa Appearing Through Acrosomal Exocytosis, but Its Dynamic Not Affected by Thawing Methods	Nguyen T. Hai , Do Q. Son, Lakshitha Fonseka, Takuya Wakai and Hiroaki Funahashi
14:00 – 14:20	[O-703] Effects of Forced Expression of Pgc-1alpha on Developmental Competence of Porcine Oocytes	Do Q. Son , Nguyen T. Hai, Takuya Wakai and Hiroaki Funahashi
14:20 – 14:40	[O-704] Improvement of Sperm Parameters with Supplementation of Astaxanthin	Moeka Ishihara , Hidetaka Tasaki and Junko Otsuki
Tea/coffee break Poster display and extra exhibition		[Ground Floor, Thien Ly Building]
[2nd turn]: 15:20 – 16:40		
Chair: Prof. Dr. Naoki Nishino, Okayama University, Japan		
Co-chair: Assoc. Prof. Dr. Nguyen Quang Thieu, Nong Lam University HCMC, Vietnam		
15:20 – 15:40	[O-705] Effects of Three-Dimensional Culture on Bovine Uterine Glands	Yosuke Sugino , Taiki Sato, Yuki Yamamoto and Koji Kimura
15:40 – 16:00	[O-706] Gut Immunoglobulin A Secretion Induced by Cyclic Sugar Independent of Number of Glucose Unit	Taisei Miyamoto and Naoki Nishino Takeshi Tsuruta
16:00 – 16:20	[O-707] Genetic Diversity of Phan Rang Sheep on Mitochondrial COI Gene Based on Nucleotide Sequencing	Le V. Loc , Tran T. Vu, Le T. Loi, Hoang T. Thanh and Nguyen N. Tan

DAY 2, AFTERNOON: November 18, 2022 [Parallel sessions]		
Session 7. Recent advances in Animal Health and Animal Biosciences		
Sub-session 7A. Recent advances in Animal Biosciences		
16:20 – 16:40	[O-708] Milk Microbiota, Milk Composition and Blood Metabolites of Jersey Cows Throughout a Lactation Period	Gathinji. P. K , Zabiulla, Y, Nguyen D. Q, Aodaofu and Nishino, N
16:40 – 17:00	[O-709] Inhibited Aerobic Spoilage by Multiple Lactic Acid Bacteria Inhabiting Total Mixed Ration Silage	Wali A. , Hou J., Tran D. P., Ton N. M. T. and Nishino N.

Speakers have 15 minutes to present their presentations and 5 minutes to answer questions.

DAY 2, AFTERNOON: November 18, 2022 [Parallel sessions]		
Session 7. Recent advances in Animal Health and Animal Biosciences		
Sub-session 7B. Recent advances in Animal Health		
[1st turn]: 13:20 – 14:40		
Chair: Assoc. Prof. Dr. Le Quang Thong, Nong Lam University HCMC, Vietnam		
Co-chair: Dr. Dinh Xuan Phat, Nong Lam University HCMC, Vietnam		
13:20 – 13:40	[O-710] Analysis of Changes in African Swine Fever Virus Genetic Structure and Biological Properties During Adaptation to Continuous Cell Culture For Development of ASF Vaccine	Joo Young Lee , Do T. Duy, Sung-sik Yoo, Hyeok-il Kwon, Seung-Chul Lee, Min Ho kim and In-joong Yoon
13:40 – 14:00	[O-711] Clinical, Pathological and Transmission Characteristics of ASF in Vietnam: Mini-Review From Research to the Field	Lai C. Danh , Nguyen T. Toan and Do T. Duy
14:00 – 14:20	[O-712] Development of Pighealth Security-X Application for Biosecurity Assessment in Sustainable Pig Production	Nguyen H. Doanh , Lai T. T. Tuyen , Le N. Van, Le T. H. Nho, Ngo T. Phuc, Vo T. Hue, Du D. Phong and Do T. Duy
14:20 – 14:40	[O-713] Differential Diagnosis of Viruses Related to Reproductive Disorder on Sows By Pentaplex-PCR Technique	Nguyen N. The , Le T. T. Ha, Vu L. X. Hiep and Dinh X. Phat
Tea/coffee break Poster display and extra exhibition		[Ground Floor, Thien Ly Building]

DAY 2, AFTERNOON: November 18, 2022 [Parallel sessions]		
Session 7. Recent advances in Animal Health and Animal Biosciences		
Sub-session 7B. <i>Recent advances in Animal Health</i>		
[2nd turn]: 15:20 – 16:40		
Chair: Assoc. Prof. Dr. Le Quang Thong, Nong Lam University HCMC, Vietnam		
Co-chair: Dr. Dinh Xuan Phat, Nong Lam University HCMC, Vietnam		
15:20 – 15:40	[O-714] Prevalence and Genetics Characteristic of Porcine Rotavirus Group C in Piglets in Some Southern And Central Highlands Provinces	Nguyen H. K. Linh and Hoang T. Hai
15:40 – 16:00	[O-715] Antibacterial Properties of <i>Allium sativum</i> and <i>Phyllanthus amarus</i> Extracts and the Effect of These Herbal Products on the Performance of Isa Brown Layers	Pham T. Hue and Vo T. T. An
16:00 – 16:20	[O-716] The Effect of Protein Sources on Gut Microbiota in Mice With and Without Osmotic Diarrhea	Nuomin , Baek R., Tran D. P., Ton N. M. T., Tsuruta T. and Nishino N.
16:20 – 16:40	[O-717] Effects of <i>Lactobacillus acidophilus</i> L-55 (Lal-55) Strain on the Clinical Signs of <i>Eimeria tenella</i> in Laying Hens	Chiumya Kondwani , Pham H. S. Hung and Toshimitsu Hatabu

Speakers have 15 minutes to present their presentations and 5 minutes to answer questions.

DAY 3: November 19, 2022 [Post - conference activities]		
08:30 – 14:30	Twin event: The 67 th anniversary of NLU - HCMC and Vietnamese Teachers' Day celebration [Hall PV100, Phuong Vy Building]	Assoc. Prof. Dr. Nguyen Phu Hoa , Nong Lam University HCMC, Vietnam
08:30 – 17:30	Field trip: HCM City Tour [Tour by event company, if available]	Dr. Nguyen Ngoc Thuy Nong Lam University HCMC, Vietnam



FIRST ANNOUNCEMENT THE 4th INTERNATIONAL CONFERENCE ON SUSTAINABLE AGRICULTURE AND ENVIRONMENT (SAE 2022)



Hsing-Hao Wu
Professor
Department of Financial and Economic Law
National University of Kaohsiung
Taiwan

**Nong Lam University - Ho Chi Minh City,
Linh Trung Ward, Thu Duc City, Ho Chi Minh city, Vietnam
NOVEMBER 17 - 19, 2022**



Phan Tai Huan
Associate Professor, Dr.
Dean of Faculty of Chemical Engineering & Food Technology
Nong Lam University - Ho Chi Minh City
Vietnam



Akhmed Sodiq
Professor
Faculty of Animal Science
Vice Rector for Academic Affairs
Jenderal Soedirman University
Indonesia



Yasushi Mori
Professor
Vice Dean of Graduate School of Environment
and Life Science
Okayama University
Japan



Assoc. Prof. Dr. Nguyen Tat Toan
Vice President
Nong Lam University - Ho Chi Minh City, Vietnam
Chairman of Scientific Board



Assoc. Prof. Dr. Huynh Thanh Hung
Acting President
Nong Lam University - Ho Chi Minh City, Vietnam
Chairman

KEYNOTES

CONFERENCE AGENDA

November 17 Onsite

Onsite registration
Pre-conference
activities

November 18 Onsite/Virtual

Plenary with
keynote lectures
Parallel with
7 scientific sessions
Poster display
and extra exhibition

November 19 Onsite

The 67th anniversary of
NLU-HCMC and
Vietnamese Teachers' Day
celebration
Field trip



CHAIRS AND CO-CHAIRS



THE 4th INTERNATIONAL CONFERENCE ON SUSTAINABLE AGRICULTURE AND ENVIRONMENT (SAE 2022)

Scientific Programme

PLENARY SESSION

Chair
NGUYEN HUY BICH
Associate Professor
Dean for Faculty of Engineering and Technology of
the Nong Lam University - Ho Chi Minh City
Vietnam



Co-chair
HSING-HAO WU
Professor
Department of Financial and Economic Law,
Dean of Office of International Affairs,
National University of Kaohsiung (NUK),
Taiwan



KEYNOTE LECTURE 1
**Greenhouse Gas Emissions in
Agricultural Fields affected by
Soil Structure and Water Management**
Yasushi Mori
Professor
Vice Dean of Graduate School of Environment
and Life Science - Okayama University - Japan



KEYNOTE LECTURE 3
**The Policy Development of Achieving Net-zero
Emission Goal in the context of Agriculture Sector:
Taiwan's Experience**
Hsing-Hao Wu
Professor
Department of Financial and Economic Law
National University of Kaohsiung - Taiwan



KEYNOTE LECTURE 2
**Innovative Approaches in Agriculture
and Food Production in Adapting
to Climate Change**
Phan Tai Huan
Associate Professor, Dr.
Dean of Faculty of Chemical Engineering & Food Technology
Nong Lam University - Ho Chi Minh City - Vietnam



KEYNOTE LECTURE 4
**Improving Animal Production and Livestock
Production System for sustainable rural
development in Indonesia**
Akhmad Sodiq
Professor
Faculty of Animal Science, Vice Rector for Academic Affair
Jenderal Soedirman University - Indonesia



Session 1: Adapting Agricultural Production to Climate Change



CHAIR
Dr. Vo Thai Dan



CO-CHAIR
Prof. Dr. Yoshihiko Hirai



CO-CHAIR
Dr. Nguyen Chau Nien

Session 2: Ecological Health and Climate Change



CHAIR
Prof. Dr. Nguyen Kim Loi



CO-CHAIR
Dr. Ardhini Rin Maharning



CO-CHAIR
Assoc. Prof. Dr. Le Quoc Tuan

Session 3: Trends and Advances in Food Science and Post-harvest Technology



CHAIR
Dr. Condro Wibowo



CO-CHAIR
**Assoc. Prof. Dr.
Kha Chan Tuyen**



CHAIR
**Rese. Prof. Dr.
Takashi Akagi**



CO-CHAIR
**Assoc. Prof. Dr.
Le Anh Duc**

Session 4: Social Economics in Sustainable Agriculture



CHAIR
Prof. Dr. Doo-Chul Kim



CO-CHAIR
Dr. Istiqamah



CO-CHAIR
Assoc. Prof. Dr. Dang Thanh Ha

Session 5: Innovative Technology in Agriculture



CHAIR
Assoc. Prof. Dr.
Hiroaki SOMURA



CO-CHAIR
Assoc. Prof. Dr.
Nguyen Huy Bich



CO-CHAIR
Assoc. Prof. Dr.
Kha Chan Tuyen

Session 6: Emerging Issues in Agricultural Transformation



CHAIR
Dist. Prof. Dr. Wan-Yu Liu



CO-CHAIR
Prof. Dr. Hsing-Hao Wu



CHAIR
Dr. Dong Li



CO-CHAIR
Dr. Nguyen Ngoc Thuy

Session 7: Recent advances in Animal Health and Animal Biosciences



CHAIR
Prof. Dr. Naoki Nishino



CO-CHAIR
Assoc. Prof. Dr.
Nguyen Quang Thieu



CHAIR
Assoc. Prof. Dr.
Le Quang Thong



CO-CHAIR
Dr. Dinh Xuan Phat

KEYNOTE SPEECHES

KEYNOTE SPEECH 1:

Greenhouse Gas Emissions in Agricultural Fields Affected by Soil Structure and Water Management

Prof. Dr. Yasushi Mori

Vice Dean of Graduate School of Environment and Life Science, Okayama University

Email: yasushim@cc.okayama-u.ac.jp

The greenhouse gas (GHG) emissions are strongly affected by soil factors, such as soil pore structure and water management. Here, a laboratory experiment was conducted to observe the effects of pore structure and water management on GHG emissions, total soil carbon, and nitrogen in agricultural soils. Masa and paddy soils were prepared with and without macropores and with and without compost application. Masa soil was exposed to unsaturated/saturated conditions and paddy soil to waterlogged conditions with/without drainage. CO₂ emissions from the masa soil with macropores were higher than those from the masa soil without macropores, indicating an enhanced gas emission pathway. Total carbon content (TC) was relatively lower in the topsoil than in the subsoil under non-flooding conditions, suggesting CO₂ release from the topsoil. On the other hand, under flooded conditions, total carbon was lower in the bottom soil than in the top soil, indicating that CO₂ and CH₄ were released from the bottom soil. Furthermore, paddy soils with macropores showed higher CO₂ emissions than those without macropores. However, soils with macropores and compost had lower CO₂ and CH₄ emissions with drainage, than without drainage; CH₄ concentrations were negatively correlated with infiltration, indicating that fresh water or oxygen is available in soils with macropores and drainage; TC and TN concentrations were lower in the subsoil than in the topsoil, suggesting that reducing conditions are formed in the no drainage soil. This indicates that macropores reduce reductive conditions and lower CH₄ emissions.

Keywords: Carbon dioxide; drainage; methane; macropore

KEYNOTE SPEECH 2:

Innovative Approaches for Agriculture and Food Production in Adapting to Climate Change

Assoc. Prof. Dr. Phan Tai Huan

Dean of Faculty of Chemical Engineering & Food Technology, Nong Lam University, HCMC, Vietnam

Email: pthuan@hcmuaf.edu.vn

Climate change has significantly affected our lives and livelihoods. This summary of the keynote presentation at SAE-2022 gives an overview of climate change and its impacts on agriculture and food production. At the same time, it addresses climate-smart agriculture and the opportunities that new agricultural technology can offer to achieve sustainability, increase food security, and improve the incomes of agricultural producers. Besides, sustainable food production mainly including crops and livestock production (primary and processed) will also be examined at various stages of the supply chain (from farm to fork) to comprehensively address challenges in responding to climate change.

The first aspect to be considered is the sensitivity of the agricultural sector to climate change. As the world's population continues to grow, arable lands for cultivation and food production are being impacted by climate change at an increasing rate. The key impacts of climate change include increasing temperatures and shifting precipitation patterns. The nature and characteristics of crops are determined by the region's climate. Therefore, increases in average seasonal temperature and precipitation can shorten growing seasons, possibly leading to outbreaks of pests and diseases, and thus declines in agricultural productivity. This will further undermine agricultural production and food systems in developing countries that need to urgently overcome poverty, hunger, and malnutrition. In turn, many agricultural sectors, including crop and livestock production, fisheries, and aquaculture are major contributors to global greenhouse gas emissions directly through production activities and indirectly through changes in land use. Therefore, agriculture needs to overcome three intertwined challenges including increasing agricultural productivity in a sustainable way to meet global demand; strengthening the capacities of the farmers to adapt to the impacts of climate change; and contributing to reducing the accumulation of greenhouse gases in the atmosphere.

Climate-smart agriculture has been applied as a modern approach toward efficient and resilient agriculture production and food systems. Climate change adaptation is actions that reduce the negative impacts of climate change while taking advantage of potential new opportunities. This part presents and reflects the opportunities that new technological developments leading to agriculture 4.0 (artificial intelligence, internet of things, sensing technologies, big data, robotics, automated equipment, satellite image, and positioning,...) can bring to agriculture in the medium and high-income countries. Automation and artificial intelligence can play an

important role in crop production, including disease prediction and detection, weeding, and pest control. Automation and precision agriculture support farmers to reduce labor costs to harvest crops, and solve the problem of shortage of manpower in general cropping operations (smart soil fertilization, smart irrigation, smart spraying). The precision in using inputs helps the farmers save both cost and time on big-scale farms. Besides, the application of new information and communications technology tools can effectively support small-scale farmers. Blockchain, wireless sensor networks, and cloud computing can improve both production and quality management. The application of such technologies has also empowered the role of rural women in agricultural production, and at the same time attracted youth to participate more in the sector. Meanwhile, advances in genetics and molecular biology may provide new paradigms for modern integrated crop-livestock systems which are productive, and sustainable under changing climatic scenarios. With a strong market orientation, this sustainable model can improve the productivity of both crops and livestock in low-income countries.

The next section of this summary approaches sustainable food production (including both fresh foods/whole foods and processed foods) and consumption systems. The EU Farm to Fork strategy (The European Green Deal) is used to illustrate the interconnections across the whole chain (sustainable food production, sustainable food processing, distribution, and consumption) to ensure the food system is fair and healthy (fair economic returns for farmers) and environmentally friendly. Increasing organic farming land, improving animal welfare, promoting a circular bio-based economy, or reducing the use of chemical fertilizers, pesticides, and antibiotics should play important roles. It also requires new approaches to facilitate farmer knowledge (extension services with weather forecasting, technological options, markets, etc.) to strengthen farmers' adaptive capacity to climate change. Current progress is also discussed toward improving the quality of the postharvest and food processing systems. Throughout the postharvest supply chain, primary food can be damaged by heat, shock, or long delivery delays. To solve this problem, smart packaging presents great opportunities in terms of quality, safety, and convenience in the agri-food sectors. Food loss and waste generation are also the main inefficiencies in the food processing sector. New food processing technology leading to food industry 4.0 can reduce such inefficiencies by applying smart sensors to monitor quality control throughout the supply chain. Artificial intelligence and big data can be used to optimize the system with control of machines, waste management, and interconnection in-plant processing. Smart factories with nonthermal technology can be implemented in the food industry to reduce energy consumption and reduce energy costs. Besides, future foods with novel ingredients from algae, insects, and microbial or plant-based proteins under the support of 3D food printing technology are also potential solutions to adapt to climate change.

In summary, global climate change has a huge negative impact on agriculture production and food systems. To become more resilient to climate change, modern agriculture and food production need to use natural resource inputs more efficiently under the support of innovative technological solutions. When sustainability challenges in agriculture and food production are of concern, then all stages of the food chain from farm to fork need to be covered.

KEYNOTE SPEECH 3:

An Introduction to Net-Zero Emission Policy in the Agriculture Sector: Taiwan's Experience

Prof. Dr. Hsing-Hao Wu

Department of Financial and Economic Law, National University of Kaohsiung, Taiwan

Email: hsiwu@nuk.edu.tw

In response to increasing extreme weather events as a result of climate change, world leaders are called upon to adopt more aggressive and sustained GHGS reduction measures to stabilize global temperature rise (IPPC, 2001). The COP26 held in November 2021 has established the Glasgow Climate Pact, the first international climate agreement that explicitly sets the goal of phasing down coal usage within the next decade. The Glasgow Climate Pact urges contracting parties to reduce global carbon dioxide emissions by 45 per cent by 2030 relative to the 2010 emission level and net-zero emission by mid-century to limit global temperature rise to 1.5°C. Glasgow Climate Pact, EU and the US have pledged to achieve carbon neutrality by 2050. Some other industrial economies in Asia, such as Japan and Korea, and Taiwan are also following the pace of 2050 net-zero emissions. Governments and industries worldwide have begun to focus on planning carbon reduction measures for the next decade to meet the mid-2030 emission reduction target as required by the Paris Agreement. There are four major emission sectors in the context of global GHG emissions. They are energy, agriculture, industry, and transportation. A recent survey reveals that 73% of global GHGs emissions come from energy consumption. This article will first explore Taiwan's overall policy framework for achieving net-zero emission targets. The main features and policy measures for achieving net-zero emissions in Taiwan's agriculture sector will be explored. Suggestions and observations of Taiwan's carbon-neutral policy in the agriculture sector will also be provided.

Keywords: Net-zero emission; agriculture sector; climate change; carbon reduction; sustainable agriculture

KEYNOTE SPEECH 4:

Improving Livestock Production System for Sustainable Rural Development in Indonesia

Prof. Dr. Akhmad Sodik

Faculty of Animal Science, Jenderal Soedirman University, Indonesia

Email: akhmad.sodik@unsoed.ac.id

The objective of this study was to describe the improving livestock production system of goat and beef cattle in rural areas of Central Java. Livestock on Farms Trials were conducted on the goat and beef cattle farmer group located at the four regencies consisting of Banyumas, Cilacap, Purbalingga, and Banjarnegara regions of Central Java province. Identification of the agriculture system and subsystem animal production were investigated under the village production system. The level of animal productivity and constraints were identified. Focus group discussions involving the farmers, extension workers, government officials, the Central Bank of Indonesia, and experts were conducted to formulate the intervention factors and strategies programs for livestock production system improvement. Factors of proven technology in terms of feeding and good farming practices could be applied to increase the productivity of goat and beef cattle in rural areas. Improving goat and beef cattle production system in rural areas of Indonesia conducted by following programs: (i) Empowering group dynamics of goat and beef cattle farmer group, (ii) Increasing farmers' skills and applied of technology to improve goat and beef cattle productivity, (iii) Facilitating the financial support including credit from the bank and subsidies from the government. This program was implemented by collaboration between the farmer groups, the local government, the Central Bank of Indonesia, and Jenderal Soedirman University.

Keywords: Livestock system, production, goat, beef cattle, rural, Indonesia

TABLE OF CONTENTS

Welcome MESSAGE	iii
Keynote speech	xxix
Oral Presentation	1
Session 1: Adapting Agricultural Production to Climate Change.....	3
Session 2: Ecological Health and Climate Change.....	11
Session 3: Trends and Advances in Food Science and Post-Harvest Technology	21
Session 4: Social Economics in Sustainable Agriculture	41
Session 5: Innovative Technology in Agriculture	51
Session 6: Emerging Issues in Agricultural Transformation	61
Session 7: Recent Advances in Animal Health and Animal Biosciences	67
Poster	
Session 1: Adapting Agricultural Production to Climate Change.....	87
Session 2: Ecological Health and Climate Change	99
Session 3: Trends and Advances in Food Science and Post-Harvest Technology	105
Session 4: Social Economics in Sustainable Agriculture	119
Session 5: Innovative Technology in Agriculture	129
Session 6: Emerging Issues in Agricultural Transformation	143
Session 7: Recent Advances in Animal Health and Animal Biosciences	149

LIST OF ORAL PRESENTATION

Session 1: Adapting Agricultural Production to Climate Change.....	3
O-101 EFFECTS OF WATER USE EFFICIENCY ON PLANT DRY MATTER IN NERICA AND JAPANESE RICE CULTIVARS UNDER DROUGHT CONDITIONS	5
<i>Nguyen T. T. Hien, Hiroto Yamanaka, Tohru Kobata, Yoshihiko Hirai and Kuniyuki Saitoh</i>	
O-102 HYDROGEL FOR IMPROVING WATER USE EFFICIENCY OF <i>Capsicum annuum</i> CROPS IN TOPSOIL	6
<i>N. A. Hasan, Khaini M. H. A., M. Y. Rafii and N. J. Sidik</i>	

O-103	BOLTING AND FLOWERING OF <i>Delphinium grandiflorum</i> var. <i>sinensis</i> NOT AFFECTED BY SOWING TIME BUT ROOT ZONE VOLUME	7
	<i>Kawai Mika, Kai Reimi, Kitamura Yoshikuni, Yasuba Ken-ichiro, Yoshida Yuichi and Goto Tanjuro</i>	
O-104	DIVERSITY EVALUATION OF <i>Cordyceps</i> spp. IN BIDOUP NUI BA, LAM DONG PROVINCE.....	8
	<i>Tran M. Hien, Nguyen T. Mai and Huynh V. Biet</i>	
O-105	INFLUENCE OF DIFFERENT HYDROPONIC UNITS ON FISH AND PLANT PERFORMANCE AND WATER QUALITY IN A SNAKEHEAD FISH-MINT AQUAPONICS SYSTEM.....	9
	<i>Nguyen P. C. Tu, Tran Q. Nhan, Nguyen N. Ha, Thai T. T. Thuy and Nguyen N. Tri</i>	
O-106	EFFECTS OF PLANTING DENSITY, FERTILIZATION AND THE GROWING SEASON ON THE NUTRITIONAL COMPOSITION OF TEN QUINOA VARIETIES GROWN IN THE CENTRAL HIGHLANDS OF VIETNAM.....	10
	<i>Nguyen V. Minh and Hoang V. Chuyen</i>	
Session 2: Ecological Health and Climate Change.....		11
O-201	EVALUATION OF METHANE REDUCTION AND ELECTRICITY PRODUCTION FOR FARM-SCALE ANAEROBIC PIGGERY WASTEWATER DIGESTERS IN TAIWAN	13
	<i>Hsing-Lung Lien and Tai-Lin Lin</i>	
O-202	A PRELIMINARY STUDY AND REVIEW OF THE METHANE EMISSION FACTOR IN RICE CULTIVATION USING AN ADJUSTED WATER MANAGEMENT PRACTICE IN TAIWAN.....	14
	<i>Hsing-Lung Lien and Tai-Lin Lin</i>	
O-203	INVESTIGATION AND ASSESSMENT OF OCCUPATIONAL NOISE EXPOSURE: CASE STUDY IN MECHANICAL FACTORIES IN HO CHI MINH CITY, VIETNAM	15
	<i>Vu X. Dan, Nguyen N. H. Mai, Phung D. Nhat, Hoang T. D. Phuong, Quach T. Thinh, Nguyen M. Ky, Nguyen K. Hue, Nguyen T. Q. Hung</i>	
O-204	POPULATION STRUCTURE OF <i>Parasesarma brevicristatum</i> AND <i>Parasesarma semperi</i> AS AN INDICATOR OF MANGROVE REPLANTED FOREST CONDITION IN BINTUNI BAY, INDONESIA	16
	<i>Fika N. Falah, Moh. H. Sastranegara and Erwin R. Ardli</i>	

O-205	CA MAU PROVINCE'S MANGROVE FOREST ECOSYSTEM IN THE FACE OF THE EFFECTS OF CLIMATE CHANGE.....	17
	<i>Pham T. Hai</i>	
O-206	EVALUATION OF STERILIZATION METHODS TO DECONTAMINATE ENVIRONMENT AND ITEMS FROM THE CORONAVIRUS SARS-COV-2	18
	<i>Nguyen T. Hiep, Huynh T. Nhut, Nguyen C. Manh, Nguyen T. M. Anh, Nguyen M. Ky and Nguyen T. Q. Hung</i>	
O-207	NEMATODE COMMUNITY AS A BASELINE TO MONITOR THE ECOSYSTEM HEALTH OF KEMBANGKUNING MANGROVE FOREST, INDONESIA.....	19
	<i>Ardhini R. Maharning, Erwin R. Ardli and Romanus E. Prabowo</i>	
O-208	ASSESSMENT OF BIOFOULING ON LOBSTER CAGES IN XUAN DAI BAY, PHU YEN PROVINCE, VIETNAM	20
	<i>Nguyen P. Hoa, Tran. T. K. Nhung, Pham T. Luu and Dang T. T. Hoa</i>	
Session 3: Trends and Advances in Food Science and Post-Harvest Technology		21
O-301	OPTIMIZATION OF FORMULATION FOR SPRAY-DRIED GAC MILK BLEND POWDER BY RESPONSE SURFACE METHODOLOGY	23
	<i>Bui P. T. Huong, Nguyen H. B. S. Long and Kha C. Tuyen</i>	
O-302	COMPARISON OF THAI AND JAPANESE FERMENTED MILK PRODUCED BY POTENTIAL PROBIOTIC LACTIC ACID BACTERIA ISOLATED IN THAILAND	24
	<i>Jirayu Jitpakdee, Hiroshi Kanzaki, Teruhiko Nitoda and Duangporn Kantachote</i>	
O-303	STIRRED MACERATION EXTRACTION OF CUSTARD APPLE (<i>Annona squamosa</i> L.) PEEL	25
	<i>Nguyen T. Trang and Phan T. Huan</i>	
O-304	OPTIMIZATION OF HYDROLYSIS CONDITIONS FOR YELLOWFIN TUNA (<i>Thunnus albacares</i>) HEADS USING ALCALASE ENZYME	26
	<i>Musiige Denis, Pham D. Hung and Nguyen V. Minh</i>	
O-305	DEVELOPING FREEZE-DRIED SNACK BITES FROM KEFIR MILK.....	27
	<i>Doan T. U. Nhi, Nguyen T. Y. Linh, Hoang T. Thu and Cao T. T. Loan</i>	
O-306	STRUCTURE ANALYSIS OF ANTIFUNGAL <i>Sesterterpene ophiobilin K</i> AND ITS ANALOGS PRODUCED BY <i>Aspergillus ustus</i>	28
	<i>Nguyen T. K. Ngoc, Natthapat Sohsomboon, Terumi Ichimiya, Teruhiko Nitoda and Hiroshi Kanzaki</i>	

O-307	THE CHANGES IN GAMMA-AMINOBUTYRIC ACID AND POLYPHENOLS IN MUNG BEANS DURING THE GERMINATION.....	29
	<i>Vu T. Anh, Kha C. Tuyen and Phan T. Huan</i>	
O-308	ULTRASOUND-ASSISTED EXTRACTION OF THE XAO TAM PHAN (<i>Paramignya trimera</i> (Oliver) Guillaum) ROOT	30
	<i>Nguyen T. N. Thao, Do A. Quan, Trinh T. Tan, Le H. Nghia, Phan P. Hien, Phung V. Trung and Nguyen M. X. Hong</i>	
O-309	INFLUENCE OF DEHYDRATION CONDITIONS ON PHYSICOCHEMICAL, PHYTOCHEMICAL AND ANTIOXIDANT PROPERTIES OF MEDICINAL PLANT DAY THUONG XUAN (<i>Hedera helix</i> L.).....	31
	<i>Nguyen V. Tang, Nguyen T. Van, Tran T. Giang, Le T. L. Hang, Dang T. M. Le, Dao V. Hung and Le T. C. Nhung</i>	
O-310	BIO-BASED AND BIODEGRADABLE PACKAGING MATERIALS: CURRENT APPLICATIONS AND PERSPECTIVES FOR SUSTAINABLE FOOD PACKAGING	32
	<i>Hoang V. Chuyen</i>	
O-311	IMPACT OF MALTODEXTRIN AND TEMPERATURE ON SPRAY DRIED RED FLESH DRAGON FRUIT (<i>Hylocereus polyrhizus</i>) POWDER	33
	<i>Duong T. N. Diep, Tran T. N. Trang and Hoang Q. Binh</i>	
O-312	EXPERIMENTAL DETERMINATION OF GUAVA LEAF DRYING TECHNOLOGY	34
	<i>Nguyen T. Phong and Le A. Duc</i>	
O-313	MICROENCAPSULATION OF AGARWOOD (<i>Aquilaria crassna</i>) ESSENTIAL OIL BY SPRAY DRYING	35
	<i>Truong T. Vy and Truong Vinh</i>	
O-314	CHARACTERISTIC OF BIODEGRADABLE FILM PRODUCED FROM THE CANNA STARCH WITH VARIOUS TYPES OF PLASTICIZERS.....	36
	<i>Condro Wibowo, Rumpoko Wicaksono, Pepita Haryanti, Susanto B. Sulistyo and Amin Fatoni</i>	
O-315	EFFECT OF PACKAGING METHOD AND STORAGE TEMPERATURE ON THE QUALITY OF FRESH SNAKEHEAD FISH (<i>Channa striata</i>) FILLETS	37
	<i>Sonkarlay Karnue and Nguyen V. Minh</i>	

O-316	INVESTIGATION OF CHITIN RECOVERY FROM SHRIMP WASTE BY YEAST FERMENTATION	38
	<i>Ta T. M. Ngoc, Bui H. Hung, Trinh T. T. Nhung and Nguyen T. M. Nhu</i>	
O-317	DRYING KINETICS OF BLACK SOLDIER FLY (BSF) LARVAE FOR USE IN FISH OR POULTRY FEED	39
	<i>Nguyen T. Nghi, Tran V. Tuan and Le Q. Vinh</i>	
Session 4: Social Economics in Sustainable Agriculture		41
O-401	LEGAL ANALYSIS OF AGRICULTURAL MARKET LAND POLICIES TO SUPPORT FARMER ECONOMIC'S WELFARE IN INDONESIA	43
	<i>Sri Wahyu Handayani, Kartono and Tedi Sudrajat</i>	
O-402	CONSUMER ACCEPTABILITY OF ALTERNATIVE FOODS: A STUDY OF PROCESSED CRICKET-BASED FOODS IN VIETNAM.....	44
	<i>Hoang H. Anh and Kha C. Tuyen</i>	
O-403	ANALYSIS OF CONSUMER PREFERENCES ON HONDJE TEA.....	45
	<i>Icuk Rangga Bawono, Rifda Naufalin and Poppy Arsil</i>	
O-404	ASSESSING THE VULNERABILITY TO DROUGHT OF THE HOUSEHOLDS IN NINH THUAN PROVINCE, VIETNAM.....	46
	<i>Chau T. Luc, Hoang H. Anh and Dang T. Ha</i>	
O-405	PRICE TRANSMISSION IN SHRIMP PRODUCTION IN VIETNAM	47
	<i>Truong N. Hao, Le C. Tru and Pham T. Thuyen</i>	
O-406	DETERMINANTS OF RELATIONSHIP QUALITY BETWEEN COFFEE FARMERS AND PURCHASING AGENTS: A CASE STUDY IN THE CENTRAL HIGHLANDS OF VIETNAM	48
	<i>Ha T. T. Hoa, Nguyen B. Dang, Dang L. Hoa and Pham T. H. Nhung</i>	
O-407	CONSUMER'S WILLINGNESS TO PAY FOR SAFE PORK IN SOUTHEAST REGION, VIETNAM	49
	<i>Mai D. Quy, Pham T. Phuong and Dang T. Ha</i>	
O-408	AN ANALYSIS OF CONSUMERS' KNOWLEDGE, AWARENESS AND WILLINGNESS TO PAY FOR E-WASTE RECYCLING: A CASE STUDY IN VIETNAM.....	50
	<i>Pham T. Thuyen, Lam P. M. Thanh, Dang L. Hoa and Pham T. Nien</i>	

Session 5: Innovative Technology in Agriculture	51
O-501 INVESTIGATING THE USEFULNESS OF A HYDROLOGICAL MODEL TO SUPPORT WATER RESOURCES ASSESSMENT ACROSS VIETNAMESE BASINS	53
<i>Hong X. Do and Le H. Tu</i>	
O-502 IMPACTS OF MECHANIZATION IN RICE FARMING ON GREENHOUSE GAS EMISSION: CASE STUDY IN MEKONG DELTA, VIETNAM	54
<i>Nguyen T. Nghi and Nguyen H. Bich</i>	
O-503 EFFECTS OF BOKASHI AND COMPOST EXTRACTS ON YIELD OF JAPANESE WATERCRESS (<i>Nasturtium officinale</i>).....	55
<i>Pham T. H. Thuan and Nguyen T. Binh</i>	
O-504 THE EFFECT OF ADDITION BIOACTIVE COMPOUNDS OF KECOMBRANG (<i>Etlingera elatior</i>) ON CHARACTERISTICS OF KEFIR.....	56
<i>Rifda Naufalin, Erminawati and Popi Nurhopipah</i>	
O-505 STUDY ON PLASTIC BIO-DEGRADATION POTENTIAL BY LARVAE OF WAX MOTH <i>Galleria mellonella</i>	57
<i>Le T. D. Trang and Nguyen H. V. Phu</i>	
O-506 SELECTION OF NON-FLOWER FADING <i>Dahlia variabilis</i> ‘NESSHO’ PLANTS BASED ON FLAVONE SYNTHASE GENE (<i>DvFNS</i>) EXPRESSION PATTERNS.....	58
<i>Edna K. Muthamia, Misaki Ando, Ken-ichiro Yasuba, Yuichi Yoshida, Tanjuro Goto and Yoshikuni Kitamura</i>	
O-507 EXTRACTION OF ANTHRAQUINONE AND SALICYLIC ACID FROM <i>Aloe barbadensis</i> Miller	59
<i>Luong V. M. Trang, Nguyen T. P. Thuy, Nguyen T. N. Lan, Tran T. T. Tra, Nguyen P. T. Nhan and Mai H. Cang</i>	
O-508 EFFECT OF NPK 12:12:17:2+TE FERTILIZER AND COCONUT HUSK ASH ON PHOTOSYNTHESIS OF OIL PALM SEEDLINGS.....	60
<i>Fathurrahman F., Qhairil Fajar, Siti Zahrah, Febri Doni, Maizar and Zaldi Arman</i>	
Session 6: Emerging Issues in Agricultural Transformation	61
O-601 FATE OF SULFONAMIDES IN PLANT – SOIL SYSTEMS: A CASE STUDY WITH SULFAMETHAZINE AND SULFAMETHOXAZOLE	63
<i>Huynh V. Khang and Dawn M. Dechand</i>	

O-602	INVESTING IN INTERNET OF THINGS TECHNOLOGY: CASE STUDIES OF SMART ALTERNATE WETTING AND DRYING IRRIGATION	64
	<i>Pham V. Bang</i>	
O-603	INSECT TRAP WITH VIBRATIONAL ENERGY DEVICE.....	65
	<i>Bryan H. H. Chiang and M. C. Liang</i>	
O-604	THE IMPACT OF COVID-19 ON ALTERING HOUSEHOLD FOOD CONSUMPTION: A CASE STUDY IN HO CHI MINH CITY, VIETNAM.....	66
	<i>Hoang H. Anh, Tran M. D. Hanh, Doan Q. Vang and Nguyen N. Thuy</i>	
Session 7: Recent Advances in Animal Health and Animal Biosciences		67
O-702	REDISTRIBUTION OF PLCZ1 IN FROZEN BULL SPERMATOZOA APPEARING THROUGH ACROSOMAL EXOCYTOSIS, BUT ITS DYNAMIC NOT AFFECTED BY THAWING METHODS.....	69
	<i>Nguyen T. Hai, Do Q. Son, Lakshitha Fonseka, Takuya Wakai and Hiroaki Funahashi</i>	
O-703	EFFECTS OF FORCED EXPRESSION OF PGC-1ALPHA ON DEVELOPMENTAL COMPETENCE OF PORCINE OOCYTES.....	70
	<i>Do Q. Son, Nguyen T. Hai, Takuya Wakai and Hiroaki Funahashi</i>	
O-704	IMPROVEMENT OF SPERM PARAMETERS WITH SUPPLEMENTATION OF ASTAXANTHIN	71
	<i>Moeka Ishihara, Hidetaka Tasaki and Junko Otsuki</i>	
O-705	EFFECTS OF THREE-DIMENSIONAL CULTURE ON BOVINE UTERINE GLANDS	72
	<i>Yosuke Sugino, Taiki Sato, Yuki Yamamoto and Koji Kimura</i>	
O-706	GUT IMMUNOGLOBULIN A SECRETION INDUCED BY CYCLIC SUGAR INDEPENDENT OF NUMBER OF GLUCOSE UNIT.....	73
	<i>Taisei Miyamoto, Naoki Nishino Takeshi Tsuruta</i>	
O-707	GENETIC DIVERSITY OF PHAN RANG SHEEP ON MITOCHONDRIAL COI GENE BASED ON NUCLEOTIDE SEQUENCING	74
	<i>Le V. Loc, Tran T. Vu, Le T. Loi, Hoang T. Thanh and Nguyen N. Tan</i>	
O-708	MILK MICROBIOTA, MILK COMPOSITION AND BLOOD METABOLITES OF JERSEY COWS THROUGHOUT A LACTATION PERIOD.....	75
	<i>Gathinji, P. K., Zabiulla, Y., Nguyen D. Q., Aodaofu and Nishino, N.</i>	

O-709	INHIBITED AEROBIC SPOILAGE BY MULTIPLE LACTIC ACID BACTERIA INHABITING TOTAL MIXED RATION SILAGE	76
	<i>Wali A., Hou J., Tran, D. P., Ton, N. M. T. and Nishino, N.</i>	
O-710	ANALYSIS OF CHANGES IN AFRICAN SWINE FEVER VIRUS GENETIC STRUCTURE AND BIOLOGICAL PROPERTIES DURING ADAPTATION TO CONTINUOUS CELL CULTURE FOR DEVELOPMENT OF ASF VACCINE	77
	<i>Joo Young Lee, Do T. Duy, Sung-sik Yoo, Hyeok-il Kwon, Seung-Chul Lee, Min Ho Kim and In-joong Yoon</i>	
O-711	CLINICAL, PATHOLOGICAL AND TRANSMISSION CHARACTERISTICS OF ASF IN VIETNAM: MINI-REVIEW FROM RESEARCH TO THE FIELD	78
	<i>Lai C. Danh, Nguyen T. Toan and Do T. Duy</i>	
O-712	DEVELOPMENT OF PIGHEALTH SECURITY-X APPLICATION FOR BIOSECURITY ASSESSMENT IN SUSTAINABLE PIG PRODUCTION	79
	<i>Lai T. T. Tuyen, Nguyen H. Doanh, Le N. Van, Le T. H. Nho, Ngo T. Phuc, Vo T. Hue, Du D. Phong and Do T. Duy</i>	
O-713	DIFFERENTIAL DIAGNOSIS OF VIRUSES RELATED TO REPRODUCTIVE DISORDER ON SOWS BY PENTAPLEX-PCR TECHNIQUE.....	80
	<i>Nguyen N. The, Le T. T. Ha, Vu L. X. Hiep and Dinh X. Phat</i>	
O-714	PREVALENCE AND GENETICS CHARACTERISTIC OF PORCINE ROTAVIRUS GROUP C IN PIGLETS IN SOME SOUTHERN AND CENTRAL HIGHLANDS PROVINCES	81
	<i>Nguyen H. K. Linh and Hoang T. Hai</i>	
O-715	ANTIBACTERIAL PROPERTIES OF <i>Allium sativum</i> AND <i>Phyllanthus amarus</i> EXTRACTS AND THE EFFECT OF THESE HERBAL PRODUCTS ON THE PERFORMANCE OF ISA BROWN LAYERS.....	82
	<i>Pham T. Hue and Vo T. T. An</i>	
O-716	THE EFFECT OF PROTEIN SOURCES ON GUT MICROBIOTA IN MICE WITH AND WITHOUT OSMOTIC DIARRHEA	83
	<i>Nuomin, Baek, R., Tran, D. P., Ton, N. M. T., Tsuruta, T. and Nishino, N.</i>	
O-717	EFFECTS OF <i>Lactobacillus acidophilus</i> L-55 (LAL-55) STRAIN ON THE CLINICAL SIGNS OF <i>Eimeria tenella</i> IN LAYING HENS.....	84
	<i>Chiumya Kondwani, Pham H. S. Hung and Toshimitsu Hatabu</i>	

POSTER

Session 1: Adapting Agricultural Production to Climate Change	87
P-101 INHIBITION ACTIVITY OF CULTIVATED <i>Ophiocordiceps sphecocephala</i> ON CANCER CELL GROWTH <i>in vitro</i>	89
<i>Doan T. P. Thuy, Tran T. T. Huong and Nguyen T. Mai</i>	
P-102 EFFECT OF BIOCHAR MICROPARTICLES DERIVED FROM AGRICULTURAL RESIDUES ON METHYLENE BLUE ADSORPTION IN AQUEOUS SOLUTION	90
<i>Nguyen C. Manh, Nguyen M. Ky, Nguyen T. Q. Hung and Yasushi Mori</i>	
P-103 IRRIGATION WATER USE EFFICIENCY OF WET RICE CULTIVATION UNDER CLIMATE CHANGE IN PHU THIEN DISTRICT, GIA LAI PROVINCE	91
<i>Tran N. L. Khuong and Nguyen D. Liem</i>	
P-104 THE LIVELIHOOD VULNERABILITY AND ADAPTIVE CAPACITY OF SHRIMP FARMERS TO CLIMATE CHANGE: A CASE STUDY IN TRA VINH PROVINCE, VIETNAM	92
<i>Nguyen T. Dat, Diep T. Tung, Nguyen T. Hung, Lam T. M. Lan and Phan X. Hue</i>	
P-105 THE DISTRIBUTION AND PRESENCE OF ARBUSCULAR MYCORRHIZAL FUNGI (AMF) IN THE ROOTS AND SOILS RHIZOSPHERE OF CUCURBITACEAE PLANTS GROWN IN HO CHI MINH CITY, VIETNAM	93
<i>Dao U. T. Da, Nguyen T. K. Tien, Tran T. Nghia, Le H. Phuc and Truong P. T. Hoang</i>	
P-106 APPLYING CONVOLUTION NEURAL NETWORK FOR LEAF IMAGES RECOGNITION WITH VIETNAMESE LEAF IMAGE DATABASE	94
<i>Phan D. Long and Tran T. Son</i>	
P-107 ISOLATION, IDENTIFICATION OF <i>Lactobacillus plantarum</i> BACTERIA AND GROWTH INHIBITORY POTENTIAL OF <i>Escherichia coli</i> , <i>Salmonella</i> spp.	95
<i>To D. Q. Thong and Vo T. T. Hue</i>	
P-108 SELECTIVE ISOLATION AND SCREENING OF <i>Streptomyces</i> sp. STRAIN OF PRODUCING CELLULOSE DEGRADING ENZYMES	96
<i>Nguyen T. Lan, Truong P. T. Hoang and Le P. Tho</i>	
P-109 DETECTION AND MANAGEMENT OF LEAF SPOT DISEASE CAUSED BY <i>Paraconiothyrium variabile</i> ON <i>Vanda</i> sp. TROPICAL ORCHIDS IN INDIA...97	
<i>Suman Dutta, Amitava Basu and Tushnima Chaudhuri</i>	

P-110	MANAGEMENT OF LEAF SPOT DISEASE CAUSING PATHOGENS ON SOLANACEOUS CROPS: THE USE OF BIO-CONTROL AGENTS TO FACILITATE SUSTAINABLE AGRICULTURE IN INDIA	98
	<i>Tushnima Chaudhuri, Amitava Basu and Suman Dutta</i>	
Session 2: Ecological Health and Climate Change		99
P-201	OBSERVATIONS OF THE HOST HABITAT OF <i>Ophiocordyceps nutans</i> IN THE BIDOUP NUI BA NATIONAL PARK, LAM DONG PROVINCE, VIETNAM.....	101
	<i>Nguyen T. Mai, Doan T. P. Thuy and Nguyen V. Hong</i>	
P-202	LONG-TERM INVESTIGATION ON HYDROLOGICAL EXTREME VALUE DISTRIBUTIONS IN CA MAU AND AN GIANG PROVINCES, VIETNAM.....	102
	<i>Dang K. Cuong and Nguyen K. Loi</i>	
P-203	ISOLATION AND IDENTIFICATION OF AMMONIA TRANSFORMING BACTERIA FROM THE BOTTOM SLUDGE OF LOBSTER FARMING AREA, PHU YEN PROVINCE	103
	<i>Truong P. T. Hoang and Nguyen P. Hoa</i>	
P-204	RAIN WATER HARVESTING TECHNOLOGY: DRINKING WATER FULFILLMENT AND WATER CONSERVATION NEARBY LANDFILL AREA...	104
	<i>Afik Hardanto, Ardiansyah and Asna Mustofa</i>	
Session 3: Trends and Advances in Food Science and Post-Harvest Technology.....		105
P-301	CURCUMIN-BASED PYRAZOLE AND ISOXAZOLE ANALOGUES WITH GREATER ANTICANCER POTENCIES AGAINST KB CANCER CELL LINE COMPARED TO FREE 1,3-DICARBONYL CURCUMINOIDS	107
	<i>Pham T. B. Van and Nguyen V. Hien</i>	
P-302	EFFECTS OF DRYING METHODS AND DRYING TEMPERATURE ON PRODUCT QUALITY OF <i>Phyllanthus amarus</i>	108
	<i>Nguyen T. Phong, Nguyen D. Khuyen and Le A. Duc</i>	
P-303	STABILITY OF SPRAY-DRIED CONCENTRATE LIME JUICE POWDER STORED AT DIFFERENT TEMPERATURES.....	109
	<i>Huynh T. Dat, Kha C. Tuyen, Nguyen V. Ay, Nguyen T. Dung and Nguyen T. T. Trang</i>	

P-304	SPRAY DRYING CONDITIONS OF LIME JUICE PREPARED BY FREEZE CONCENTRATION.....	110
	<i>Huynh T. Dat, Kha C. Tuyen, Nguyen V. Ay, Nguyen T. Dung, Ha T. M. Linh and Ngo H. Huy</i>	
P-305	PROTEIN FRACTION OF HARD- AND SOFT-SHELL MUD CRABS OF <i>Scylla paramamosain</i> (Estampador, 1949).....	111
	<i>Nguyen P. C. Tu, Ho T. T. Thy, Nguyen N. Ha, Thai T. T. Thuy and Ong M. Quy</i>	
P-306	ENZYMATIC PREPARATION OF YELLOWFIN-TUNA HEAD FOR OLEAGINOUS YEAST CULTIVATION	112
	<i>Nguyen H. Ngan, Pham T. Lan, Huynh T. Linh and Ta T. M. Ngoc</i>	
P-307	EFFECTS OF PROCESS DRYING ON THE MICROENCAPSULATION OF LEMON ESSENTIAL OIL BY ION-GEL ALGINATE-CALCIUM-CHITOSAN METHOD	113
	<i>Dao N. Duy</i>	
P-308	OPTIMIZATION OF PROCESS CONDITIONS FOR JAM PRODUCTION FROM <i>Chrysaliidocarpus lutescens</i> USING RESPONSE SURFACE METHODOLOGY	114
	<i>Le T. K. Loan, Ta N. M. Duyen and Ngo V. Tai</i>	
P-309	EFFECT OF PRE-TREATMENTS ON QUALITY AND STORAGE LIFE OF DRIED BANANA BY USING SOLAR DRYER DOME	115
	<i>Nguyen V. Phong, Tran H. X. Nu and Phan T. L Khanh</i>	
P-310	EFFECTS OF HEAT TREATMENT ON THE PHYSICOCHEMICAL PARAMETERS OF ACEROLA FRUIT (<i>Malpighia emarginata</i> DC.) JUICE OVER DIFFERENT MATURITY INDEXES	116
	<i>Duong T. N. Diep, Pham N. Tram and Hoang Q. Binh</i>	
P-311	RESEARCH ON OPTIMIZING THE DRYING PROCESS OF PYINKADO (<i>Xylia xylocarpa</i>) BY VACUUM INFRARED RADIATION DRYING METHOD	117
	<i>Bui T. T. Kim, Hoang T. T. Huong and Le A. Duc</i>	
Session 4: Social Economics in Sustainable Agriculture		119
P-401	ANALYSIS OF THE FACTORS AFFECTING THE INTENTION TO ADOPT NET HOUSE IN APPLE PRODUCTION IN NINH THUAN PROVINCE	121
	<i>Le Vu, Tran D. Lap, Tran H. Nam, Le C. Tru, Quy M. Trung, Nguyen M. Ton, Nguyen V. Cuong and Pham T. A. Ngoc</i>	

P-402	THE FULFILLMENT OF WORKERS' SOCIAL SECURITY ON INCREASING PRODUCTION IN KALIGUA TEA PLANTATION	122
	<i>Siti Kunarti, Sri Wahyu Handayani and Sri Hartini</i>	
P-403	FACTORS AFFECTING SMALLHOLDER FARMERS' CHOICE OF MARKETING CHANNELS FOR AGRICULTURAL PRODUCTS: A LITERATURE REVIEW.....	123
	<i>Ha T. T. Hoa, Nguyen B. Dang and Pham T. H. Nhung</i>	
P-404	ANALYZING THE QUALITY OF RELATIONSHIP BETWEEN MANUFACTURER AND DISTRIBUTORS: A CASE STUDY IN CHANH VIET TRADING AND INVESTMENT JOINT STOCK COMPANY.....	124
	<i>Nguyen T. A. Tien, Tran D. Ly and Tran M. Quoc</i>	
P-405	THE EFFECTIVENESS OF AGRICULTURE EXTENSION ACTIVITIES APPLYING CLIMATE-SMART AGRICULTURE IN AN GIANG PROVINCE ...	125
	<i>Huynh P. Long and Phan H. Trang</i>	
P-406	BENEFIT SHARING MECHANISM IN FOREST MANAGEMENT: A CASE STUDY ON FOREST DEPENDENT COMMUNITY IN CENTRAL VIETNAM .	126
	<i>Bui V. Danh and Le Q. Thong</i>	
P-407	A SYNTHESIS OF AGRICULTURE EXTENSION FOR CLIMATE-SMART AGRICULTURE	127
	<i>Huynh P. Long, Pham T. H. Nhung and Nguyen B. Dang</i>	
Session 5: Innovative Technology in Agriculture		129
P-501	IMPROVING LAND-USE PLANNING DATABASE FOR SUSTAINABLE LAND MANAGEMENT IN VUNG TAU CITY, BA RIA - VUNG TAU PROVINCE	131
	<i>Truong D. T. Linh</i>	
P-502	EFFECT OF LOW-POWER SEMICONDUCTOR LASER BEAM ON PROTEIN AND GENISTEIN CONTENT, GERMINATION RATE OF SOYBEAN SEEDS	132
	<i>Thai V. Ton and Le H. Hai</i>	
P-503	HIERARCHICAL CLASSIFICATION METHOD OF HYDROLOGIC NETWORK TO SUPPORT CREATION OF A MULTI-SCALE HYDROGRAPHIC DATABASE.....	133
	<i>Nguyen T. H. Hanh and Vu X. Cuong</i>	

P-504	OPTIMIZATION CONDITIONS FOR GROWTH AND INVESTIGATION OF ANTI BACTERIAL ACTIVITIES OF FUNGUS <i>PYCNOPORUS SANGUINEUS</i>	134
	<i>Do N. T. Mai, Hoang M. Hao and Nguyen H. Tri</i>	
P-505	A SUPPLY RESPONSE MODEL OF BLACK TIGER SHRIMP IN MEKONG DELTA	135
	<i>Le N. B. Ngoc, Le Q. Thong and Thai A. Hoa</i>	
P-506	FOOD ESTATE FARMERS' PREFERENCES OF SOURCE SEED NEW SUPERIOR VARIETIES IN RICE SEED PRODUCTION.....	136
	<i>Twenty Liana, Susilawati and Wahyu A. Nugroho</i>	
P-507	EXTRACTION OF ROTENONE FROM <i>Derris elliptica Benth</i>	137
	<i>Nguyen T. Tu, Nguyen P. T. Nhan, Tran T. T. Tra, Nguyen T. N. Lan and Mai H. Cang</i>	
P-508	SURVEYING THE POSSIBILITY OF SYNTHETIC NANO SILVER FROM <i>Syzygium samagense</i> FLOWER BUDS EXTRACT	138
	<i>Nguyen Q. Trong, Doan D. N. Trinh, Hong L. Quy, Do M. Tri and Nguyen H. Nguyen</i>	
P-509	CHARACTERISTICS OF YOGHURT WITH THE ADDITION OF BIOACTIVE COMPOUNDS FROM KECOMBRANG EXTRACT	139
	<i>Rifda Naufalin, Erminawati and Popi Nurhopipah</i>	
P-510	USE OF PROTEIN HYDROLYSATE DERIVED FROM BLACK SOLDIER FLY LARVAE AS A FOLIAR BIO-FERTILIZER FOR MUSTARD GREEN CULTIVATION.....	140
	<i>Nguyen N. Ha, Ta Q. Son, Tran N. Hao, Nguyen P. C. Tu and Nguyen T. T. Dung</i>	
P-511	ULTRASOUND-ASSISTED ENZYMATIC EXTRACTION OF POLYPHENOLS FROM CUSTARD APPLE (<i>Annona squamosa</i> L.) PEEL.....	141
	<i>Duong T. N. Dan, Phan T. Thanh and Phan T. Huan</i>	
P-512	EXPLORATION OF GENES INVOLVED IN THE PRODUCTION OF THE <i>Enterococcus faecium</i> NKR-5-3B BACTERIOCIN AND SCREENING FOR NOVEL VARIANTS	142
	<i>Nguyen M. Cuong, Juliana Vukotic, Pham T. Huong and Mark Turner</i>	

Session 6: Emerging Issues in Agricultural Transformation	143
P-601 ENHANCING ENZYMATIC HYDROLYSIS YIELD OF SPENT COFFEE GROUNDS BY ALKALINE ORGANOSOLV PRETREATMENT	145
<i>Trinh T. P. Ly, Nguyen V. Tat, Ho M. Hanh and Nguyen Q. Anh</i>	
P-602 EXTRACTION OF PECTIN FROM PASSION FRUIT PEEL: PROCESS OPTIMIZATION AND CHARACTERIZATION.....	146
<i>Tran T. K. Ngan, Le Q. Tu and Nguyen T. T. Thuy</i>	
P-603 DRAGON FRUIT VALUE CHAIN IN MEKONG DELTA	147
<i>Nguyen T. H. Nga and Le N. B. Ngoc</i>	
P-604 QUALITY RELATIONSHIP BETWEEN MANUFACTURERS AND DISTRIBUTORS IN THE SUPPLY CHAIN OF ABODE BRICKS IN MEKONG DELTA.....	148
<i>Ha T. T. Tuyen and Le N. B. Ngoc</i>	
Session 7: Recent Advances in Animal Health and Animal Biosciences	149
P-701 APPLICATION OF THE MB-1 ATTENUATED INFECTIOUS BURSAL DISEASE VACCINE ON DAY-OLD ISA BROWN LAYERS	151
<i>Nguyen T. K. Oanh, Nguyen M. Ho and Quach T. Anh</i>	
P-702 ASSESSMENT OF <i>Ornithobacterium rhinotracheale</i> (ORT) ANTIBODY TITER FLUCTUATION ON SOME CHICKEN BREEDS AFTER VACCINATION WITH ORNITIN TRIPLE	152
<i>Le T. K. Tuyen, Nguyen M. Ho, Nguyen L. T. Truc, Nguyen T. K. Oanh and Quach T. Anh</i>	
P-703 INVESTIGATION OF PHYTOCHEMICAL COMPOSITIONS AND BIOLOGICAL ACTIVITIES OF <i>Caesalpinia minax</i> Hance.....	153
<i>Nguyen T. V. Anh, Le N. T. Dong, Trinh T. P. Ly, Phung V. C. Hong and Le T. Thien</i>	
P-704 THE FACTORS AFFECTING MILK PRODUCTION ON DAIRY COW FARMS IN HO CHI MINH CITY, VIET NAM	154
<i>Nguyen T. Thuong, Phan T. N. Theu, Tran P. Hoa, Tran T. M. Tu</i>	
P-705 PROTECTION OF NEWCASTLE DISEASE IN CHICKEN AFTER VACCINATION IN DONG NAI PROVINCE.....	155
<i>Nguyen T. Thuong, Nguyen T. M. Nhan, Nguyen T. B. Lien and Phan C. Thong</i>	

P-706	CHARACTERISTICS AND PERFORMANCE OF <i>Leiolepis guttata</i> RAISING IN BINH DINH PROVINCE	156
	<i>Nguyen T. B. Lien, Vo T. L. Na, Nguyen T. Thuong and Vo M. Trieu</i>	
P-707	INVESTIGATION OF PRESENCE OF NEWCASTLE DISEASE VIRUS AND H5-SUBTYPE INFLUENZA VIRUS IN SWIFTLET HOUSES BY MULTIPLEX RT-PCR.....	157
	<i>Do T. Trinh, Hoang G. Lam, Nguyen M. T. Mi, Cao T. Q. Nhu and Dinh X. Phat</i>	
P-708	INSULIN-LIKE GROWTH FACTOR-1 REGULATES THE AROMATASE ENZYME ABUNDANCE, ESTROGEN RECEPTORS EXPRESSION AND ANDROGEN PRODUCTION IN BOVINE FOLLICLES.....	158
	<i>Rawan Ahmad Farid, Langar Hikmatullah I, Yuki Yamamoto and Koji Kimura</i>	
P-709	EFFECT OF VASCULAR ENDOTHELIAL GROWTH FACTOR ON MEIOSIS RESUMPTION COMPETENCE OF PORCINE OOCYTE.....	159
	<i>Nguyen T. Ngan, Nguyen T. N. Han, Phan H. H. Trinh, Le T. Thanh and Luu K. Nhien</i>	
P-710	STUDY ON PROLACTIN GENE POLYMORPHISM IN STAR53 CROSSBRED DUCKS USING PCR-RFLP	160
	<i>Le T. Loi I, Pham T. N. Tuyet, Nguyen T. K. Ly, Hoang T. Thanh and Nguyen N. Tan</i>	
P-711	ATTEMPT TO ESTABLISH CULTURE METHOD OF BOVINE OVIDUCTAL SMOOTH MUSCLE CELLS HAVING CONTRACTILE ABILITY AND COLLAGEN GEL CONTRACTION ASSAY	161
	<i>Sayaka Kubota, Yuki Yamamoto and Koji Kimura</i>	
P-712	EVALUATING OF CORRELATION OF THE ANTIBODIES AGAINST PORCINE CIRCOVIRUS TYPE 2 IN VACCINATED SOWS AND THEIR PROGENY.....	162
	<i>Nguyen V. Non and Nguyen T. Toan</i>	
P-713	GENETIC DIVERSITY OF PHAN RANG SHEEP BASED ON MITOCHONDRIAL D-LOOP SEQUENCE	163
	<i>Tran T. Vu, Le T. Loi, Hoang T. Tuan and Nguyen N. Tan</i>	
P-714	TRIAL TO EVALUATE THE EFFICACY OF BIOLOGICAL CASTRATION VACCINE (IMPROVAC®) ON ESTROGEN HORMONE AND GENITAL ORGANS IN FEMALE PIGS	164
	<i>Lai C. Danh, Nguyen K. Quoc, Vo T. Hue, Du D. Phong, Phan T. Truc, Doan T. V. Khanh and Do T. Duy</i>	

P-715	EFFICACY OF BIOLOGICAL CASTRATION VACCINE (IMPROVAC®) ON TESTOSTERONE AND GENITAL ORGANS IN BOARS	165
	<i>Nguyen L. Q. Nhu, Lai C. Danh, Giap X. Thien, Nguyen T. A. Linh, Huynh N. Truc, Du D. Phong, Phan T. Truc, Vo T. Hue, Doan T. V. Khanh and Do T. Duy</i>	
P-716	THE ADAPTATION CAPACITY OF 15 - DAI XUYEN SEA DUCKS (SEA DUCKS) TOWARDS SODIUM CHLORIDE (NaCl) IN DRINKING WATER IN TAN PHU DONG DISTRICT, TIEN GIANG PROVINCE	166
	<i>Thai Q. Hieu, Le T. H. Nho, Le P. Thao, Tran T. M. Tu, Le N. Man, Tran T. Dan and Nguyen N. Tuan</i>	
P-717	THE BACTERIA COMMUNITY IN RELATION TO THE STATUS OF UTERINE SAMPLES OF DAIRY COWS	167
	<i>Tran T. M. Tu, Nguyen T. Thuong, Tomas J. Acosta and Naoki Nishino</i>	
P-718	EFFECTS OF POST-HATCH FEEDING TIME AND PRE-STARTER FEEDS ON GUT HEALTH OF LUONG PHUONG BREED	168
	<i>Bui T. K. Phung, Cao P. U. Tran and Che M. Tung</i>	
P-719	EXPLORING THE ETIOLOGY OF REFRACTILE BODIES IN HUMAN OOCYTES	169
	<i>Yuto Aoki, Hidetaka Tasaki, Mikiya Nakatsuka and Junko Otuki</i>	
P-720	THE EFFECTS OF ETHYLENEDIAMINETETRAACETIC ACID IN CULTURE MEDIUM ON INNER CELL MASS.....	170
	<i>Nanami Sono, Hidetaka Tasaki and Junko Otsuki</i>	
P-721	THE APPLICATION OF SOFT PALATE RESECTION SURGERY FOR THE TREATMENT OF BRACHYCEPHALIC OBSTRUCTIVE AIRWAY SYNDROME IN BRACHYCEPHALIC DOG BREEDS	171
	<i>Cao N. An, Vu T. Vy, Le D. Khoa, Nguyen T. T. An and Le Q. Thong</i>	
P-722	MUTATION ANALYSIS OF GENES ASSOCIATED WITH RECESSIVE DISORDERS IN A RARE STRAIN OF JAPANESE BLACK CATTLE.....	172
	<i>Misa Kakiuchi, Kazuhiro Yoneda, Le N. A. Thu, Takayuki Ibi, Shinji Sasaki, Tetsuo Kunieda and Takehito Tsuji</i>	
P-723	β-CASEIN GENE POLYMORPHISM IN JERSEY COWS REARED IN OKAYAMA, JAPAN.....	173
	<i>Aodaofu, Nuomin, Tran, D. P., Li, D. L., Maeda, T. and Nishino, N.</i>	
P-724	PRODUCTION OF β-CASOMORPHIN FROM A1 MILK, A2 MILK, A1 YOGURT, AND A2 YOGURT.....	174
	<i>Baek, R., Nuomin, Ton, N. M. T., Kiyochika, T., Tsuruta, T. and Nishino, N.</i>	

ORAL PRESENTATION



SESSION 1

Adapting Agricultural Production to Climate Change



EFFECTS OF WATER USE EFFICIENCY ON PLANT DRY MATTER IN NERICA AND JAPANESE RICE CULTIVARS UNDER DROUGHT CONDITIONS

Nguyen T. T. Hien^{1,2}, Hiroto Yamanaka³, Tohru Kobata¹, Yoshihiko Hirai¹
and Kuniyuki Saitoh^{1*}

¹*Graduate School of Environmental and Life Science, Okayama University, Okayama City, Japan*

²*Institute of Resources and Environment, Hue University, Hue City, Vietnam*

³*Faculty of Agriculture, Okayama University, Okayama City, Japan*

*Email: prn86oxc@s.okayama-u.ac.jp

Abstract

NERICA, a promising series of cultivars for Africa developed by crossing Asian rice (*Oryza sativa* L.) and African rice (*Oryza glaberrima* Steud.), is reported to be drought tolerant. This study examined the transpiration and contribution of water use efficiency to plant aboveground dry matter in a total of 29 cultivars, including 23 NERICA, 1 indica-type, and 5 japonica-type cultivars. Seedlings were transplanted, 2 plants per pot (1/5000 a Wagner pot), on June 14, 2021. When the flag leaf appeared, three water treatments with three replications were imposed for a period of 14 days. The control pots (C) were watered daily to maintain the water content per pot at field capacity (SW). Medium dry pots (MD) and hard dry pots (HD) were watered when the weight of the pots reached 40% and 10% of SW, respectively. The surface of the pots was covered to eliminate the evaporation. Samples for dry matter measurement were collected on the same day, at the beginning and at the end of water treatment. While there was a significant difference in water use efficiency (WUE) between cultivars when soil moisture treatments were included, there was no significant difference between soil moisture treatments when cultivars were included. NERICA 4 significantly showed the lowest WUE, while NERICA 9 and Hokuriku 193 had the highest WUE. Cultivars with higher transpiration rate (Tr) had higher dry matter production proven by a close linear relationship between Tr/vapor pressure deficit (VD) and dry matter increase (Δ DW). Under high VD, DW was more highly correlated with Tr/VD than with WUE.

Keywords: NERICA; water use efficiency; drought; dry matter production

HYDROGEL FOR IMPROVING WATER USE EFFICIENCY OF *Capsicum annuum* CROPS IN TOPSOIL

N. A. Hasan^{1,2*}, Khaini M. H. A.^{1,3}, M. Y. Rafi^{4,5} and N. J. Sidik³

¹*School of Biology, Faculty of Applied Science, Universiti Teknologi MARA, Cawangan Negeri Sembilan Kampus Kuala Pilah, Malaysia*

²*Biotechnology, Microbiology and Environmental Collaborative Science, Universiti Teknologi MARA, Cawangan Negeri Sembilan Kampus Kuala Pilah, Malaysia*

³*Faculty of Applied Sciences, Universiti Teknologi MARA, Selangor, Malaysia*

⁴*Institute of Tropical Agriculture and Food Security, Universiti Putra Malaysia, Serdang, Malaysia*

⁵*Department of Crop Science, Faculty of Agriculture, Universiti Putra Malaysia, Serdang, Malaysia*

*Email: aishahnh@uitm.edu.my

Abstract

Enhancing food and water security through sustainable agriculture is crucial, especially in light of the cumulative effects of climate change. Applications of hydrogels in agriculture have recently drawn a lot of attention from both researchers and farmers. This investigation aims to evaluate the impact of hydrogel on *Capsicum annuum* crop productivity and irrigation water use effectiveness. The experimental material, a polybag containing a specially prepared mixture of hydrogel and topsoil, included the pepper variety cv Bara. In addition, 20 percent, 40 percent, 60 percent, 80 percent, and 100 percent biodegradable hydrogel doses per plant were examined. The treatment schedule was set out using a random complete block approach. Water consumption, irrigation frequency, water usage effectiveness, plant height, fruit features, and yield were the factors under investigation. Results showed that hydrogel recorded the best growth characteristics when used at doses of 40% hydrogel: 60% topsoil per plant. When compared to the control, water efficiency was connected with the use of hydrogel. Indicators of production did not demonstrate statistical significance. The study's findings suggest that hydrogel functioned as a water retainer, releasing water into the topsoil and improving water use efficiency in pepper crops without impacting plant growth.

Keywords: Agriculture; *Capsicum annuum*; hydrogel; topsoil; water efficiency

BOLTING AND FLOWERING OF *Delphinium grandiflorum* var. *sinensis* NOT AFFECTED BY SOWING TIME BUT ROOT ZONE VOLUME

Kawai Mika*, Kai Reimi, Kitamura Yoshikuni, Yasuba Ken-ichiro, Yoshida Yuichi
and Goto Tanjuro

*Department of Crop Science, Division of Agriculture and Life Science, Graduate School of
Environmental and Life Science, Okayama University, Okayama City, Japan*

**Email: plaa7qx1@s.okayama-u.ac.jp*

Abstract

On transplants production of *Delphinium grandiflorum* var. *sinensis* during the high temperature season in Japan, bolting in cell trays and early flowering after planting have shown significant problems. In previous experiments, we found that bolting and flowering were not observed in the plants grown in 406 cell trays with 4 ml root zone volume for one year. Therefore, in this experiment, we investigated the effects of the sowing time and root zone volume on bolting, flowering and cut flower quality of *Delphinium grandiflorum* var. *sinensis* 'F1 Morpho Grand Blue'. Seeds were sown in 406 (root zone volume 4 mL), 288 (9 mL), 200 (12 mL) and 128 (20 mL) cell trays on July 1, 2019, and on August 1, 2019. On September 20, 2019, 5 seedlings were planted in a planter with a capacity of 12 L. Regardless of sowing time, bolting before planting was found in 128, and 200 cell trays, but little in 288 and 406 cell trays. Regardless of sowing time, plants grown in 200, 288 and 406 cell trays had not seen early flowering after planting, and there was no significant difference in cut flower quality among them. Bolting was affected not by the sowing time but by the root zone volume during raising in the high temperature season. It was considered possible to produce high-quality cut flowers by raising under root restriction.

Keywords: Cell tray; high-quality cut flowers; root zone volume; secondary cut flower; short stem flowering

DIVERSITY EVALUATION OF *Cordyceps* spp. IN BIDOUP NUI BA, LAM DONG PROVINCE

Tran M. Hien¹, Nguyen T. Mai² and Huynh V. Biet^{3*}

¹ Faculty of Biological Science, Nong Lam University, Ho Chi Minh City, Vietnam

² Faculty of Science, Nong Lam University, Ho Chi Minh City, Vietnam

³ Research Institute for Biotechnology and Environment, Nong Lam University, Ho Chi Minh City, Vietnam

*Email: hvbiet@hcmua.edu.vn

Abstract

Cordyceps sp. has been known for a variety of functional and valuable human health components such as cordycepin, adenosine, and hydroxyethyl adenosine that led to high demand for their usage. There are more than 680 species of *Cordyceps* spp. around the world. However, *Cordyceps sinensis* and *Cordyceps militaris* are the two most studied species, which led to the pressure to look for other species that have at least similar functions or even better than *Cordyceps sinensis* and *Cordyceps militaris*. With that objective, diversity understanding is the initial step we implement. Twenty specimens of *Cordyceps* spp. were collected from Bidoup Nui Ba to examine for morphology such as fertile head size, stroma length, host weight, and length, with microscopic for the shape of Perithecia, Asci, and Ascospore. Then those specimens were extracted DNA with the CTAB method for the PCR cycle with ITS5/ITS4 primers. PCR products were sequenced to get data for building a phylogeny tree. Based on the finding of morphology we found that there are three samples of *Cordyceps sphecocephala* which was parasitic on Hymenoptera and seventeen samples of *Cordyceps nutans* which is parasitic on Hemiptera. Molecular phylogeny analyses of ITS supported the results of morphology results by dividing twenty samples into two different clades similar to what was found by morphology with high bootstrap support.

Keywords: *Cordyceps* spp.; diversity; ITS; morphology

INFLUENCE OF DIFFERENT HYDROPONIC UNITS ON FISH AND PLANT PERFORMANCE AND WATER QUALITY IN A SNAKEHEAD FISH-MINT AQUAPONICS SYSTEM

Nguyen P. C. Tu^{1*}, Tran Q. Nhan¹, Nguyen N. Ha^{2,3}, Thai T. T. Thuy² and Nguyen N. Tri¹

¹*Faculty of Fisheries, Nong Lam University, Ho Chi Minh City, Vietnam*

²*Research Institute of Biotechnology and Environment, Nong Lam University, Ho Chi Minh City, Vietnam*

³ *Faculty of Biological Sciences, Nong Lam University, Ho Chi Minh City, Vietnam*

*Email: npctu@hcmuaf.edu.vn

Abstract

This study was done to assess the effect of two hydroponics cultivation (media bed (MB) and floating raft (FR) on the performance of striped snakehead fish (SSF) (*Channa striata*) and mint (*Mentha arvensis* L.), and water quality parameters in the aquaponic system. Fish were cultured at a density of 500 fingerlings per m³ for 130 days. Mints were planted at densities of 40 and 34 lettuce m⁻² in the MB and FR treatments, respectively, and had two cutting harvests. During the experimental period, levels of most water quality parameters analysed in the two treatments were in the optimal range for SSF and mint. After 130 days, all the growth performance and survival rate of fish in the FR treatment were higher than those in the MB treatment, but these differences were not statistically significant ($p > 0.05$). For mint, the plant height and diameter in the MB were significantly higher than those in the FR, but the fresh biomass in the FR was significantly greater than those in the MB ($p < 0.05$). In general, SSF and mint, under aquaponics, develop best in the FR hydroponic sub-system.

Keywords: Aquaponics; floating raft; media bed; mint; snakehead fish

EFFECTS OF PLANTING DENSITY, FERTILIZATION AND THE GROWING SEASON ON THE NUTRITIONAL COMPOSITION OF TEN QUINOA VARIETIES GROWN IN THE CENTRAL HIGHLANDS OF VIETNAM

Nguyen V. Minh¹ and Hoang V. Chuyen^{2*}

¹*Faculty of Agriculture and Forestry, Tay Nguyen University, Dak Lak Province, Vietnam*

^{2*}*Faculty of Chemical and Food Technology, Ho Chi Minh City University of Technology and Education, Ho Chi Minh City, Vietnam*

*Email: chuyenhv@hcmute.edu.vn

Abstract

Quinoa (*Chenopodium quinoa* Willd.) has been grown and harvested for food in Europe and South America for thousands of years, with some varieties having recently been found suitable to grow in the tropical conditions of Asian countries, including Vietnam. This study investigated the variation in nutritional quality (protein, starch, fat, fiber and mineral contents) of quinoa seeds from 10 varieties affected by different growing factors, including planting density, fertilization, and the growing season in Dak Lak province, Vietnam. The results notably showed that the grow of quinoa in the rainy season with a planting density of 66.666 plants/ha using the fertilizing formulation of 120 kg N + 60 kg P₂O₅ + 105 kg K₂O + 1000 kg organic compost + 500 kg of lime powder per ha per crop resulted in the highest yield and nutritional quality of quinoa seeds. The Atlas variety produced the highest yield with the highest protein content (22.7%), while the Lucas boldo variety had the highest fat content (4.4%), and the Isluga variety showed the highest mineral content (9.4%) among the different varieties. The starch content of the varieties was comparable, ranging from 57.7 to 60.2%. These findings suggest that quinoa can be a new promising crop for agricultural development in Vietnam.

Keywords: Quinoa; planting density; fertilization; season; nutritional quality

SESSION 2

Ecological Health and Climate Change



EVALUATION OF METHANE REDUCTION AND ELECTRICITY PRODUCTION FOR FARM-SCALE ANAEROBIC PIGGERY WASTEWATER DIGESTERS IN TAIWAN

Hsing-Lung Lien^{1*} and Tai-Lin Lin¹

¹*Department of Civil and Environmental Engineering, National University of Kaohsiung,
Kaohsiung, Taiwan*

**Email: lien.sam@nuk.edu.tw*

Abstract

The wastewater produced from pig husbandry is a critical issue of environmental concerns. To prevent pollution caused by the wastewater, a strict regulation has been designed and implemented to compel piggery farms in Taiwan into properly operating their wastewater facilities. However, the emission of biogas containing a large portion of methane, a greenhouse gas with global warming potential nearly 28 times higher than that of CO₂, from the anaerobic digestion process has not yet been considered as a pollutant. From the circular economy point of view, the so-called “wastewater” is no longer considered as waste but rather a resource since methane is a gas that can be used as fuel to generate electricity. In this study, we examined three pig farms in Taiwan with total pig herd sizes numbering between 4200 to 40000 pigs to evaluate their methane reduction potential using the CDM small-scale methodology AMS.III.H. The total methane emission reductions for these three pig farms were found to be 11652.1, 5844.3, and 424.7 tCO₂e/year, which corresponds to 126.7±38.6, 146.1±70.2, and 50.6±14.3 kgCO₂e/year/head, respectively. The power generation can therefore be estimated based on the methane reduction.

Keywords: Greenhouse gas; methane; renewable energy; anaerobic digestion; wastewater treatment

A PRELIMINARY STUDY AND REVIEW OF THE METHANE EMISSION FACTOR IN RICE CULTIVATION USING AN ADJUSTED WATER MANAGEMENT PRACTICE IN TAIWAN

Hsing-Lung Lien^{1*} and Tai-Lin Lin¹

¹*Department of Civil and Environmental Engineering, National University of Kaohsiung, Kaohsiung, Taiwan*

Email: lien.sam@nuk.edu.tw

Abstract

Rice is the most widely consumed staple food in Taiwan, where the total planted area of paddy field rice amounted to close to 159,890.91 hectares, accounting for 20% of the total available agricultural area. The conventional method for cultivating rice is by flooding the fields, where an anaerobic conduction is created and causes the emission of methane, a greenhouse gas (GHG) with a global warm potential nearly 28 times higher than that of carbon dioxide. In Taiwan, rice cultivation accounted for 18.5% of total GHG emission in the agricultural sector. To evaluate the emission reduction of methane from rice cropping soils, a preliminary study was conducted by using an alternate wetting and drying (AWD) irrigation technology to interrupt the anaerobic decomposition of inundated soil in southern Taiwan's Pingtung county. Based on the CDM methodology, the methane emission factor for the field with AWD and without AWD management was estimated to be 95 and 134 kgCO₂e/ha, respectively. The reduction potential was about nearly 30%. The preliminary estimates may vary and have high uncertainty. For comparative purposes, a brief review of the methane emission factor in flooded rice cultivation was compared with various irrigation management practices in Taiwan.

Keywords: Methane; rice cultivation; greenhouse gas; emission factor; irrigation

INVESTIGATION AND ASSESSMENT OF OCCUPATIONAL NOISE EXPOSURE: CASE STUDY IN MECHANICAL FACTORIES IN HO CHI MINH CITY, VIETNAM

Vu X. Dan¹, Nguyen N. H. Mai², Phung D. Nhat¹, Hoang T. D. Phuong¹, Quach T. Thinh¹,
Nguyen M. Ky², Nguyen K. Hue², Nguyen T. Q. Hung^{2*}

¹*Ho Chi Minh City's Center for Disease Control, Ho Chi Minh City, Vietnam*

²*Faculty of Environment and Natural Resources, Nong Lam University,
Ho Chi Minh City, Vietnam*

**Email: quanghungmt@hcmuaf.edu.vn*

Abstract

The research topic “Assessment of Noise Exposure in a working environment of workers at 3 mechanical factories in Ho Chi Minh City” was conducted at Nong Lam University, from August 2020 to December 2021. This study aimed to determine the technological process applied in factories, pointed out the percentage of workers exposed to noise pollution and discover the factors affecting the noise pollution of the production facilities. The study was conducted based on real-working environmental monitoring at 3 mechanical factories, surveying working positions, and interviewing employees.

The study results showed: (1) The typical technological process of 3 factories was Materials → Forming → Welding → Finishing → Assembly → Cleaning → Painting → Finished products. (2) The percentage of workers exposed to noise was 44%. The average time workers exposed to high noise exceeding the permissible standard was 5.7 hours. The average noise level of the 3 mechanical companies was 84 dBA. (3) The factors affecting noise exposure of workers at 3 mechanical factories were the technology of the factory, the layout of the production process, the working stages of the workers. Exposure to high noise level, duration working time, and age demonstrated a significant association with hypertension, tinnitus and hearing loss.

Keywords: Noise pollution; worker; factory; working time

POPULATION STRUCTURE OF *Parasesarma brevicristatum* AND *Parasesarma semperi* AS AN INDICATOR OF MANGROVE REPLANTED FOREST CONDITION IN BINTUNI BAY, INDONESIA

Fika N. Falah¹, Moh. H. Sastranegara² and Erwin R. Ardli^{2*}

¹Master Program in Biology, Universitas Jenderal Soedirman, Purwokerto, Indonesia

²Faculty of Biology, Universitas Jenderal Soedirman, Purwokerto, Indonesia

*Email: erwin.ardli@unsoed.ac.id

Abstract

The mangrove forest in Bintuni Bay is one of the largest in Indonesia, and a portion of it is being used as production forest to produce woodchips. Replanting in the production forest results in various ecosystem conditions through time. Since the Sesarmidae crab is an important component of the mangrove ecosystem and contributes significantly to its energy cycle, it is frequently used as a bioindicator to evaluate the ecosystem's health. In the production mangrove area of PT. Bintuni Utama Pure Wood Industries, purposive sampling was used with circular plots in natural mangrove forests, in areas with replanted trees aged 25 and 5 years, as well as in areas of recently-harvested forests. According to the survey, station 3's five-year-old replanting of *P. brevicristatum* and *P. semperi* crabs had a population density of 139.455 Ind.ha⁻¹, while station 4's damaged forest had a population density of 119,047 Ind.ha⁻¹. Both varieties of crabs have a higher male to female sex ratio. It was discovered that young individuals dominated the two species of crabs' size distribution. Both species of crabs' length-weight relationships displayed a positive allometric tendency. The density of the saplings was the element of the mangrove vegetation that had the greatest impact on the population structure of both crabs.

Keywords: West Papua; replantation; crabs population; density

CA MAU PROVINCE'S MANGROVE FOREST ECOSYSTEM IN THE FACE OF THE EFFECTS OF CLIMATE CHANGE

Pham T. Hai

Department of Silviculture and Agroforestry, Faculty of Forestry,

Nong Lam University, Ho Chi Minh City, Vietnam

Email: pthai@hcmuaf.edu.vn

Abstract

One of the most significant issues facing humanity is climate change, which has a variety of negative direct effects on the environment, cultures, and economics. Vietnam has a coastline of 3260 km and over 1 million square kilometers of marine exclusive economic zones, more than three times the country's total land area. As a result, the sea is crucial to the nation's growth and defense objectives. Mangrove forests are particularly prevalent in Vietnam's coastal regions, particularly in the province of Ca Mau, whose mangrove forest is classified by UNESCO as one of the world's biosphere reserves. Thus, given the context, better understanding the mangrove ecosystem in Ca Mau is an important research need of utmost urgency. This paper focused on status, achievements, and limitations of the Ca Mau mangrove forest. On this basis, we proposed solutions to maintain and develop the ecosystem in ways that could contribute to both economic development and environmental protection in the province.

Keywords: Climate change; mangrove; ecosystem; environment forest

EVALUATION OF STERILIZATION METHODS TO DECONTAMINATE ENVIRONMENT AND ITEMS FROM THE CORONAVIRUS SARS-COV-2

Nguyen T. Hiep¹, Huynh T. Nhut², Nguyen C. Manh², Nguyen T. M. Anh²,
Nguyen M. Ky² and Nguyen T. Q. Hung^{2*}.

¹*Research Institute for Sustainable Development, Ho Chi Minh University of Natural Resources and Environment, Ho Chi Minh City, Vietnam*

²*Faculty of Environment and Natural Resources, Nong Lam University, Ho Chi Minh City, Vietnam*

*Email: quanghungmt@hcmuaf.edu.vn

Abstract

Currently, the COVID-19 pandemic has created devastation around the world. This epidemic is now officially labelled as Severe Acute Respiratory Syndrome Coronavirus 2, named SARS-CoV-2. Since the outbreak of the pandemic, there has been a lot of research on this novel coronavirus and it has been shown that it spreads very quickly from person to person mainly through droplets in airborne. Other studies have shown that coronavirus can survive on surfaces for hours to days. Therefore, it is very important to find effective solutions to fight the virus in both the human body and outside the environment. In this review work, we evaluated various sterilization methods that could be used to decontaminate the environment and items. The objective is to provide a basis of knowledge incorporating different sterilization techniques and point out their limitations that allow health care facilities and disease prevention organizations to pick the most suitable technique for sterilization to prevent disease-causing viruses.

Keywords: COVID-19; coronavirus; environment decontamination; SARS-CoV-2; sterilization

NEMATODE COMMUNITY AS A BASELINE TO MONITOR THE ECOSYSTEM HEALTH OF KEMBANGKUNING MANGROVE FOREST, INDONESIA

Ardhini R. Maharning^{1*}, Erwin R. Ardli¹ and Romanus E. Prabowo¹

¹*Faculty of Biology, Universitas Jenderal Soedirman, Purwokerto, Indonesia*

**Email: ardhini.maharning@unsoed.ac.id*

Abstract

Previous studies show that nematode community structure is an efficient bio-tool to detect environmental changes and pollution impacts. Despite their presence and function in an ecosystem, the nematode community has not been used to monitor the Kembangkuning mangrove forest ecosystem of Segara Anakan. Thus, we intended to collect nematode data as a baseline to monitor the mangrove forest's ecosystem health. The mangrove forest in question is a naturally growing forest dominated by *Rhizophora apiculata* and *Aegiceras corniculatum*, surrounded by settlements and industries such as oil refineries, from which oil spills have occurred as a result of several ship accidents. We extracted nematodes from mangrove sediment (up to 10 cm depth) using the Baermann funnel method. The nematode functional traits and genera were recorded as the baseline data for monitoring purposes. To further examine the nematode community variations, we correlated the nematode functional traits and composition to specific environmental variables, including organic carbon, nitrogen, phosphorous, and potassium. Canonical correspondence analysis revealed that there was 25.32% accumulated variance with four prominent variables associated with the trait distribution (potassium $r = 0.56$, water content $r = -0.56$, salinity $r = 0.75$, organic carbon $r = -0.68$). The genus composition showed similar patterns, but phosphorous effects were more pronounced. Comparison with published data indicates that the three most abundant nematodes, the non-selective deposit, and epistrate feeders of our study site, were also observed in anthropogenically disturbed areas. This finding suggests that our study site requires continual health monitoring to maintain a relatively healthy forest ecosystem.

Keywords: Baseline data; early monitoring; ecosystem health; mangrove forest; nematode assemblage

ASSESSMENT OF BIOFOULING ON LOBSTER CAGES IN XUAN DAI BAY, PHU YEN PROVINCE, VIETNAM

Nguyen P. Hoa^{1*}, Tran. T. K. Nhung¹, Pham T. Luu² and Dang T. T. Hoa¹

¹*Nong Lam University, Ho Chi Minh City, Vietnam*

²*Institute of Tropical Biology, Ho Chi Minh City, Vietnam*

*Email: phuhoa@hcmuaf.edu.vn

Abstract

This study was conducted to determine the composition and biomass of fouling diatom and fauna on lobster cages in Xuan Dai Bay, Phu Yen province, Vietnam. The results show that the diatom consisted of 21 genera belonging to three families, of which the Bacillariophyceae dominated with nineteen genus accounting for 90%, followed by one genus of Chrysophyceae and one genus belonging to Ebriaceae, each accounting for 5%. The fouling fauna included 21 species derived from three fauna classes. They were 14 species belonging to the seven bivalve mollusc families (Anomiidae, Arcticidae, Limidae, Mytilidae, Ostreidae, Pinnidae, and Veneridae; 67% in total) and six families of Gastropoda (Cystiscidae, Buccinidae, Neritidae, Thiaridae, Pyramidellidae, and Vermetidae; 28% in total). The bivalve mollusc dominated the species composition. The average fouling diatom biomass between the highest sampling plots was 25,140 cells/dm² in September and the lowest was 4,169 cells/dm² in November. The average fouling fauna among sampling times were highest at 81 individuals/dm² in July and the lowest at 10 individuals/dm² in December. The results of CCA key correlation analysis showed that biofouling communities were dominated by pH, salinity, NH₃, NO₂, total nitrogen, soluble phosphorus, and total phosphorus.

Keywords: Bivalve mollusc; diatom; fouling; lobster cage

SESSION 3

Trends and Advances in Food Science and Post-Harvest Technology



OPTIMIZATION OF FORMULATION FOR SPRAY-DRIED GAC MILK BLEND POWDER BY RESPONSE SURFACE METHODOLOGY

Bui P. T. Huong¹, Nguyen H. B. S. Long² and Kha C. Tuyen^{1*}

¹*Faculty of Chemical Engineering and Food Technology, Nong Lam University, Ho Chi Minh City, Vietnam*

²*Dong An Polytechnic, Binh Duong Province, Vietnam*

**Email: khachantuyen@hcmuaf.edu.vn*

Abstract

Nutritionally, Gac fruit (*Momordica cochinchinensis* Spreng.) arils contain a high level of oil rich in β -carotene and lycopene. It is well known that milk is a good source of calcium, vitamin D, protein, fat, and other essential nutrients that are linked with numerous health benefits. Importantly, it has been found that a significant improvement in the absorption of carotenoids into the human body occurs when they are digested with oil. Therefore, it was of interest to develop a milk powder rich in hydrophobic β -carotene and lycopene. The study aimed to optimize the ratio of Gac arils to whole milk and the addition of β -cyclodextrin on the content of β -carotene and lycopene of spray-dried Gac powder by the response surface methodology. The results showed that the second-order model was sufficient to describe and predict retention of β -carotene and lycopene with R^2 values of 0.88 and 0.98, respectively. Under optimal conditions (ratio of Gac aril to the milk of 1: 19, w/w, and β -cyclodextrin concentration of 13.5%), retention of β -carotene and lycopene were predicted and validated as 72.8% and 77.0%, respectively. The physical and reconstitution properties of the optimized spray-dried powder were also determined. It was concluded that the spray-dried powder containing high content of β -carotene and lycopene and having an attractive yellow-orange color could be produced by optimizing the ratio of Gac aril to the milk and β -cyclodextrin addition.

Keywords: β -carotene; Gac aril; lycopene; milk; response surface methodology (RSM); spray-drying

COMPARISON OF THAI AND JAPANESE FERMENTED MILK PRODUCED BY POTENTIAL PROBIOTIC LACTIC ACID BACTERIA ISOLATED IN THAILAND

Jirayu Jitpakdee¹, Hiroshi Kanzaki¹, Teruhiko Nitoda¹ and Duangporn Kantachote^{2*}

¹Graduate School of Environmental and Life Science, Okayama University, Okayama, Japan

²Department of Microbiology, Division of Biological Science, Prince of Songkla University, Hat Yai, Thailand

¹Email: jirayu.jitpakdee@gmail.com

^{2*}Email: pddb5pw9@s.okayama-u.ac.jp

Abstract

As we previously reported [1,2], two selected lactic acid bacterial (LAB) strains, *Pediococcus pentosaceus* ENM104 and *Lactiplantibacillus plantarum* SPS109 isolated from fermented foods in Thailand, showed remarkable cholesterol-reducing activity and γ -aminobutyric acid production in Thai fermented dairy products, respectively. Antioxidant activity of these LAB fermented products then tended to be more attractive in their various characteristics, i.e., property of casein hydrolysis in both LAB strains (particularly in fermented milk in this report). Thus, we report here on the preparation of Japanese fermented milk by these two isolated LAB and the comparison of their properties, especially antioxidant activity, between Thai and Japanese fermented milk.

Japanese fermented milk was prepared by single- and co-culture cultivations for 72 h fermentation. Results illustrated that 2,2-diphenyl-2-picrylhydrazyl (DPPH) antioxidant activity in Japanese fermented milk was improved after fermentation by both single- and co-culture cultivations. Furthermore, DPPH antioxidant activity was significantly ($p < 0.05$) higher than Thai fermented milk, meanwhile, the oxygen radical absorbance capacity (ORAC) method previewed vice versa. Moreover, total phenolic content (TPC) of Thai fermented milk tended to be higher than Japanese fermented milk. Amongst these differences, the material used was one of the main factors for antioxidant activity improvement. Interestingly, ORAC detection of SPS109 single- and co-culture cultivations revealed higher than ENM104 single cultivation. This revealed that antioxidant activity depended on bacterial strain as well. Thus, the fermented milk was proven to show improved antioxidant activity and potent to be one of the functional foods.

Keywords: Antioxidant activity, fermented milk, lactic acid bacteria, oxygen radical absorbance capacity, probiotic

STIRRED MACERATION EXTRACTION OF CUSTARD APPLE (*Annona squamosa* L.) PEEL

Nguyen T. Trang^{1,2} and Phan T. Huan^{1*}

¹*Faculty of Chemical Engineering and Food Technology, Nong Lam University,
Ho Chi Minh City, Vietnam*

²*Institute of Biotechnology and Food Technology, Industrial University of Ho Chi Minh City,
Ho Chi Minh City, Vietnam*

*Email: pthuan@hcmuaf.edu.vn

Abstract

Custard apple (*Annona squamosa* L.) is among the common fruits in tropical regions, including Vietnam. The purpose of this study aimed to valorize the peel of custard apple fruit by using stirred maceration extraction. The effect of various factors of extraction time (30 - 60 min), ethanol concentration (40 - 70%), solvent-to-solid ratio (15 - 30 mL/g), and temperature (40 - 70°C) on the total polyphenol content (TPC) and radical scavenging activity by DPPH and ABTS assays of the extracts was investigated. Response surface methodology with a Box-Behnken design was applied to find the optimal condition of investigated variables. The coefficients describing the effects of temperature, extraction time, ethanol concentration, and solvent-to-solid ratio on the dependent responses were defined by using multiple linear regressions. The optimal conditions were found at the temperature of 60°C, the extraction time of 51 min, the ethanol concentration of 52%, and the solvent-to-solid ratio of 26 mL/g. Under these conditions, experimental results showed the optimum TPC of 94.08 mg GAE/g, the antioxidant activity of 536.64 $\mu\text{mol TE/g}$ in the DPPH assay, and 1310.83 $\mu\text{mol TE/g}$ in the ABTS assay.

Keywords: Antioxidants; custard apple peel; maceration; polyphenols; response surface methodology

OPTIMIZATION OF HYDROLYSIS CONDITIONS FOR YELLOWFIN TUNA (*Thunnus albacares*) HEADS USING ALCALASE ENZYME

Musiige Denis¹, Pham D. Hung² and Nguyen V. Minh^{1*}

¹*Faculty of Food Technology, Nha Trang University, Nha Trang City, Vietnam*

²*Aquaculture Institute, Nha Trang University, Nha Trang City, Vietnam*

*Email: minhnv@ntu.edu.vn

Abstract

The objective of the present study was to optimize the hydrolysis conditions (i.e., enzyme to substrate level, temperature, and time) for preparing protein hydrolysates from yellowfin tuna heads using a complete composite design (CCD) of response surface methodology (RSM). The model equation was proposed with regard to the effects of enzyme to substrate level, temperature, and time on the degree of hydrolysis (DH) and protein solubility (PS). The results indicated that all the hydrolysis conditions had a significant effect ($P < 0.05$) on both the DH and PS. An enzyme to substrate level of 0.82% (v/w), the temperature of 55.0°C, and hydrolyzing time of 7 h were found to be the optimum conditions to obtain the highest DH (28.0%) and PS (89.1%) using alcalase. The regression coefficients observed during both experimental and validation runs for DH and PS were 0.9381 and 0.9613, respectively, showing the validity of prediction models. The amino acid profile of protein hydrolysates obtained with the optimized conditions was similar to FAO/WHO reference proteins. The protein hydrolysates from yellowfin tuna heads serve as a good source of amino acids and have a potential for applications in the food processing industry.

Keywords: Alcalase protease; optimization; protein hydrolysates; yellowfin tuna heads

DEVELOPING FREEZE-DRIED SNACK BITES FROM KEFIR MILK

Doan T. U. Nhi¹, Nguyen T. Y. Linh¹, Hoang T. Thu² and Cao T. T. Loan^{3*}

¹*Faculty For High Quality Training Food Technology, Ho Chi Minh City University of Technology and Education, Ho Chi Minh City, Vietnam*

²*Nurturing Foods Co. Ltd., Ho Chi Minh City, Vietnam*

³*Faculty of Biological Sciences, Nong Lam University, Ho Chi Minh City, Vietnam*

*Email: loan.caothithanh@hcmuaf.edu.vn

Abstract

Despite the fact that kefir milk is high in vitamins and minerals and contains a variety of beneficial bacteria, its consumption is low due to its yeasty and tangy flavor. As a result, the goal of this research is to create a tasty and healthy freeze-dried foodstuff using kefir as the main ingredient. Fermentation time, biomass, sensory, pH, dry matter, and microorganisms were all used to determine the quality of kefir milk. Among the three kinds of milk tested, Vinamilk with a kefir grain ratio of 7% (w/v) fermented for 16 hours at 25°C produced the best kefir milk. Similarly, snack bites made from this kefir milk with 0.1% gelatin and freeze-dried at 55°C for 30 hours had the highest acceptability. According to the nutritional components of the snack, it contains carbohydrate (56.6%), fat (20.2%), protein (16.4%), and ash, and is high in iron, folic acid, and calcium. The *Lactobacillus spp.* density in this product was determined to be 1.6×10^7 cfu/g, making this freeze-dried snack a promising functional food.

Keywords: Freeze-dried snack; functional food; kefir grain; kefir milk; *Lactobacillus*

STRUCTURE ANALYSIS OF ANTIFUNGAL *Sesterterpene ophiobolin K* AND ITS ANALOGS PRODUCED BY *Aspergillus ustus*

Nguyen T. K. Ngoc*, Natthapat Sohsomboon, Terumi Ichimiya, Teruhiko Nitoda and Hiroshi Kanzaki

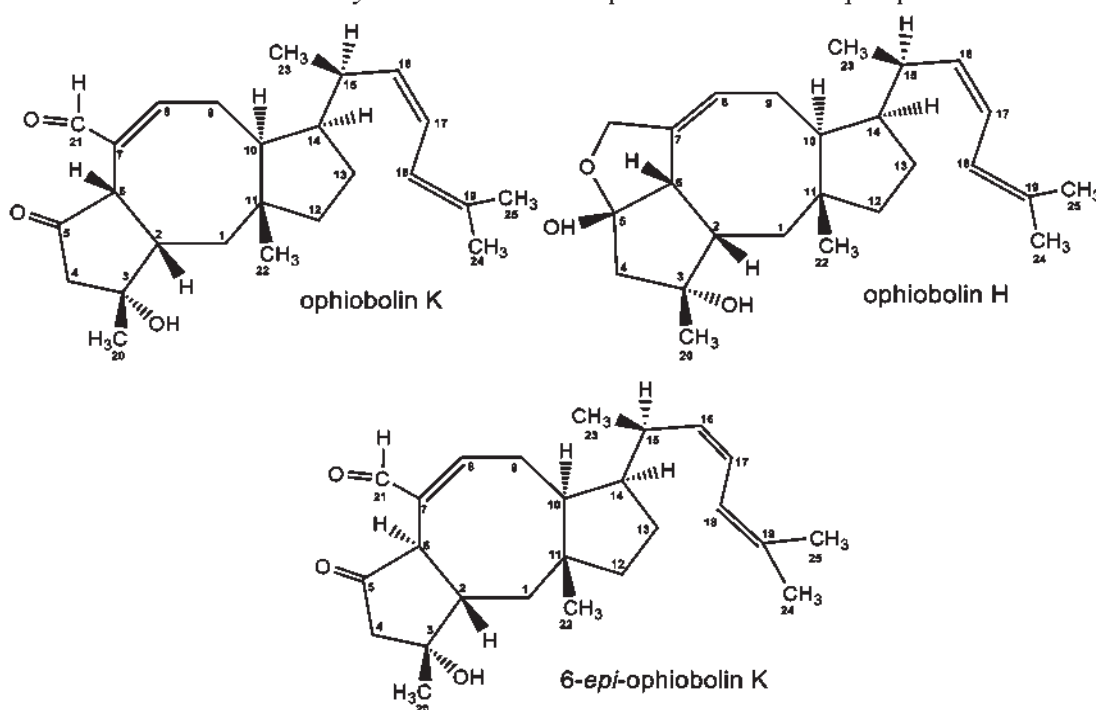
Graduate School of Agricultural and Life Science, Okayama University, Japan

*Email: ngocnguyen2203@gmail.com

Abstract

In our laboratory, an experiment work showed that the culture extract of *Aspergillus ustus* inhibited the growth of *Aspergillus repens*. The active compound was identified through a combination of spectroscopic analyses to be a sesterterpene, ophiobolin K, which also exhibited unique wide antimicrobial activity. HPLC analysis of the culture extract revealed the presence of several compounds with similar UV spectra to that of ophiobolin K. These compounds were considered to be analogs of ophiobolin K. Among them, two compounds were isolated and characterized through NMR spectroscopy, UV-Vis spectroscopy, and optical rotation measurement. As a result, they were identified as ophiobolin H and 6-*epi*-ophiobolin K as shown below.

measurement. As a result they were identified as ophiobolin H and 6-*epi*-ophiobolin K.



Keywords: Antifungal compound; ophiobolin analogs; sesterterpene compounds

THE CHANGES IN GAMMA-AMINOBUTYRIC ACID AND POLYPHENOLS IN MUNG BEANS DURING THE GERMINATION

Vu T. Anh^{1*}, Kha C. Tuyen¹ and Phan T. Huan¹

¹*Faculty of Chemical Engineering and Food Technology, Nong Lam University,
Ho Chi Minh City, Vietnam*

**Email: vuthuyanh@hcmuaf.edu.vn*

Abstract

Gamma-aminobutyric acid (GABA) an inhibitory neurotransmitter, plays a role in regulating neuronal excitability. Polyphenols naturally occur in plants and help to prevent or reverse damage in cells caused by aging, the environment, and lifestyle. Edible sprouts such as mung beans are a valuable source that presents high content of bioactive compounds. These contents in raw mung beans are very low, but they increase significantly during germination. The objectives of this study were to determine the most appropriate germination conditions, including light conditions (dark, led, and UV-C), salt concentrations (0.5%, 1.0%, and 1.5%), and relative humidity (80%, 90%, and 99%) to maximize the content of GABA and polyphenols. The results showed that all investigated treatments (light, salt, and humidity) increased GABA and polyphenol levels, but LED lighting and relative humidity (90%) were the most effective. Under those conditions, the content of GABA and polyphenols increased about 12 and 2 times, respectively. Furthermore, the changes in GABA and polyphenol contents were different under different soaking and incubation conditions. In conclusion, the nutritional quality of mung beans, in terms of GABA and polyphenols, could be improved by controlling light and relative humidity during germination.

Keywords: GABA; humidity; light; mung beans; germination; polyphenol; salt

ULTRASOUND-ASSISTED EXTRACTION OF THE XAO TAM PHAN (*Paramignya trimera* (OLIVER) GUILLAUM) ROOT

Nguyen T. N. Thao^{1,2}, Do A. Quan¹, Trinh T. Tan¹, Le H. Nghia¹, Phan P. Hien³,
Phung V. Trung⁴ and Nguyen M. X. Hong^{1*}

¹*Faculty of Chemical Engineering and Food Technology, Nong Lam University,
Ho Chi Minh City, Vietnam*

²*Department of Natural Science, Phu Yen University, Phu Yen Province, Vietnam*

³*Institute of Applied Science and Technology, Van Lang University, Ho Chi Minh City, Vietnam*

⁴*Center for Research and Technology Transfer, Vietnam Academy of Science and Technology*

*Email: nmxhong@hcmuaf.edu.vn

Abstract

Xao tam phan, a *Paramignya* genus of the Citrus family, is a well-known medicinal plant in Thailand and Vietnam, and is associated with treating cancer, hepatitis, diabetes, and nose infections. Extraction is a key operation in the preparation of xao tam phan extracts rich in bioactive compounds. Recently, ultrasound has been successfully applied in the extraction of medicinal plants for improvement in yield and quality extracts. Until present, the application of ultrasound in xao tam phan extraction has not been considered. In this study, the effect of sonication treatment on the extraction of total phenolics and saponin from xao tam phan root was investigated and optimized by response surface methodology. The results indicated that the optimal sonication power, temperature, and time were 200 W, 58°C, and 10 min, respectively. Under those conditions, the total phenolic and saponin contents in the resultant extract were maximized and validated to be 20.70 ± 0.77 mg GAE/g dried sample and 326.30 ± 2.03 mg EE/g dried sample, respectively. For comparison, a higher extraction yield of ultrasound-treated samples, in terms of total phenolics (~ 27%) and total saponin (~ 76%), was found as compared to the untreated ones. In conclusion, the results reveal that the application of ultrasound on xao tam phan root significantly enhanced the phytochemical contents during extraction.

Keywords: *Paramignya trimera*; total phenolics; total saponin; ultrasound; xao tam phan

INFLUENCE OF DEHYDRATION CONDITIONS ON PHYSICOCHEMICAL, PHYTOCHEMICAL AND ANTIOXIDANT PROPERTIES OF MEDICINAL PLANT DAY THUONG XUAN (*Hedera helix* L.)

Nguyen V. Tang^{1,2*} Nguyen T. Van, Tran T. Giang, Le T. L. Hang¹, Dang T. M. Le¹,
Dao V. Hung¹ and Le T. C. Nhung³

¹Research, Development and Teaching Group on Functional Foods,
Nha Trang University, Vietnam

²Faculty of Food Technology, Nha Trang University, Vietnam

³Faculty of Faculty of Natural Science, Quy Nhon University, Vietnam

*Email: tangnv@ntu.edu.vn

Abstract

The aim of this study was to investigate the influence of dehydration conditions on physicochemical, phytochemical, and antioxidant properties of the medicinal plant Day thuong xuan (*Hedera helix* L.) collected in Da Lat, Vietnam. In this study, the effects of twelve different drying conditions were conducted including sun drying (SUD), hot-air drying at 40, 60, 80, and 100°C (HAD40/60/80/100), microwave drying at 270, 450, 720, and 900W (MWD270/450/720/900) and infrared drying at 40, 45, and 50°C (IRD 40/45/50). The physicochemical, phytochemical, and antioxidant properties of the medicinal plant Day thuong xuan were then assessed. The results showed that microwave drying at 900W took the shortest drying time (0.28h), consumed the least energy (0.26 kWh), and obtained the lowest moisture (2.0%) and water activity (0.35), while hot-air drying at 100°C retained the highest levels of phytochemical compounds in terms of saponins, phenolics, flavonoids, proanthocyanidins, and alkaloids (88.14 mg escin equivalents, 4.65 mg gallic acid equivalents, 62.77 mg catechin equivalents, 0.23 mg catechin equivalents and 44.66 mg atropine equivalents/g dried sample, respectively), which displayed the greatest antioxidant activity in terms of ABTS/ DPPH radical scavenging capacity and cupric reducing antioxidant capacity (8.06, 12.93, and 16.07 mg Trolox equivalents/g dried sample, respectively). Hot-air drying at 100°C was recommended to prepare dried samples from the medicinal plant Day thuong xuan (*Hedera helix* L.) for further investigations and applications.

Keywords: Antioxidant; Day thuong xuan (*Hedera helix* L.); hot-air drying; infrared drying; microwave drying; sun drying

BIO-BASED AND BIODEGRADABLE PACKAGING MATERIALS: CURRENT APPLICATIONS AND PERSPECTIVES FOR SUSTAINABLE FOOD PACKAGING

Hoang V. Chuyen

*Faculty of Chemical and Food Technology, Ho Chi Minh City University of Technology
and Education, Ho Chi Minh City, Vietnam*

Email: chuyenhv@hcmute.edu.vn

Abstract

Food packaging is an important aspect of the modern food industry due to its vital role in food preservation, storage, and the reduction of food leftovers along the distribution systems. However, the increase in the utilization of packaging materials and the insufficient management of food packaging waste has resulted in a huge amount of trash generation. Among the solutions for resolving the issues, the utilization of bio-based materials and biodegradable polymers has been demonstrated as one of the potential approaches for the future packaging of food products. PubMed searches were undertaken to collect data for recent original research and systematic review publications related to bio-based and biodegradable materials focusing on food packaging applications. The results showed that there have been a number of recent developments related to production techniques for improving characteristics of bio-based and biodegradable materials such as starch, cellulose, chitosan, gums, proteins, and other biopolymers. In addition, the newly developed bio-materials also exhibited positive effects and potential applications for sustainable food packaging.

Keywords: Bio-based material; biodegradable polymer; food packaging; shelf life

IMPACT OF MALTODEXTRIN AND TEMPERATURE ON SPRAY DRIED RED FLESH DRAGON FRUIT (*Hylocereus polyrhizus*) POWDER

Duong T. N. Diep^{1*}, Tran T. N. Trang¹ and Hoang Q. Binh²

¹*Faculty of Chemical Engineering and Food Technology, Nong Lam University,
Ho Chi Minh City, Vietnam*

²*Institute of Applied Technology and Sustainable Development, Nguyen Tat Thanh University,
Ho Chi Minh City, Vietnam*

*Email: duongngocdiep@hcmuaf.edu.vn

Abstract

Red flesh dragon fruit (*Hylocereus polyrhizus*) has been considered a rich source of essential nutrients for health. The objective of this research was to investigate the ability of producing fruit powder from the pulp and the utilization of the peel of red flesh dragon fruit by spray drying technique. Maltodextrin concentration and inlet air temperature were the experimental factors that investigated the effects on the physicochemical properties of the powder. Results obtained showed that the concentration of maltodextrin (10 - 20%) and the inlet spray drying temperature (140 - 160°C) affected the retention of betacyanin, morphology, and other properties of the fruit powder. The maltodextrin concentration of 15% and the inlet temperature of 150°C revealed high retention (98.75%) of betacyanin. There were also other analytical methods including SEM, FTIR, and DSC explored to confirm the changes of the samples through the processing.

Keywords: Betacyanin; inlet temperature; maltodextrin; red flesh dragon fruit

EXPERIMENTAL DETERMINATION OF GUAVA LEAF DRYING TECHNOLOGY

Nguyen T. Phong and Le A. Duc*

*Faculty of Engineering and Technology, Nong Lam University Ho Chi Minh City,
Ho Chi Minh City, Vietnam*

**Email: leanhduc@hcmuaf.edu.vn*

Abstract

Psidium guajava L., commonly known as Guava of the Myrtle family, is grown in tropical and subtropical climates. Guava leaves have been used medicinally for many health benefits in several countries. This study presents the results of determining the drying method and drying mode of guava leaves through experimental methods: sun drying, hot air drying, and heat pump drying. The drying methods were carried out at three temperatures of 45°C, 50°C, and 55°C. The rate of moisture loss and product quality (tannin content) in guava leaves after drying are the basis for choosing the appropriate drying method and drying mode. The results determined that the heat pump drying method is suitable for the temperature of 45°C and the time of 200 minutes to produce dried guava leaves with a standard moisture content of $11 \pm 0.5\%$. Guava leaves after drying have a green color and a characteristic scent of guava leaves, and the tannin content in the product after drying reaches 7.7%, suitable for preparing medicinal materials such as powder or guava leaf tea, etc.

Keywords: Guava leaves; heat pump dryer; hot air drying; sun drying; tannin

MICROENCAPSULATION OF AGARWOOD (*Aquilaria crassna*) ESSENTIAL OIL BY SPRAY DRYING

Truong T. Vy* and Truong Vinh

*Department of Natural Compounds, Faculty of Food and Chemical Technology,
Nong Lam University, Ho Chi Minh City, Vietnam*

**Email: thaovyhh@hcmuaf.edu.vn*

Abstract

Agarwood essential oil is the essential oil extracted from the heartwood of agarwood trees (*Aquilaria* sp.) after inoculation or natural infection of one of several fungal species. The essential oil is proved to carry antioxidant, antimicrobial and anti-stress activities. Microencapsulation of agarwood essential oil by spray drying was carried out at different levels of inlet temperature and compressed air pressure. Microencapsulation process was qualified based on following parameters including process's microencapsulation yield, moisture content of powder, powder particle size, drying yield, yield of oil retention and encapsulated oil's composition. Microencapsulation yield was affected by inlet temperature whereas drying yield changed as air pressure varied from 1.5 to 2.5 kgf/cm². Other parameters were affected by both variables. Oil composition was affected by microencapsulation process, but the main components still remained in the encapsulated oil. The drying air temperature of 150°C and air pressure of 2.5 kgf/cm² were the best parameters for both microencapsulation yield (89.12%) and drying yield (79.00%).

Keywords: Microencapsulation; agarwood; *Aquilaria crassna*; essential oil; spray drying

CHARACTERISTIC OF BIODEGRADABLE FILM PRODUCED FROM THE CANNA STARCH WITH VARIOUS TYPES OF PLASTICIZERS

Condro Wibowo^{1*}, Rumpoko Wicaksono¹, Pepita Haryanti¹, Susanto B. Sulisty²
and Amin Fatoni³

¹*Department of Food Technology, Faculty of Agriculture, Jenderal Soedirman University*

²*Department of Agricultural Engineering, Faculty of Agriculture,
Jenderal Soedirman University*

³*Department of Chemistry, Faculty of Mathematics and Natural Sciences,
Jenderal Soedirman University*

**Email: condro.wibowo@unsoed.ac.id*

Abstract

Plastic has recently gained popularity as a packaging material due to its characteristics (light, strong, and flexible). However, it has a negative impact on the environment. Therefore, it is necessary to utilize biodegradable packaging to lessen waste and environmental degradation caused by plastic. In Indonesia, a variety of tubers with a high starch content are widely available and have the potential to serve as the major component of biodegradable packaging. One of the tubers is canna (*Canna edulis Kerr*). This study aims to investigate the impact of various plasticizers and canna concentrations on the chemical, physical, and sensory characteristics of the biodegradable film. The treatments applied in this research were the concentration of canna starch (1%, 1.5%, and 2% (w/v)) and the type of plasticizer (sorbitol, glycerol, and polyethylene glycol). The properties of the biodegradable film were determined, including thickness, color, transparency, solubility, water vapor transmission rate, moisture, ash content, and the sensory properties (clarity, appearance, texture, and preferences). Anova was used to assess the data of chemical and physical variables. Sensory variables were analyzed using the Friedman test. The result showed that the type of plasticizer had a significant impact on moisture content, ash content, solubility, thickness, color, and transparency. Starch concentration had a significant impact on moisture content, ash content, water vapor transmission rate, and thickness. Based on the results of the study, it was suggested to use sorbitol as a plasticizer and a starch concentration of 1% for making biodegradable film from canna.

Keywords: Biodegradable; canna; packaging; plasticizer; quality

EFFECT OF PACKAGING METHOD AND STORAGE TEMPERATURE ON THE QUALITY OF FRESH SNAKEHEAD FISH (*Channa striata*) FILLETS

Sonkarlay Karnue¹ and Nguyen V. Minh^{2*}

¹National Fishery and Aquaculture Authority (NaFAA), Bushrod Island, Monrovia, Liberia

²Faculty of Food Technology, Nha Trang University, Nha Trang City, Vietnam

*Email: minhnv@ntu.edu.vn

Abstract

The objective of the present study was to investigate the effect of packaging methods (i.e., air-packaging and vacuum-packaging) and storage temperatures (i.e., the chilled temperature of 2-4°C and superchilled temperature of $-2.5 \pm 0.5^{\circ}\text{C}$) on the sensory quality and chemical properties of fresh snakehead fish fillets. The results indicated that vacuum packaging and superchilled storage significantly ($P < 0.05$) improved the quality of fresh snakehead fillets, resulting in higher lipid, phospholipid, and soluble protein contents and lower hydroperoxide (PV) and thiobarbituric acid-reactive substances (TBARS) values compared to other groups. Sensory analysis using the quality index method (QIM) and Torry scores rejected the air-packaged and vacuum-packaged fillets on day 9 and 13 at chilled storage, respectively. Meanwhile, the shelf-lives of air-packaged and vacuum-packaged fillets stored at a superchilled temperature of $-2.5 \pm 0.5^{\circ}\text{C}$ were 15 and 25 days, respectively. Strong linear correlations ($r^2 = 0.9871$ for chilled-air-packaged fillets, $r^2 = 0.9605$ for chilled-vacuum-packaged fillets, $r^2 = 0.9797$ for superchilled-air-packaged fillets and $r^2 = 0.9132$ for superchilled-vacuum-packaged fillets) were found between the QI values and storage time of each fillet group. It can be reasonably concluded that vacuum packaging and storage at $-2.5 \pm 0.5^{\circ}\text{C}$ was more efficient in preserving the fresh quality of the snakehead fish fillets.

Keywords: Packaging method; sensory quality; snakehead fish; superchilled storage

INVESTIGATION OF CHITIN RECOVERY FROM SHRIMP WASTE BY YEAST FERMENTATION

Ta T. M. Ngoc^{1,2*}, Bui H. Hung¹, Trinh T. T. Nhung¹ and Nguyen T. M. Nhu¹

¹*Department of Food Technology, Faculty of Chemical Engineering, Ho Chi Minh City University of Technology (HCMUT), Vietnam*

²*Vietnam National University Ho Chi Minh City, Ho Chi Minh City, Vietnam*

*Email: ttmngoc@hcmut.edu.vn

Abstract

This study investigated the possibility of using yeast fermentation to transform shrimp waste into chitin for further applications. The white leg shrimp head was incubated with three yeast strains *Yarrowia lipolytica*, *Candida tropicalis*, and *Pichia kudriavzevii*, in comparison with bacteria *Bacillus subtilis* and commercial protease Alcalase. The efficacy of transformation was evaluated through deproteinization, delipidization, and demineralization levels after 5 days. A deproteinization of 85.8% was obtained when incubated with *Y. lipolytica* which was significantly higher than 76.9% and 72.5% obtained with Alcalase hydrolysis and *B. subtilis* incubation, respectively. Besides, *C. tropicalis* and *P. kudriavzevii* expressed a similar low level of deproteinization about 31.3 - 31.7%. All three yeast showed a good demineralization in the range of 38.2 - 49.4% on shrimp head, while *B. subtilis* could demineralize only 16.0%. The crude chitin obtained with *Y. lipolytica* incubation possessed a very low lipid content of 0.7%. This primary research showed a potential application of yeast fermentation in chitin recovery from shrimp waste.

Keywords: By-product valorisation; chitin recovery; shrimp waste; yeast fermentation

DRYING KINETICS OF BLACK SOLDIER FLY (BSF) LARVAE FOR USE IN FISH OR POULTRY FEED

Nguyen T. Nghi*, Tran V. Tuan and Le Q. Vinh

Faculty of Engineering and Technology, Nong Lam University, Ho Chi Minh City, Vietnam

**Email: ntngghi@hcmuaf.edu.vn*

Abstract

BSF Larvae for fish or chicken feed must be dried to a moisture content of 8% to 10% to meet the requirements for feed milling and storage. The purpose of this study was to determine the drying kinetics of BSF larvae under hot air drying method. Three different drying temperatures (60, 70, and 80°C) were used to dry larvae arranged in thin layers. Additionally, one batch of larvae drying was tested using a reversible air flatbed dryer coupled with an indirect wood furnace at a drying temperature of 70°C. Sun drying was used as the control. Three drying equations were generated; these included one per drying temperature, and regression coefficients were greater than 0.97. Using a reversible air flatbed dryer at a drying temperature of 70°C, the drying time was 12.8 hours to reduce the moisture content of larvae from 73.0% to 8.6%; the drying cost was US\$56.7 per ton. Sun drying took five days to reduce the moisture content from 63.6% to 8.9% with the average solar radiation intensity of $388 \pm 221.4 \text{ W.m}^{-2}$. Nutrient components were tested with the percentage of protein from 48.6% to 50.1% and with no difference between the drying methods. In this study, increasing the drying temperature reduced the drying time but did not significantly affect the nutrient value.

Keywords: Drying kinetics; larvae moisture content; thin-layer drying



SESSION 4

Social Economics in Sustainable Agriculture



LEGAL ANALYSIS OF AGRICULTURAL MARKET LAND POLICIES TO SUPPORT FARMER ECONOMIC'S WELFARE IN INDONESIA

Sri Wahyu Handayani*, Kartono and Tedi Sudrajat

Faculty of Law, Jenderal Soedirman University, Purwokerto, Indonesia

**Email: sri.handayani@unsoed.ac.id*

Abstract

This study criticizes the agricultural market land policies which has impacts on the welfare of farmers in Indonesia. It began with the legal analysis of protecting agricultural land at the national level to the district level then agricultural land market policy in Indonesia. This study found several weaknesses of the policy and its implementation. Among them are the regulations of agricultural land policies related to spatial planning arrangements that are not complete until operational at the district level, as well as the regulation of legal subjects in the agricultural land market that is not balanced so that it is entered by parties with a tendency to shift agricultural land to non-agricultural purposes. To find out the implementation of these policies, this research is also equipped with an empirical approach sourced from in-depth interviews with farmers, land office employees, and employees of the Agriculture Service in Karawang Regency, West Java. These problems were analyzed using social welfare norms that are evenly distributed as stated in the basis of the Indonesian state, Pancasila. From the results of data analysis, it is known that the weakness of the policy has resulted in a domino effect making farmers lose ownership of agricultural land, so that the term small farmers (peasants) appears. Finally, this has an impact on the socio-economic welfare of farmers. This research proposes recommendations for agricultural land protection policy concepts which include regulating agricultural land markets to support the sustainability of agricultural land.

Keywords: Legal policy; market; agricultural land; farmer's welfare

CONSUMER ACCEPTABILITY OF ALTERNATIVE FOODS: A STUDY OF PROCESSED CRICKET-BASED FOODS IN VIETNAM

Hoang H. Anh^{1*} and Kha C. Tuyen²

¹*Faculty of Economics, Nong Lam University, Ho Chi Minh City, Vietnam*

²*Faculty of Chemical Engineering and Food Technology, Nong Lam University, Ho Chi Minh City, Vietnam*

*Email: hoanghaanh@hcmuaf.edu.vn

Abstract

With the population overgrowing, the pressure on food security is also increasing globally. Many countries worldwide began to see insects as an alternative food source to traditional food sources. This study used data from 110 Vietnamese consumers and the Contingent Valuation Method to assess consumers' acceptability and willingness to pay for cricket-based food products: cricket protein powder, cricket sausage, cricket burger, and cricket mayonnaise. The survey results showed that 75% of the respondents knew cricket-based food as street foods or regional specialties. However, processed cricket-based are quite new in the Vietnamese market as 68%, 64%, 63%, and 74% of the surveyed consumers were unaware of cricket protein powder, cricket sausage, cricket burger, and cricket mayonnaise, respectively. Furthermore, this paper identified that the acceptability of using cricket protein powder, cricket sausage, cricket burger, and cricket mayonnaise were 71%, 65%, 60%, and 58%, respectively. The positive impacts of consumer understanding and attitudes on the acceptability of cricket-based products were confirmed as they were consistently significant in all four logistic regression models in this study. Finally, the calculated willingness to pay for these cricket-based products were 471,999 VND/kg (protein powder), 44,153 VND/250 gr (sausage), 44,153 VND/portion (burger), and 51,303 VND/250 ml (mayonnaise). These results imply that cricket-based foods have the potential to become a practical business, but firms need to invest in promotion and pricing to be successful in the Vietnamese market.

Keywords: Consumer acceptability; alternative foods; processed cricket-based foods; Vietnam

ANALYSIS OF CONSUMER PREFERENCES ON HONDJE TEA

Icuk Ranga Bawono¹, Rifda Naufalin^{2*} and Poppy Arsil²

¹*Accounting Department, Faculty of Business and Economic,
Jenderal Soedirman University, Purwokerto*

²*Department of Food Technology, Agricultural Faculty,
Jenderal Soedirman University, Purwokerto*

**Email: rifda.naufalin@unsoed.ac.id*

Abstract

This research aims to (1) examine the consumer characteristics of hondje tea, (2) analyze consumer preferences for hondje tea associated with the attributes, (3) analyze the importance of attributes in hondje tea, (4) compile marketing mix recommendations based on the results of research. This research was carried out by distributing questionnaires directly or using google drive form. The number of respondents is 100 people who have been calculated using the Slovin formula, determining the respondents using the snowball sampling technique, with the 34 variables. We use factor analysis for this research. The results of consumer characteristics show that most consumers are female (59%), aged 15-25 years (48%), work as private employees (35%), graduated education (57%), earn Rp1,500,000- Rp3,000,000/month (31%), married (55%). Level of importance of hondje tea products based on loading factors, which are product labels (0.867), productsuperiority information (0.851), ease of obtaining products (0.829), research products that need to be developed (0.814), and also products whose flavour uniqueness (0.780). The results of factor analysis show that 34 variables can be summarized into 7 factors, (1) product with eigenvalues 13,443, (2) accessibility, with eigenvalues 3,070, (3) Innovation, with eigenvalues 2,214, (4) promotion, with eigenvalues value 1,959, (5) sanitation and hygiene, with eigenvalues 1,462, (6) flavors and prices, with the eigenvalues value of 1,287, (7) lifestyle, with the value of eigenvalues 1,049.

Keywords: Consumer preference; hondje tea; Factor Analysis

ASSESSING THE VULNERABILITY TO DROUGHT OF THE HOUSEHOLDS IN NINH THUAN PROVINCE, VIETNAM

Chau T. Luc*, Hoang H. Anh and Dang T. Ha

Faculty of Economics, Nong Lam University, Ho Chi Minh City, Vietnam

**Email: chautanluc@gmail.com*

Abstract

Drought is a natural phenomenon that cause serious water shortage and losses to the livelihood of farmers in the central province of Vietnam. This study assessed drought vulnerability of the rural households in Ninh Thuan province using the IPCC livelihood vulnerability approach. Data used for the analysis was collected from the survey of 212 households that were randomly selected 3 drought prone districts of province. The data collected included information on household's sociodemographic profile, livelihood systems, social networks, health status, food and water security, and drought conditions. Results of the study shows that the ethnic poors with limited asset to resources and information are the most vulnerable household who need more support from local community and government for adopting integrated drought risk management approach.

Keywords: Drought; households; vulnerability; livelihood; Ninh Thuan

PRICE TRANSMISSION IN SHRIMP PRODUCTION IN VIETNAM

Truong N. Hao^{1*}, Le C. Tru² and Pham T. Thuyen²

¹*Faculty of Business Administration, Ho Chi Minh City Industry and Trade College,
Ho Chi Minh City, Vietnam*

²*Faculty of Economics, Nong Lam University, Ho Chi Minh City, Vietnam*

**Email: truongngochao@hitu.edu.vn*

Abstract

Under the trade international integration, vertical price transmission in agri-food export supply chains is an essential issue that needs attention. The study analyses the price transmission from export prices to farm-gate prices of the black-tiger shrimp and white-leg shrimp production in Vietnam. Monthly price series of black-tiger shrimp and white-leg shrimp are collected from January 2015 to October 2020, from the Department of Aquaculture of Ca Mau, Soc Trang, Kien Giang, Ben Tre provinces; Vietnam Association of Seafood Exporters and Producers, and Vietnam market analysis and forecast joint stock company. The Johansen cointegration test, the Toda-Yamamoto Granger causality test, the Engle-Granger's two-stage estimation, and the asymmetric error correction model using the Houck and Ward approach were applied. The results showed a long-term relationship between the farm-gate prices and export prices for both black-tiger shrimp and white-leg shrimp. The export prices were the price leader. In the long run, the price transmission from export prices to farm-gate prices in both black-tiger shrimp and white-leg shrimp was incomplete; however, the white-leg shrimp's price transmission was noticeably better than black-tiger shrimp's. In the short run, there was no statistically significant effect of export prices on farm-gate prices of black-tiger shrimp; while the price transmission of white-leg shrimp was significant but relatively slow rate. The price transmission for black-tiger shrimp and white-leg shrimp was symmetric in the short run and the long run. The findings of this study are useful for farmers in developing the production and business strategy. Symmetric price transmission in both the short run and the long run is a positive signal for farmers to invest in sustainable production approaches and to meet stringent standard requirements of the export market.

Keywords: Price transmission; cointegration; error correction model; shrimp production

DETERMINANTS OF RELATIONSHIP QUALITY BETWEEN COFFEE FARMERS AND PURCHASING AGENTS: A CASE STUDY IN THE CENTRAL HIGHLANDS OF VIETNAM

Ha T. T. Hoa^{*}, Nguyen B. Dang, Dang L. Hoa and Pham T. H. Nhung

Faculty of Economics, Nong Lam University, Ho Chi Minh City, Vietnam

**Email: hoaha@hcmuaf.edu.vn*

Abstract

The study analyzes the determinants of the relationship quality between coffee farmers and purchasing agents using data from a survey of 212 coffee farmers. The Structural Equation Modeling (SEM) was employed. The results showed that five factors influencing the relationship quality are collaboration, perceived price, profit/risk sharing, power asymmetry, and effectiveness communication. Effectiveness communication was the most important factor positively influencing the relationship quality between coffee farmers and purchasing agents whereas power asymmetry negatively affects the relationship quality. The study also claimed that relationship quality had a positive influence on farmers' profit and relationship continuity intention between coffee farmers and purchasing agents. Policymakers should concentrate on improving transparency and information sharing between coffee farmers and purchasing agents to enhance relationship quality. The findings could be useful to develop the agricultural supply chain, particularly in the coffee market in Vietnam.

Keywords: Coffee; farmers; purchasing agents; relationship quality; Vietnam

CONSUMER'S WILLINGNESS TO PAY FOR SAFE PORK IN SOUTHEAST REGION, VIETNAM

Mai D. Quy*, Pham T. Phuong and Dang T. Ha

Faculty of Economics, Nong Lam University, Ho Chi Minh City, Vietnam

**Email: maidinhquy@hcmuaf.edu.vn*

Abstract

Food safety is one of the main concerns for consumers due to its direct effect on people's health. In order to deal with unsafe food, the demand for food safety has increased in recent years as well as the consequent increase in price accepted by consumers. This study investigates the awareness and willingness to pay of consumers for pork characterized by four attributes, namely pork safety certification labels, traceable pork, pork brand and price, based on a choice experiment conducted among 395 consumers from Ho Chi Minh City, Binh Duong and Dong Nai Provinces in Southeast region, Viet Nam. A random parameter logit model was estimated to elicit consumers' willingness to pay. Results from the survey revealed that consumers were concerned about unsafe pork affecting their health because pork is a common food in the daily meals of Vietnamese people. The results showed that consumers are more willing to pay a price premium for pork with safety attributes than for pork without these attributes. The government should improve the traceability system, safety certification labels, promote pork brand and publicity on pork safety attributes.

Keywords: Choice experiment; consumers; safe pork; willingness to pay

AN ANALYSIS OF CONSUMERS' KNOWLEDGE, AWARENESS AND WILLINGNESS TO PAY FOR E-WASTE RECYCLING: A CASE STUDY IN VIETNAM

Pham T. Thuyen^{*}, Lam P. M. Thanh, Dang L. Hoa and Pham T. Nhien

Faculty of Economics, Nong Lam University, Ho Chi Minh City, Vietnam

**Email: phamthuyen@hcmuaf.edu.vn*

Abstract

The increase in the generation of e-waste is a growing concern worldwide. Stakeholders should share the responsibility of e-waste management. Consumers should be actively involved due to their two roles (users and disposers) in the whole life cycle of e-waste. Based on a survey of 544 residents in Ho Chi Minh City via a structured questionnaire, the paper analyses consumers' knowledge, awareness, and willingness to pay (WTP) for e-waste recycling. This study found that the majority of the residents (81.07%) knew that e-waste is harmful. Around 51.65% of respondents agreed that e-waste recycling would positively contribute to the environment while 48.53% of the respondents agreed that e-waste recycling ensured the public's health. However, in total 932 responses, 372 responses mentioned that they were selling waste electrical and electronic equipment (WEEE) to scrap collectors for economic benefit while 136 responses answered that WEEE was stored in their home. Only 115 responses replied that they brought WEEE to drop-off centers. A hundred of responses said that WEEE was thrown with household wastes when these devices became outdated and could not be repaired. About 78.50% of respondents said that there were no or very few e-waste drop-off points in their living and nearby areas. The results also showed that 74.45% of respondents were willing to pay an environmental fee for e-waste recycling. The mean WTP (the percentage of purchasing bill) was calculated by the weighted arithmetic mean method: for television (1.87%), computer (1.92%), and mobile phone (1.95%). This preliminary analysis is useful for policy-makers in developing effective e-waste management policies.

Keywords: E-waste recycling; Consumers' Awareness; WEEE management; Willingness to pay (WTP)

SESSION 5

Innovative Technology in Agriculture



INVESTIGATING THE USEFULNESS OF A HYDROLOGICAL MODEL TO SUPPORT WATER RESOURCES ASSESSMENT ACROSS VIETNAMESE BASINS

Hong X. Do^{1*} and Le H. Tu²

¹*Faculty of Environment and Natural Resources, Nong Lam University,
Ho Chi Minh City, Vietnam*

²*Research Center for Climate Change, Nong Lam University,
Ho Chi Minh City, Vietnam*

**Email: doxuanhong@hcmuaf.edu.vn*

Abstract

Water resources assessment is a crucial task that provides essential information for designing and implementing new policies to support sustainable agriculture development. To reliably assess water resources, long-term information about different components of the water cycle such as precipitation, evapotranspiration, and runoff are required. However, the records of these variables are usually not available, thus other toolsets such as satellite imageries and earth system models are often used in water assessment.

This study investigates the usefulness of a semi-distributed hydrological model (with basin size ranges from 358 to 6,392 ha) in estimating different components of the water cycle for seven Vietnamese basins, located over different climate zones of Vietnam. To ensure the models are useful for future investigation into the impact of climate change, we selected only catchments that are not influenced heavily by human intervention (i.e., catchments that have not experienced rapid urbanization and their streamflow regimes are not influenced by large dams).

The models showed satisfactory performance, with the evaluation metrics (for monthly streamflow) ranging from 0.53 to 0.9 for Nash-Sutcliffe efficiency, from 0.31 to 0.69 for RMSE-observations standard deviation ratio, and from -15.1 to 19.4 of percentage bias during the calibration and validation periods. The model also showed that precipitation directly contributed from 32 to 77% of streamflow in these catchments. The outputs of the developed models from 1980 to 2019 were then analyzed to understand changes and interactions between different components of the water cycle across Vietnam.

Keywords: Climate change; water resources; hydrological model; sustainable development; water assessment

IMPACTS OF MECHANIZATION IN RICE FARMING ON GREENHOUSE GAS EMISSION: CASE STUDY IN MEKONG DELTA, VIETNAM

Nguyen T. Nghi* and Nguyen H. Bich

Faculty of Engineering and Technology, Nong Lam University, Ho Chi Minh City, Vietnam

**Email: ntngghi@hcmuaf.edu.vn*

Abstract

Mekong Delta is considered as granary of Vietnam. With the total cultivated area of 4.07 million ha, the annual rice production was 24.3 million tons, accounting for 50% of production and 90% of exported amount of the whole country. The average rice yield of the two crops in Mekong Delta is about 5.5 ton/ha, with the highest of 7 tons/ha in some other provinces. For rice farming in Mekong Delta, the level of mechanization was 3.17 HP/ha, in which the highest level was 1.38 HP/ha for tillage operation; the lowest level was 0.03 HP/ha for seeding and transplanting operations. While ratio of mechanization is almost 100% for irrigation, tillage and harvesting operations, it is still lower for the rest operations. Obviously, application of machines in rice farming has a lot of advantages. However, it is also the cause of increase in GHG emission from burning fuel (direct emission) and manufacturing (indirect emission) of the machines. Computed from fuel consumption, the direct CO₂ eq. emission in rice farming operations was 0.22 ton/ha per cropping season. For manufacturing the machines, the indirect CO₂ eq. emission was 0.02 ton/ha, accounting for 8.5% of the total. With the cultivated rice area of 4.07 million ha in Mekong Delta, total CO₂ eq. emission from mechanization in rice farming corresponds to 733,000 ton/year. To compensate for this negative impacts, mechanization contributed to - an increase in the amount of rice straw to be used instead of burned, reduction in production cost and input materials.

Keywords: Rice farming; mechanization; greenhouse gas (GHG) emission; Mekong Delta

EFFECTS OF BOKASHI AND COMPOST EXTRACTS ON YIELD OF JAPANESE WATERCRESS (*Nasturtium officinale*)

Pham T. H. Thuan and Nguyen T. Binh*

Faculty of Agronomy, Nong Lam University, Ho Chi Minh City, Vietnam

**Email: binh.ngthanh@hcmuaf.edu.vn*

Abstract

The use of organic solutions as Bokashi and Compost extracts, which are fermented following two different methods, have been reported as a potential farming practice at small scale. The aim of this work was to study the organic solutions-making process and determine their effectiveness on yield of Japanese Watercress (*Nasturtium officinale*) – JWC. Bokashi was incubated anaerobically for 3–4 days in a closed 92L-woody bins containing 4 parts of milled JWC and 01 part of Compost derived from chicken manure and rice husk. Compost extracts were prepared by submerging 1.0 kg of Compost tea bag into 25L of clean water stored in plastic bins connected an air pump to allow compost tea to bubble for 24 hours. Two organic solutions were analyzed for their chemical properties before trial application on JWC. A field experiment was arranged in RCBD, consisting of five treatments and three replications. The treatments were: water only as control– T_1 ; Bokashi extract– T_2 ; Compost extract– T_3 ; commercial bio-fertilizer– T_4 , and NPK fertilizer– T_5 . All treatments, except for T_1 and T_4 , received the same amount of 3.28 kg N/1000 m².

Basically, the study determined the process of making organic solutions containing essential nutrients which can be used as a liquid organic fertilizer. The results of trial application show that JWC fertigated with diluted Bokashi and Compost yielded from 1327.3–1362.5 kg/1000 m², which was similar to T_5 (1231.4 kg/1000 m²), but significant higher ($p < 0.05$) than T_1 (741.6 kg/1000 m²) and T_4 (850.8 kg/1000 m²).

Keywords: Bokashi; Compost; organic fertilizer; Japanese watercress

THE EFFECT OF ADDITION BIOACTIVE COMPOUNDS OF KECOMBRANG (*Etlingera elatior*) ON CHARACTERISTICS OF KEFIR

Rifda Naufalin*, Erminawati and Popi Nurhopipah

*Department of Food Technology, Agricultural Faculty,
Jenderal Soedirman University, Purwokerto*

**Email : rifda.naufalin@unsoed.ac.id*

Abstract

Kefir is a fermented milk product, which act as the balance of microflora in the human digestive tract. Kefir has a fresh, distinctive aroma and taste that is sour and slightly tart like soda. The functional properties of kefir can be improved by addition bioactive components from kecombrang extract. Kecombrang (*Etlingera elatior*) is a spice plant belonging to the Zingiberaceae group and has been used in food products. The commonly used parts of this plant are flowers, leaves, and stems. The purpose of this study was to determine the characteristics of cow's milk kefir with various types of kecombrang extracts (leaves, flowers and stems) and variations in extract concentrations and to determine the best combination of extract types with concentrations to produce kefir with the highest antioxidant activity. This research used a completely randomized design (CRD) with the factors studied were the type of kecombrang extract at the level of kecombrang leaf extract, kecombrang flower extract and kecombrang stem extract and the concentration at the level of 2.5%, 5% and 7.5%. The variables tested included the characteristics of kefir including pH, viscosity, color, antioxidant, syneresis and total LAB, as well as testing for sensory properties including taste, texture, aroma and overall (Overall). The test results of the kefir characteristic variables were analyzed using ANOVA and Duncan's advanced multiple range test at the level of $\alpha=5\%$. The results showed that the type of kecombrang extract affected the viscosity, color and antioxidant content as well as sensory properties which included taste and overall. The concentration of the extract increases the color and viscosity. The best kefir formulation was obtained from the addition of 7.5% kecombrang flower extract with the highest antioxidant content of 74.83%. The addition of 7.5% kecombrang flower extract to cow's milk kefir contains 90.6% water content; ash content 0.99%; fat content 2.19%; protein content of 5.6% and carbohydrate content of 0.6% which are in accordance with CODEX STAN 243-2003.

Keywords: Kefir; antioksidant; kecombrang extract; extract concentration

STUDY ON PLASTIC BIO-DEGRADATION POTENTIAL BY LARVAE OF WAX MOTH *Galleria mellonella*

Le T. D. Trang* and Nguyen H. V. Phu

*Research Institute for Biotechnology and Environment, Nong Lam University,
Ho Chi Minh City, Vietnam*

**Email: ltdtrang@hcmuaf.edu.vn*

Abstract

Recently, polyethylene bio-degradation by the wax moth larvae of *Galleria mellonella* has been reported. The objective of this study is to evaluate the bio-degradation potential on other common plastics including polystyrene (PS), polyvinylchloride (PVC), low density polyethylene (LDPE) and highdensity polyethylene (HDPE) by the wax moth larvae. The results showed the life cycle of *G. mellonella* reared on artificial diet was 34-41 days. Larvae 3rd and 4th instar performed bio-degradation potential on all tested plastic and PS was the plastic that both degraded best. In particular, the 4th instar larvae showed higher potential on PS degradation and caused the mass loss of 205.33 mg/30 larvae after 6 days of direct contact. Unlike 3rd instar larvae, 4th instar larvae had ability to survive and develop in the next stages after consuming PS. Furthermore, consuming plastic only had affected the survival ratio, cocoon size, pupation rate and pupation time of 4th instar larvae.

Keywords: Bio-degradation; *Galleria mellonella*; larvae; plastic; polystyrene

SELECTION OF NON-FLOWER FADING *Dahlia variabilis* ‘NESSHO’ PLANTS BASED ON FLAVONE SYNTHASE GENE (*DvFNS*) EXPRESSION PATTERNS

Edna K. Muthamia*, Misaki Ando, Ken-ichiro Yasuba, Yuichi Yoshida, Tanjuro Goto and Yoshikuni Kitamura

Department of Crop Science, Division of Agriculture and Life Science, Graduate school of Environmental and Life Science Okayama University. Okayama City, Japan.

**Email: edna.muthamia@jkuat.ac.ke*

Abstract

Dahlia variabilis ‘Nessho’ cultivar exhibits flower fading characteristics from autumn to spring. The color changing phenomenon is attributed to *Dahlia variabilis* flavone synthase gene (*DvFNS*) expression in whole plant level. Our previous studies suggested that the *DvFNS* expression in young leaves under the appropriate environmental conditions correspond to the potential for the fading occurrence in flowers. In this study, we verified the potential for application of *DvFNS* expression analysis in young leaves for the selection of plants that rarely exhibit flower fading. Plants that had earlier been screened and classified as candidate highly sensitive to flower fading (CRH) plants and low sensitive (CRL) plants were used. The plants were maintained under acclimation conditions (Day temperature of 25°C from 06:00 to 18:00 hours and 20°C Night Temperature, from 18:00-06:00 hours) for 2 weeks to eliminate the effect of greenhouse condition on the *DvFNS* expression. After that, the plants were maintained under *DvFNS* inductive condition (Day temperatures of 20°C from 08:00-18:00 hours and Night temperatures of 9°C 18:00-08:00) for 2 weeks. Then, unexpanded young leaves were sampled and *DvFNS* expression in the samples were analyzed by real time RT-PCR. There was significant elevation in expression of *DvFNS* gene in CRH plants with up to 2.5 times increase before and after inductive treatment. On the contrary, there was no significant change in CRL plants. The findings provide a faster and alternative way for selection of plantlets that will produce red flower color without flower color confirmation.

Keywords: *Dahlia*; *DvFNS* ; flower fading; plantlet selection

EXTRACTION OF ANTHRAQUINONE AND SALICYLIC ACID FROM *Aloe barbadensis* Miller

Luong V. M. Trang¹, Nguyen T. P. Thuy², Nguyen T. N. Lan¹, Tran T. T. Tra¹,
Nguyen P. T. Nhan¹ and Mai H. Cang^{1*}

¹Department of Natural Products, Faculty of Chemical Engineering and Food Technology,
Nong Lam University, Ho Chi Minh City, Vietnam

²Department of Food Microbiology and Product Development, Faculty of Chemical
Engineering and Food Technology, Nong Lam University, Ho Chi Minh City, Vietnam

*Email: maihuynhcang@hcmuaf.edu.vn

Abstract

The objective of the research was to identify the suitable parameters for the extraction of anthraquinone, and salicylic acid from Aloe (*Aloe barbadensis* Miller). Parameters were evaluated including ethanol concentration (99.5, 80, 50.0%), material/solvent ratio (1/1, 1/2, 1/3, 1/4 g/ml), stirring speed (100, 200, 300, 400 rpm), temperature (40, 45, 50, 55°C), stirring time (10, 20, 30, 40 minutes). Optimum conditions for anthraquinone and salicylic acid extraction on a laboratory scale were the ratio of 1/2 (g/ml), 50°C, 20 minutes and 300 rpm for the ratio of material/solvent, extraction temperature, extraction time, stirring speed, respectively using ethanol as solvent extraction. The maximum anthraquinone and salicylic acid content were 0.3136 mg/ml and 2.0413 mg/ml, respectively. These parameters showed great potential in developing food products from Aloe extract containing high anthraquinone and salicylic acid content.

Keywords: *Aloe barbadensis* Miller; anthraquinone; extraction; salicylic acid

EFFECT OF NPK 12:12:17:2+TE FERTILIZER AND COCONUT HUSK ASH ON PHOTOSYNTHESIS OF OIL PALM SEEDLINGS

**Fathurrahman F.^{1*}, Qhairil Fajar¹, Siti Zahrah¹, Febri Doni², Maizar¹
and Zaldi Arman³**

¹ *Department of Agrotechnology, Faculty of Agriculture, Universitas Islam Riau, Indonesia*

² *Department of Biology, Faculty of Mathematics and Natural Sciences,
Universitas Padjadjaran, Indonesia*

³ *Department of Food, Food Crops and Horticulture Riau Province, Indonesia*

**Email: fathur@agr.uir.ac.id*

Abstract

The oil palm plantation has faced many problems related to seedling preparations. One of them is a lack of nutrients for growth. To tackle this problem, a study was conducted to determine the effects of NPK 12:12:17:2+TE (NPK) fertilizer and coconut husk ash (CHA) towards the growth and photosynthesis of oil palm seedlings in peat media. The best plant height was the interaction of NPK fertilizer (103 g) and CHA (80 g) resulting in a height of 97.83 cm at the age of 137 days after planting compared to a height of 61.33 cm (control). The highest increase in stem girth was found in the interaction between NPK (103 g) and CHA (120 g) resulting in 5.66 cm compared to only 3.90 cm (control). For the chlorophyll content, the highest dose of treatment interaction resulted, namely 64.53 in the NPK 103 g treatment. The photosynthesis resulted in 37.77 mol CO₂ m⁻² s⁻¹ at the interaction of NPK fertilizer at a dose of 69 g and 80 g of CHA. The highest stomata conductance was 0.231 mol H₂O m⁻² s⁻¹ at the interaction of NPK 69 g and CHA 120 g. The smallest internal CO₂ concentration were 37.35 mol CO₂ mol⁻¹ at the interaction of NPK 130 g and CHA 80 g. The highest transpiration was 6.71 mM H₂O m⁻²s⁻¹ at the interaction of NPK 69 g and CHA 80 g. The highest WUE was 11.58 % in the NPK treatment in combination with a dose of 35 g CHA. Increasing the dose fertilizers and increased growth and photosynthesis, stomata conductance, decreased internal CO₂, increased transpiration and WUE.

Keywords: Oil palm; fertilizer; elevated of growth; plant physiology

SESSION 6

Emerging Issues in Agricultural Transformation



FATE OF SULFONAMIDES IN PLANT – SOIL SYSTEMS: A CASE STUDY WITH SULFAMETHAZINE AND SULFAMETHOXAZOLE

Huynh V. Khang^{1,2*} and Dawn M. Dechand¹

¹*Department of Biosystems and Agricultural Engineering,
Michigan State University, Michigan, USA*

²*Faculty of Biological Sciences, Nong Lam University, Ho Chi Minh City, Vietnam*

**Email: khanghv@hcmuaf.edu.vn*

Abstract

Occurrence of sulfonamides in agricultural soils and subsequent accumulation in plants grown in contaminated soils have prompted concerns about unintentional human exposure to antibiotics. The present study investigated the fate of sulfamethazine (SMT) and sulfamethoxazole (SMX) in soil columns planted with *Arabidopsis thaliana*, using ¹⁴C-labeled and unlabeled chemicals. Both SMT and SMX rapidly formed non-extractable residues with soil constituents, with extractable ¹⁴C-radioactivity after 7 days accounted for only 12.5 – 18.3% and 8.4 – 15.9% of the initially spiked ¹⁴C-SMT and ¹⁴C-SMX, respectively. Plant uptake and metabolism of sulfonamides were compound-specific, with concentrations of SMT and SMX in plant tissues were in range of 4.0 – 5.4 µg/g and 0.068 – 0.077 µg/g, respectively. Conversely, the ¹⁴C-radioactivity in ¹⁴C-SMX-treated plants (54.8 ± 2.0 nCi/g) was higher than those in ¹⁴C-SMT-treated plants (28.2 ± 6.0 nCi/g), suggesting plant uptake of other biotransformation products from soils. The predominant proportions of SMT and SMX taken up by *A. thaliana* and their metabolites were detected in plant roots. Glycosylated conjugates were found to be the major metabolites of SMT and SMX in plant tissues.

Keywords: Antibiotics; *Arabidopsis thaliana*; phytometabolism; plant uptake; sulfonamides

INVESTING IN INTERNET OF THINGS TECHNOLOGY: CASE STUDIES OF SMART ALTERNATE WETTING AND DRYING IRRIGATION

Pham V. Bang

School of Economics and Law, Tra Vinh University, Tra Vinh Province, Vietnam

Email: pvbang@tvu.edu.vn

Abstract

In recent years, reduced rainfall and water stress have threatened the livelihoods of millions of rice producers in Vietnam's Mekong Delta (VMD). To enhance the rice farmers' resilience capacity to climate change, it is essential to introduce and promote water-saving cultivation practices such as alternate wetting and drying (AWD) in rice production. Unfortunately, it is fact that the application of this technology in the region is very limited. We, therefore, hypothesized in this study that the precise water measurements and convenience of Internet of Things (IoT) technology could facilitate the uptake of AWD. To confirm this hypothesis, we investigated both the technical and financial feasibility of deploying IoT technology in open-field conditions. This paper focuses on the assessments of costs and benefits of investing in IoT AWD compared to the least cost manual one. We found that the investment is financially viable for smallholder farmers with plot sizes over 2 hectares and conditions conducive to applying AWD (the case of individual farmers in Can Tho). The assessments also showed that the larger economies of scale would make the IoT investment highly profitable (the case of an agricultural company in An Giang). The analysis, however, revealed that the efficiency gains of investing in IoT technology could not compensate for poor AWD conditions, and thus smallholder farmers in Tra Vinh site should instead apply the low-cost alternative of manual AWD.

Keywords: Alternate wetting and drying; cost-effectiveness; investing in technology; precision agriculture; rice production

INSECT TRAP WITH VIBRATIONAL ENERGY DEVICE

Bryan H. H. Chiang and M. C. Liang*

*Department of Electrical Engineering, National University of Kaohsiung,
Kaohsiung, Taiwan*

**Email: m1085119@mail.nuk.edu.tw*

Abstract

In this study, one has designed an insect trapping device that makes use of sustainable power. This sustainable power generator adopted vibrating energy from nature. It can absorb energy from wind or vibration and convert it into electricity to drive LEDs. With the phototaxis of insects, LED light sources can be used to attract insects. Also, the natural vibration of the generator can be used as an additional attraction to lure the insects into the trap. On top of that, testing the correlation between different types of LEDs and the tempted insects to achieve the effect of attracting specific pests. The device consists of a vibrational energy generator, light module and other components.

Keywords: Sustainable power; vibrational energy; insect trap; LED; pest

THE IMPACT OF COVID-19 ON ALTERING HOUSEHOLD FOOD CONSUMPTION: A CASE STUDY IN HO CHI MINH CITY, VIETNAM

Hoang H. Anh^{1*}, Tran M. D. Hanh¹, Doan Q. Vang² and Nguyen N. Thuy¹

¹*Faculty of Economics, Nong Lam University, Ho Chi Minh City, Vietnam*

²*Faculty of Economics, University of Technology and Education, Ho Chi Minh City, Vietnam*

**Email: hoanghaanh@hcmuaf.edu.vn*

Abstract

In Vietnam, the first four waves of the Covid-19 pandemic since early 2020 have profoundly altered food consumption throughout the country, especially during the fourth wave in the second half of 2021, when strict social-distancing measures were imposed by the government. This study analyzes changes in food acquisition methods and food consumption of households in Ho Chi Minh City. An online survey was deployed to collect data during the fourth wave of Covid-19 in Vietnam. Before the beginning of the pandemic in Vietnam, food was primarily purchased from traditional markets and other direct methods. Since the beginning of the pandemic, findings show there have been notable changes in food acquisition methods. Notably, 52% of respondents increased their habits of going shopping in grocery stores, as opposed to in traditional markets and supermarkets where they go less often. Moreover, consumers have changed their online shopping behaviors, with 34% of respondents buying more food online and 15% purchasing a lot more than before the pandemic. Furthermore, surveyed households consumed less food since the onset of the pandemic, especially processed food (61%), fast food (61%), and fresh food (45%). On the other hand, more frozen food (46%) and more meat (47%) were consumed. From the estimated ordinal probit regression, the study also found that the factors most affecting changes in food consumption since the pandemic were the perceived risks, the impacts of Covid-19 on household income, average household income, age of household members, and household size.

Keywords: Covid-19; food acquisition; food consumption; ordinal probit regression; Ho Chi Minh City; Vietnam

SESSION 7

Recent Advances in Animal Health and Animal Biosciences



REDISTRIBUTION OF PLCZ1 IN FROZEN BULL SPERMATOZOA APPEARING THROUGH ACROSOMAL EXOCYTOSIS, BUT ITS DYNAMIC NOT AFFECTED BY THAWING METHODS

Nguyen T. Hai^{1,2}, Do Q. Son¹, Lakshitha Fonseka^{1,3}, Takuya Wakai¹
and Hiroaki Funahashi^{1*}

¹*Department of Animal Science, Graduate School of Environmental and Life Science, Okayama University, Okayama, Japan*

²*Department of Animal Production, Faculty of Animal Science and Veterinary Medicine, Nong Lam University, Ho Chi Minh City, Vietnam*

³*Department of Animal Science, Faculty of Agriculture, University of Ruhuna, Matara, Sri Lanka*

*Email: hirofun@okayama-u.ac.jp

Abstract

The objective of current study was to evaluate the redistribution of phospholipase C zeta 1 (PLCZ1) in frozen-thawed bull spermatozoa and its dynamic through acrosome reaction. Firstly, a 2x4 factorial design was applied to determine the relation of thawing conditions (conventional, 39°C for 60 sec vs. rapid, 70°C for 8 sec followed by 39°C for 52 sec) and capacitation inducers (caffeine, heparin, both caffeine and heparin, or control). Both percentages of spermatozoa with intact acrosome and with PLCZ1 at the acrosome region decreased significantly ($P < 0.05$) after the spermatozoa were cultured with caffeine or both caffeine and heparin for 90 min. In these groups, the incidence of spermatozoa exhibiting PLCZ1 at both regions of acrosome and equatorial segment was significantly increased ($P < 0.05$). However, no differences were found between conventional and rapid thawing conditions or between heparin and control. Secondly, frozen-thawed spermatozoa were cultured with calcium ionophore for 0, 30, 60, or 90 min. There was a significant reduction ($P < 0.05$) in the percentage of spermatozoa with PLCZ1 at acrosome region only, and simultaneous increases at both regions of acrosome and equatorial segment, or at equatorial segment only. These were associated with the increase of acrosome-reacted spermatozoa in the presence of calcium ionophore. In conclusion, PLCZ1 redistribution in frozen-thawed bull spermatozoa seems to be due to the acrosome exocytosis, but its translocation is not affected by two thawing conditions examined.

Keywords: Acrosome reaction; frozen bull spermatozoa; dynamic; PLCZ1; thawing procedure

EFFECTS OF FORCED EXPRESSION OF PGC-1 α ON DEVELOPMENTAL COMPETENCE OF PORCINE OOCYTES

Do Q. Son¹, Nguyen T. Hai^{1,2}, Takuya Wakai¹ and Hiroaki Funahashi^{1*}

¹*Department of Animal Science, Graduate School of Environmental and Life Science, Okayama University, Okayama, Japan*

²*Department of Animal Production, Faculty of Animal Science and Veterinary Medicine, Nong Lam University, Ho Chi Minh City, Vietnam*

*Email: hirofun@okayama-u.ac.jp

Abstract

The objective of this research was to examine the changes in developmental competence after PGC-1 α , peroxisome proliferators-activated receptor γ coactivator-1 α , was overexpressed in porcine oocytes during in-vitro maturation. Cumulus-oocyte-complexes were cultured in mPOM medium supplied with eCG, hCG and dibutyryl cAMP for the first 20 h. After that, the oocytes were denuded and centrifuged to get a better view of the cytoplasm. A solution of mRNA constructs of PGC-1 α was injected into the oocytes. Oocytes were then further cultured in fresh mPOM medium for another 24 h. After maturation, polar body extrusions (PBE) rates were checked, and matured oocytes were parthenogenetically activated. Injection success was checked with Western Blot and Immunocytochemistry. Reactive Oxygen Species (ROS) production assays were performed with CM-H2DCFDA oxidative stress indicator. High-level of PGC-1 α overexpression lowered the PBE rates ($P < 0.05$), while low-level overexpression did not show any effects on nuclear maturation. Exogenous PGC-1 α in high level abolished the development ability of activated oocytes, and in low level significantly impaired ($P < 0.05$) the developmental competence. Oocytes with elevated levels of PGC-1 α showed increased levels ROS production ($P < 0.01$). In conclusion, expression of exogenous PGC-1 α heavily decreased the developmental ability of porcine oocytes, and increase in ROS production may contribute to the negative impact. Future experiments are needed to further investigate the mechanisms at which PGC-1 α overexpression affects porcine oocytes.

Keywords: Porcine; oocytes; in-vitro maturation; early development; PGC-1 α

IMPROVEMENT OF SPERM PARAMETERS WITH SUPPLEMENTATION OF ASTAXANTHIN

Moeka Ishihara¹, Hidetaka Tasaki^{1,2} and Junko Otsuki^{1,2*}

¹ Graduate school of Environmental and Life Science, Okayama University, Okayama City, Japan

² Assisted Reproductive Technology Center, Okayama University, Okayama City, Japan

*Email: pfy78n3y@s.okayama-u.ac.jp

Abstract

Various factors can give rise to sperm damage during cryopreservation. The addition of protective substances to the cryopreservation solution is considered to be effective in mitigating the aforesaid damage. In this study, we focused on astaxanthin, a substance known to have a variety of beneficial properties, including antioxidant and anti-inflammatory effects. The purpose of this study was to evaluate the efficacy of supplementing mouse sperm cryopreservation solution with astaxanthin. Astaxanthin was dissolved in dimethyl sulfoxide and adjusted to 0.5, 1, 2, and 4 μ M in cryopreservation solution. The same volume of dimethyl sulfoxide was added to cryopreservation solution as a control. After thawing, eight parameters were evaluated by a computer-assisted sperm analysis. The results demonstrated that the addition of 1 μ M astaxanthin yielded the highest sperm motility. Consequently, these results were compared with those of the control group. The addition of 1 μ M astaxanthin significantly improved the sperm motility rate ($P = 0.005$). The membrane integrity of the sperm heads was further evaluated by double staining with Propidium iodide and Hoechst 33342, and the membrane integrity of the sperm tails was analyzed by hypoosmotic swelling test. No significant differences were found between the solution with the addition of 1 μ M astaxanthin or the control group. These results suggest that the addition of astaxanthin can improve sperm motility, due to the antioxidant capacity of astaxanthin. However, it does not protect the membrane integrity of the sperm head or tail.

Keywords: Mouse sperm; cryopreservation; motility; astaxanthin; antioxidant effect

EFFECTS OF THREE-DIMENSIONAL CULTURE ON BOVINE UTERINE GLANDS

Yosuke Sugino¹, Taiki Sato², Yuki Yamamoto^{1,3} and Koji Kimura^{1*}¹Graduate School of Environmental and Life Science, Okayama University, Okayama, Japan²Faculty of Agriculture, Okayama University, Okayama, Japan³Graduate School of Agriculture, Tokyo University of Agriculture and Technology, Tokyo, Japan

*Email: p1tl7fut@s.okayama-u.ac.jp

Abstract

In ruminants, uterine glands play key roles in the establishment of pregnancy by secreting various factors into the uterine lumen. Although three-dimensional (3D) culture system is well known to investigate cellular functions *in vitro*, the detailed functions of uterine gland are not fully elucidated using the culture system. Here, this study aims to clarify the benefit of 3D culture system to examine the innate functions of bovine uterine glands. Isolated bovine uterine glands were cultured in 2D or 3D culture system using extracellular matrix (Matrigel), and mRNA levels of the secretion proteins of SERPINA14, MEP1B, APOA1, ARSA, CTGF, and SPP1 were investigated in isolated and cultured uterine glands. Protein expressions of estrogen receptor β (ER β) and progesterone receptor (PR), and establishment of apico-basal polarity were also examined. In isolated uterine glands, mRNA levels of the secretion proteins changed during estrous cycle. Although uterine glands cultured in both 2D and 3D expressed ER β and PR, progesterone did not affect SERPINA14 mRNA expression. Expression of APOA1 mRNA in 2D cultured uterine glands did not respond to estrogen and progesterone. Moreover, mRNA levels of the secretion proteins in 3D culture system were significantly higher than in 2D culture system, which might be attributed to the different cellular morphology between them. The locations of ZO-1 and β -catenin in 2D cultured uterine glands were disordered compared with 3D cultured uterine glands. These results showed that hormonal responsiveness in secreted protein expressions and the cellular morphology were different between 2D and 3D cultured bovine uterine glands.

Keywords: Bovine; secreted proteins; three-dimensional culture; uterine glands

GUT IMMUNOGLOBULIN A SECRETION INDUCED BY CYCLIC SUGAR INDEPENDENT OF NUMBER OF GLUCOSE UNIT

Taisei Miyamoto*, Naoki Nishino Takeshi Tsuruta

Graduate School of Environmental and Life Sciences, Okayama University, Okayama, Japan

**Email: miyamoto2030@s.okayama-u.ac.jp*

Abstract

Cyclic nigerosyl nigerose (CNN), α -cyclodextrin (CD), β -CD, and γ -CD are cyclic sugar that consists of 4, 6, 7, and 8 glucose units, respectively. A previous study revealed that oral administration of CNN increases immunoglobulin A (IgA) concentration in mice feces. IgA is a major antibody secreted into the gut and contributes to symbiosis with bacteria. In this study, we compared the effect of cyclic sugars with a different number of glucose units on gut IgA secretion. Balb/c mice were divided into 5 groups and fed a control diet (Control group) or a cyclic sugar-supplemented diet (CNN, α -CD, β -CD, and γ -CD group) for 12 weeks. The IgA concentration in the feces were measured at week 6 and 12. At week 12, mice were sacrificed and the colonic tissue was collected for measurement of gene expression related to IgA class switching. The IgA concentration was significantly higher in CNN group than in Control, α -CD, and β -CD group at week 6 and the effect lasts for 12 weeks after administration. Gene expression of *Aldh1a2* was significantly higher in CNN group than α -CD, β -CD, and γ -CD group ($P < 0.05$). *Aldh1a2* produces retinoic acid, which induces IgA production. These results suggest that amount of gut IgA secretion is induced by cyclic sugar independent of the number of glucose unit. Furthermore, the stimulatory effect of cyclic sugar on gut IgA secretion may be modified by an enzyme expression related to IgA class switching.

Keywords: Cyclic sugar; Immunoglobulin A; gut bacteria

GENETIC DIVERSITY OF PHAN RANG SHEEP ON MITOCHONDRIAL COI GENE BASED ON NUCLEOTIDE SEQUENCING

Le V. Loc¹, Tran T. Vu¹, Le T. Loi¹, Hoang T. Thanh² and Nguyen N. Tan^{1*}

¹*Faculty of Biological Sciences, Nong Lam University,
Ho Chi Minh City, Vietnam*

²*Vigova Poultry Research and Development Center, Ho Chi Minh City, Vietnam*

**Email: nntan@hcmuaf.edu.vn;*

Abstract

This study aimed to investigate the genetic diversity of Phan Rang sheep at Ninh Thuan province of Vietnam based on mitochondrial cytochrome oxidase subunit 1 gene (COI) by nucleotide sequencing. The primers were designed for PCR to amplify the target COI gene with 882 bp in size. The sequence from 20 individual samples representing four sheep breeds were used to analyze the nucleotide diversity, genetic distance and to reconstruct the phylogenetic tree. The results showed that the percentage of nucleotide was Adenine (27.7%), Thymine (31.2%), Cytosine (23.9%), Guanine (17.2%). Percentage of nucleotide pairs A+T and C+G was 58% and 42%, respectively, and the nucleotide diversity (π) was 0.002. 10 polymorphic sites and 4 haplotypes were found and the haplotype diversity (H_d) was 0.500 ± 0.122 . The largest haplotype group consisted of 14 individuals and most of Phan Rang sheep grouped into the same haplotype. The genetic distance value between hybrid Australian sheep (AuHS) and Arabian pure breed sheep (ArS) was the highest ($d=0.00386 \pm 0.00060$), then lower in between hybrid Arabian (ArHS) and ArS (0.00342 ± 0.00034) or between Phan Rang sheep (PRS) and ArS ($d=0.00334 \pm 0.00003$), while this value was lowest in between PRS and AuHS ($d=0.00103 \pm 0.0002$) or ArHS ($d=0.00111 \pm 0.00022$). The results of phylogenetic tree demonstrated that most of Phan Rang sheep grouped into one clade and more closer to Asian sheep. Increasing sample size and expanding the geography for collecting the samples for further analysis are required.

Keywords: COI gene; genetic diversity; mitochondrial DNA; Phan Rang sheep

MILK MICROBIOTA, MILK COMPOSITION AND BLOOD METABOLITES OF JERSEY COWS THROUGHOUT A LACTATION PERIOD

Gathinji, P. K., Zabiulla, Y., Nguyen D. Q., Aodaofu and Nishino, N.*

Department of Animal Science, Okayama University, Okayama, Japan

**Email: hon.dr.gk@gmail.com*

Abstract

The global demand for microbially and compositionally high-quality milk is soaring. Sustainable production of high-quality milk boils down to the breed of cows reared and hygiene management practices of a dairy farm. Jersey cows have gained traction for the production of compositionally high-quality milk. However, information on Jersey milk microbiota, metabolic profiles, and their possible correlations throughout a lactation period remains dearth. We collected milk and blood samples from eight lactating Jersey cows throughout a lactation period. Airborne dust samples were also collected every time to assess the environmental impact on the microbial quality of milk. The microbiota was assessed by Illumina MiSeq sequencing. CombiFoss FT+ analyzer was used to analyze milk composition, and commercial kits were used to measure metabolic profiles. Burkholderiaceae and Oxalobacteriaceae were the predominant milk microbiota, and the two taxa changed inconsistently across the lactation. NEFA, GOT, and haptoglobin levels were low during the early stage of lactation, while GPT, phosphorus, and total protein levels were relatively higher towards the end of the lactation. Milk contamination by Burkholderiaceae and Oxalobacteriaceae was strongly linked with the GOT and GPT fluctuations. Milk protein and fat steadily increased as the lactation advanced. The microbiota of airborne dust was closely clustered with milk microbiota, indicating that airborne dust, in part, was the source of milk contamination.

Keywords: Jersey cows; milk microbiota; airborne dust; blood metabolites

INHIBITED AEROBIC SPOILAGE BY MULTIPLE LACTIC ACID BACTERIA INHABITING TOTAL MIXED RATION SILAGE

Wali A. *, Hou J., Tran, D. P. , Ton, N. M. T. and Nishino, N.

Department of Animal Science, Okayama University, Okayama, Japan

**Email: pxz39327@s.okayama-u.ac.jp*

Abstract

Producing total mixed ration (TMR) silage is one method to mitigate the drawbacks of wet by-products regarding nutrient balance and handling. The high aerobic stability of TMR silage started to attract researchers' attention in the early 2000s. High ambient temperatures in the tropics will make anaerobic storability and aerobic stability more difficult to control; hence, the production of TMR silage can be a good option to ensure the preservation and feed use of wet by-products. In this study, whole corn silage was inoculated with *Lactobacillus buchneri*, *L. formosensis*, *L. parafarraginis*, *L. hammesii*, *L. paralimentarius*, and *L. farciminis*, which were isolated from aerobically stable total mixed ration silage. *L. buchneri*, *L. parafarraginis* and *L. farciminis* showed inhibitory activity against aerobic deterioration at acceptable levels. The yeast genera affected by inoculation were different between three LAB-inoculated silages, indicating that multiple species may cooperate in exhibiting inhibitory effects.

Keywords: Aerobic spoilage; lactic acid bacteria; microbiota; total mixed ration silage

ANALYSIS OF CHANGES IN AFRICAN SWINE FEVER VIRUS GENETIC STRUCTURE AND BIOLOGICAL PROPERTIES DURING ADAPTATION TO CONTINUOUS CELL CULTURE FOR DEVELOPMENT OF ASF VACCINE

Joo Young Lee^{1*}, Do T. Duy², Sung-sik Yoo¹, Hyeok-il Kwon¹, Seung-Chul Lee¹,
Min Ho kim¹ and In-joong Yoon¹

¹*ChoongAng Vaccine Laboratories, Daejeon, Republic of Korea.*

²*Faculty of Animal Sciences and Veterinary Medicine, Nong Lam University,
Ho chi Minh City, Vietnam*

**Email: jason.lee@cavac.co.kr*

Abstract

African swine fever virus (ASFV) causes a virulent, deadly infection in wild and domestic swine and is currently causing a pandemic from Asia area. Therefore, a safe and effective vaccine seems to be a reasonable demand for the prevention and control of ASF. Experimental vaccines derived from naturally occurring, genetically modified, or cell culture-adapted ASFV have been evaluated, but no commercial vaccine is available to control African swine fever (ASF). We report here the genotypic analysis of viruses obtained at different passages during the process of adaptation of a virulent ASFV field isolate from the Korea and Vietnam to grow in cultured cell lines. ASF viruses were successively passaged about 15 times in CAS-01 cells. Viruses obtained in Korea and Vietnam were evaluated in vitro for the ability to replicate in CAS-01 cells. Replication of ASF viruses in CAS-01 cells increased with successive passages. Full-length sequence analysis of each of these viruses revealed significant deletions that gradually accumulated in multi-areas at the right and left variable ends of the genome. Mutations that result in amino acid substitutions and frameshift mutations were also observed, though in a rather limited number of genes. The potential importance of these genetic changes in virus adaptation/attenuation is discussed.

Keywords: African swine fever virus; CAS-01 cell lines; Gene deletion; Korea; Vietnam

CLINICAL, PATHOLOGICAL AND TRANSMISSION CHARACTERISTICS OF ASF IN VIETNAM: MINI-REVIEW FROM RESEARCH TO THE FIELD

Lai C. Danh, Nguyen T. Toan and Do T. Duy*

*Faculty of Animal Science and Veterinary Medicine, Nong Lam University,
Ho Chi Minh City, Vietnam*

**Email: duy.dotien@hcmuaf.edu.vn*

Abstract

African swine fever has caused heavy losses to the Vietnamese pig industry since 2019, which threatens the sustainability of pig production and the environment. The objective of this study was to review clinical, pathological and epidemiological characteristics which were recorded and reported from many studies in Vietnam, thereby helping to provide the value information and comprehensive view of ASF in Vietnam. ASFV has spread quickly in national, local and farm scales and infected all age groups of pigs, but the morbidity rate of sows and boars tend to be higher than that of piglets. Several risk factors increase ASF infection at farms such as proximity to residential areas, markets, slaughterhouses, major roads, use of leftovers or untreated drinking water, introducing pigs of unknown origin, improper handling of sick pigs and other animal vector. The common typical clinical signs of ASFV-infected pigs were characterized as fever, loss of appetite and redness of the body. Severe hemorrhage and infarction in multiple organs has been reported in many ASF cases in Vietnam, in which hemorrhagic splenomegaly and dark-red hemorrhage were the most common lesions.

Keywords: African swine fever; pathology; transmission; Vietnam

DEVELOPMENT OF PIGHEALTH SECURITY-X APPLICATION FOR BIOSECURITY ASSESSMENT IN SUSTAINABLE PIG PRODUCTION

Lai T. T. Tuyen^{1†}, Nguyen H. Doanh^{1†}, Le N. Van¹, Le T. H. Nho⁴, Ngo T. Phuc³, Vo T. Hue², Du D. Phong² and Do T. Duy^{1*}

¹Faculty of Animal Science and Veterinary Medicine, Nong Lam University, Ho Chi Minh City, Vietnam; ²Zoetis Vietnam company; ³Trade and service Gpet company, Ho Chi Minh City, Vietnam; ⁴Department of Animal Health of Tien Giang Province.

Presenting author email:doanh.nguyenhuu107@gmail.com

*Email: duy.dotien@hcmuaf.edu.vn

† Authors have the same contribution

Abstract

The Vietnamese pig production has been facing high pressure from diseases, especially African Swine Fever (ASF), which has been causing huge damage to this industry. When commercial vaccines have not been developed successfully, implementing strict biosecurity in the modern approach is an effective solution to control and prevent disease transmission. The study aimed to develop an application (App) for biosecurity assessment named Pighealth Security-X in pig farms toward modern biosecurity. The App Pighealth Security-X has 165 questions divided into two assessing options: 1. The traditional approach includes eight biosecurity assessments: Location and structure, Husbandry practice, Farm management, Transport, Husbandry equipment, Vermin and bird control, Feed/Water/Equipment, Visitors, and Farmworkers; and 2. The modern approach includes external biosecurity and internal biosecurity. External biosecurity aims to prevent pathogens from entering and leaving the farm. Internal biosecurity aims to prevent pathogens from spreading within the farm, separated into three distinct zones of a pig farm (Risk zone, Buffer zone, and Clean zone). The result of the biosecurity assessment displayed in percentage (%) of biosecurity scores combined with comments and solutions helped the users investigate the gaps in biosecurity and find suitable solutions. The App was operated on smartphones to improve processing time. The assessment can perform anytime and anywhere. The result can be presented, stored, and reported quickly. The application of biosecurity assessment from thirty pig farms showed that the result of the biosecurity assessment from the Pighealth Security-X was reliable as there was an inverse correlation with the disease status of farms (farms with low biosecurity tended to have higher disease incidence, $R=-0,715$, $P<0,05$). In short, Pighealth Security-X is looking toward a new era of biosecurity, contributing to the improvement of disease control, improving productivity, and reducing cost of labor.

Keywords: ASF; biosecurity; Pighealth Security-X; pig; Vietnam

DIFFERENTIAL DIAGNOSIS OF VIRUSES RELATED TO REPRODUCTIVE DISORDER ON SOWS BY PENTAPLEX-PCR TECHNIQUE

Nguyen N. The¹, Le T. T. Ha ¹, Vu L. X. Hiep² and Dinh X. Phat^{1*}

¹*Faculty of Biological Sciences, Nong Lam University, Ho Chi Minh City, Vietnam*

²*Department of Animal Science, University of Nebraska - Lincoln, United States*

*Email: dinhxuanphat@hcmuaf.edu.vn

Abstract

The newly emerged diseases caused by ASFV and PCV3 and their confirmed prevalence in Vietnam highlighted a necessity for a method to differentiate DNA viruses that are related to reproductive failures in sow herds including PCV2, PCV3, PPV, ASFV. In this communication, a diagnostic multiplex-PCR (mPCR) was established with pathogen-specific primers selected from previous studies and another set of primers designed for *COX1* gene serving as an internal amplification control (IAC). The predicted products of PCV2, PCV3, PPV, ASFV and IAC were 702 bp, 223 bp, 380 bp, 278 bp and 463 bp, respectively. After optimization, the mPCR functioned specifically at 62°C. Results revealed the consistent detection limit at 100 copies/gene/reaction. In application, 185 serum samples from sows were used to examine the presence of the related pathogens. mPCR results showed that the mono-infection rate of PCV2, PCV3, PPV, and ASFV was 0% (0/85), 40% (34/85), 28.2% (24/85), and 48.2% (41/85), respectively. Regarding coinfection rate, the data indicated that coinfections of 2, 3 and 4 pathogens were 20%, 8.2% and 0% accordingly. In conclusion, the mPCR assay was successfully established and ready to serve for diagnosis of PCV2, PCV3, PPV and ASFV infection in reality with high specificity and sensitivity. It is a good contribution to a better understanding of the epidemiology of these diseases in swine.

Keywords: ASFV; multiplex PCR; PCV2; PCV3; PPV

PREVALENCE AND GENETICS CHARACTERISTIC OF PORCINE ROTAVIRUS GROUP C IN PIGLETS IN SOME SOUTHERN AND CENTRAL HIGHLANDS PROVINCES

Nguyen H. K. Linh and Hoang T. Hai*

*Faculty of Animal Science and Veterinary Medicine, Nong Lam University,
Ho Chi Minh City, Vietnam*

**Email: hai.hoangthanh@hcmuaf.edu.vn*

Abstract

Rotavirus C (RVC) is a cause of gastroenteritis in swine and has a worldwide distribution however there are not many researchs in Vietnam. Between August 2020 and September 2021, 129 faecal samples from pigs younger than 21 days old from herds in some southern and central highlands provinces in Viet Nam were collected and tested by realtime PCR. The purpose of this study was to investigate the prevalence of RVC among diarrheic pigs of different areas, regions, seasons. As a result, RVC was detected in 17 samples (13.18%). In the South central region, South east region and Highlands region, the pevevalence are 6.67%, 11.11% and 33.33, respectively. The prevalence in neonate pigs (3 days old) and nursery piglets (4 –20 days old) were 26.92% and 9.71%, respectively. In dry season and rainy season, the prevalence were 3.45% and 33.33%, respectively. Additionally, the VP7 genes of the positive samples were sequenced to charaterize molecular diversity. Based on an 85% identity cutoff value at the nucleotide level in comparing with other 27 VP7 genes, it showed that the virus in two positive samples belonged to group G3 and had the similarity up to 97%.

Keywords: Porcine; rotavirus group C; prevalence; PCR; sequencing

ANTIBACTERIAL PROPERTIES OF *Allium sativum* AND *Phyllanthus amarus* EXTRACTS AND THE EFFECT OF THESE HERBAL PRODUCTS ON THE PERFORMANCE OF ISA BROWN LAYERS

Pham T. Hue^{1*} and Vo T. T. An¹

¹Faculty of Animal Science and Veterinary Medicine, Nong Lam University,
Ho Chi Minh City, Vietnam

*Email: phamhue2021@gmail.com

Abstract

Antibacterial activity of garlic extracts against *Ornithobacterium rhinotracheale* and phyllanthus extracts destroying *Escherichia coli* were evaluated by agar diffusion assay. The results showed that *Ornithobacterium rhinotracheale* radicals were sensitive to pure garlic extract and pure alcohol-mixed garlic extract, moderately sensitive to diluted alcohol and distilled water-mixed garlic extract, and sensitive to antibiotics - doxycycline and amoxicillin/clavulanic acid. Moreover, 250 mg/ml of phyllanthus extract might destroy *Escherichia coli* while minimal bactericidal concentration of doxycycline and amoxicillin against *Escherichia coli* were 16 µg/ml and 64 µg/ml, respectively.

The effects of garlic and phyllanthus extracts on productive performance and egg quality in from-23-to-29-week-old laying hens were also determined. A total of 1584 Isa Brown hens were randomly assigned to 2 groups in a completely randomized one-factor design. In control group, layers were drunk doxycycline-mixed water while others were used garlic and phyllanthus extracts in herbal group. The results showed that 30-week-old layers in herbal and control batches had nearly the same laying rate, average egg weight, feed conversion ratio, and mortality and elimination rate. For egg quality, the eggs of herbal-used layers having Haugh units and thick albumin ratio were higher than that of antibiotic-used layers ($p < 0.05$). However, there was no statistically significant difference between herbal and control groups with shape units, yolk ratio, shell thickness, yolk color, and shell color ($p > 0.05$). Generally, the eggs in control group still had doxycycline residue on day 11 after stopping antibiotic use while herbal batch promoted economic efficiency due to increasing profit by 3%.

Keywords: *E. coli*; garlic extract; Isa Brown laying hens; ORT; phyllanthus extract

THE EFFECT OF PROTEIN SOURCES ON GUT MICROBIOTA IN MICE WITH AND WITHOUT OSMOTIC DIARRHEA

Nuomin¹, Baek, R.¹, Tran, D. P.¹, Ton, N. M. T.¹, Tsuruta, T.¹ and Nishino, N.^{1*}

¹*Department of Animal Science, Okayama University, Okayama 700-8530, Japan*

**Email: hon.dr.gk@gmail.com*

Abstract

Trillions of microorganisms inhabit the human gut, composing a dynamic ecosystem implicated in health and disease. Diet is a crucial factor influencing gut microbiota composition, indicating the potential for therapeutic dietary strategies to manipulate microbial diversity, composition, and stability. In this study, five types of proteins, including A1 casein, A2 casein, standard casein, soy protein, and egg albumin, were evaluated on gut microbiota in mice. Osmotic diarrhea was induced by administering MgSO₄ solution. Diets containing proteins at 200 g/kg levels were fed to mice for four weeks. Cecum short-chain fatty acids (SCFA) concentration and cecum microbiota were assessed. The SCFA concentrations appeared to be higher in casein-fed than in soy-fed and egg-fed mice. The Chao 1 and Shannon indexes of the cecum microbiota were greater in soy-fed mice than in egg-fed mice, and the indexes of casein-fed mice were their intermediates. The abundances of several bacterial families were affected by dietary protein sources; however, feeding A1, A2, and standard caseins did not differentiate the cecum microbiota. The results indicated that, rather than the effect of A1 casein, A2 casein, and standard casein, the differences between casein, soy, and egg proteins might be distinctive regarding gut microbiota modulation.

Keywords: A1 milk; A2 milk; gut microbiota; mice

EFFECTS OF *Lactobacillus acidophilus* L-55 (LaL-55) STRAIN ON THE CLINICAL SIGNS OF *Eimeria tenella* IN LAYING HENS

Chiumya Kondwani^{1*}, Pham H. S. Hung² and Toshimitsu Hatabu¹

¹Department of Animal Science, Okayama University, Okayama, Japan

²Department of Veterinary Medicine, Hue University of Agriculture and forestry, Hue City, Vietnam

*Email: kochiumya@gmail.com

Abstract

The aim of this study was to evaluate the effects of *Lactobacillus acidophilus* L-55 (LaL-55) against clinical signs of *Eimeria tenella* in chicks. Chickens (White Leghorn: n=18) were randomly assigned to one of four groups: two control groups (with or without LaL-55), and two *E. tenella* infected groups (w/o LaL-55). Chicks in the LaL-55 infected group were administered orally with LaL-55 powder at 0.75 mg/100 g body weight at 7 days old until the end of the experiment. Chickens in *E. tenella*-infected groups w/o LaL-55 were inoculated with sporulated *E. tenella* oocytes (1×10^3 oocytes/chick/ml) at 14 days old. Data included observation of clinical signs and counting of oocysts from 4 to 15 days post-infection (DPI). On 5DPI, 3 chicks were euthanised in each group, and caeca were harvested for histological analysis. Compared to chicks with LaL-55, *E. tenella*-infected chicks without LaL-55 had severe diarrhoea. The number of oocytes in the LaL-55 group was lower than in the infected control group. The cumulative means on the 7DPI for the infected groups with and without LL-55 were 54500 ± 8461 and 420000 ± 31177 , respectively, showing a statistically significant difference in the data between the groups ($p < 0.001$). In both infected groups w/o LaL-55, histological score in the cecum was 3.67 ± 0.17 and 3.11 ± 0.26 , respectively. Burden scores were not significantly different in infected chicks with and without LaL-55, 3.60 ± 0.18 , and 2.90 ± 0.11 , respectively. These results indicate that LaL-55 alleviates clinical signs and improves gut health in laying hens infected with *E. tenella*.

Keywords: *Eimeria tenella*; oocytes; histopathological score; LaL-55; laying hens; oocytes

POSTER



SESSION 1

Adapting Agricultural Production to Climate Change



INHIBITION ACTIVITY OF CULTIVATED *Ophiocordyceps sphecocephala* ON CANCER CELL GROWTH *in vitro*

Doan T. P. Thuy*, Tran T. T. Huong and Nguyen T. Mai

Department of Biology, Faculty of Science, Nong Lam University, Ho Chi Minh City, Vietnam.

**Email: thuydoan@hcmuaf.edu.vn*

Abstract

Ophiocordyceps, a genus of fungi with valuable medicinal properties, is mostly found in areas 1500 m above sea level. Due to global warming, Ophiocordyceps is considered a genus at risk. In our ongoing research, *O. sphecocephala* in Bidoup Nui Ba National Park, Lam Dong province, Vietnam was collected and cultivated *in vitro*. The ethanol extract of our cultivated *O. sphecocephala* showed significant inhibition activity against several cell lines such as NCI H460 (lung cancer cells), Hepa G2 (liver cancer cells), HeLa (cervical cancer cells), Jurkat (leukemia cells) and MCF7 (breast cancer cells). The greatest inhibition activity was recorded on MCF7 and Jurkat cell lines. Further experiments are in progress in order to improve the cultivation conditions as well as the extraction methods for *O. sphecocephala*.

Keywords: Cancer cells; cultivation; inhibition; *Ophiocordyceps*; *O. sphecocephala*

EFFECT OF BIOCHAR MICROPARTICLES DERIVED FROM AGRICULTURAL RESIDUES ON METHYLENE BLUE ADSORPTION IN AQUEOUS SOLUTION

Nguyen C. Manh^{1,3*}, Nguyen M. Ky², Nguyen T. Q. Hung² and Yasushi Mori³

¹*Research Institute of Biotechnology and Environment, Nong Lam University,
Ho Chi Minh City, Vietnam*

²*Faculty of Environment and Natural Resources, Nong Lam University
Ho Chi Minh City, Vietnam*

³*Graduate School of Environmental and Life Science, Okayama University, Okayama, Japan*

*Email: congmanh@hcmuaf.edu.vn

Abstract

Different particle sizes of biochar derived from agricultural residues collected from the Mekong Delta (Vietnam), including rice straw (BC-RT) and compressed rice straw (BC-CRT) under various pyrolysis conditions in a pilot-scale reactor. The particle sizes were prepared through several ASTM sieves, i.e., dry grinding and sieving distribution. A scanning electron microscope (SEM) was used to characterize the biochar particles further. Methylene blue removal investigated the adsorption capacity for each biochar particle size as an adsorbent compared to commercially activated carbon. Experimental findings illustrated that dye adsorption (methylene blue) increased with both the initial concentration of the adsorbent and biochar dosage. Biochar microparticles prepared from different sources improved adsorption capacity (3.8 ± 0.5 to 6.8 ± 1.1 mg g⁻¹) greater than raw biochar and commercially activated carbon. Additionally, the adsorption capacity depends on the materials and thermo-chemical conversion of biochar. The maximum adsorption capacity was 21.2 mg g⁻¹ for BC-CRT particles size 212 µm for a pollutant concentration of 100 mg L⁻¹ and higher than activated carbon. Thus, biochar in particle size distribution produced at 350 - 500°C indicated the effective potential in removing dye pollutants and promising application in textile wastewater treatment.

Keywords: Biochar; rice straw; particle size; adsorption; wastewater; dyes

IRRIGATION WATER USE EFFICIENCY OF WET RICE CULTIVATION UNDER CLIMATE CHANGE IN PHU THIEN DISTRICT, GIA LAI PROVINCE

Tran N. L. Khuong* and Nguyen D. Liem

*Faculty of Environment and Resources, Gia Lai Sub-campus of Nong Lam University,
Ho Chi Minh City, Vietnam*

**Email: tnlkhuong@hcmuaf.edu.vn*

Abstract

Restructuring crops in drought-prone and inefficient rice fields is a solution to improve agricultural land-use efficiency and adapt to climate change. This study aimed to evaluate irrigation water use efficiency (IWUE) for wet rice cultivation in different conditions of climate, soil type, and crop season in Phu Thien district, the rice bowl of Gia Lai province. First, we used the CropWat model to estimate irrigation water requirements for Winter and Spring rice crops grown on three soil types of sandy clay loams, sandy loams, and clay in the baseline from 1986 to 2015, and three high greenhouse gas emission scenarios of normal, wet, and dry year by 2045 – 2065. The crop coefficient of wet rice in CropWat was calibrated based on the Vietnamese national standard TCVN 8641-2011 for irrigation water. Next, the CropWat outputs including reference evapotranspiration and crop irrigation schedule were imported into the AquaCrop model to calculate rice yields under different climate, soil type, and crop season scenarios. The validation of AquaCrop was performed against observed rice productivity data in 2005 according to the statistical yearbook of Gia Lai province. Finally, IWUE was estimated as the ratio between rice yield simulated from AquaCrop and the amount of irrigation water simulated from CropWat. The results showed that IWUE for wet rice decreased due to climate change. Although rice cultivation in the Spring crop or on sand clay loams soils is projected to maximize irrigation water productivity, it is most vulnerable to temperature increases and changes in rainfall. Meanwhile, rice production in the Winter crop or on sandy loams soils is the most climate tolerant.

Keywords: AquaCrop; CropWat; irrigation water use efficiency; Representative concentration pathways (RCPs); wet rice

THE LIVELIHOOD VULNERABILITY AND ADAPTIVE CAPACITY OF SHRIMP FARMERS TO CLIMATE CHANGE: A CASE STUDY IN TRA VINH PROVINCE, VIETNAM

Nguyen T. Dat*, Diep T. Tung, Nguyen T. Hung, Lam T. M. Lan and Phan X. Hue

School of Economics and Law, Tra Vinh University, Tra Vinh Province, Vietnam

**Email: nguyentandat@tvu.edu.vn*

Abstract

This study measured the vulnerability and current adaptive capacity of shrimp farmers to climate change in two districts (Duyen Hai – DH and Cau Ngang – CN) of Tra Vinh province, Vietnam. The analysis is based on the Intergovernmental Panel on Climate Change's (IPCC) vulnerability assessment framework, through three contributing factors (exposure, sensitivity, and adaptive capacity). A total of 45 indicators were proposed for those dimensions under the five forms of livelihood capital (human, physical, natural, social and financial capital), which comply with the Sustainable Livelihood Framework developed by Chambers and Conway. Three methods of assessing the climate change vulnerability index were employed to compare the livelihood vulnerability index of shrimp farmers in two regions (Climate Vulnerability Index, Livelihood Effect Index, and Livelihood Vulnerability index under the IPCC). A total of 300 households were interviewed in 10 randomly selected villages distributed equally over two districts. The results indicate that the three ways of measuring the livelihood vulnerability index are consistent with each other. Additionally, the analysis reveals that the inland district Cau Ngang was more vulnerable to climate change than the coastal districts Duyen Hai, mainly due to natural capital and social capital.

Keywords: Adaptive capacity; climate change; livelihood vulnerability; shrimp farming; sustainability

THE DISTRIBUTION AND PRESENCE OF ARBUSCULAR MYCORRHIZAL FUNGI (AMF) IN THE ROOTS AND SOILS RHIZOSPHERE OF CUCURBITACEAE PLANTS GROWN IN HO CHI MINH CITY, VIETNAM

Dao U. T. Da¹, Nguyen T. K. Tien², Tran T. Nghia¹, Le H. Phuc³
and Truong P. T. Hoang¹

¹*Research Institute for Biotechnology and Environment, Nong Lam University,
Ho Chi Minh City, Vietnam*

²*Faculty of Biological Science, Nong Lam University, Ho Chi Minh City, Vietnam*

³*Bio Nong Lam Limited Company, Vietnam*

*Email: daouyentranda@gmail.com

Abstract

The study assesses the presence of arbuscular mycorrhizal fungi (AMF) in roots and soils rhizosphere of Cucurbitaceae plants (loofah, gourd, winter melon, cucumber, bitter melon) grown in Hoc Mon, Cu Chi, and Binh Chanh districts, Ho Chi Minh City. The results determined the presence of AMF in 37 soil and 19 root samples. The spore density of arbuscular mycorrhiza in the root and soil rhizosphere was, on average, 63.6 spores/50g for soils, while the root symbiotic ratio was 5.1%. The morphological identification of AMF determined spores of five genus (*Glomus*, *Acaulospora*, *Gigaspora*, *Scutellospora*, *Sclerocystis*) showing a morphological variety of AMF spores in Cucurbitaceae plants' soil rhizosphere. However, based on the infection structures of AMF, this study only managed to determine the symbiotic in the roots with three genus: *Glomus*, *Acaulospora*, and *Gigaspora*. In the trial of re-infection of AMF in three plants (bitter melon, winter melon, cucumber) in the net house, the result of spore density and root ratio had the highest to the lowest value of cucumber, bitter melon, and winter melon at the 14, 21 and 28-day mark after infection. The identification result of AMF has recorded the presence of five genus (*Glomus*, *Acaulospora*, *Gigaspora*, *Scutellospora*, and *Sclerocystis*) in the soil rhizosphere, as well as the symbiosis in the roots of three genus: *Glomus*, *Acaulospora*, and *Gigaspora*.

Keywords: Cucurbitaceae; Arbuscular Mycorrhiza Fungi

APPLYING CONVOLUTION NEURAL NETWORK FOR LEAF IMAGES RECOGNITION WITH VIETNAMESE LEAF IMAGE DATABASE

Phan D. Long^{1*} and Tran T. Son²

¹ *Nong Lam University, Ho Chi Minh City, Vietnam*

² *University of Natural Science, Ho Chi Minh City, Vietnam*

**Email: phandinhlng@hcmuaf.edu.vn*

Abstract

Convolutional Neural Networks (CNNs) are widely reputed to be effective and efficient means for solving computer vision tasks such as image recognition, image classification, and object recognition. To date, there exist several CNN-based models, such as AlexNet - 2012, ZFNet - 2013, Google LeNet - 2014 and ResNet – 2015, that have been widely applied to solve classification problems with high performance. In this paper, we propose a model by combining AlexNet and ZFNet models to image classification tasks with our collected dataset including 6900 leaf images of 12 common plants found in Vietnam. Experimental results showed that the proposed method outperforms other competitive models (AlexNet and ZFNet) in terms of accuracy and F1 measures. Additionally, the proposed method significantly reduced the execution time in comparison to AlexNet and ZFNet.

Keywords: Vietnamese leaf Database; Convolutional Neural Networks; computer vision; convolutional neural networks; leaf image recognition

ISOLATION, IDENTIFICATION OF *Lactobacillus plantarum* BACTERIA AND GROWTH INHIBITORY POTENTIAL OF *Escherichia coli*, *Salmonella* spp.

To D. Q. Thong* and Vo T. T. Hue

Faculty of Biological Science, Nong Lam University

*Email: quocthong171070@gmail.com

Abstract

The purpose of this study is to investigate the effect of culture conditions on the biomass multiplication of *Lactobacillus plantarum* strain and recover crude bacteriocin products, as a basis for application in production, biological preservation in the food and pharmaceutical industries. 12 strains of suspected bacteria *Lactobacillus* sp. isolated from the milk of nursing mother. Morphological observation and physiological - biochemical tests finally selected 3 strains of *Lactobacillus* sp. by biochemical reactions according to Bergey's classification. Bacterial species identification by molecular biology by Sanger method, high - intensity rRNA16S sequencing using two primers B27F (5'-AGGTTTGATCCTGGCTCAGG-3') and U1492R (5'-GGTTACCTTGTTACGTT-3') recorded 3 strains of *Lactobacillus plantarum* with similar properties of lines SM1,2, SM1,7 and SM2,4 respectively, 100% and 99.79%. Suitable conditions for the growth of *Lactobacillus plantarum*: loading rate 4%, pH = 7, 33°C, MRS medium, 24 hours after inoculation, the highest bacterial biomass was obtained. Under the same culture conditions, after 48h, crude bacteriocin was obtained and was able to inhibit the growth of *E. coli* and *Salmonella typhi* with 5.33 – 14.67 mm of inhibition zone diameter.

Keywords: Bacteriocin; *Lactobacillus plantarum*; biomass; inhibition zone

SELECTIVE ISOLATION AND SCREENING OF *Streptomyces* sp. STRAIN OF PRODUCING CELLULOSE DEGRADING ENZYMES

Nguyen T. Lan^{1*}, Truong P. T. Hoang² and Le P. Tho³

¹*Faculty of Biological Science, Nong Lam University*

²*Research Institute for Biotechnology and Environment, Nong Lam University*

³*Bio Nong Lam Company Limited.*

*Email: 18126077@st.hcmuaf.edu.vn

Abstract

The study was conducted with the aim of isolating *Streptomyces* sp. and investigated the influence of some factors on cellulase production ability on semi-solid media such as substrate, substrate ratio, suitable pH to recover the most cellulase enzyme by determining cellulase enzyme activity of actinomycete strains. *Streptomyces* sp. isolated from soil by the Miller method. To isolate *Streptomyces* sp. capable of degrading cellulose, 10 soil samples were collected from industrial cropland in Lam Dong Province. The ability to produce cellulase enzymes of actinomycetes was determined by the presence of a halo ring on medium with a source of CMC substrate around the actinomycete colony. The method for determining cellulase enzyme activity was based on the coloration reaction between reducing sugars and DNS reagents. The results isolated 16 actinomycetes capable of degrading cellulose. Out of 16 isolates of actinomycetes, 5 strains have strong resolving power on ISP4 medium with CMC substrate source. Strain D3.2 gave the largest resolution ring with a diameter of 19.9 mm after 5 days of culture. Cellulase enzyme activity of strain D3.2 was obtained the highest after 7 days of incubation with solid medium containing 30% bagasse and 70% rice bran with pH = 7 reaching 1684.3 UI/g. The results of identification by molecular biology with Sanger method for full-length rRNA16S sequencing identified actinomycete strain D3.2 belonging to species *Streptomyces coelicolor* with 100% similarity.

Keywords: *Streptomyces* sp.; CMC; isolate; cellulase; *Streptomyces coelicolor*

DETECTION AND MANAGEMENT OF LEAF SPOT DISEASE CAUSED BY *Paraconiothyrium variable* ON *Vanda* sp. TROPICAL ORCHIDS IN INDIA

Suman Dutta¹, Amitava Basu^{1*} and Tushnima Chaudhuri²

¹Department of Plant Pathology, Faculty of Agriculture

²Bidhan Chandra Krishi Viswa Vidyalyaya, Nadia, West Bengal, India

*Email: mtvbasu@rediffmail.com

Abstract

Vanda orchids have been gaining in popularity among customers. A new type of leaf spot disease affecting *Vanda* sp. orchids, with typical symptoms of dark brown/black spots surrounded by thin yellow rings, was first reported in a plant nursery of Nadia, West Bengal, India (23°16'98''N, 88°51'60''E). The cultural characteristics were tested at different temperatures, as well as in various media, pH levels, nitrogen and carbon sources. The Potato Dextrose Agar medium proved to be the most effective for mycelia growth of the pathogen. The highest mycelia growth was achieved at 25°C and pH 9. Dextrose and Potassium Nitrate were found to be the best sources of carbon and nitrogen nutrition for the pathogen. The sporulation occurred at 40DAI on PDA medium. The colour of the pycnidia ranged from dark brown to black, measuring around $232.35 \pm 8.74\mu\text{m} \times 175.92 \pm 18.58\mu\text{m}$. Conidia were short-cylindrical or ellipsoidal, straight or slightly curved, rounded at both the ends, one celled and with thin and smooth walls that are hyaline with dimensions of $2.97\text{--}4.11\mu\text{m} \times 0.93\text{--}2.06\mu\text{m}$. Under *in vitro* testing, the lowest ED₅₀ value of 34.11µg/ml was recorded due to Azoxystrobin 23%SC. The *Allium sativum* bulb extract@ 15% conc. became more effective in inhibiting the growth (58.75%) of the test pathogen. The *T. viride* inhibited maximum mycelia growth up to 86.11 %. Molecular identification of *Paraconiothyrium variable* was confirmed by PCR amplification and sequencing of the internal transcribed spacer (ITS) regions of the ribosomal DNA by using primers ITS1 and ITS4. The partial nucleotide sequences of the M-A.BASU isolate and the AB isolate infecting Vanda Orchids were deposited in the GenBank and assigned with accession number of ON076866 (885bp) and ON204526 (885bp). Blast analysis of the sequences of ITS region depicted 100% nucleotide sequence identity (NSI) with the *Paraconiothyrium variable* strain KF027 (Accession number: KM096133) reported in Italy.

Keywords: Leaf spot; orchid; *Paraconiothyrium variable*, *vanda* sp.

MANAGEMENT OF LEAF SPOT DISEASE CAUSING PATHOGENS ON SOLANACEOUS CROPS: THE USE OF BIO-CONTROL AGENTS TO FACILITATE SUSTAINABLE AGRICULTURE IN INDIA

Tushnima Chaudhuri¹, Amitava Basu^{1*} and Suman Dutta²

¹Department of Plant Pathology, Faculty of Agriculture

²Bidhan Chandra Krishi Viswa Vidyalaya, Nadia, West Bengal, India

^{2*}Email: mtvbasu@rediffmail.com

Abstract

Vegetable production is the most economically important crop in West Bengal, India, where potato ranks second and tomato ranks sixth in terms of production. Due to the indiscriminate application of fungicides, it poses a threat to the ecosystem. Hence, to achieve sustainable food production without affecting human beings and non-target organisms, incorporating biological control methods in plant disease management programs is necessary. In recent times, four newly reported pathogens of solanaceous vegetables (*viz. Phoma exigua* and *Curvularia spicifera* from potatoes, as well as *Alternaria alternata* and *Corynespora cassiicola* from tomatoes) have been creating severe damage to farmers' fields. Consequently, the management of the above-mentioned pathogens has been thoroughly investigated in the present study. Biological control can be described as an intentional use of living organisms, to curb the growth and development of one or more plant pathogens by using another organism, *i.e.*, the bio-control agents (BCAs). *Trichoderma* spp, *Pseudomonas fluorescens* and *Bacillus subtilis* are the most promising BCAs. These BCAs have important modes of action like mycoparasitism, antibiosis and competition for food. *In-vitro* studies reveal that *Trichoderma harzianum* was most effective against *Phoma exigua* (74.44%), *Curvularia spicifera* (76.66%), *Alternaria alternata* (72.22%), and *T. viride* against *C. cassiicola* (76.66%). Seed treatment with recommended talc-based formulation of the BCAs were used under net house conditions. Under net house conditions, the PDI was lowest due to use of *T. harzianum* (19.78%) against *Phoma exigua* in potatoes and 15.78% against *Alternaria alternata* in tomatoes.

Keywords: *Bacillus*; potato; *Pseudomonas*; tomato; *Trichoderma*

SESSION 2

Ecological Health and Climate Change



OBSERVATIONS OF THE HOST HABITAT OF *Ophiocordyceps nutans* IN THE BIDOUP NUI BA NATIONAL PARK, LAM DONG PROVINCE, VIETNAM

Nguyen T. Mai^{1*}, Doan T. P. Thuy¹ and Nguyen V. Hong²

¹*Department of Biology, Faculty of Science, Nong Lam University,
Ho Chi Minh City, Vietnam.*

²*Institute of Geography, Vietnam Academy of Science and Technology,
Hanoi, Vietnam*

*Email: ngtpmai@hcmuaf.edu.vn

Abstract

Cordyceps are endoparasitic fungi that infect insects and other types of arthropods throughout the world. During forays of entomogenous fungi in Bidoup Nui Ba National Park, specimens morphologically similar to *O. nutans* were collected from the Lat and Dung Kno communes of Lac Duong district, Lam Dong province, Vietnam. Regular observations between 2020 and 2022 in forest locations of different altitudinal ranges revealed the occurrence of *O. nutans* only in two high altitude forests ranging from 1.250 to 1.800 m.a.s.l. with temperature fluctuations between 20 and 25,7°C. Morphological comparisons, as well as molecular phylogenetic analyses using ITS, indicate that the neotropical specimen found is *Ophiocordyceps nutans* (Pat.). The teleomorphic entomophagous fungus *Ophiocordyceps nutans* is an entomogenous fungus growing on true bugs, associated with four species of sap-sucking pentatomid stinkbugs of the Hemiptera order (*Halyomorpha halys*, *Acanthosoma labiduroides*, *Clavigralla scutellaris*, and *Proxys punctulatus*). This fungus was constantly associated with the types of stinkbugs in question infecting the bark of one of the commonly found tree species: *Cassine glauca*. The bark of *Cassine glauca* consists of an endophytic fungus, *Hymenostilbe nutans* (anamorphic state of *O. nutans*). Findings indicate that the phytophagous Hemiptera ingesting *H. nutans* would in turn become a host for its teleomorphic state of *O. nutans*, thus leading to the completion of its life cycle. As a result, given its ability to parasitize up to four species of stinkbugs that pose a hazard to agriculture and silviculture, *O. nutans* can act as a possible biocontrol agent.

Keywords: Cordyceps; ITS; species; Hemiptera; Cassine; bugs

LONG-TERM INVESTIGATION ON HYDROLOGICAL EXTREME VALUE DISTRIBUTIONS IN CA MAU AND AN GIANG PROVINCES, VIETNAM

Dang K. Cuong¹ and Nguyen K. Loi²

¹ Faculty of Information Technology, Nong Lam University, Ho Chi Minh City, Vietnam

² Research Center for Climate Change, Nong Lam University, Ho Chi Minh City, Vietnam

¹Email: dkcuong@hcmuaf.edu.vn

²Email: ngkloi@hcmuaf.edu.vn

Abstract

In the Mekong Delta of Vietnam, climate change poses serious risks to water-related sustainability and safety. In addition to being one of Vietnam's most significant agricultural production hubs, the area is home to about 20 million people. Investigating and evaluating the hydrological situation in this situation becomes urgent. In this study, we evaluated the unique extreme value distributions of rainfall, flow, and salinity crest using long-term meteorological and hydrological data collected in the provinces of An Giang and Ca Mau from 1976 to 2017. Additionally, the properties of extreme value distribution are examined in this work. Results show that there has been continuity between the theoretical model and the empirical data across time. Further research revealed an increase in the volume and frequency of exceptionally high-flow occurrences. Increased flows can aid in preventing salinization in the downstream Mekong Delta and minimizing water shortages during the dry season. However, higher and more frequent peak discharges will exacerbate flood risks in the basin.

Keywords: Long-term hydrological, Extreme value distribution; Newton – Raphson method; maximum likelihood estimation; Gumbel distribution

ISOLATION AND IDENTIFICATION OF AMMONIA TRANSFORMING BACTERIA FROM THE BOTTOM SLUDGE OF LOBSTER FARMING AREA, PHU YEN PROVINCE

Truong P. T. Hoang* and Nguyen P. Hoa

Nong Lam University, Ho Chi Minh City, Vietnam

**Email: hoangtp@hcmuaf.edu.vn*

Abstract

The cage culture of lobsters in Xuan Dai Bay, Phu Yen province, Vietnam, has created a large amount of waste at the bottom of the bay. Sludge waste can potentially cause significant pollution in the farming area. Therefore, the objective of the study was to isolate and identify bacteria capable of transforming ammonia from the bottom sludge of the lobster farming area. Ammonia transforming bacterial strains were isolated and identified from 132 bottom sludge samples. Ten colonies with different morphologies and colors were selected, all capable of transforming ammonia the fastest (after 10 days of incubation). Based on biochemical reactions by API 20NE kit, API 20E and 16S-rRNA region sequencing method, three bacterial strains (*Sphingobacterium multivorum* KL26, *Providencia stuartii* KL30, and *Alcaligenes faecalis* KL33) were able to transform ammonia with the highest efficiency (> 90%) after only four days of incubation. After 7 days of incubation, the *Pseudomonas stutzeri* KL15 and *Micrococcus luteus* KL35 strains transformed ammonia with an efficiency of >80%. In addition, these strains can grow on media containing up to 6% NaCl.

Keywords: Ammonia; bacteria; lobster farming; sludge

RAIN WATER HARVESTING TECHNOLOGY: DRINKING WATER FULFILLMENT AND WATER CONSERVATION NEARBY LANDFILL AREA

Afik Hardanto*, Ardiansyah and Asna Mustofa

Laboratory of Bio-Environment Control and Management Engineering, Faculty of Agriculture, Jenderal Soedirman University

**Email: afik.hardanto@unsoed.ac.id*

Abstract

Minimum waste treatment in the Landfill may decrease water quality. The research aims to ascertain groundwater quality nearby Kaliori Landfill (Banyumas Regency, Central Java), rainwater potential for drinking water purposes, and decreasing runoff due to rainwater harvesting technology implementation. Groundwater samples were collected from eight wells around Kaliori Landfill. Rainwater samples were collected from rainwater harvesting technology that was already installed. Water quality is defined by total coliform, pH, TDS, temperature, smell, and limpidity. Infiltration and capacity rate, daily rainfall, and rainwater catchment area were measured for hydrological aspects. Total coliform of well water is higher (i.e. from 13 cells/100 ml until >1,600 cells/100 ml) than rainwater (i.e. 12 ± 2.6 cells/100 ml), furthermore, it correlates with the horizontal and vertical distance. Based on acidity and TDS values, well water is higher (pH 6.5-8.5; TDS 188.8 ± 128.7 ppm, respectively) than rainwater (pH 6.1 ± 0.2 TDS 8.4 ± 1.4 ppm, respectively). The temperature, smell, and limpidity parameters of rainwater are more proper for drinking water than well water. Rainwater harvesting technology is able to reduce runoff by 58.42% with the rainwater catchment area around 7,094.5 m² and daily rainfall of 25 mm/day. Waste management in Landfills should concern with groundwater pollution. Rainwater harvesting technology potential solution for drinking water supply in water crisis areas with high rainfall.

Keywords: Rainwater harvesting; water quality; water conservation; clean water crisis; landfill

SESSION 3

Trends and Advances in Food Science and Post-Harvest Technology



CURCUMIN-BASED PYRAZOLE AND ISOXAZOLE ANALOGUES WITH GREATER ANTICANCER POTENCIES AGAINST KB CANCER CELL LINE COMPARED TO FREE 1,3-DICARBONYL CURCUMINOIDS

Pham T. B. Van* and Nguyen V. Hien

Department of Chemistry, Nong Lam University, Ho Chi Minh City, Vietnam

**Email: vanpham@hcmuaf.edu.vn*

Abstract

As part of our ongoing research on exploring anticancer inhibitory curcumin-based agents, we now report the cytotoxicity of isoxazole/pyrazole curcuminoids bearing various substituents in aromatic moieties. Fourteen isoxazole/pyrazole curcuminoids (**O1-7** and **P1-7**) were evaluated for their *in vitro* anticancer activities against human oral epidermal carcinoma-KB cell line in comparison with their parent structure, i.e., free 1,3-dicarbonyl curcuminoids. Structures of **O1** ($IC_{50} = 13.85 \pm 1.17 \mu M$) and **P1** ($IC_{50} = 3.40 \pm 0.22 \mu M$) displayed good cytotoxicity profiles compared with curcumin ($IC_{50} = 33.35 \pm 2.66 \mu M$), and were thus identified as potential hit scaffolds for further studies.

Keywords: Anticancer; curcumin; isoxazole/pyrazole curcuminoids

EFFECTS OF DRYING METHODS AND DRYING TEMPERATURE ON PRODUCT QUALITY OF *Phyllanthus amarus*

Nguyen T. Phong, Nguyen D. Khuyen and Le A. Duc*

*Faculty of Engineering and Technology, Nong Lam University,
Ho Chi Minh City, Vietnam*

**Email: leanhduc@hcmuaf.edu.vn*

Abstract

Phyllanthus amarus is a precious medicine which has been widely used in traditional oriental medicine as a cure to treat liver diseases, diabetes, and kidney stones. This study evaluates the effects of different drying techniques at different temperatures on product quality as antioxidant capacity (IC₅₀) and color change of *Phyllanthus amarus*. The *Phyllanthus amarus* was dehydrated by outdoor sun drying and three indoor drying techniques which consisted of hot air drying, heat pump drying, and vacuum drying at temperatures of 35, 40, 45, and 50°C until reaching the moisture content of $11 \pm 0.5\%$. It is shown that the drying methods and drying temperatures remarkably affected the drying time, color change, and antioxidant capacity of *Phyllanthus amarus*. Among the four drying methods used, vacuum drying at 40°C resulted in better product quality by retaining natural color and antioxidant capacity (IC₅₀) with the shortest drying time (3.5 hours).

Keywords: Antioxidant capacity; heat pump drying; hot air drying; *Phyllanthus amarus*; vacuum drying

STABILITY OF SPRAY-DRIED CONCENTRATE LIME JUICE POWDER STORED AT DIFFERENT TEMPERATURES

Huynh T. Dat^{1*}, Kha C. Tuyen¹, Nguyen V. Ay², Nguyen T. Dung³
and Nguyen T. T. Trang¹

¹*Faculty of Chemical Engineering and Food Technology, Nong Lam University,
Ho Chi Minh City, Vietnam*

²*Faculty of Agriculture, Can Tho University, Can Tho, Vietnam*

³*Faculty of Chemical Engineering and Food Technology,
Ho Chi Minh City University of Technology and Education, Vietnam*

*Email: dat.huynhtien@hcmuaf.edu.vn

Abstract

Spray-dried powder from lime juice concentrate provides high nutritional values, but its stability during storage has not been documented yet. The present study aimed to evaluate the physicochemical and microbial stability of spray-dried lime powder stored in aluminum bags at different temperatures (5, 30, and 40°C) for 12 weeks. The changes in ascorbic and citric acids were measured by using high-performance liquid chromatography (HPLC) whereas the total phenolic content (TPC) was analyzed using the Folin-Ciocalteu method. Yeast and mold were counted using 3M™ Petrifilm™ Plate. During 12-week storage, water activity of spray-dried lime powders was not significantly different at all tested temperatures ($a_w \sim 0.25$). A small reduction in citric acid (16%) was found at the storage temperature of 40°C. The TPC of lime powders was slightly reduced when the lime powder was stored at 5°C, but the content remarkably decreased (66%) (from 109 to 54 mgGAE/100 g) found at the 40°C counterpart. Total ascorbic acid significantly ($p < 0.01$) reduced during the storage, found in all temperatures. The highest reduction (79.5%) in ascorbic acid was found at 40°C. Based on the Arrhenius model (using storage temperatures of 30 and 40°C), the Q_{10} and activation energy of ascorbic acid were calculated as 1.26 and 4385 cal/mol. During storage at all temperatures, mold and yeast were not detected. In conclusion, spray-dried concentrate lime powder is stable regarding microbial aspects during storage. To preserve vitamin C and TPC, the lime powder should be stored at a cool temperature.

Keywords: Lime juice concentrate; powder; Q10 storage; temperature

SPRAY DRYING CONDITIONS OF LIME JUICE PREPARED BY FREEZE CONCENTRATION

Huynh T. Dat^{1*}, Kha C. Tuyen¹, Nguyen V. Ay², Nguyen T. Dung³, Ha T. M. Linh¹
and Ngo H. Huy¹

¹*Faculty of Chemical Engineering and Food Technology, Nong Lam University,
Ho Chi Minh City, Vietnam*

²*Faculty of Agriculture, Can Tho University, Can Tho, Vietnam*

³*Faculty of Chemical Engineering and Food Technology,
Ho Chi Minh City University of Technology and Education, Vietnam*

*Email: dat.huynhtien@hcmuaf.edu.vn

Abstract

Lime juice concentrate is rich in vitamin C and phenolic compounds, exerting a range of health benefits. Spray drying converts fruit juice into powder and offers convenience for industrial applications. The appropriate spray drying conditions for lime juice prepared by freeze concentration are rarely reported. Thus, this study aimed to investigate the effects of lime juice solids (27-43%, using maltodextrin DE 12 as a carrier), inlet temperature (130-170°C), and feed flow rate (20-40 mL/min) on drying yield, total ascorbic and phenolic contents (TPC) of the dried lime powder. The retention of total phenolic and vitamin C were significantly affected by the lime juice solid and were found to be highest in the feeding juice with a solid content of 33%. The inlet drying temperature influenced the yield, total ascorbic acid, and phenolic contents of the lime powders. The drying using an inlet temperature of 140°C resulted in the dried lime powder with the highest yield (93.2%) and an acceptable total ascorbic acid and phenolic contents (115 mg/100 g and 11 mg GAE/100 g, respectively). The most appropriate feed flow rate was 30 mL/min which resulted in lime powder with high yield, total ascorbic acid, and phenolic content. In conclusion, the high-quality spray-dried powder can be processed from a 33% solid of lime juice at the 140°C inlet temperature and 30 mL/min of feed flow rate. Under these conditions, the powder has a suitable moisture content (4.5%) and water activity (< 0.25) that would be stable for storage.

Keywords: Concentrate lime juice; spray drying; TPC; vitamin C; yield

**PROTEIN FRACTION OF HARD- AND SOFT-SHELL MUD CRABS OF
Scylla paramamosain (Estampador, 1949)**

Nguyen P. C. Tu^{1*}, Ho T. T. Thy¹, Nguyen N. Ha², Thai T. T. Thuy² and Ong M. Quy¹

¹*Faculty of Fisheries, Nong Lam University, Ho Chi Minh City, Vietnam*

²*Research Institute for Biotechnology and Environment, Nong Lam University,
Ho Chi Minh City, Vietnam*

**Email: npctu@hcmuaf.edu.vn*

Abstract

The difference in the protein fraction was investigated from the pre-molt hard shelled to newly - molted (soft shelled) mud crabs (*Scylla paramamosain*) of both sexes. The study evaluated the protein fraction from the body muscle (BM), the legs and claws muscle (CM), and the hepatopancreas (HP) of pre-molted, inter-molted, and post-molted shell crabs (MSC). Except for myofibrillar protein, the protein levels and fraction differed significantly in pre-, inter-, and post-MSC ($p < 0.05$). Protein level was higher in pre-molt (17.8%), followed by inter-molt (11.1%) and lowest in post-molt (7.75%). Each type of crabs showed a fairly consistent protein fraction: in the pre-MSC, 17-82% sarcoplasmic, 3-14% myofibrillar, 7-55% alkali soluble, and 5-13% stroma fraction. In the inter-MSC, in the above order, 34-88%, 2-24%, 2-34%, and 6-21%, respectively. Similarly, in the post-MSC, in the above sequence, 30-90%, 2-23%, 1-45%, and 5-16%, respectively. However, there were no significant variations between male and female crab tissues ($p > 0.05$) in terms of protein content and composition. Moreover, significant differences in protein contents and nitrogenous compositions were found among various tissues ($p < 0.05$). The levels of protein and non-protein nitrogenous compounds were observed to be higher in BM than those of CM, and HP. While, the content of sarcoplasmic protein was highest in the HP, followed by the BM and lowest in the CM. However, the tendency in concentrations of myofibrillar, alkali soluble, and stroma fraction among different tissues was CM > BM > HP.

Keywords: Inter-molt; mud crabs (*Scylla paramamosain*); post-molt; pre-molt; protein fraction

ENZYMATIC PREPARATION OF YELLOWFIN-TUNA HEAD FOR OLEAGINOUS YEAST CULTIVATION

Nguyen H. Ngan¹, Pham T. Lan², Huynh T. Linh² and Ta T. M. Ngoc^{3,4*}

¹*Faculty of Food Technology, Nha Trang University, Nha Trang, Vietnam*

²*Institute of Biotechnology and Environment, Nha Trang University, Nha Trang, Vietnam*

³*Department of Food Technology, Faculty of Chemical Engineering, Ho Chi Minh City University of Technology (HCMUT), Ho Chi Minh City, Vietnam*

⁴*Vietnam National University, Ho Chi Minh City, Vietnam*

*Email: ttmngoc@hcmut.edu.vn

Abstract

Tuna head hydrolysis gives tuna oil and stickwater which is often dried to produce fishmeal. The drying process may require a lot of energy and the lipid remaining in the liquid after centrifuge may decrease the powder quality (rancidity, decrease stability...). Meanwhile, this stickwater is very suitable to culture yeast cells. In this study, the conditions for tuna head hydrolyzation using two commercial proteases, Protamex and Alcalase, were investigated. The raw material was adjusted to pH 5.5-7.5 and the temperature of hydrolyzation was maintained at 50, 55, and 60°C. Hydrolysis efficiency was evaluated using nitrogen recovery (%) and lipid recovery (%). Results show that Protamex gave higher hydrolysis efficiency than Alcalase as the nitrogen recovery reached 72% and the lipid recovery reached 77%. Both enzymes worked at tuna head's natural pH. The suitable hydrolysis temperature was 50°C and 55°C for Protamex and Alcalase, respectively. Stickwater obtained with Protamex hydrolyzation showed a good ability for *Yarrowia lipolytica* cultivation as there was no lag phase observed for all investigated conditions. The biomass accumulation was 5.85 g/l after 72 hours incubation at 24°C.

Keywords: By-product valorization; fish hydrolysate; stickwater; *Yarrowia lipolytica*; yeast biomass; yellowfin-tuna head

EFFECTS OF PROCESS DRYING ON THE MICROENCAPSULATION OF LEMON ESSENTIAL OIL BY ION-GEL ALGINATE-CALCIUM-CHITOSAN METHOD

Dao N. Duy*

*Faculty of Chemical Engineering and Food Technology,
Nong Lam University, Ho Chi Minh City, Vietnam*

**Email: duydn@hcmuaf.edu.vn*

Abstract

The quality of lemon essential oil microencapsulated seeds was investigated with three different drying methods: tray drying, vacuum drying, and fluidized bed drying. The results showed that the alginate-calcium and calcium alginate-calcium microencapsulated seeds applied the fluidized bed drying method for the lowest drying time of 24 minutes and 27 minutes respectively, with the highest encapsulation efficiency after drying (EEAD) (75 - 85%) compared with tray drying (61 - 65%) and vacuum drying (70 - 75%). Regarding the effect of the drying method on storage time, the fluidized bed drying method gave the best results in terms of post-drying microencapsulation efficiency of 17% for the alginate-calcium system and 25% for the following alginate-chitosan-calcium system 4 weeks of storage.

Keywords: Encapsulation Efficiency After Drying (EEAD); fluidized bed drying; loading capacity; microencapsulation; tray drying; vacuum drying

OPTIMIZATION OF PROCESS CONDITIONS FOR JAM PRODUCTION FROM *Chrysalidocarpus lutescens* USING RESPONSE SURFACE METHODOLOGY

Le T. K. Loan^{1*}, Ta N. M. Duyen¹ and Ngo V. Tai²

¹*Faculty of Agriculture and Food Technology, Tien Giang Univerity,
Tien Giang Province, Vietnam*

²*School of Food Industry, King Mongkut's Institute of Technology Ladkrabang,
Bangkok, Thailand*

*Email: lethikimloan@tgu.edu.vn

Abstract

This research was done to find the best conditions for processing *Chrysalidocarpus lutescens* fruit into a jam that would be high quality, especially overall acceptability, and antioxidant compound. Response surface methodology (RSM) was used to optimize the various conditions (blanching time, content of added sugar, and mild heating time). The jam was optimized to produce a product with sufficient sensory acceptance and high quality using a uniform precision type Box-Behnken design with three variables in a three-level pattern with 18 runs (and six center points). Total polyphenol content, tannin content, and sensory evaluation of jam made under design conditions were conducted, and the findings were compared with those predicted by the RSM. Data obtained from RSM were subjected to the analysis of variance (ANOVA) using a second-order polynomial equation. Results showed that the model fit was significant ($p < 0.05$) for both sensory value and polyphenol content. There was also a satisfactory correlation between actual and predicted values. Depending on the best sensory score obtained, the highest polyphenol and tannin content, the optimum conditions were a blanching time of 10 min, total usage of sugar of 40%, and mild heating for 50 min.

Keywords: *Chrysalidocarpus lutescens*; jam; optimization; Response surface methodology

EFFECT OF PRE-TREATMENTS ON QUALITY AND STORAGE LIFE OF DRIED BANANA BY USING SOLAR DRYER DOME

Nguyen V. Phong¹, Tran H. X. Nu² and Phan T. L Khanh^{2*}

¹*Department of Biotechnology, Biochemistry, and Post-harvest Technology, SOFRI*

²*Faculty of Chemical Engineering and Food Technology, Nong Lam University,*

Ho Chi Minh City, Vietnam

**Email: lankhanh@hcmuaf.edu.vn*

Abstract

The present study was conducted to assess the effect of different pre-treatment methods on the quality of dried Cavendish banana. Peeled banana fruits were soaked in citric acid solution; citric acid, NaHCO₃, and/or honey at 55 ± 5°C; boiling sugar, citric acid, and/ or honey, then solar dried, and dried banana products characterized in terms of their moisture content, total soluble solids, titratable acidity, reducing sugars, total sugars, color changes, sensory qualities, and microbial properties. These examinations were undertaken to evaluate the suitability of pre-treatment methods for the preservation of solar dried banana as value-added foods and to minimize postharvest losses. Blanching pre-treatment methods in which banana fruits were soaked in a boiling solution including sugar, citric acid, and/ or honey before solar drying reduced the drying time by 96 hours compared to that of untreated bananas, and improved the color of final dried banana products in 45 days of storage. Pre-treatment methods by blanching before drying operation also maintained the moisture content of dried banana samples at 25.43% and prevented the growth of microorganisms in stored banana products. Moreover, due to the economic issues and sensory liking in terms of color, texture and taste, conclusively, pre-treatment with blanching methods was considered to be the optimal treatment prior to solar drying.

Keywords: Blanching; Cavendish banana; pre-treatments; solar drying; quality

EFFECTS OF HEAT TREATMENT ON THE PHYSICOCHEMICAL PARAMETERS OF ACEROLA FRUIT (*Malpighia emarginata* DC.) JUICE OVER DIFFERENT MATURITY INDEXES

Duong T. N. Diep^{1*}, Pham N. Tram¹ and Hoang Q. Binh²

¹*Faculty of Chemical Engineering and Food Technology, Nong Lam University,
Ho Chi Minh City, Vietnam*

²*Institute of Applied Technology and Sustainable Development,
Nguyen Tat Thanh University, Ho Chi Minh City, Vietnam*

*Email: duongngocdiep@hcmuaf.edu.vn

Abstract

Acerola (*Malpighia emarginata* DC.) is a tropical fruit characterized by its high content of ascorbic acid and other micronutrients. Thermal processing is approached to increase the shelf existence of foods and beverages through inactivating microorganisms and enzymes. This research was to investigate the physicochemical behavior of acerola fruit juice under heat treatments. On behalf of ripenesses, the three stages of green, yellowish – red, and red acerola color were investigated. Under the heat treatment of 80°C for 20 minutes, the green fruits resulted in the juice with higher content of ascorbic acid (1960.67 ± 43.02 mg/100 g FW), titratable acidity ($0.33 \pm 0.03\%$), total soluble solid ($7.95 \pm 0.08^{\circ}\text{Brix}$) and pH (3.78 ± 0.01); however, the sample looked to be unsuitable for use as fruit juice since it revealed unattractive color, aroma, and taste. Meanwhile, the sample (yellow-red fruit stage) gave the juice with slightly lower contents of ascorbic acid (1434.40 ± 53.35 mg/100g FW), titratable acidity ($0.29 \pm 0.01\%$), total soluble solid ($8.15 \pm 0.06^{\circ}\text{Brix}$) and pH (3.81 ± 0.05); however, it revealed better sensorial characteristics, likely to be suitable for use as fruit juice.

Keywords: Acerola fruits; heat treatment; maturity index; physicochemical

RESEARCH ON OPTIMIZING THE DRYING PROCESS OF PYINKADO (*Xylia xylocarpa*) BY VACUUM INFRARED RADIATION DRYING METHOD

Bui T. T. Kim¹, Hoang T. T. Huong¹ and Le A. Duc^{2*}

¹Faculty of Forestry, Nong Lam University, Ho Chi Minh City, Vietnam

²Faculty of Engineering and Technology, Nong Lam University, Ho Chi Minh City, Vietnam

*Email: leanhduc@hcmuaf.edu.vn

Abstract

In this study, wood samples (*Xylia xylocarpa*) with dimensions of 50 x 50 x 500 mm were dried under an absolute pressure of 0.12 - 0.217 bar at a temperature from 45 to 59°C and infrared radiation intensity of 459 - 741 W/m² to assess their drying characteristics. The experiment planning method of Box & Hunter with a “black box math” model and statistical analyses by a non-linear regression analysis method to determine were used. The study determined two second-order polynomial regression equations describing the influence of the temperature and infrared radiation intensity on the drying time (Ti) and wood’s defect rate (De). Based on the directed grope algorithm and random algorithm method, the results of solving optimal problems gave optimal drying regime of *Xylia xylocarpa* as follows: optimal norms for drying process with $Ti_{min} = 64,29h$ and $De_{min} = 11.6\%$ at drying temperature of 58.7°C, infrared radiation intensity of 625.2 W/m² and moisture content of dried wood at 10 - 12% (w.b).

Keywords: Drying time; optimize; vacuum infrared drying; wood’s defect; *Xylia xylocarpa*



SESSION 4

Social Economics in Sustainable Agriculture



ANALYSIS OF THE FACTORS AFFECTING THE INTENTION OF ADOPTION OF THE NET HOUSE MODEL IN APPLE PRODUCTION IN NINH THUAN PROVINCE

Le Vu^{1*}, Tran D. Lap¹, Tran H. Nam¹, Le C. Tru¹, Quy M. Trung², Nguyen M. Ton¹,
 Nguyen V. Cuong¹, Pham T. A Ngoc³

¹*Faculty of Economics - Nong Lam University, Ho Chi Minh City;*

²*Office of Ninh Thuan Provincial People's Committee;*

³*International Institute - University of Economics and Finance*

**Email: levu@hcmuaf.edu.vn*

Abstract

The production of apples on the farms in Ninh Thuan province is one of the key production sectors of the province. But apple production is severely damaged by the fruit fly. Therefore, the net house model for apple production to prevent the gold fly has been deployed and has been piloted in a number of areas. In order to develop the net house model, the analysis of the factors that influence the intention to adopt a net house model is necessary. By combining models of TAM, TPB and perceived risk, with data collected from 141 apple growers in the province and through the use of the Partial Least Squares (PLS) technique with SmartPLS software 3.0 for analysis, the results showed that: apple grower attitudes had the greatest impact on intention to adopt net house, followed by perceived usefulness, perceived ease of use, compatibility, perceived behavior control and subjective norms

Keywords: Apple grower, farmer, net house, PLS-SEM, TAM, TBP model

THE FULFILLMENT OF WORKERS' SOCIAL SECURITY ON INCREASING PRODUCTION IN KALIGUA TEA PLANTATION

Siti Kunarti*, Sri Wahyu Handayani and Sri Hartini

Faculty of Law, Jenderal Soedirman University, Purwokerto, Indonesia

**Email: sri.handayani@unsoed.ac.id*

Abstract

The demand for workers' social security is the state's obligation as a form of government intervention in realizing general welfare. Social security is an urgent right for workers, as well as a means of protection in realizing harmonious industrial relations. Labor productivity is important for companies in increasing production at Kaligua tea plantation. Employers employ tea pickers as partners for the sustainability of their production and business. However, there are differences in the status of tea pickers between permanent workers, contract workers, and casual daily workers which affect performance and increase production. This difference in worker status results in differences in social security facilities obtained by workers. This study aims to determine the implementation of social security rights to increase production in Kaligua tea plantation. The research method used is normative empirical, with a statutory approach that is supported by field/empirical data based on law in action. The results of this study recommend things that need to be improved for the implementation of the rights of tea picker workers including social security for workers in accordance with the legislation, so that workers can carry out their obligations to work well and in the end there will be an increase in production and welfare of tea pickers and the company also increased.

Keywords: Social Security; workers; production

FACTORS AFFECTING SMALLHOLDER FARMERS' CHOICE OF MARKETING CHANNELS FOR AGRICULTURAL PRODUCTS: A LITERATURE REVIEW

Ha T. T. Hoa*, Nguyen B. Dang and Pham T. H. Nhung

Faculty of Economics, Nong Lam University, Ho Chi Minh City, Vietnam

**Email: hoaha@hcmuaf.edu.vn*

Abstract

This study reviews the factors affecting farmers' choice of marketing channels for agricultural products. The choice of farmers' marketing channels contributes to monitoring the quality of products, increasing farmers' income, and stabilizing agricultural production provided to the market. The review shows that factors affecting farmers' choice of marketing channels are classified into five main categories: (1) demographic factors, (2) farming factors, (3) transaction-specific factors, (4) relationship dynamics factors, and (5) behavioral factors. Depending on the types of agricultural products and the characteristics of households, farmers choose the marketing channels appropriate to their situations. Most studies reveal that agricultural marketing channels include direct marketing channels (farmers' markets, consumers) and indirect marketing channels (middlemen, wholesalers, local traders, cooperatives, processors, exporters, retailers, and food services). Transaction cost economics (TCE) theory has been commonly used in studies on farmers' choice of marketing channels.

Keywords: Agricultural product; choice; farmer; marketing channel; smallholder

ANALYZING THE QUALITY OF RELATIONSHIP BETWEEN MANUFACTURER AND DISTRIBUTORS: A CASE STUDY IN CHANH VIET TRADING AND INVESTMENT JOINT STOCK COMPANY

Nguyen T. A. Tien*, Tran D. Ly and Tran M. Quoc

Faculty of Economics, Nong Lam University, Ho Chi Minh City, Vietnam

**Email: nguyenthiaitien97@gmail.com*

Abstract

The relationship between the manufacturers and the distributors has existed for a long time in the economy. This study analyzes the quality of the relationship between manufacturers and distributors by surveying 152 distributors of Chanh Viet Trading and Investment Joint Stock Company – a Start-up business in the field of production and distribution of products from Vietnamese lemons. The confirmatory factor analysis (CFA) method and the SEM model with Amos Graphic software show that there are 5 factors affecting the quality of the relationship between the manufacturer and the distributors, including Personal interaction, commissions, product quality, delivery quality, and service quality. Personal interaction is the most important factor that positively influences the relationship quality between manufacturers and distributors. The study also claims that relationship quality positively impacts distributor's profit and relationship continuity intention between distributors and manufacturer. The study provides information to the manufacturer's boss based on the perception of distributors. Manufacturers can devise action strategies to maintain a good relationship with distributors and improve business efficiency.

Keywords: The quality of the relationship; manufacturers; distributors; distributor's profit

THE EFFECTIVENESS OF AGRICULTURE EXTENSION ACTIVITIES APPLYING CLIMATE-SMART AGRICULTURE IN AN GIANG PROVINCE

Huynh P. Long^{1*} and Phan H. Trang²

¹*Faculty of Economics, Nong Lam University, Ho Chi Minh City, Vietnam*

²*Faculty of Information and Communication Technology, Can Tho University, Can Tho City, Vietnam*

**Email: long.huynhphuong@hcmuaf.edu.vn*

Abstract

This research aims at investigating the level of participation in agricultural extension activities of farmers in An Giang province in order to determine the current situation and effectiveness of agriculture extension activities applying climate-smart agriculture (CSA) and factors affecting the efficiency of agricultural extension activities applying CSA in the area. The agriculture of An Giang province is heavily affected by climate change, as it is the watershed province of the Mekong Delta. To cope with these effects, An Giang province has implemented many solutions to overcome but have not been implemented optimally, thus causing negative impacts not only on production and farmers' lives but also affecting local economic growth and development. The results of exploratory factor analysis (EFA) show that farmers' participation in extension activities is affected by the qualifications and ability of extension staff, the agricultural extension program of the private sector brings more effective to farmers than public sector extension programs, because public sector extension programs have few sources of support, farmers' compliance in production processes is not high because it depends on long-standing farming practices that are passed on, which in turn affects the effectiveness of extension programs. This research shows that the application of climate-smart agriculture in extension activities is effective in ensuring food security by ensuring increased productivity and income for farmers from agriculture and response to climate change.

Keywords: An Giang province; agriculture extension activities; climate-smart agriculture; effectiveness

BENEFIT SHARING MECHANISM IN FOREST MANAGEMENT: A CASE STUDY ON FOREST DEPENDENT COMMUNITY IN CENTRAL VIETNAM

Bui V. Danh^{1*} and Le Q. Thong²

¹*Department of Business Administration, Saigon Technology University,
Ho Chi Minh City, Vietnam*

²*Department of Economics, Nong Lam University, Ho Chi Minh City, Vietnam*

**Email: danhvan.bui@gmail.com*

Abstract

How to obtain both goals of forest protection and livelihood development is a very challenging mission, especially to the forest dependent communities. A collaboration management approach has been studied and employed in recent years in Vietnam, one of the countries that is likely to be heavily affected by global climate change. The approach works successfully and effectively because it links forest-dependent communities and forest management enterprises under a benefit sharing mechanism, which promotes sharing of responsibilities and interests in management, protection and development of forest to find out effective solutions for forest management and livelihoods of local communities. The nature of benefit sharing mechanism is to allow accessibility of forest resources to forest dependent communities as well as improve motivation and their responsibility in the conservation of forests.

The study site is Dakrong District, Quang Tri Province, Central Vietnam. Van Kieu ethnic people, a typical forest-dependent community, accounts for most of local villagers. Through analysis of the natural, socio-economic situations and farming practices of the local people, combined with direct interviews with stakeholders, the research team propose a Benefit Sharing Mechanism and suggest solutions for forest management in the area and can. This Benefit Sharing Mechanism could be applied to other localities.

Keywords: Benefit sharing mechanism; collaboration management approach; forest dependent community; forest management; livelihood management

A SYNTHESIS OF AGRICULTURE EXTENSION FOR CLIMATE-SMART AGRICULTURE

Huynh P. Long*, Pham T. H. Nhung and Nguyen B. Dang

Faculty of Economics, Nong Lam University, Ho Chi Minh City, Vietnam

**Email: long.huynhphuong@hcmuaf.edu.vn*

Abstract

This research aims at synthesizing agricultural extension service (AES) for climate-smart agriculture (CSA). The literature shows that AES plays important role in agriculture production and rural development, especially in the context of climate change and food insecurity. There are more and more new, effective extension methods employed (i.e. extension service via SMS (Short Messaging Service) and MMS (Multimedia Messaging Services), discovery learning, information and communication technologies,...). Globally, CSA(s) are becoming popular. However, the application of CSA is impeded by many factors, including perceived benefits, ease of use, financial constraints, etc; farmers adopt CSA timidly. Although public extension service normally plays the leading role and brings some achievements in transferring knowledge and technical advances to farmers, public extension service is not as effective as private extension service in many cases. The effectiveness of AES has been measured differently across the literature. Some researchers evaluate AES results through the technical efficiency of production. Some others link the effectiveness of AES to farmers' participation in extension services, to farmers' adoption of a given production technique or method. There are many factors affecting the effectiveness of agriculture extension service, including proficiency of extension staff, farmers' demographical characteristics, perceived benefits of CSA, the cost for application, financial efficiency, natural conditions of production, etc.

Keywords: Agriculture extension; climate-smart agriculture; effectiveness; factor; rural development



SESSION 5

Innovative Technology in Agriculture



IMPROVING LAND-USE PLANNING DATABASE FOR SUSTAINABLE LAND MANAGEMENT IN VUNG TAU CITY, BA RIA - VUNG TAU PROVINCE

Truong D. T. Linh

*Department of Land and Real Estate Management, Nong Lam University,
Ho Chi Minh City, Vietnam*

Email: truongdothuylinh@hcmuaf.edu.vn

Abstract

Land use planning (LUP) database is an effective tool in managing the implementation process of LUP, creating good conditions for using land sustainability to be able to archive the highest socio-economic benefits. Vung Tau city is an area where the management of LUP and urban planning is quite complicated and has been successful in building LUP database. However, this database still has many limitations and needs to be further improved. From results of analyzing the input data about cadastral, current land use and LUP, our study has (1) successfully transformed the structure of the cadastral database of Ward 9, from the existing structure according to Circular 17/2010/TT-BTNMT to the standard structure according to Circular 75/2015/TT-BTNMT; (2) standardized the 2019 land inventory data in accordance with the data standard of Land Statistics and Inventory and built the data layer of current land use for whole city; (3) improved the LUP database (period 2010-2020) for Vung Tau city, including: updating attribute information, adding metadata, connecting to the scanned LUP records, overlaying cadastral database with the data layer of current land use and LUP database; and (4) proposed a group of solutions to support the process of management, operation, sharing and integration LUP database into the land database of locality. Our results will be the foundation to help Vung Tau city manage land sustainably, contribute to successfully build the national land database and meet the exploitation requirements of LUP information in accordance with the orientation of Ministry of Natural Resources and Environment for the study area.

Keywords: Land database; land use planning database; sustainable land management; Vung Tau City

EFFECT OF LOW-POWER SEMICONDUCTOR LASER BEAM ON PROTEIN AND GENISTEIN CONTENT, GERMINATION RATE OF SOYBEAN SEEDS

Thai V. Ton* and Le H. Hai

*Department of Physics, Faculty of Science, Nong Lam University,
Ho Chi Minh City, Vietnam.*

**Email: tvton@hcmuaf.edu.vn*

Abstract

In Vietnam, soybean has long been familiar in people's lives due to its delicious taste, nutritious and wholesome. In addition, soybean also contains a substance that is capable of preventing and treating disease. This active ingredient is called isoflavones as composed of genistein, daidzein, and glycitein which can treat prostate cancer in men, breast cancer in women, and menopause in women as well as aging. The research and application of semiconductor lasers working at different wavelengths with low power to increase the content of genistein, soy yield, and protein content is having a high potential effect in the future. In this study, we investigated the interaction of low-power semiconductor laser beams with combined wavelengths of 780 nm and 940 nm on soybean plants to quantify genistein content by HPLC-DAD method and Kjeldahl method to determine protein content in soybean seeds. The laser interaction process is carried out with the same power, frequency, and irradiation times of 10, 20, and 30 minutes, respectively. Experiments showed that the groups of plants that were irradiated in terms of growth and genistein content both achieved higher results than the control group. In which, 30 minutes of irradiation time, the genistein content achieved the best results, increasing by 84.04%. Meanwhile, the protein content decreased only in the 10-minute interaction group. This study is an important premise for the production of soybean plants adapted to climate change in the condition that no chemical drugs are used in the nucleation and development of the plant.

Keywords: Genistein; protein; soybean; two simultaneous wavelengths

HIERARCHICAL CLASSIFICATION METHOD OF HYDROLOGIC NETWORK TO SUPPORT CREATION OF A MULTI-SCALE HYDROGRAPHIC DATABASE

Nguyen T. H. Hanh^{1*} and Vu X. Cuong²

¹*Faculty of Land and Real Estate Management, Nong Lam University,
Ho Chi Minh City, Vietnam*

²*University of Natural Resources and Environment, Ho Chi Minh City, Vietnam*

**Email: honghanh@hcmuaf.edu.vn*

Abstract

Hydrologic networks are fundamental elements in cartography, greatly affect climate, geomorphology, vegetation, soil and the generalization of these hydrologic networks directly influences the quality of cartographic maps. Hydrologic features are sensitive to scale change, therefore multiple representations are required to maintain visual and geographic logic at smaller scales. This article demonstrates a hierarchical classification method and automated generalization of hydrologic networks to support creation of a multi-scale hydrographic database. This is a difficult and important process for hydrographic generalization that requires the consideration of semantic, geometric, topological, and structural characteristics. However, owing to most existing methods lose important spatial distribution characteristics of hydrography, especially rivers, connection consistency between scale levels, thus affecting the quality of maps. Therefore, a hierarchical classification of hydrologic features is proposed that consists of following steps. First, a tree structures is investigated to realize the organization and intelligent structures of hydrologic data. Second, based on the structure, each river is traced in the upstream direction from its estuary to create the connections of hydrographic networks based on a consideration of the semantics, length, and the hierarchical relationships of of a hydrological network are then determined. Finally, a hierarchical elimination algorithm is used to generalize the map, this method was verified using sample data tests and evaluating the results

Keywords: Automated generalization; hydrography; multiscale database; hierarchical classification

OPTIMIZATION CONDITIONS FOR GROWTH AND INVESTIGATION OF ANTI-BACTERIAL ACTIVITIES OF FUNGUS *Pycnoporus sanguineus*

Do N. T. Mai¹, Hoang M. Hao² and Nguyen H. Tri^{3*}

¹Faculty of Biology - Biotechnology, University of Natural Sciences, Vietnam National University, Ho Chi Minh City, Vietnam

²Faculty of Food and Chemical Technology, Ho Chi Minh City University of Technical Education, Ho Chi Minh City, Vietnam

³Faculty of Science, Nong Lam University, Ho Chi Minh City, Vietnam

*Email: nhtri@hcmuaf.edu.vn

Abstract

Pycnoporus sanguineus is a fungus that serves as an important source of enzymes in various industries and contains numerous antibacterial compounds. Samples of red-orange mushrooms named Pyc-1 and Pyc-2 were collected in Cu Chi district, Ho Chi Minh City, and Tan Phu district, Dong Nai province, respectively. Both Pyc-1 and Pyc-2 were identified by morphological analysis combined with molecular biology analysis. The fruiting body is a brilliant reddish-orange in colour. Caps can range from 2.6–5.2 cm in diameter, and stems can be 2–3 cm long. The fungal spores are white, cylindrical, slightly curved, smooth, and translucent, with a diameter ranging from 4.1–6.2 µm in width and 7.5–10.2 µm in length. The ITS-rDNA sequence analysis showed that Pyc-1 (MZ305063) and Pyc-2 (MZ305070) belonged to the species *Pycnoporus sanguineus*, with the percentage of ITS rDNA homology at 99.69% and 99.84%, respectively. The pH and light intensity were investigated to determine the optimum conditions for fruiting body cultivation. Results showed that *P. sanguineus* fruiting bodies reached the highest average dry weight of 20.39 ± 1.77 g/bag of 500 g substrate where the initial pH of the substrate was 9.0 and the light level was 50% (1000–1500 lux). The agar well diffusion method was applied to evaluate the antibacterial activity of mushroom extracts under alcohol and water conditions. The results showed that both samples were resistant to Gram-negative bacteria *Escherichia coli*, *Salmonella spp.*, and Gram-positive bacteria *Staphylococcus aureus*, *Bacillus cereus*, and did not show resistance to *Pseudomonas aeruginosa*.

Keywords: Antibacterial; fruiting body; ITS-rDNA; phylogeny; *Pycnoporus sanguineus*

A SUPPLY RESPONSE MODEL OF BLACK TIGER SHRIMP IN MEKONG DELTA

Le N. B. Ngoc^{1*}, Le Q. Thong² and Thai A. Hoa¹

School of Economics and Law, Tra Vinh University, Tra Vinh Province, Vietnam

²Faculty of Economics, Nong Lam University, Ho Chi Minh City, Vietnam

**Email: baongoccamau80@gmail.com*

Abstract

This study aims to analyze the effect of black tiger shrimp price and other factors to shrimp output and farming area in Mekong Delta using supply response function based on the Nerlovian partial adjustment model. Quarterly panel data collected from Ca Mau, Kien Giang, Soc Trang, and Bac Lieu provinces for the period of 2014 to 2017 were used in Nerlovian supply response function. Using the fixed-effects method (FEM), the results proved that (i) expected price has significant effect in directing black tiger shrimp farmers to formulate the supply response decision, (ii) quantity harvested of white leg shrimp and black tiger shrimp is a vital factor in the supply response function, (iii) average response elasticity is more sensitive, and (iv) the price of input and price of competing commodities may shift the supply curve to the left.

Keywords: Black tiger shrimp; Nerlovian supply response model; price elasticity; Mekong Delta

FOOD ESTATE FARMERS' PREFERENCES OF SOURCE SEED NEW SUPERIOR VARIETIES IN RICE SEED PRODUCTION

Twenty Liana*, Susilawati and Wahyu A. Nugroho

National Research and Innovation Agency (BRIN), Indonesia

**Email: twen001@brin.go.id*

Abstract

Increasing rice production can be done by applying technological innovations, one of which is the use of superior seeds. The research was carried out to analyze the level of preference of farmers towards potential seed sources to be produced, namely Inpari 32 HDB, and Inpari Padjajaran. The research was conducted in September 2021 - January 2022, through surveys and field observations of 24 farmers in Pulang Pisau Regency. Data analysis was carried out descriptively and Mann-Whitney U test analysis. The results showed that the characteristics of resistance to pests and diseases were the most important characteristics for farmers in the selection of varieties, followed by production characteristics. Resistance to pests and diseases is the most important characteristic because this condition can lead to crop failure. In the vegetative phase, farmers liked the Inpari Padjajaran variety (0.38), while in the generative phase the farmers liked Inpari 32 HDB (0.43 – 0.55), and for resistance to pests and diseases, farmers liked Inpari 32 HDB variety (0.68).

Keywords: Farmer; preference; source seed

EXTRACTION OF ROTENONE FROM *Derris elliptica* Benth

Nguyen T. Tu, Nguyen P. T. Nhan, Tran T. T. Tra, Nguyen T. N. Lan and Mai H. Cang*

*Department of Natural Products, Faculty of Chemical Engineering and Food Technology,
Nong Lam University, Ho Chi Minh City, Vietnam*

**Email: maihuynhcang@hcmuaf.edu.vn*

Abstract

Rotenone is a natural rotenoid used as biopesticide and occurs in several plant species such as *Derris*, *Lonchocarpus*, *Tephrosia* and *Mundulea*. This study investigated the impact factor on rotenone extraction including the solvent (acetone, chloroform, ethanol), the ratio of solvent/material (5 - 20 ml/g), temperature (30 - 60°C) and time (12 - 96 hours) on the rotenone content obtained from the roots of *Derris elliptica* Benth. in Viet Nam. The results showed that the suitable conditions for rotenone extraction were the ratio of 15 (ml/g), 30°C and 24 hours for ratio of solvent and raw material, extraction temperature and extraction time, respectively using acetone as solvent extraction. The highest rotenone extraction yield was 2.61%.

Keywords: Biopesticide; *Derris elliptica* Benth; xtraction; rotenone

SURVEYING THE POSSIBILITY OF SYNTHETIC NANO SILVER FROM *Syzygium samagense* FLOWER BUDS EXTRACT

Nguyen Q. Trong, Doan D. N. Trinh, Hong L. Quy, Do M. Tri and Nguyen H. Nguyen*

*Faculty of Chemical Engineering and Food Technology, Nong Lam University,
Ho Chi Minh City, Vietnam*

*Email: nguyennh@hcmuaf.edu.vn

Abstract

The study was to investigate the possibility of synthesizing silver nanoparticles by chemical reduction method with the reducing agent being An Phuoc plum flower bud extract (*Syzygium Samagense*), the silver salt used was AgNO_3 99.8%. The survey showed that the influence of factors affecting the synthesis of silver nanoparticles: AgNO_3 concentration (2 mM; 5 mM; 10 mM), volume ratio $V_{\text{extract}}/V_{\text{AgNO}_3}$ (1:30; 2:30 ; 3:30; 4:30), reaction temperature (50°C, 60°C, 70°C, 80°C), reaction time (15 minutes; 30 minutes; 45 minutes; 60 minutes). The presence of silver nanoparticles was detected by UV-VIS in the wavelength range from 350-500 nm and X-ray diffraction (XRD). The size of silver nanoparticles were determined by scanning electron microscopy (FE-SEM). The results showed that the silver nanoparticles were uniformly distributed in average size in the range of 20-35 nm.

Keywords: Silver nanoparticles; Green synthesis; *Syzygium samagense*

CHARACTERISTICS OF YOGHURT WITH THE ADDITION OF BIOACTIVE COMPOUNDS FROM KECOMBRANG EXTRACT (*Etlingera elatior*)

Rifda Naufalin*, Erminawati and Popi Nurhopipah

*Department of Food Technology, Agricultural Faculty, Jenderal Soedirman University,
Purwokerto*

*Email: rifda.naufalin@unsoed.ac.id

Abstract

This research was to determine characteristics of yoghurt with the addition of bioactive components from kecombrang extract (flowers, leaves and stems) with variations concentration of extract to determine the best combination of types of extract and concentration to produce yoghurt with the highest antioxidant activity. The materials used are flowers, leaves and stems kecombrang extract with aquadest, as well as materials for making yoghurt with pasteurized fresh milk. The experimental design used was Completely Randomized Design (CRD) with 9 treatments and 3 replication. The study consist of the factors studied; kecombrang extract types (flowers, leaves and stems) and the concentration of extract at the level of 2.5%, 5% and 7.5%. Data analysis used was Analysis of Variant (ANOVA) at 5% significance level and Duncan's advanced multiple range test. The results showed that the types kecombrang extract (flowers, leaves and stems) had a significant effect on viscositas, color, antioxidant activity and sensory properties (taste and overall) of yoghurt. Extract Concentration increase color (a* and b*) and viscosity of yoghurt produce. The best yoghurt formulation from yoghurt addition with 7.5% kecombrang flower extract is yoghurt that has the highest antioxidant activity of 59.48% with chemical properties (85% water content; 0.99% ash content; 5.65% fat content; 7.88% protein content and 0.47% carbohydrate content) which is in accordance with SNI 01 – 2981 – 2009.

Keywords : Yoghurt; kecombrang extract; functional drink; antioxidant

USE OF PROTEIN HYDROLYSATE DERIVED FROM BLACK SOLDIER FLY LARVAE AS A FOLIAR BIO-FERTILIZER FOR MUSTARD GREEN CULTIVATION

Nguyen N. Ha^{1,2*}, Ta Q. Son², Tran N. Hao², Nguyen P. C. Tu³ and Nguyen T. T. Dung^{1,2}

¹ *Research Institute for Biotechnology and Environment, Nong Lam University, Ho Chi Minh City, Vietnam*

² *Faculty of Biological Sciences, Nong Lam University, Ho Chi Minh City, Vietnam*

³ *Faculty of Fisheries, Nong Lam University, Ho Chi Minh City, Vietnam*

*Email: nnha@hcmuaf.edu.vn

Abstract

This study examined the potential of a black soldier fly (BSF) larvae-derived protein hydrolysate as a foliar bio-fertilizer through Alcalase enzymatic hydrolysis. Trial for enzymatic hydrolysis of BSF designed using a central composite design with four factors, including enzyme concentrations (0.5 – 2%), pH (5.5 – 9.5), solid/liquid ratios (5 – 20, w/v), and hydrolysis duration (1 – 5 hours). Results from the regression model suggested that the maximum degree of hydrolysis (approximately 9.34%) occurred at an Alcalase concentration of 2.18%, pH 8, solid/liquid ratio of 12.7, and hydrolysis time of 5 hours. The potential effects of different doses of the protein hydrolysate (i.e., 0, 10, 20, and 30 mL/8L) on growth of the mustard green (*Brassica juncea* L) were subsequently evaluated. Moreover, the agronomic effect of the BSF hydrolysate on plant growth was also compared with that of a commercial product (cinnamon worm hydrolysate, (*Perionyx excavatus*) and inorganic fertilizers. The results showed that the theoretical yield of the mustard green was highest in the BSF hydrolysate-applied treatments (approximately 12.15 tons/ha), at the rate of 20 mL/8L. The BSF hydrolysate showed better plant yield-promoting effect (5.03 tons/ha) compared to that of the earthworm hydrolysate (3 tons/ha). Collectively, this study suggested that BSF hydrolysate is a promising foliar bio-fertilizer that may help increase crop yield.

Keywords: Black soldier fly larvae; foliar bio-fertilizer; enzymatic hydrolysis; Alcalase; mustard green

ULTRASOUND-ASSISTED ENZYMATIC EXTRACTION OF POLYPHENOLS FROM CUSTARD APPLE (*Annona squamosa* L.) PEEL

Duong T. N. Dan, Phan T. Thanh and Phan T. Huan*

*Faculty of Chemical Engineering and Food Technology, Nong Lam University,
Ho Chi Minh City, Vietnam*

**Email: pthuan@hcmuaf.edu.vn*

Abstract

The objective of the present research work was to valorize the peel of custard apple (*Annona squamosa* L.) fruit by ultrasound-assisted enzymatic extraction (UAEE) method. The effects of different process parameters including total UAEE time (60 - 120 min), enzyme concentration (0.15 - 0.6% v/v), and the ratio of enzyme mixture (Celluclast 1.5L and Pectinex Ultra SP-L) on the total polyphenol content and antioxidant capacity of the extracts were investigated. The results showed that the antioxidant capacity correlated with the total polyphenol content. At a total UAEE time of 90 min, enzyme concentration of 0.15% (v/v), and the ratio of Celluclast to Pectinex of 2:1, a high total polyphenol content was obtained at 29.90 (mg GAE/g sample), and the antioxidant capacity by DPPH and ABTS assays were 21.77 and 20.91 (mg AAE/g sample), respectively.

Keywords: Custard apple peel; ultrasound-assisted enzymatic extraction; polyphenol; antioxidants

EXPLORATION OF GENES INVOLVED IN THE PRODUCTION OF THE *Enterococcus faecium* NKR-5-3B BACTERIOCIN AND SCREENING FOR NOVEL VARIANTS

Nguyen M. Cuong^{1,2*}, Juliana Vukotic², Pham T. Huong² and Mark Turner²

¹*Department of Food Development and Microbiology, Nong Lam University,
Ho Chi Minh City, Vietnam.*

²*School of Agriculture and Food Sciences, The University of Queensland, Australia*

**Email: cuong.nguyenmanh@hcmuaf.edu.vn*

Abstract

Enterococcus faecium NKR-5-3 has decadelly been highly concerned because of its antimicrobial activity against a wide range of Gram-positive bacteria. Enterocin NKR-5-3B (Ent53B) gene operon of *Enterococcus faecium* is responsible for the production of antimicrobial compounds. In this research, a screening test was conducted, firstly, to establish the characteristics of *Lactococcus lactis* containing Ent53B gene operon under high thermal conditions at 37°C. More than two-hundred fifty samples were incubated and dropped. This aimed to collect single colonies that may show differences in the clearing dimension in the screening test, such as a smaller or an uninhibited zone. The smaller or an uninhibited zone produced may be a sign of potential mutation. After screening, the experiment was continued with a PCR process and sequencing to determine the characteristics of these smaller and no zone colonies. However, these colonies did not contain any differences or mutations in the genome at the result. Then, the research attempted to identify novel Ent53B sequence variants from twenty-six seafood species by carrying out PCR and sequencing technique to determine any mutation occurred in the host genome. Two single colonies from the twenty samples, 713b and 811, showed the antimicrobial ability to *L. plantarum* 14917 with clearing zones and where further tested to identify the strain. At the result, the 16S rDNA of the two colonies remained significantly conserved to the original strain.

Keywords: Lactic bacteria; bacteriocin; enterocin; bacterial stress; food preservation

SESSION 6

Emerging Issues in Agricultural Transformation



ENHANCING ENZYMATIC HYDROLYSIS YIELD OF SPENT COFFEE GROUNDS BY ALKALINE ORGANOSOLV PRETREATMENT

Trinh T. P. Ly^{1,2,3*}, Nguyen V. Tat², Ho M. Hanh² and Nguyen Q. Anh³

¹*Research Institute for Biotechnology and Environment, Nong Lam University,
Ho Chi Minh City, Vietnam*

²*Faculty of Biological Sciences, Nong Lam University, Ho Chi Minh City, Vietnam*

³*Khai Minh Technology Group, Ho Chi Minh City, Vietnam*

**Email: phily@hcmuaf.edu.vn*

Abstract

Million tons of spent coffee grounds discharged into the environment every year have caused serious pollution problems. Development of conversion process of spent coffee grounds into value-added products is an important strategy, which not only increase economic value for coffee industry but also reduce the environmental impacts. In this study, spent coffee grounds were pretreated by an alkaline organosolv process using a reflux system following by enzymatic hydrolysis for the production of simple sugars. As results, optimal conditions for the pretreatment of spent coffee grounds were found at 50% aqueous acetone concentration for 3.6 hours with NaOH concentration of 0.75%. The enzymatic hydrolysis of pretreated spent coffee grounds reached maximal value after 72 hours at a ratio of the enzyme to substrate of 5%. Thermal treating of spent coffee grounds prior to hydrolysis significantly improved the production of reducing sugars with the highest concentration of 10.9 g/L, providing a hydrolysis yield of 214.6 mg reducing sugar/g dry biomass. Mannose sugar accounted for nearly 50% of the reducing sugar in the hydrolysate. Besides, the hydrolysate also contained 2.1 g/L glucose, 1.8 g/L galactose, 14.0 mg/L caffeine, and 214.6 mg/L phenolic compounds with antioxidant activity equivalent to 137.4 mg ascorbic acid/L. This study demonstrated a feasible and effective alkaline organosolv pretreatment process to enhance the production yield of soluble sugars from spent coffee grounds, which may uses as culture media for further obtaining microbial biomass and fermentable products.

Keywords: Spent coffee grounds; organosolv pretreatment; enzymatic hydrolysis; mannose; phenolic compounds

EXTRACTION OF PECTIN FROM PASSION FRUIT PEEL: PROCESS OPTIMIZATION AND CHARACTERIZATION

Tran T. K. Ngan, Le Q. Tu and Nguyen T. T. Thuy*

Faculty of Science, Nong Lam University, Ho Chi Minh City, Vietnam

**Email: nguyenthathuy@hcmuaf.edu.vn*

Abstract

The objectives of this study were to extract and determine the chemical composition and physicochemical properties of pectin from passion fruit peel. Pectin was isolated by heated citric acid solution and the soluble pectin was precipitated with 96% ethanol. Response surface methodology and central composite design were used to determine the effect variables on the yield of obtained pectin. The results showed that the optimum condition for a high pectin extraction yield ($16.87 \pm 0.24\%$) was extraction time of 90 min, temperature of 85°C , citric acid concentration of 1M and a liquid/solid ratio of 5%. The obtained pectin with the molecular weight of 20.821 kDa was found to contain 62% galacturonic acid with a degree of methyl esterification of 51%. The FTIR spectrum of passion fruit peel pectin revealed a similar structure to commercial pectin.

Keywords: Pectin extraction; passion fruit peel; galacturonic acid; methoxyl content

DRAGON FRUIT VALUE CHAIN IN MEKONG DELTA

Nguyen T. H. Nga* and Le N. B. Ngoc

Faculty of Economics, Bac Lieu University, Bac Lieu Province, Vietnam

**Email: hangagct@gmail.com*

Abstract

The research objective was to analyze the value chain of dragon fruit in the Mekong Delta, which was carried out with the goal of the strategy and activities to improve profits and income for the actors involved in the project. A sample of 331 facilitators and stakeholders in the dragon fruit value chain in the Mekong Delta were interviewed. The stakeholders include dragon fruit growers, collectors, processors, retailers, workers, exporters, wholesalers, chain promoters, and cooperatives/cooperatives. The research results showed that the production and consumption of dragon fruit still remained many problems such as lack of market information, unstable selling price and great dependence on the Chinese market. Farmers were still small-scale production. Besides, production linkages were weak, production distance was limited, could not meet market demand in quantity and quality, prices were low in season, and many pests and diseases were affected by climate change. In addition, logistics of preliminary processing was not good.

Keywords: Added value; dragon fruit; value chain; Mekong Delta

QUALITY RELATIONSHIP BETWEEN MANUFACTURERS AND DISTRIBUTORS IN THE SUPPLY CHAIN OF ABODE BRICKS IN MEKONG DELTA

Ha T. T. Tuyen* and Le N. B. Ngoc

Faculty of Economics, Kien Giang University, Kien Giang Province, Vietnam

**Email: htttuyen@vnkgu.edu.vn*

Abstract

The research objective is to analyze the linkages and quality of relationships between factors in the supply chain of abode bricks in Mekong Delta. Cronbach's Alpha, EFA, and research hypothesis tests were used in this quantitative research. Three relationship quality components: trust, commitment, and satisfaction, have been identified in this study. And five factors influenced the components of relationship quality, including product quality, delivery quality, market information, communication, and personal interaction. Besides, it increased the relationship between factors that affected relationships' quality, resulting in improved business performance and cooperation.

Keywords: Relationship quality; Supply chain; abode bricks; manufacturers; Mekong Delta

SESSION 7

Recent Advances in Animal Health and Animal Biosciences



APPLICATION OF THE MB-1 ATTENUATED INFECTIOUS BURSAL DISEASE VACCINE ON DAY-OLD ISA BROWN LAYERS

Nguyen T. K. Oanh, Nguyen M. Ho and Quach T. Anh*

*Faculty of Animal Science and Veterinary Medicine, Nong Lam University,
Ho Chi Minh City, Vietnam*

**Email: nguyengkieuoanh.namlam@gmail.com*

Abstract

The objectives of this study were evaluate the safety and effectiveness of a new approach to Gumboro disease prevention on layer chickens by the attenuated Infectious Bursal Disease vaccine named MB-1. Over 50,000 day-old Isa Brown chicks were injected with MB-1 vaccine mixed with HVT&CVI Marek's vaccine by subcutaneous injection at the hatchery. Elisa was used to test the antibody titer of IBD and ND at 1, 14, 18, 21, 24, 28, 32, 35, 42, and 56d. Bursa index, bursal smears on FTA cards, and bursa lesion scores will be taken from 6 birds At 21, 28, 35, 42d. On days 35, and 42; 10 feather follicles were considered the interference of MB-1 vaccine with the MD vaccine virus. The MDAs were 3876. The RT-PCR result showed that MB-1 was early in the Bursa from 21 – 42d, and Marek serotype 1 and 3 vaccine viruses were found from feather follicles at 42d proving that no interference of the vaccine of MB-1 with the Marek vaccine virus. Bursa Index and Bursa Lesion Score of chickens receiving the MB-1 vaccine were in the normal range and showed signs of recovery at 32d. The average ND antibody titer was 1411 at 24d, 5581 at 28d, and reached a high level at 56d (7822; CV 39.38%) which proved that MB-1 did not affect the humoral immune response. Moreover, MB-1 induced high IBD antibody titers, reaching an average of 1730 titers at 24d, 3330 titers at 28d, and maintained at a high level until 56d.

Keywords: Antibody titer; attenuated IBD vaccine; Gumboro; localization; MB-1

ASSESSMENT OF *Ornithobacterium rhinotracheale* (ORT) ANTIBODY TITER FLUCTUATION ON SOME CHICKEN BREEDS AFTER VACCINATION WITH ORNITIN TRIPLE

Le T. K. Tuyen^{1*}, Nguyen M. Ho², Nguyen L. T. Truc², Nguyen T. K. Oanh²
and Quach T. Anh²

¹ *Ninh Thuan Campus, Nong Lam University, Ho Chi Minh City, Vietnam*

² *Faculty of Animal Science and Veterinary Medicine, Nong Lam University,
Ho Chi Minh City, Vietnam*

*Email: lktuyen@hcmuaf.edu.vn

Abstract

The level of ORT antibody titer (ORT Ab) is one of the tools to monitor chickens infected with ORT field challenge or ORT vaccination. However, Vietnam still does not have data to recommend the level of ORT Ab when chickens respond immunity to ORT disease. This study aimed to investigate ORT Ab on different chicken breeds (Noi, Ac, Tre, and Luong Phuong) and different types of chickens (layer and broiler) after vaccination with Ornitin Triple vaccine from the data of field trials from 2019 to 2021. The results showed that the ORT Ab in 4 broiler breeds post-vaccination was significantly higher than pre-vaccination ($P < 0.001$). After 2 weeks of vaccination, the ORT Ab of Ac breed was significantly lower than the other breeds with 14,106. However, 4 weeks after vaccination, the ORT Ab of Luong Phuong (24,576) was the lowest; The ORT Ab of Noi (44,574) and Ac (41,175) chicken breeds had higher than Tre (31,701) and Luong Phuong chickens ($P < 0.001$). In addition, ORT Ab in vaccinated Isa Brown groups after 8 weeks was significantly higher than in the control group (1736), reached 18,078 in vaccinated at 8 weeks old group, and average titers of 28199 in vaccinated at 8 and 12 weeks old. At 65 weeks of age, ORT Ab remained high at 15,891 and there was no difference when using a single shot versus with booster shots Ornitin Triple vaccine. In summary, ORT Ab was different across chicken breeds and was last longer than 65 weeks of age.

Keywords: ORT; ORT vaccine; Ornitin triple; Vietnam local chicken

INVESTIGATION OF PHYTOCHEMICAL COMPOSITIONS AND BIOLOGICAL ACTIVITIES OF *Caesalpinia minax* Hance

Nguyen T. V. Anh^{1*}, Le N. T. Dong¹, Trinh T. P. Ly², Phung V. C. Hong²
and Le T. Thien³

¹ Faculty of Biological Sciences, Nong Lam University, Ho Chi Minh City, Vietnam

² Research Institute for Biotechnology and Environment, Nong Lam University
Ho Chi Minh City, Vietnam

³ Faculty of Chemical Engineering and Food Technology, Nong Lam University
Ho Chi Minh City, Vietnam

*Email: anh.nguyenthivan@hcmuaf.edu.vn

Abstract

Caesalpinia minax Hance (*C.minax* Hance) has long been used as a medicinal herb to support the treatment of many human diseases such as diabetes, cough, fever, and hemostasis. It contains many valuable chemical components and performs biological functions such as antioxidant and antimicrobial capacity. In this study, quantitative analysis of total phenolic, flavonoid, saponin, tannin, crude lipid and protein content in the *C.minax* extract were carried out. Antioxidant activity of the extract was estimated using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay. As results, the phytochemical contents of *C.minax* Hance were found to be 2.58 % saponins, 2% tannins, 785 mg/kg flavonoid, 1175 mg/kg polyphenols, 2.78% crude lipids and 2.98% crude proteins. The extract of *C.minax* Hance showed antioxidant capacity with an IC₅₀ value of 92 mg/L. The antibacterial activity of *C.minax* extract was examined on four strains including *S.aureus*, *B.spizizenii*, *Salmonella sp.* and *E.coli* by Kirby-Bauer method with the diameter of inhibition zone of 3 ± 0.15 mm, 1.8 ± 0.05 mm and 1.5 ± 0.06 mm, respectively. In addition, *C.minax* Hance displayed enzyme inhibition activity to α -amylase and α -glucosidase at IC₅₀ values of 0.10 mg/L and 0.82 mg/L, respectively. The study suggested that a potential medicinal source but it needs comprehensive research to investigate its particular bioactive components and toxicity for future development of herbal medicines.

Keywords: *Caesalpinia minax* Hance; physicochemical; biological activities; antioxidant; enzyme inhibition

THE FACTORS AFFECTING MILK PRODUCTION ON DAIRY COW FARMS IN HO CHI MINH CITY, VIET NAM

Nguyen T. Thuong^{1*}, Phan T. N. Theu², Tran P. Hoa³, Tran T. M. Tu⁴

*¹Faculty of Animal Science and Veterinary Medicine, Nong Lam University,
Ho Chi Minh City, Vietnam*

²Agricultural Service Center, Duc Hue District, Long An Province, Vietnam

*³Dairy Demonstration and Experiment Farm, Center of Animal, Seeds and Aquatic Breeds,
Ho Chi Minh City, Vietnam*

*⁴Faculty of Agriculture and Food Technology, Tien Giang University,
Tien Giang Province, Vietnam*

**Email: thuong.nguyenthi@hcmuaf.edu.vn*

Abstract

The objective of the study was to evaluate the factors affected the milk production including milk yield and quality on dairy cow farms in Ho Chi Minh City. The milk data were collected from December 2021 to March 2022 at two farms (Farm A in Binh Chanh district and Farm B in Cu Chi district). Farm A, the data were collected from AfiFarm management software and the quality contents of fatness, solids-not-fat (SNF), protein, and lactose of the milk were analyzed in farm lab. The data of Farm B were filtered from Epacific management software. The milk somatic cell count (SCC) was examined by using Foss MilkoScan analyzer. The results showed the milk yield was seen differently between Farm A and B ($P < 0.01$). Farm A's milk yield average was 20.15 kg/day/cow, and the contents were fatness 3.20%, SNF 8.99%, protein 3.49%, lactose 4.84%, and SCC 285,000 cells/ml. The milk yield and contents were seen differently between months on Farm A ($P < 0.01$), and found the highest quality in December with 21.10 kg/day, 9.10% SNF, 3.53% protein, 4.90% lactose and SCC lowest at 231,000 cells/ml. However, the milk yield of Farm B was 12.55 kg/day/cow. The results indicated the parity, number of milking udders (3, 4 udders), breeds (F1, F2, F3), period of lactation (0-60, 61-120, >120 days of milking) and months of year affected the milk yield on Farm B ($P < 0.01$). The interesting finding was the cows having milk yield less than 10 kg/day correlating the risk of the milk SCC and decreasing the milk quality.

Keywords: Dairy cows; Ho Chi Minh City; milk quality; milk yield

PROTECTION OF NEWCASTLE DISEASE IN CHICKEN AFTER VACCINATION IN DONG NAI PROVINCE

Nguyen T. Thuong^{1*}, Nguyen T. M. Nhan¹, Nguyen T. B. Lien² and Phan C. Thong³

¹*Faculty of Animal Science and Veterinary Medicine, Nong Lam University,
Ho Chi Minh City, Vietnam*

²*Nong Lam University, Gia Lai Campus, Vietnam*

³*Department of Animal Husbandry and Veterinary Medicine, Dong Nai Province, Vietnam*

**Email: thuong.nguyenthi@hcmuaf.edu.vn*

Abstract

The aim of the study was to evaluate the efficiency of protection after vaccination and define the circulation of Newcastle disease virus (NDV) in chicken. The purpose was to establish the Newcastle disease's safety areas in chicken in Dong Nai province. With two sampling times in 2020, we collected total 1,260 blood samples at 21 days after vaccination from 125 chicken smallholdings at the first sampling, and from 42 smallholdings for the second one. The swab samples were 420 pooled samples in 7 districts of the province. The serum samples were used to test NDV antibody after vaccination by using HA and HI, and the swab samples using PCR to determine circulation of NDV. The results showed the average of protective rate was 54.7%, and was seen differently between two sampling times (60.2% and 49.2%, respectively) ($P < 0.05$). The protective rate was highest 90.0% in Cam My district, and lowest one in Dinh Quan at 37.8% at the first sampling time. Comparing with the second time, the protective rate was highest in Long Khanh City at 81.1%, while Long Thanh district was at 18.9% lowest rate. The protective rate was seen differently between 7 districts of the province, husbandry areas (group 1, 2, 3, 4), and farm size (< 200 , 200-1,000, $> 1,000$ chicken) in the first sampling time ($P < 0.01$), but in the second one there was found the same among them ($P > 0.05$). The PCR results indicated no presence of NDV in all swab samples. That was the good basic to set up the Newcastle disease's safety areas in chicken in Dong Nai province.

Keywords: Dong Nai province; Newcastle disease; protective rate; vaccination

CHARACTERISTICS AND PERFORMANCE OF *Leiolepis guttata* RAISING IN BINH DINH PROVINCE

Nguyen T. B. Lien^{1*}, Vo T. L. Na¹, Nguyen T. Thuong² and Vo M. Trieu¹

¹ Nong Lam University, Gia Lai Campus, Vietnam

² Faculty of Animal Science and Veterinary Medicine, Nong Lam University, Ho Chi Minh City, Vietnam

*Email: nguyenbichlien.gl@gmail.com

Abstract

Leiolepis guttata is one of butterfly lizard species. Nowadays, as decreasing natural populations and increasing people demands, the commercial farms raising these lizards become necessarily. Therefore this study was conducted to evaluated the performance and productive characteristics of *Leiolepis guttata* raised in semi-natural enviroment farms in My Thang commune, Phu My district, Binh Dinh Province. The farm had total 18,000 lizards in all ages including 5,400 lizards one month, 4,900 lizards 6 months, 3,200 breeding lizards, 4,500 lizards for meat. The data was collected random in 20 adult males and 20 adult females. After 3 months raising, the result showed *L. guttata* grewed highly in sandy. Adult males had greater body mass and colourful skin than adult females. The body weight of adult male and female was 290.45 ± 93.70 g, 211.63 ± 34.69 g, respectively. The body length of adult male and female was 192.94 ± 22.34 mm; 171.84 ± 9.60 mm, respectively. Both body weight and body length of adult males were more than their adult females ($P < 0.05$). The survival rate was high 90 - 95%. Their food was mainly vegetable. Female lizards laid about 3 – 6 eggs depending on body size. *L. guttata* was fast growing and seasonal reproduction and rarely got infectious diseases. *L. guttata* raised in semi-natural enviroment farms was not only the great potential for the wild lizard breeding but also for ecological sustainability.

Keywords: Binh Dinh province; characteristics; *Leiolepis guttata*; performance; reproduction

INVESTIGATION OF PRESENCE OF NEWCASTLE DISEASE VIRUS AND H5-SUBTYPE INFLUENZA VIRUS IN SWIFTLET HOUSES BY MULTIPLEX RT-PCR

Do T. Trinh, Hoang G. Lam, Nguyen M. T. Mi, Cao T. Q. Nhu and Dinh X. Phat*

Faculty of Biological Sciences, Nong Lam University, Ho Chi Minh City, Vietnam

**Email: dinhxuanphat@hcmuaf.edu.vn*

Abstract

The purpose of this study was to investigate the presence of Avian paramyxovirus 1 (APMV-1), also known as Newcastle disease virus (NDV), and Avian influenza type A, especially H5 subtype (AIV-H5) in swiftlet houses and swiftlet nest by multiplex RT-PCR (mRT-PCR). The assay used two specific primer pairs designed to detect the conserved sequence of the F gene of NDV and the HA gene of the AIV-H5, with product sizes of 282 bp and 420 bp, respectively. The mRT-PCR was established with detection limit of 25 copies/reaction for each target virus. The thermal cycle was optimized as follows: cDNA synthesis at 45°C for 20 min, an initial denaturation at 95°C for 5 min, followed by 35 cycles of amplification encompassing denaturation at 95°C for 30 sec, annealing at 58°C for 30 sec, and extension at 72°C for 45 sec, ending by a final extension step at 72°C for 7 min. Eighty-eight field samples including feces and swabs of the nest surface were examined and all samples were confirmed to be negative for these two viruses. The results of this study indicated that the swiftlet nests and the environment of swiftlet houses were not contaminated with NDV or AIV-H5 viruses. Moreover, the established mRT-PCR protocol had good specificity, detection limit, and can apply for routine veterinary diagnosis.

Keywords: H5-subtype; influenza; NDV; mRT-PCR; swiftlet house; swiftlet nest

INSULIN-LIKE GROWTH FACTOR-1 REGULATES THE AROMATASE ENZYME ABUNDANCE, ESTROGEN RECEPTORS EXPRESSION, AND ANDROGEN PRODUCTION IN BOVINE FOLLICLES

Rawan Ahmad Farid^{1*}, Langar Hikmatullah¹, Yuki Yamamoto² and Koji Kimura¹

¹Graduate School of Environmental and Life Science, Okayama University, Okayama Japan.

²Laboratory of Veterinary Physiology, Tokyo University of Agriculture and Technology, Japan

*Email: pp5q8bkc@s.okayama-u.ac.jp

Abstract

Androgens are converted to estrogen through P450 aromatase (CYP19A1) in granulosa cells (GCs). Estradiol 17 β (E2) plays a key role in follicular development and follicular selection. The action of E2 is mediated by estradiol receptors (ER) in follicles. Although, the factors regulating the expression of ER in GCs have not been well defined. Insulin-like growth factor-1 (IGF-1) is known to be required for the acquisition of follicular dominance in cattle. We examined the expression of ER β in uncultured GCs of the three largest follicles of paired ovaries, the effects of different concentrations (0.1, 1, 10, 50, and 100 ng/ml) of IGF-1 on the expression of ER β , and CYP19A1 mRNA abundance in cultured GCs, and on the production of progesterone (P4), androstenedione (A4), and testosterone (T) in cultured theca cells. Small follicles (<6 mm) expressed the highest levels of ER β mRNA. IGF-1 (100 ng/ml) significantly increased ER β expression in small follicles, while IGF-1 (0.1-100 ng/ml) increased ER β expression in mid-sized follicles ($p < 0.05$). IGF-1 (50 and 100 ng/ml) significantly increased P4 in both small and mid-sized follicles. IGF-1 (50 ng/ml) increased A4 production in small and IGF-1 (0.1, 10 and 50 ng/ml) mid-sized follicles respectively. IGF-1 (100 ng/ml) increased CYP19A1 mRNA abundance in small follicles significantly ($p < 0.05$). These results indicate that IGF-1 increases ER β mRNA expression and CYP19A1 mRNA abundance in GCs, and A4 and P4 production in theca cells, which serve as substrates for E2 synthesis, and suggest that IGF-1 is crucial for follicle development and selection.

Keywords: Follicles; Granulosa cells; Theca cells; IGF-1

EFFECT OF VASCULAR ENDOTHELIAL GROWTH FACTOR ON MEIOSIS RESUMPTION COMPETENCE OF PORCINE OOCYTE

Nguyen T. Ngan*, Nguyen T. N. Han, Phan H. H. Trinh, Le T. Thanh
and Luu K. Nhien

Faculty of Biological Sciences, Nong Lam University, Ho Chi Minh City, Vietnam

**Email: 17126086@st.hcmuaf.edu.vn*

Abstract

This study aimed to investigate the expression of vascular endothelial growth factor (VEGF) receptors and supplementation of VEGF in culture media on meiotic resumption competence of porcine oocyte. One step RT-PCR was applied to amplify VEGF-R1 (180 bp), VEGF-R2 (313 bp), and GAPDH (187 bp) genes. The results showed that VEGF-R1 and VEGF-R2 expression in ovarian tissue derived from small follicles (SF) was lowest (0.81 ± 0.06 and 0.11 ± 0.04 , respectively) when compared to medium follicles (MF; 0.82 ± 0.05 and 0.98 ± 0.10 , respectively), large follicles (LF; 0.95 ± 0.04 and 0.81 ± 0.05 , respectively), and corpus luteum (CL; 1.14 ± 0.12 and 0.77 ± 0.13 , respectively). In cumulus-oocyte complexes (COCs), expression of VEGF-R1 was highest at 44hrs (1.05 ± 0.06) of IVM, significantly different to 0hr and 22hrs (0.65 ± 0.06 and 0.82 ± 0.02 , respectively). In addition, supplementation of VEGF in IVM medium at different concentrations (0; 50; 100 and 200 ng/mL) during 44hrs of IVM resulted in increased nuclear maturation rate of oocytes. Maturation rate was highest (82.9%) in COCs group treated with 200 ng/mL VEGF as compared to other treated groups (58.6%, 65.7%, and 74.3% for 0, 50, 100 ng/mL, respectively). Furthermore, the stage-dependent effect of VEGF supplementation on nuclear maturation had been recorded. Maturation rate was highest ($P < 0.05$) in COCs group treated with 200 ng/mL VEGF for 44hrs (85.8%) compared to none treated (59.2%), only treated for first 22hrs (75.0%) or last 22hrs of IVM (66.7%). In conclusion, expression of VEGF receptors was found in tissue derived from different follicle sizes, while only VEGF-R1 was observed in COCs. VEGF supplementation in IVM medium enhanced nuclear maturation concerning the concentration and stage-dependent effects of maturation.

Keywords: Meiosis resumption; ovarian tissue; porcine oocytes; receptors; VEGF

STUDY ON PROLACTIN GENE POLYMORPHISM IN STAR53 CROSSBRED DUCKS USING PCR-RFLP

Le T. Loi¹, Pham T. N. Tuyet², Nguyen T. K. Ly¹, Hoang T. Thanh²
and Nguyen N. Tan^{1*}

¹*Faculty of Biological Sciences, Nong Lam University in Ho Chi Minh City, Vietnam*

²*VIGOVA Poultry Research and Development Center, Ho Chi Minh City, Vietnam*

*Email: nntan@hcmuaf.edu.vn

Abstract

The aims of this study were to evaluate the polymorphism of prolactin gene in the exon 5 region in crossbred ducks (Star53) by using PCR-RFLP method. A total of 60 blood samples were collected to extract the total DNA. A primer set was designed to amplify a segment of 536 bp in the exon 5 of the prolactin gene and then genotyping by using restricted enzymes such as *DraI*, *PvuII* and *PstI* according to the manufacturer. The 536 bp fragment target gene was successfully amplified. After genotyping, the monomorphism was found at PRL/*DraI* and PRL/*PvuII* loci. The polymorphism at the PRL/*PstI* site was identified by two alleles C and T, the frequency of C and T was 0.85 and 0.15, respectively. Two genotypes were observed and the genotype frequency was 0.70 and 0.30 for CC and CT, respectively. In Addition, the PIC and expected heterozygosity were 0.223 and 0.255, respectively. Taken together, we conclude that the polymorphic site at locus PRL/*PstI* was detected, allele C and CC genotypes were dominant. Understanding more insight into the association between PRL/*PstI* polymorphism and reproductive traits of Star53 crossbred ducks, further study is required.

Keywords: Crossbred duck; exon 5; polymorphism; PCR-RFLP; prolactin gene

ATTEMPT TO ESTABLISH CULTURE METHOD OF BOVINE OVIDUCTAL SMOOTH MUSCLE CELLS HAVING CONTRACTILE ABILITY AND COLLAGEN GEL CONTRACTION ASSAY

Sayaka Kubota^{1*}, Yuki Yamamoto^{1,2} and Koji Kimura¹

¹ Graduate School of Environmental and Life Science, Okayama University,
Okayama City, Japan

² Graduate School of Agriculture, Tokyo University of Agriculture and Technology,
Fuchu City, Japan

*Email: pqen5vrs@s.okayama-u.ac.jp

Abstract

The contraction movement of oviductal smooth muscle cells (OVSMCs) is involved in the oviductal transport of gametes and early embryos. To investigate this detailed mechanism, it is necessary to culture OVSMCs which maintain contractile ability. However, in the current culture method, OVSMCs do not show any contractile ability. In this study, the new culture method was established for contractile OVSMCs and conduct collagen gel contraction assay to confirm the contractile ability of obtained OVSMCs. OVSMCs were collected from bovine oviductal tissue by enzymatic digestion and cultured with an extracellular matrix (bovine type I collagen, or laminin), serum starvation, or both. We measured mRNA expression level of contractile markers (Myosin heavy chain (MHC) and Myocardin (MYOCD)) by qRT-PCR in OVSMCs cultured in various conditions. In collagen gel contraction assay, cultured OVSMCs were embedded in collagen gel, and the area of the gel was measured after oxytocin addition which induces oviduct contraction. OVSMCs cultured with laminin coat or serum starvation significantly increased MHC mRNA expression level compared to the control ($P < 0.05$), however, they did not show any collagen gel contraction. When the two conditions were combined, MHC mRNA expression did not increase compared to the control. MYOCD mRNA expression was not increased in any of the culture methods. From the above results, the culture methods improved MHC mRNA expression level, but OVSMCs did not show any contractile ability. Therefore, further investigation must be necessary to obtain the contractile OVSMCs.

Keywords: Bovine; oviduct; smooth muscle cells; contraction; culture method

EVALUATING OF CORRELATION OF THE ANTIBODIES AGAINST PORCINE CIRCOVIRUS TYPE 2 IN VACCINATED SOWS AND THEIR PROGENY

Nguyen V. Non^{1*} and Nguyen T. Toan²

¹*Ceva Animal Health Vietnam, Ho Chi Minh City, Vietnam*

²*Nong Lam University, Ho Chi Minh City, Vietnam*

**Email: non.nguyen@ceva.com*

Abstract

This study was aimed at evaluating the correlation of the antibodies against PCV2 in vaccinated sows and their progeny. A total of ninety sows with three parity clusters (first, second, 3-5th parity) were bled at 84-day-gestation to assess the PCV2 viremia and select out sixty PCV2 PCR-negative pregnant sows. These sows were randomly distributed in two groups and vaccinated intramuscularly (2ml) either with subunit vaccine or whole inactivated PCV2 vaccine on day 90 of gestations. Blood samples were taken from sows 6 days pre and 20 days post-vaccination. After farrowing, two piglets (<1.2 kg and >1.5 kg) per sow were bled at the first 24 hours and every interval week until 42 days old. Those serum samples from sows and piglets were measured for the anti-PCV2 antibody by Ingezim Circo IgG (Ingenasa) and determined the PCV2 viremia by qPCR (AniCon).

Significantly higher IgG antibody levels were detected in sows 20 days post-vaccination compared with 6 days pre-vaccination ($p < 0.001$). The IgG level in 110-day-gestation sows has positively correlated with their offspring ($r^2 = 0.5$ and $p < 0.001$), and no viremia detection in both dam and progeny. The result of mixed-effects regression was established ($p < 0.001$) in which the maternally derived antibody (MDA) was dependent on the dam's IgG concentration and piglet' age ($p < 0.001$) but independent ($p > 0.05$) of litter or the birth weight and the kind of vaccine. In conclusion, the vaccination for pregnant sows has improved humoral immunity, limited the PCV2 viremia before farrowing, and induced a high level of maternal antibodies in the offspring.

Keywords: IgG; maternal antibodies; offspring; PCV2; sow

GENETIC DIVERSITY OF PHAN RANG SHEEP BASED ON MITOCHONDRIAL D-LOOP SEQUENCE

Tran T. Vu¹, Le T. Loi¹, Hoang T. Tuan² and Nguyen N. Tan^{1*}

¹*Faculty of Biological Sciences, Nong Lam University, Ho Chi Minh City, Vietnam*

²*Vigova Poultry Research and Development Center, Ho Chi Minh City, Vietnam*

*Email: nntan@hcmuaf.edu.vn;

Abstract

The aim of this study was to investigate the genetic diversity of Phan Rang sheep at Ninh Thuan province of Vietnam based on nucleotide variations of mitochondrial D-loop region. The primers was designed to amplify the target gene with 709 bp in size, in which contained the fragment of 650 bp of the D-loop region. The sequences from 20 individual samples were used to analyze the nucleotide, haplotype diversity, genetic distance and reconstruct the phylogenetic tree. The results showed that the average number of nucleotide nucleotide composition was 38.0% A, 28.7% T, 20.8% C, 12.5% G, 66.7% A+T, and 33.3% G+C, and the A+T were more common than the G+C haplotype substantially, showing an AT bias. The nucleotide diversity (π) was 0.02641 ± 0.0000241 . There were 75 polymorphic sites and 13 haplotypes were found and the haplotype diversity (Hd) was 0.932 ± 0.00177 . . The genetic distance value between Phan rang sheep (PRS) and Arabian pure breed sheep (ArS) or ArS and hybrid Australian sheep (AuHS) was the highest (0.0359-0.0359), then lower between ArS) and AuHS (0.0320). The lowest value was observed between PRS and AuHS (0.0207) or ArHS (0.0262) or between AuHS and ArHS (00235). The results of phylogenetic tree demonstrated that most of Phan Rang sheep and crossbred sheep grouped into one clade and more closer to Asian sheep, especially South East Asia region, and halogroup B was found to be dominant in Phan Rang sheep. Thus, increasing sample size and whole d-loop sequencing for further analysis are required.

Keywords: Phan Rang Sheep; mitochondrial DNA; D-loop; genetic diversity

TRIAL TO EVALUATE THE EFFICACY OF BIOLOGICAL CASTRATION VACCINE (IMPROVAC®) ON ESTROGEN HORMONE AND GENITAL ORGANS IN FEMALE PIGS

Lai C. Danh¹, Nguyen K. Quoc¹, Vo T. Hue², Du D. Phong², Phan T. Truc²,
Doan T. V. Khanh¹ and Do T. Duy^{1*}

¹*Faculty of Animal Science and Veterinary Medicine, Nong Lam University,
Ho Chi Minh City, Vietnam*

²*Zoetis Vietnam company, Ho Chi Minh City, Vietnam*

*Email: duy.dotien@hcmuaf.edu.vn

Abstract

Gonadotropin – releasing hormone (GnRH) is secreted in hypothalamus and promotes the secretion of follicle stimulating hormone (FSH) and luteinizing hormone (LH) in pituitary gland, which play important roles in physiological maturity of female pig. Biological castration vaccine (IMPROVAC®) can stimulate the immune system of pigs to produce endogenous GnRH neutralizing antibodies, thereby reducing the maturation expression of sows. The aim of this study was to evaluate the effects of the IMPROVAC® vaccine on hormone secretion and reproductive organs of female pigs. A total of 20 healthy pigs, uniform in breed (LDxYSxDuroc), 12 + 0.5 weeks old, were assigned to 2 experimental groups. Group IF included 10 female pigs vaccinated at 12 and 16 week-old and Group EF included 10 entire female pigs non- vaccinated. The sera were collected at 12, 16 and 23 weeks of age. The trial pigs were slaughtered and sampled genitals at 23 weeks of age. The anti-GnRH antibody titers of the pigs in IF group were highly positive at week age 16 (0.46 ng/ml) and 23 (0,68 ng/ml) and were significantly higher ($p < 0.05$) than those in EF group. Meanwhile, the pigs of IF group showed lower concentration of estrogen than EF group at 16th and 23th week old, corresponding 44.16 vs. 59.43 and 39.30 vs. 91.34 pg/ml. At the time of slaughter, the genitals of pigs in IF group were significantly smaller and lighter than those in EF group. The quantity of secondary follicles of IF group were higher than that of EF group, in contrast with graafian follicles and lack of appearance of corpus luteum. The results showed that IMPROVAC® can stimulate pigs to effectively secrete anti-GnRH antibodies to reduce estrogen levels, which inhibits the development of genital organs in female pigs.

Keywords: IMPROVAC®; estrogen genital organs; female pigs

EFFICACY OF BIOLOGICAL CASTRATION VACCINE (IMPROVAC®) ON TESTOSTERONE AND GENITAL ORGANS IN BOARS

Nguyen L. Q. Nhu¹, Lai C. Danh¹, Giap X. Thien¹, Nguyen T. A. Linh¹, Huynh N. Truc¹, Du D. Phong², Phan T. Truc², Vo T. Hue², Doan T. V. Khanh¹ and Do T. Duy^{1*}

¹*Faculty of Animal Science and Veterinary Medicine, Nong Lam University, Ho Chi Minh City, Vietnam*

²*Zoetis Vietnam company, Ho Chi Minh City, Vietnam*

*Email: duy.dotien@hcmuaf.edu.vn

Abstract

This study aimed to evaluate the effects of IMPROVAC® vaccine on testosterone secretion and development of genital organs in the male pigs. A total of 25 male pigs, 03 weeks old, uniform in breed (LDxYSxDuroc) were randomly assigned to 3 groups named IM, SM and EM. 10 in IM group were vaccinated 2 doses of IMPROVAC® at 12 and 18 week-old and non-castrated, 10 pigs in SM group were routinely castrated at 3 week-old and non-vaccinated, and 5 entire pigs in EM group were non-vaccinated and non-castrated. The sera of trial pigs were collected at 12, 18 and 23 weeks of age, and their genitals were sampled at 23 week-old. The mean anti-GnRH antibody titer of pigs in IM group (0.47 ng/ml) was significantly higher ($p < 0.05$) than that of the EM and SM groups (0.34 and 0.32 ng/ml, respectively) at age week 23, while the testosterone concentration of pigs in IM group (4.86 ng/ml) was much lower than that of the EM group (26.72 ng/ml) ($p < 0.001$). However, there was no difference between testosterone concentration of pigs in IM group and SM group (4.86 and 2.25 ng/ml, respectively). The size and weight of genital organs in IM group were significantly lower ($p < 0.01$) than the EM group, while similar to pigs in the SM group. The findings showed that IMPROVAC® can stimulate pigs to secrete anti-GnRH antibodies to effectively reduce testosterone concentration, which inhibits the development of genital organs in male pigs. Biological castration vaccine (IMPROVAC®) could be an alternative to conventional castration to optimize time, labor and animal welfare.

Keywords: IMPROVAC®; testosterone; genital organs; boars

THE ADAPTATION CAPACITY OF 15 - DAI XUYEN SEA DUCKS (SEA DUCKS) TOWARDS SODIUM CHLORIDE (NaCl) IN DRINKING WATER IN TAN PHU DONG DISTRICT, TIEN GIANG PROVINCE

Thai Q. Hieu^{1*}, Le T. H. Nho¹, Le P. Thao¹, Tran T. M. Tu³, Le N. Man,³ Tran T. Dan² and Nguyen N. Tuan²

¹*Department of Livestock Production and Veterinary, Tien Giang Province, Vietnam;*

²*Faculty of Animal Science and Veterinary Medicine, Nong Lam University, Ho Chi Minh City, Vietnam;*

³*Faculty of Agriculture and Food Technology, Tien Giang University, Tien Giang Province, Vietnam.*

**Email: quochieu64@gmail.com*

Abstract

The present study was designed to evaluate the adaptation capacity of 15 - Dai Xuyen sea ducks (sea ducks) towards sodium chloride (NaCl) in drinking water in Tan Phu Dong district, Tien Giang province. The study was conducted in four treatments supplying water with different salt concentrations (1) 6 – 12‰; (2) 13 - 19‰; (3) 20 - 24‰ and (4) 25 - 30‰. Elephant grass was supplied with the different ratio: 0%, 5%, 8%, and 10 % in the period of 30 - 70 days old. The results indicated that adaptation to saline drinking water in sea ducks was an effective method to habituate the ducks to saline water intake. The saline water intake could reached at 19‰ and elephant grass supplement at the rate $\leq 5\%$ without health impairment. The 63 days old sea ducks with 19‰ saline water intake and 5% elephant grass supplement showed the normal performance without body impairment.

Keywords: Sea-duck; saline tolerance; growth performance; Tien Giang

THE BACTERIA COMMUNITY IN RELATION TO THE STATUS OF UTERINE SAMPLES OF DAIRY COWS

Tran T. M. Tu^{1*}, Nguyen T. Thuong², Tomas J. Acosta³ and Naoki Nishino⁴

¹*Faculty of Agriculture and Food Technology, Tien Giang Univerity,
Tien Giang Province, Vietnam*

²*Faculty of Animal Science and Veterinary Medicine, Nong Lam Univerity,
Ho Chi Minh City, Vietnam*

³ *Field Center of Animal Science and Agriculture, Obihiro University, Japan.*

⁴*Department of Animal Science, Graduate School of Life and Environmental Science,
Okayama University, Okayama, Japan.*

**Email: tranminhtu@tgu.edu.vn*

Abstract

The objective of the study was to identify the bacteria related with the status of the uterine samples were collected from Holstein cows after calving 1 months in dairy farm at Hokaido University. A total of 18 uterine samples were collected from healthy cows. The colour of uterine samples were recorded from transparency to brown, and red colour. Uterine bacteria community were subjected to DGGE and qPCR. The results showed the total bacteria was seen differently highest (10^{14} copies/mL) in red mucus samples ($P < 0.01$) which *Fusobacterium neurophorum* and *Bacteroides heparinolyticus* were mainly identified. *Escherichia E.coli* and *Pseudomonas flurescens* were found in brown mucus sample, which the population of bacteria showed a slight increase (10^{11} copies/mL). Meanwhile *Lactobacillus buchneri* and *Bifidobacterium sp* were seen in transparency samples, which the total bacteria were about $10^{10.5}$ copies/mL. The results indicated that the colour of uterine samples may show bacteria community and their population.

Keywords: Dairy cows; uterine samples; bacteria identification; bacteria population

EFFECTS OF POST-HATCH FEEDING TIME AND PRE-STARTER FEEDS ON GUT HEALTH OF LUONG PHUONG BREED

Bui T. K. Phung*, Cao P. U. Tran and Che M. Tung

*Faculty of Animal Science and Veterinary Medicine, Nong Lam University,
Ho Chi Minh City, Vietnam*

**Email: phung.buithikim@hcmuaf.edu.vn*

Abstract

In chickens, many studies have shown that the growth rate of the digestive system is quite fast in the first weeks after hatching, so their gut health is also influenced by nutrition in the early post-hatching period. The objective of this study was to evaluate access to feed immediate after hatching (0h) and delay to 30h after hatching with two different starter feeds (Vistart and Commerical used during the first 7 days after hatching), which affected intestinal villi morphology, and intestinal microflora (*Lactobacillus* and *E.coli*) in Luong Phuong chickens. A total of 480 uniform chicks of Luong Phuong breed were randomly divided into 4 treatments with 12 replications (10 chicks/pen). At 7 days of age, the microvilli in the duodenum and jejunum of the group fed at 0h have significantly more developed height and width than 30 hrs group ($P < 0.05$). The microvilli width in the Vistart group also increased faster than in the Commerical group ($P < 0.05$). Moreover, there is an interaction between the time of feeding and the starter feeds on the development of the width of the villi in the jejunum, if feeding 0h should use Vistart feed because the width of the intestinal capillaries will grow stronger than feeding 30 h as well as using Commerical feed ($P=0.05$). No significant correlations were found between *Lactobacillus* and *E.coli* in post-hatch feeding. However, the amount of *Lactobacillus* in the Vistart group was better than Commerical ($P < 0.05$) in the first 7 days.

Keywords: Feeding time; Gut health; Intestinal microflora; Pre-starter feed

EXPLORING THE ETIOLOGY OF REFRACTILE BODIES IN HUMAN OOCYTES

Yuto Aoki^{1*}, Hidetaka Tasaki^{1,2}, Mikiya Nakatsuka^{2,3} and Junko Otuki^{1,2}

¹*Graduate School of Environmental and Life Science, Okayama University,
Okayama, Japan*

²*Assisted Reproductive Technology Center, Okayama University, Okayama, Japan*

³*Graduate School of Health Sciences, Okayama University, Okayama, Japan*

*Email: px7j0k8z@s.okayama-u.ac.jp

Abstract

A refractile body (RB) is one of the dysmorphic phenotypes found in human oocytes. Oocytes with RBs larger than 5 μm in diameter have been reported to have reduced fertilization and implantation rates. Our previous study revealed that the characteristics of RBs are similar to those of lipofuscin, however, the etiological details remain unclear. In this study, we aimed to clarify the relationship between RBs and patients' age, and the association between RBs, lysosomes and autophagy. Ovaries were obtained from 24 patients with gender identity disorder (mean age $\pm$ SD; 31.5 ± 7.1). With 100 or more isolated primordial follicles from each of the 24 ovaries, the percentage of primordial follicles with RBs larger than 5 μm in diameter was calculated and compared among the patients. Primordial follicles were stained using Lysotracker Red DND-99 and LC3 antibody, to investigate any connection between lysosomes, LC3 and RBs. The percentage of primordial follicles with RBs larger than 5 μm in diameter ranged from 0.7% to 73.6% (mean $\pm$ SD; 24.8 ± 18.5). No relationship between patients' age and the presence of large RBs was detected ($P = 0.276$). Lysosomes were found to be localized inside the refractile bodies, whereas LC3 was distributed throughout the oocyte. No association with RBs was detected. These results suggest that the presence of large RBs is not related to aging, but rather related to lysosomes. Autophagy may be involved in RB formation earlier than the primordial follicle stage.

Keywords: Autophagy; refractile body; lipofuscin; primordial follicle; lysosome

THE EFFECTS OF ETHYLENEDIAMINETETRAACETIC ACID IN CULTURE MEDIUM ON INNER CELL MASS

Nanami Sono^{1*}, Hidetaka Tasaki^{1,2} and Junko Otsuki^{1,2}

¹*Graduate School of Environmental and Life Science, Okayama University,
Okayama, Japan*

²*Assisted Reproductive Technology Center, Okayama University, Okayama, Japan*

*Email: pc249rhe@s.okayama-u.ac.jp

Abstract

Monochorionic dichorionic (MD) twins are thought to result from the splitting of the inner cell mass (ICM) during the blastocyst stage, which is known to occur more frequently with blastocyst transfer. However, what causes the ICM to split remains unclear. Our previous study found that the ICMs of blastocysts that resulted in MD twins had loose intercellular junctions. Ethylenediaminetetraacetic acid (EDTA) has been shown to be effective in improving developmental rates, but it may also weaken intercellular junctions by chelating Ca^{2+} and Mg^{2+} . Consequently, the aim of this study was to investigate the intercellular adhesion of the ICM by preparing culture media with different EDTA concentrations. Oocytes derived from ICR mice were in vitro fertilized and cultured in KSOM-AA medium at different EDTA concentrations. Then, we evaluated the development rates and morphology of the ICMs using anti-Oct4 antibody. The percentage of embryos with scattered Oct4-positive cells was 37.6% in the control group, which was significantly higher than 15.3% in the low concentration group ($P < 0.001$). In addition, three split embryos were observed in the control group and one in the low-concentration group. This study showed that lower concentrations than the conventional 10 μM of EDTA in the culture medium did not affect embryonic development. It also suggests that the conventional EDTA concentration in the culture medium weakens the binding between ICM cells, resulting in the scattering and separation of ICM cells.

Keywords: Ethylenediaminetetraacetic acid; inner cell mass; culture medium; monochorionic dichorionic twin

THE APPLICATION OF SOFT PALATE RESECTION SURGERY FOR THE TREATMENT OF BRACHYCEPHALIC OBSTRUCTIVE AIRWAY SYNDROME IN BRACHYCEPHALIC DOG BREEDS

Cao N. An*, Vu T. Vy, Le D. Khoa, Nguyen T. T. An and Le Q. Thong

*Faculty of Animal Sciences and Veterinary Medicine, Nong Lam University,
Ho Chi Minh City, Vietnam*

**Email: caonaman@gmail.com*

Abstract

The research was performed on 10 dogs, of which 2 are brachycephalic breeds and 8 are non-brachycephalic breeds. Two brachycephalic breeds were BOAS positive in grades III and II. As a result, the prevalence of BOAS (+) in our finding was 0.48. French Bulldog, male and above 1 year old was considered a risk factor for having BOAS (+) (70%, 56.41%, and 67.85% respectively). Cutting site bleeding was the only intra-operative complication that we can observe during the surgery and this happened in 1 brachycephalic case (10%). This complication is not affecting the recovery process of the patient. Pain has not been noticed post-surgery. Respiratory function was improved for at least one grade after the surgery. Common complications post-surgery that can be named were regurgitation (10%), vomiting (10%), and death (10%). The average time for one surgery was 37 minutes for brachycephalic dogs and 22 minutes for non-brachycephalic dogs. The healing time for stenotic nares surgery was 7 – 10 days.

Keywords: Soft palate resection; brachycephalic obstructive airway treatment; brachycephalic dog

MUTATION ANALYSIS OF GENES ASSOCIATED WITH RECESSIVE DISORDERS IN A RARE STRAIN OF JAPANESE BLACK CATTLE

Misa Kakiuchi^{1*}, Kazuhiro Yoneda², Le N. A. Thu³, Takayuki Ibi¹, Shinji Sasaki⁴,
Tetsuo Kunieda⁵ and Takehito Tsuji¹

¹*Graduate School of Environmental and Life Science, Okayama University, Okayama, Japan*

²*Yoneda Genotyping Laboratory Ltd., Osaka, Japan*

³*Faculty of Animal Science and Veterinary Medicines, Hue University of Agriculture and
Forestry, Hue City, Vietnam*

⁴*Faculty of Agriculture, University of the Ryukyus, Okinawa, Japan*

⁵*Faculty of Veterinary Medicine, Okayama University of Science, Ehime, Japan*

*Email: pluo3zw6@s.okayama-u.ac.jp

Abstract

Takenotani Tsuru is a rare strain of Japanese Black (JB) cattle that has contributed to establishing important strains of JB cattle and is maintained for 200 years in Okayama, Japan. This strain has been confirmed to retain genetic characteristics that are clearly separated from those of current major strains of JB cattle, which therefore is considered an important genetic resource for the JB population with declining genetic diversity. However, because this strain has been maintained in a closed and small population, it is important to understand whether mutations causing recessive disorders are present. In this study, the exon sequences of 18 genes reported as causative genes of recessive disorders in cattle were analyzed by a comparison between the whole genome sequences of 2 sires from the rare strain and those of 100 JB cattle mixed DNA sample as a control. As a result, no variants were detected in 4 genes and 41 variants were detected in the remaining 14 genes. Eight of those variants were evaluated as deleterious by predictive software. However, these variants were homozygous in at least one healthy sire or found in the 100 JB mixed sample at a higher frequency than the reported causative mutations, indicating that these variants were not unique to the rare strain and were very unlikely to be harmful by resulting in recessive disorders. From these results, we conclude that no unique mutations harmful to maintaining the strain were found in the 18 genes of the rare strain.

Keywords: Japanese Black cattle; recessive disorders; Takenotani Tsuru; whole genome sequencing

β -CASEIN GENE POLYMORPHISM IN JERSEY COWS REARED IN OKAYAMA, JAPAN

Aodaofu*, Nuomin, Tran, D. P., Li, D. L., Maeda, T. and Nishino, N.

Department of Animal Science, Okayama University, Okayama, Japan

**Email: pxz39327@s.okayama-u.ac.jp*

Abstract

The frequencies of A1, A2, B, and I genotypes of the *CSN2* genes of Jersey cows in Japan were investigated. Blood samples were taken from 590 Jersey cows from eight farms in Okayama Prefecture, located in the southwest region of Japan. The frequencies of A1, A2, B, and I genotypes were determined by sequencing the exon 7 of the *CSN2* genes at chromosome 6. The allele frequencies of A1, A2, B, and I were 0.059, 0.746, 0.125, and 0.07, respectively, with A2A2 (0.558) as the most frequent genotype, followed by A2B and A2I with 0.190 and 0.103, respectively. No variants of A3, F, G, H1, and H2 were found. Considering that variant B belongs to A1 group and variant I to A2 group, the metabolic profiles of A1A1, A1A2, and A2A2 genotype cows for two farms were compared. Although differences between farms were observed for urea nitrogen, Ca, and P concentrations in blood, no differences were found owing to the three group-based genotypes. Japanese dairy cows are mostly (more than 99%) Holsteins and the population of Jersey is less than 1%; however, the Jersey breed appears advantageous for gathering A2A2 cows to produce A2 milk.

Keywords: β -casein; *CSN2* gene; genotype; Jersey

PRODUCTION OF β -CASOMORPHIN FROM A1 MILK, A2 MILK, A1 YOGURT, AND A2 YOGURT

Baek, R. *, Nuomin, Ton, N. M. T., Kiyochika, T., Tsuruta, T. and Nishino, N.

Department of Animal Science, Okayama University, Okayama, Japan

**Email: p80g61q3@s.okayama-u.ac.jp*

Abstract

Based on phenotypic differences in the β -casein *CSN2* gene, milk is classified into two types, A1 and A2. A peptide called β -casomorphin-7 (BCM-7) is produced during digestion when A1 milk is consumed, and BCM-7 may cause digestive discomfort and gut inflammation. Because of amino acid mutation, BCM-7 would not be produced from A2 milk; hence, A2 milk is now commercialized with the claim that it is less harmful to health. Meanwhile, lactic acid bacteria may possess the enzyme X-prolyl dipeptidyl-peptidase (Pep-X), which degrades proline-rich peptides; hence, concerns about A1 milk could be minimized when processed to yogurt and cheese. In this study, the production of BCM-7 after *in vitro* digestion was determined for A1 and A2 milk, and their yogurts fermented with lactic acid bacteria having Pep-X activity. Milk was obtained from Jersey cows of A1A1 and A2A2 genotypes determined by sequencing exon 7 of the *CSN2* gene chromosome 6. Casein was prepared by isoelectric precipitation with and without fermentation using *Streptococcus thermophilus* and *Lactobacillus plantarum* as starters. *S. thermophilus* had Pep-X activity. Lyophilized casein was subjected to *in vitro* digestion, and the peptides produced were ultrafiltrated and analyzed by reversed-phase HPLC. The amount of BCM-7 produced from 1 g of casein were 0.281 and 0.158 mg for A1 and A2 milk, 0.152 and 0.058 mg for A1 and A2 yogurt. When milk was processed to prepare yogurt, the production of BCM-7 decreased.

Keywords: β -casomorphin; casein; *CSN2* gene; milk

Sponsors:



NONG LAM UNIVERSITY, HO CHI MINH CITY



📍 Quarter 6, Linh Trung Ward, Thu Duc City,
Ho Chi Minh City, Vietnam
☎ 028 38966780
📠 028 38960713
✉ vphanhchinh@hcmuaf.edu.vn
🌐 www.hcmuaf.edu.vn