

XXIInd RENCONTRES DU VIETNAM | UNESCO'S OFFICIAL PARTNER
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THE SECOND VIETNAM INTERNATIONAL SYMPOSIUM ON MEDICINAL PLANTS AND NATURAL PRODUCTS

HỘI THẢO QUỐC TẾ LẦN THỨ HAI
VỀ CÂY DƯỢC LIỆU
VÀ HỢP CHẤT THIÊN NHIÊN



March 26 - 28, 2026



Quy Nhon, Vietnam

ABSTRACT BOOK





RENCONTRES DU VIETNAM
THE SECOND VIETNAM INTERNATIONAL SYMPOSIUM ON MEDICAL PLANTS AND
NATURAL PRODUCTS (MPNP2026)

ICISE, Quy Nhon Nam Ward, Gia Lai province, Vietnam
 March 26-28, 2026

PROGRAMME

Day 1, 25th March, 2026		
All day	Welcome invited guests and delegates to Quy Nhon Nam, Gia Lai	
18:00 ~	Meeting of the MPNP2026 organizing committee	Seagull hotel, 489 An Duong Vuong, Quy Nhon Nam, Gia Lai
19:00 ~	Welcome Dinner	Seagull hotel, 489 An Duong Vuong, Quy Nhon Nam, Gia Lai
Day 2, 26th March, 2026		
7:30 ~ 8:30	Moving to ICISE from Seagull Hotel by Shuttle Buses	
8:00 – 16:00	Opening, registration and poster hanging	ICISE, Quy Nhon Nam, Gia Lai
Chair: Assoc. Prof. Nguyen Thi Kieu Oanh <i>University of Science and Technology Hanoi, Vietnam</i> Co-Chair: Assoc. Prof. Nguyen Bao Quoc <i>Nong Lam University, Ho Chi Minh City, Vietnam</i>		
8:30 – 9:00	Welcome address Opening remarks Group photo	Assoc. Prof. Nguyen Thi Kieu Oanh Chair of Organizing Committee, MPNP2026 Dr. Tran Thanh Son Rencontres du Vietnam and ICISE
Keynote talks – Main Hall		
Co-Chair: Prof. Eric Gontier <i>University of Picardie Jules Verne, Amiens, France</i> Co-Chair: Assoc. Prof. Nguyen Bao Quoc <i>Nong Lam University, Ho Chi Minh City, Vietnam</i>		
9:00 – 9:30	Keynote speaker 1 (KO-01): 35 Years of Pioneering Research on Medicinal Plant Biotechnology and A New Direction in Microgravity-Validated Systems for Scalable Biomass and Metabolite Production	Prof. Duong Tan Nhut <i>Institute of Life Sciences, VAST, Vietnam</i>
9:30 – 10:00	Keynote speaker 2 (KO-02): Gut Metabolism of Polymethoxyflavones by the Cobalamin-Dependent O-Demethylase	Prof. Jeahong Han <i>President of Asian Society of Natural Product (ASNP)</i>

		Chung-Ang University, Republic of Korea	
10:00 – 10:30	Tea break and poster visiting		
Keynote talks – Main Hall			
Co-Chair: Prof. Duong Tan Nhut Institute of Life Sciences, VAST, Vietnam			
Co-Chair: Assoc. Prof. Nguyen Thi Kieu Oanh University of Science and Technology Hanoi, Vietnam			
10:30 – 11:00	Keynote speaker 3 (KO-03): Young Scientists and Plant Secondary Metabolites: Charting a One Health, Sustainable, and Ethical Roadmap for 2040		Prof. Eric Gontier University of Picardie Jules Verne, Amiens France
11:00 – 11:30	Keynote speaker 4 (KO-04): Efficient Cannabis Cultivation Technologies in Vertical Farming Systems		Prof. Jong Seok Park Chung Nam National University, Republic of Korea
11:30 – 12:00	Industry session		
12:00 – 13:00	Lunch break		ICISE, Quy Nhon Nam, Gia Lai
13:00 – 13:45	Poster presentation		
Concurrent sessions			
	Medicinal plants and other valuable natural resources Main Hall	Advances in natural products discovery Meeting Room 1	Production and application of medicinal plants and their bioactive compounds Meeting Room 2
	Co-Chair: Prof. Duong Tan Nhut Co-Chair: Assoc. Prof. Nguyen Thi Hong Thuong	Co-Chair: Prof. Jeahong Han Co-Chair: Dr. Le Thanh Huong	Co-Chair: Prof. Eric Gontier Co-Chair: Dr. Govind P. Rao
14:00 – 14:30	Invited speaker 1 (IO-1): Chemical constituents and hypoglycemic activity of Gomphogyne bonii: implications for product development research Assoc. Prof. Phuong Thien Thuong Vietnam-Korea Institute of Science and Technology, Hanoi, Vietnam	Invited speaker 2 (IO-2): Discovery of plant-based alkyl triphenylphosphonium derivatives as potent cytotoxic agents against cancer cell lines Assoc. Prof. Dang Hoang Phu University of Science, Vietnam National University Ho Chi Minh City, Vietnam	Invited speaker 3 (IO-3): Plant Enzyme Inhibitors: Extraction, Biological Activity, and Application Assoc. Prof. Nguyen Minh Chon Institute of Food and Biotechnology, Can Tho University, Vietnam
14:30 – 14:50	Oral talk -1 (OP-1.1):	Oral talk 1 (OP-2.1):	Oral talk 1 (OP-3.1):

	Assessment of Genetic Diversity of Camellia Tea Varieties Cultivated in Phu hoi Commune, Dong Nai province Using SRAP markers Assoc. Prof. Nguyen Bao Quoc Nong Lam University, Ho Chi Minh City, Vietnam	<i>In silico</i> molecular characterization and anticancer activity of bougainin of Bougainvillea plant Dr. Govindappa Melappa Davangere University, Davangere, India	Evaluation of the sedative effect of an herbal blend containing <i>Cleistocalyx operculatus</i>, <i>Mentha arvensis</i>, <i>Perilla ocymoides</i>, <i>Ocimum sanctum</i>, and <i>Stevia rebaudiana</i> Assoc. Prof. Tran Thi Le Minh Nong Lam University, Ho Chi Minh City, Vietnam
14:50 – 15:10	Oral talk 2 (OP-1.2) Conservation and Commercialization of <i>Picrorhiza kurroa</i> and <i>Swertia chirayita</i>: The Case of Two Endangered Medicinal Herbs in the Western Himalaya. Dr. Rajesh Chauhan Himachal Pradesh Forest Department Chief Project Director (JICA-PIHPFEM&L) Totu, Shimla, India	Oral talk 2 (OP-2.2) Optimization of synthesis conditions for <i>Calophyllum inophyllum</i> L.-loaded solid lipid nanoparticles Assoc. Prof. Mai Huynh Cang Nong Lam University, Ho Chi Minh City, Vietnam	Oral talk 3 (OP-3.2) Rheology and Extrusion 3D Printing of kappa Carrageenan/Olive Oil Emulsion Gel Tablets for Release of Vitamin C and Curcumin Prof. Prachi Thareja Indian Institute of Technology Gandhinagar, Gujarat, India
15:10 – 15:30	Oral talk 3 (OP-1.3) Isolation and biophysical characterization of <i>Endophytic actinomycetes</i> with antibacterial, antioxidant and anti-inflammatory properties Prof. Shyam Kumar Vootla Karnatak University, Dharwad, India	Oral talk 3 (OP-2.3) Isolation and Structural Characterization of a Triterpenoid Saponin, Barringtonenol C Glycoside, from <i>Barringtonia acutangula</i> Fruit and Its Anticancer Potential Against Hepatocellular Carcinoma Dr. Pradeepa Krishnappa Kuvempu University, Shivamogga, India	Oral talk 3 (OP-3.3) Formulation of Microparticle Systems Containing Polyphenols Extracted from Noni (<i>Morinda citrifolia</i> L.) Fruits Dr. Duong Thi Thuan Duy Tan University, Da Nang City, Vietnam
15:30 -16:00	Tea break + poster visiting		
	Co-Chair: Prof. Moonhyuk Kwon Co-Chair: Prof. Dang Phuong Thao	Co-Chair: Assoc. Prof. Dang Hoang Phu Co-Chair: Assoc. Prof. Nguyen Thi Hong Thuong	Co-Chair: Assoc. Prof. Nguyen Minh Chon Co-Chair: Dr. Nguyen Phuoc Vinh
16:00 - 16:20	Oral talk 4 (OP-1.4)	Oral talk 4 (OP-2.4)	Oral talk 4 (OP-3.4)

	Integrated genomic, evolutionary and applied research on duckweeds (Lemnaceae) Assoc. Prof. Hoang Thi Nhu Phuong Da Lat University, Lam Dong province, Vietnam	Antioxidant-Linked Pharmacological Potential of a Traditionally Used Asian Wild Fruit: A Bioactive Metabolite Assessment of Flacourtia montana Prof. Rajashekharappa Sharath Davangere University, Davangere, India	Anti-inflammatory Activity of <i>Knema lenta</i> Warb.: From Methanolic Extract to a Newly Identified Bioactive Compound Dr. Le Thanh Huong University of Science and Technology of Hanoi, Vietnam
16:20 – 16:40	Oral talk 5 (OP-1.5) Research Advances in Medicinal Plants of The Genus Centaurea Grown in Algeria Prof. Hamada Haba Batna 1 University, Batna, Algeria	Oral talk 5 (OP-2.5) Integrated Metabolomic Profiling, Antioxidant and Cytotoxic Evaluation, and Computational Target Validation of Bioactive Phytoconstituents from <i>Sargostigma klenii</i> Assoc. Prof. Raja Naika Hanumanaika Central University of Kerala, Kasaragod, India	Oral talk 5 (OP-3.5) Anticancer activity of extraction and nature compound isolated from Chum Duong fruit (<i>Sphaerocoryne affinis</i>) on cervical cancer line Dang Viet Tuan University of Science, Vietnam National University, Ho Chi Minh City, Vietnam
16:40 – 17:00	Oral talk 6 (OP-1.6) Quantitative Analysis and Bioactivity Evaluation of Methyl Gallate Isolated from the Vietnamese Lacquer Tree Dr. Le Van University of Medicine and Pharmacy at Ho Chi Minh city, Vietnam	Oral talk 6 (OP-2.6) Potential Anti-Melanogenic Secondary Metabolites from the Polar Extracts of <i>Gigantochloa levis</i> (Blanco) Merr. Shoots Assoc. Prof. Lina Sagara-Lacandalo Mindanao State University, Philippines Western Mindanao State University, Zamboanga City, Philippines	Oral talk 6 (OP-3.6) Anticancer activity of <i>Sphaerocoryne affinis</i> fruit on human metastatic breast cancer cell line MDA-MB-231 Truong Thi Bich Ngoc University of Science, Vietnam National University, Ho Chi Minh City, Vietnam
17:00 – 17:20	Oral talk 7 (OP-1.7) Chemical constituents and bioactivities of the alkaloid enrichment from <i>Coptis chinensis</i> roots Do Hoang Giang Center for High Technology Research and Development, Vietnam Academy of Science	Oral talk 7 (OP-2.7) Bioactivity Guided Fractionation of <i>Toona ciliata</i> M. Roem Leaf Extract as a source of Anti-leishmanial compound Vishal Kumar Singh Institute of Medical Sciences, Banaras Hindu University, India	Oral talk 7 (OP-3.7) Ethyl acetate extract of <i>Elephantopus mollis</i> kunth. induced apoptosis and senescence in human lung cancer cells Tran Thanh Long University of Sciences, Vietnam National University, Ho Chi Minh City, Vietnam

	<i>and Technology, Hanoi, Vietnam</i>	
17:30	Returning to Seagull Hotel by shutter Buses	
Day 3, 27th March, 2026		
8:30 – 9:00	Moving to ICISE from Seagull Hotel by shuttle Buses	
Keynote talks – Main Hall		
Co-Chair: Prof. Duong Tan Nhut <i>Institute of Life Sciences, VAST, Vietnam</i> Co-Chair: Prof. Eric Gontier <i>University of Picardie Jules Verne, Amiens, France</i>		
9:00 – 9:30	Keynote speaker 5 (KO-05): Constructing complexity: Biosynthesis and Engineering of Spirooxindole Alkaloids in Plants	Assist. Prof. Thu Thuy Dang <i>The University of British Columbia, Canada</i>
9:30 – 10:00	Keynote speaker 6 (KO-06): Integrating Plant Biotechnology and Natural Product Research for Sustainable Functional Food Development	Prof. So-Young Park <i>Chungbuk National University, Republic of Korea</i>
10:00 – 10:30	Tea break and poster visiting	
Keynote talks – Main Hall		
Co-Chair: Prof. Jeahong Han <i>President of Asian Society of Natural Product (ASNP)</i> Co-Chair: Assoc. Prof. Phuong Thien Thuong <i>Vietnam-Korea Institute of Science and Technology, Hanoi, Vietnam</i>		
10:30 – 11:00	Keynote speaker 7 (KO-07): Integrating Traditional Knowledge and Modern Science: The Therapeutic Promise of Vietnamese Medicinal Plants	Prof. Dang Phuong Thao <i>University of Science, Vietnam National University Ho Chi Minh City, Vietnam</i>
11:00 – 11:30	Keynote speaker 8 (KO-08): Research on Plant Specialized Metabolism and Synthetic Biology for a Sustainable Future: How to Produce Natural Products from Nature to Synthetic.	Prof. Moonhyuk Kwon <i>Gyeongsang National University, Republic of Korea</i>
11:30 – 12:00	Industry session	
12:00 – 13:00	Lunch break	<i>ICISE, Quy Nhon Nam, Gia Lai</i>
13:00 – 13:45	Poster presentation	

Concurrent sessions			
	Medicinal plants and other valuable natural resources Main Hall	Advances in natural products discovery Meeting Room 1	Production and application of medicinal plants and their bioactive compounds Meeting Room 2
	Co-Chair: Assist. Prof. Thu Thuy Dang Co-Chair: Assoc. Prof. Tran Thi Le Minh	Co-Chair: Prof. So-Young Park Co-Chair: Assoc. Prof. Nguyen Minh Chon	Co-Chair: Assoc. Prof. Phuong Thien Thuong Co-Chair: Dr. Le Thanh Huong
14:00 – 14:30	Invited speaker 4 (IO-4): Exploration of Bacterial Natural Products with Genome Information and Molecular Networks <i>Dr. Jin Soo Park</i> <i>Korea Institute of Science and Technology, Republic of Korea</i>	Invited speaker 5 (IO-5): Phenotypic Screening Based Discovery of Neuroprotective and Hepatic metabolic modulators <i>Dr. Lee Jae Wook</i> <i>Korea Institute of Science and Technology, Republic of Korea</i>	Invited speaker 6 (IO-6): Elicitation as a tool to improve the profiles of high-value secondary metabolites <i>Prof. Niranjana Murthy Hosakatte</i> <i>Chungbuk National University, Republic of Korea</i> <i>Christ University, India</i>
14:30 – 14:50	Oral talk 8 (OP-1.8) Ethnobotanical Survey of Medicinal Plants and Practices of Traditional Healers in North Pemba Region of Zanzibar: Implications for Sustainable Use and Conservation <i>Dr. Khamis Kheir</i> <i>Zanzibar Health Research Institute, South Unguja Region, Zanzibar, Tanzania</i>	Oral talk 8 (OP-2.8) PTM-Guided Natural Product Discovery for Targeting Pathological Tau and α-Synuclein Assembly <i>Prof. Sharad Gupt</i> <i>Indian Institute of Technology Gandhinagar, Gujarat, India</i>	Oral talk 8 (OP-3.8) A novel herbal-based ear drop with <i>Ocimum gratissimum</i> essential oil: an alternative strategy for managing otomycosis <i>Dr. Nguyen Phuoc Vinh</i> <i>Faculty of Pharmacy, University of Health Sciences, Vietnam National University, Ho Chi Minh City, Vietnam</i>
14:50 -15:10	Oral talk 9 (OP-1.9) Catalytic promiscuity of oxido-reductases in natural products metabolism <i>Dr. Nguyen T. Don</i> <i>University of British Columbia, Canada</i>	Oral talk 9 (OP-2.9) Enhancing kinsenoside production and antibacterial potential in <i>Anoectochilus lylei</i> rhizome cultures via elicitation <i>Dr. Ho Thanh Tam</i> <i>Duy Tan University, Da Nang City, Vietnam</i>	Oral talk 9 (OP-3.9) The effects of <i>Elephantopus mollis</i> extracts on the migration, invasion, and adhesion of human cervical cancer SiHa cells <i>Assoc. Prof. Nguyen Thi My Trinh</i> <i>University of Sciences, Vietnam National University Ho Chi Minh City, Vietnam</i>
15:10 – 15:30	Oral talk 10 (OP-1.10)	Oral talk 10 (OP-2.10)	Oral talk 10 (OP-3.10)

	Optimization of Ultrasound-Assisted Extraction Conditions for Piperine from Black Pepper (<i>Piper nigrum</i> L.) and its Characteristics Dr. Phan Vinh Thinh <i>Nha Trang University, Nha Trang City, Vietnam</i>	Purification of aqueous <i>Syzygium cumini</i> (L.) seed extract using ultrafiltration: Identification of fouling mechanism and development of steady state and unsteady state model for prediction of permeate flux Prof. Biswajit Sarkar <i>Guru Gobind Singh Indraprastha University, New Delhi, India</i>	<i>Garcinia talbotii</i> fruit extract and its active principle Oblongifolin A sensitize chemoresistance in MIA PaCa-2/Panc-1 Pancreatic cancer cell lines Prof. Kumaraswamy Honnenahally Malleshappa <i>Kuvempu University, Karnataka, India</i>
15:30 -16:00	Tea break + poster visiting		
	Co-Chair: Prof. Moonhyuk Kwon Co-Chair: Assoc. Prof. Tran Thi Le Minh	Co-Chair: Prof. Dang Phuong Thao Co-Chair: Dr. Le Thanh Huong	Co-Chair: Assoc. Prof. Phuong Thien Thuong Co-Chair: Dr. Nguyen Phuoc Vinh
16:10 – 16:30	Oral talk 11 (OP-1.11) Evaluation of the biological activities of microfungi species isolated from the medicinal plant <i>Angelica sinensis</i> Dr. Trieu Anh Trung <i>Hanoi National University of Education, Hanoi, Vietnam</i>	Oral talk 11 (OP-2.11) AI-Guided Chemical and Bioactivity Mapping to Accelerate Drug Discovery from Vietnamese Medicinal Plants Dr. Nguyen Thi Xuan Dieu <i>University of Medicine and Pharmacy at Ho Chi Minh City</i>	Oral talk 11 (OP-3.11) Up-scaling study for optimized formulation and Experimental Validation of Chitosan Nanoparticles Loaded-Curcumin in Hyperlipidemic Rats Dr. Varunakumara Julpi Bheemappa <i>Kuvempu University, Shivamogga, India</i>
16:30 – 16:50	Oral talk 12 (OP-1.12) Aaptamine Inhibits Foam Cell Formation by Downregulating CD36 and SR-A Expression, and, Reducing oxLDL Uptake Ina Monica Firsty <i>Universiti Malaysia Terengganu, Terengganu, Malaysia</i>	Oral talk 12 (OP-2.12) A Green and Scalable Process for Flavonoid Enrichment from Immature Pomelo Fruit Using Diaion HP-20 Adsorption Resin Dr. Nguyen Ngoc Lien <i>East Asia University of Technology, Bac Ninh, Vietnam</i>	Oral talk 12 (OP-3.12) <i>Pandanus tectorius</i> Self-Nanoemulsifying Drug Delivery System: a Natural Strategy to Prevent Atherosclerosis via the Inhibition of HMG CoA Reductase Alifa Husnun Kholieqoh <i>Universiti Malaysia Terengganu, Kuala Terengganu, Malaysia</i>
16:50 – 17:10	Oral talk 13 (OP-1.13) Effects of Simulated Microgravity on Growth and Lignan Biosynthesis in	Oral talk 13 (OP-2.13) Green Deep Eutectic Solvent-Assisted Extraction of Flavonoids and Phenolics	Oral talk 13 (OP-3.13) Weak Affinity Chromatography for Herbal Medicines: A Tool for

	<i>Phyllanthus amarus</i> Single Cells Nguyen Thi Nhu Mai <i>Institute of Life Sciences, Da Lat city, Vietnam</i>	from <i>Kaempferia galanga</i> Rhizomes Nguyen Thu Uyen <i>University of Science and Technology Hanoi, Vietnam</i>	Bioactivity, Bioavailability, and Drug-Herb Interactions Research Timothy Jay Bengala <i>De La Salle Medical and Health Sciences Institute, Dasmariñas, Cavite, Philippines</i>
17:10 – 17:30	Oral talk 14 (OP-1.14) Fabrication of a bioactive biopolymer film integrating python fat and tamanu (<i>Calophyllum inophyllum</i> L.) oil Tran Ngoc Chi Uyen <i>Nong Lam University Ho Chi Minh City, Vietnam</i>	Oral talk 14 (OP-2.14) Stress-adapted traits of plant growth-promoting bacteria associated with native <i>Musa</i> species in Vietnam Le Van Thanh Luan <i>Fulbright University Vietnam, Ho Chi Minh City, Vietnam</i>	Oral talk 14 (OP-3.14) Antioxidant and Photoprotective Potentials of <i>Diplopterygium giganteum</i> Gametophyte Extracts Derived from In Vitro Culture Nguyen Hoang Phuc <i>University of Sciences, Vietnam National University, Ho Chi Minh City, Vietnam</i>
17:30 – 17:50		Oral talk 15 (OP-2.15) Cannabis phytomolecules have anti-cancer and anti-angiogenesis activity related to ovarian cancer Prof. Hinanit Koltai <i>ARO, Volcani Institute, Israel</i>	
18:00 – 19:00	Cocktail banquet		
19:00 – 21:00	GALA dinner		<i>ICISE, Quy Nhon Nam, Gia Lai</i>
21:00 ~	Returning to Seagull Hotel by shutter Buses		
Day 4, 28th March 2026			
8:30 ~ 9:00	Moving to ICISE from Seagull Hotel by shuttle Buses		
Keynote and invited talks – Main Hall			
Co-Chair: Prof. Niranjana Murthy Hosakatte <i>Chungbuk National University, Republic of Korea</i> Co-Chair: Prof. Eric Gontier <i>University of Picardie Jules Verne, Amiens, France</i>			
9:00 – 9:30	Keynote speaker 9 (KO-9): (Online) Analytical Perspectives on Plant Secondary Metabolites: Mass Spectrometry Based Metabolomics Approaches		Dr. Robin Joshi <i>University of Pennsylvania, USA</i>

9:30 – 10:00	Keynote speaker 10 (KO-10): Medicinal Plants and Natural Products in Vietnam: Potentials, Opportunities, Challenges, and Strategic Requirements in the New Era	Assoc. Prof. Tran Van On <i>Hanoi University of Pharmacy</i>
10:00 – 10:30	Tea break	
10:30 – 11:00	Keynote speaker 11 (KO-11) Soil Microbiome Diversity and its Role in Medicinal Plants Growth and Quality	Dr. Govind P. Rao <i>Editor in Chief, Medicinal Plants, India</i>
11:00 -12:00	Closing ceremony – Main Hall + Best oral and poster prize for students	Assoc. Prof. Nguyen Thi Kieu Oanh Chair of Organizing Committee, MPNP2026 Assoc. Prof. Nguyen Bao Quoc Co-chair of Organizing Committee, MPNP2026
12:00 – 13:30	Lunch break	<i>ICISE, Quy Nhon Nam, Gia Lai</i>
13:30 – 16:00	Excursion in Hon Kho island for delegates	
16:00 – 17:00	Back to the Seagull hotel, Quy Nhon Nam, Gia Lai, Vietnam	

Preface

According to the World Health Organization (WHO), more than 80% of the global population relies on medicinal plants for primary health care. The increasing interest in natural therapies and plant-derived compounds is driving new advances in medicine, shifting the focus toward health maintenance, wellness enhancement, and preventive care - an increasingly important global trend.

Vietnam, located in Southeast Asia within the tropical zone, possesses diverse climatic and geographical conditions that are highly favorable for the growth and development of medicinal plants. Of the approximately 12,000 plant species recorded in Vietnam, around 5,000 species have been traditionally used in ethnomedicine. Vietnam's diverse flora and fauna provide abundant natural resources, with many species of high pharmacological and economic value, particularly when combined with the indigenous knowledge of its 54 ethnic groups. Owing to its rich biodiversity and long-standing cultural traditions, Vietnam is recognized as one of the 15 key countries on the global map of medicinal plants.

However, in recent years, climate change and environmental degradation have posed significant challenges to the conservation and sustainable use of medicinal plant resources. These issues highlight the urgent need for more scientific and sustainable approaches in the research, development, conservation, and innovation of medicinal plants and natural products in Vietnam.

This year, Rencontres du Vietnam presents **The Second Vietnam International Conference on Medicinal Plants and Natural Products (MPNP2026)** that will mainly be focused on various aspects of medicinal plants biology at agronomy and molecular levels, the progression of plant derived extracts, molecules, and foods as well as establishment of Vietnamese and global private-public network. The conference aims to provide an interdisciplinary platform for all delegates to present research results, share experiences, and discuss the most recent innovations, trends and concerns as well as practical challenges encountered and solutions adopted in the field of medicinal plant biology and advanced innovation in natural products. This event is also a chance for all delegates to maintain the existing and initiate new multidisciplinary collaborative networks.

The symposium has received a total of 90 abstracts across keynote, invited, oral, and poster presentations. The presenters represent 14 countries, including Israel, South Korea, France, United States, Canada, Vietnam, India, Indonesia, Algeria, Laos, South Africa, Philippines, Belgium, and Tanzania, as well as many universities, research institutes, and industry partners.

On behalf of the organizing committee, we would like to show our great appreciation to Prof. Jean Tran Thanh Van –President of Rencontres du Vietnam, Director of ICISE Quy Nhon, Prof. Le Kim Ngoc (Rencontres du Vietnam) for more generous financial support to this event. We are truly grateful to valuable supports from ICISE; Society for Conservation and Resource Development of Medicinal Plants, India; The Asian Society of Natural Product Research.

Thank you so much for joining MPNP2026 in ICISE, Quy Nhon and wishing you all the best time at this event.

Gia Lai, March 2026

Organizing Committee of MPNP2026

SCIENTIFIC ADVISORY COMMITTEE

- **Prof. Marie-Genevieve Dijoux Franca**

University of Lyon 1, France

- **Prof. Eric Gontier**

University of Picardie Jules Verne, France

- **Dr. Govind P.Rao**

Society for Conservation and resource Development of Medicinal Plants, New Delhi India

- **Prof. Duong Tan Nhut**

Institute of Life Sciences, VAST, Vietnam

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Nong Lam University, HCMC, Vietnam

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- **Assoc. Prof. Phuong Thien Thuong**

Vietnam-Korea Institute of Science and Technology

- **Dr. Ho Thanh Tam**

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Nong Lam University, HCMC, Vietnam

- **Dr. Ho Thanh Tam**

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- **Dr. Tran Thanh Son**

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- **Mrs. Nguyen Thi Loi**

ICISE, Quy Nhon, Vietnam

- **Mr. Nguyen Trong Nhan**

ICISE, Quy Nhon, Vietnam

CONTENTS		Page
Keynote lectures		
[KO-01] 35 Years of Pioneering Research on Medicinal Plant Biotechnology and A New Direction in Microgravity-Validated Systems for Scalable Biomass and Metabolite Production. <i>Prof. Duong Tan Nhut</i> <i>Institute of Life Sciences, VAST, Vietnam</i>		2
[KO-02] Gut Metabolism of Polymethoxyflavones by the Cobalamin-Dependent O-Demethylase. <i>Prof. Jeahong Han</i> <i>President of Asian Society of Natural Product (ASNP),</i> <i>Chung-Ang University, Republic of Korea.</i>		4
[KO-03] Young Scientists and Plant Secondary Metabolites: Charting a One Health, Sustainable, and Ethical Roadmap for 2040. <i>Prof. Eric Gontier</i> <i>University of Picardie Jules Verne, Amiens, France.</i>		5
[KO-04] Efficient Cannabis Cultivation Technologies in Vertical Farming Systems. <i>Prof. Jong Seok Park</i> <i>Chung Nam National University, Republic of Korea</i>		5
[KO-05] Constructing complexity: Biosynthesis and Engineering of Spirooxindole Alkaloids in Plants. <i>Assist. Prof. Thu Thuy Dang</i> <i>The University of British Columbia, Canada</i>		7
[KO-06] Integrating Plant Biotechnology and Natural Product Research for Sustainable Functional Food Development. <i>Prof. So-Young Park</i> <i>Chungbuk National University, Republic of Korea</i>		8
[KO-07] Integrating Traditional Knowledge and Modern Science: The Therapeutic Promise of Vietnamese Medicinal Plants. <i>Prof. Dang Phuong Thao</i> <i>University of Science, Vietnam National University Ho Chi Minh City, Vietnam</i>		9
[KO-08] Research on Plant Specialized Metabolism and Synthetic Biology for a Sustainable Future: How to Produce Natural Products from Nature to Synthetic. <i>Prof. Moonhyuk Kwon</i> <i>Gyeongsang National University, Republic of Korea.</i>		10
[KO-09] Analytical Perspectives on Plant Secondary Metabolites: Mass Spectrometry Based Metabolomics Approaches. <i>Dr. Robin Joshi</i> <i>University of Pennsylvania, USA</i>		12
[KO-10] Medicinal Plants and Natural Products in Vietnam: Potentials, Opportunities, Challenges, and Strategic Requirements in the New Era. <i>Assoc. Prof. Tran Van On</i> <i>Hanoi University of Pharmacy</i>		13
[KO-11] Soil Microbiome Diversity and its Role in Medicinal Plants Growth and Quality.		14

Dr. Govind P. Rao <i>Editor in Chief, Medicinal Plants, India</i>	
Invited speakers	
[IO-01] Chemical constituents and hypoglycemic activity of <i>Gomphogyne bonii</i>: implications for product development research. Assoc. Prof. Phuong Thien Thuong <i>Vietnam-Korea Institute of Science and Technology, Hanoi, Vietnam</i>	17
[IO-02] Discovery of plant-based alkyl triphenylphosphonium derivatives as potent cytotoxic agents against cancer cell lines. Assoc. Prof. Dang Hoang Phu <i>University of Science, Vietnam National University Ho Chi Minh City, Vietnam</i>	18
[IO-03] Plant Enzyme Inhibitors: Extraction, Biological Activity, and Application. Assoc. Prof. Nguyen Minh Chon <i>Institute of Food and Biotechnology, Can Tho University, Vietnam</i>	19
[IO-04] Exploration of Bacterial Natural Products with Genome Information and Molecular Networks. Dr. Jin Soo Park Korea <i>Institute of Science and Technology, Republic of Korea</i>	20
[IO-05] Phenotypic Screening Based Discovery of Neuroprotective and Hepatic metabolic modulators. Dr. Lee Jae Wook Korea <i>Institute of Science and Technology, Republic of Korea</i>	21
[IO-06] Elicitation as a tool to improve the profiles of high-value secondary metabolites. Prof. Niranjana Murthy Hosakatte <i>Chungbuk National University, Republic of Korea; Christ University, India</i>	22
Oral talks	
[OP-1.1] Assessment of Genetic Diversity of <i>Camellia</i> Tea Varieties Cultivated in Phu Hoi Commune, Dong Nai Province Using SRAP Markers. Assoc. Prof. Nguyen Bao Quoc <i>Nong Lam University, Ho Chi Minh City, Vietnam</i>	24
[OP-1.2] Conservation and Commercialization of <i>Picrorhiza kurroa</i> and <i>Swertia chirayita</i>: The Case of Two Endangered Medicinal Herbs in the Western Himalaya. Dr. Rajesh Chauhan <i>Himachal Pradesh Forest Department, India</i> <i>Chief Project Director (JICA-PIHPFEM&L) Totu, Shimla, India</i>	25
[OP-1.3] Isolation and biophysical characterization of endophytic actinomycetes with antibacterial, antioxidant and anti-inflammatory properties. Prof. Shyam Kumar Vootla <i>Karnatak University, Dharwad, India</i>	26
[OP-1.4] Integrated genomic, evolutionary and applied research on duckweeds (Lemnaceae). Assoc. Prof. Hoang Thi Nhu Phuong <i>Da Lat University, Lam Dong Province, Vietnam</i>	27
[OP-1.5] Research Advances in Medicinal Plants of the Genus <i>Centaurea</i> Grown in Algeria. Prof. Hamada Haba	28

<i>Batna 1 University, Batna, Algeria</i>		
[OP-1.6] Quantitative Analysis and Bioactivity Evaluation of Methyl Gallate Isolated from the Vietnamese Lacquer Tree.		29
Dr. Le Van <i>University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam</i>		
[OP-1.7] Chemical constituents and bioactivities of the alkaloid enrichment from <i>Coptis chinensis</i> roots.		30
Do Hoang Giang <i>Center for High Technology Research and Development, Vietnam Academy of Science and Technology, Hanoi, Vietnam</i>		
[OP-1.8] Ethnobotanical Survey of Medicinal Plants and Practices of Traditional Healers in North Pemba Region of Zanzibar: Implications for Sustainable Use and Conservation.		31
Dr. Khamis Kheir <i>Zanzibar Health Research Institute, South Unguja Region, Zanzibar, Tanzania</i>		
[OP-1.9] Catalytic promiscuity of oxido-reductases in natural products metabolism.		32
Dr. Nguyen T. Don <i>University of British Columbia, Canada</i>		
[OP-1.10] Optimization of ultrasound-assisted extraction conditions for piperine from black pepper (<i>Piper nigrum</i> L.) and its characteristics.		33
Dr. Phan Vinh Thinh <i>Nha Trang University, Nha Trang City, Vietnam</i>		
[OP-1.11] Evaluation of the biological activities of microfungal species isolated from the medicinal plant <i>Angelica sinensis</i> .		34
Dr. Trieu Anh Trung <i>Hanoi National University of Education, Hanoi, Vietnam</i>		
[OP-1.12] Aaptamine inhibits foam cell formation by downregulating CD36 and SR-A expression, and reducing oxLDL uptake.		35
Ina Monica Firsty <i>Universiti Malaysia Terengganu, Malaysia</i>		
[OP-1.13] Effects of simulated microgravity on growth and lignan biosynthesis in <i>Phyllanthus amarus</i> single cells.		36
Nguyen Thi Nhu Mai <i>Institute of Life Sciences, Da Lat City, Vietnam</i>		
[OP-1.14] Fabrication of a bioactive biopolymer film integrating python fat and tamanu (<i>Calophyllum inophyllum</i> L.) oil.		37
Tran Ngoc Chi Uyen <i>Nong Lam University, Ho Chi Minh City, Vietnam</i>		
[OP-2.1] <i>In silico</i> molecular characterization and anticancer activity of bougainin of <i>Bougainvillea</i> plant.		38
Dr. Govindappa Melappa <i>Davangere University, Davangere, India</i>		
[OP-2.2] Optimization of synthesis conditions for <i>Calophyllum inophyllum</i> L.-loaded solid lipid nanoparticles.		39
Assoc. Prof. Mai Huynh Cang <i>Nong Lam University, Ho Chi Minh City, Vietnam</i>		

[OP-2.3] Isolation and structural characterization of a triterpenoid saponin, Barringtonol C-glycoside, from <i>Barringtonia acutangula</i> fruit and its anticancer potential against hepatocellular carcinoma. Dr. Pradeepa Krishnappa <i>Kuvempu University, Shivamogga, India</i>	40
[OP-2.4] Antioxidant-linked pharmacological potential of a traditionally used Asian wild fruit: a bioactive metabolite assessment of <i>Flacourtia montana</i> . Prof. Rajashekharappa Sharath <i>Davangere University, Davangere, India</i>	41
[OP-2.5] Integrated metabolomic profiling, antioxidant and cytotoxic evaluation, and computational target validation of bioactive phytoconstituents from <i>Sargostigma klenii</i> . Assoc. Prof. Raja Naika Hanumanaika <i>Central University of Kerala, Kasaragod, India</i>	42
[OP-2.6] Potential anti-melanogenic secondary metabolites from the polar extracts of <i>Gigantochloa levis</i> (Blanco) Merr. shoots. Assoc. Prof. Lina Sagalar-Lacandalo <i>Mindanao State University; Western Mindanao State University, Zamboanga City, Philippines</i>	43
[OP-2.7] Bioactivity-guided fractionation of <i>Toona ciliata</i> M. Roem leaf extract as a source of anti-leishmanial compound. Vishal Kumar Singh <i>Institute of Medical Sciences, Banaras Hindu University, India</i>	44
[OP-2.8] PTM-guided natural product discovery for targeting pathological tau and α -synuclein assembly. Prof. Sharad Gupta <i>Indian Institute of Technology Gandhinagar, Gujarat, India</i>	45
[OP-2.9] Enhancing kinsenoside production and antibacterial potential in <i>Anoectochilus lylei</i> rhizome cultures via elicitation. Dr. Ho Thanh Tam <i>Duy Tan University, Da Nang City, Vietnam</i>	46
[OP-2.10] Purification of aqueous <i>Syzygium cumini</i> (L.) seed extract using ultrafiltration: Identification of fouling mechanism and development of steady state and unsteady state model for prediction of permeate flux. Prof. Biswajit Sarkar <i>Guru Gobind Singh Indraprastha University, New Delhi, India</i>	47
[OP-2.11] AI-guided chemical and bioactivity mapping to accelerate drug discovery from Vietnamese medicinal plants. Dr. Nguyen Thi Xuan Dieu <i>University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam</i>	48
[OP-2.12] A green and scalable process for flavonoid enrichment from immature pomelo fruit using Diaion HP-20 adsorption resin. Dr. Nguyen Ngoc Lien <i>East Asia University of Technology, Bac Ninh, Vietnam</i>	49
[OP-2.13] Green deep eutectic solvent-assisted extraction of flavonoids and phenolics from <i>Kaempferia galanga</i> rhizomes.	50

Nguyen Thu Uyen <i>University of Science and Technology Hanoi, Vietnam</i>	
[OP-2.14] Stress-adapted traits of plant growth-promoting bacteria associated with native Musa species in Vietnam. Le Van Thanh Luan <i>Fulbright University Vietnam, Ho Chi Minh City, Vietnam</i>	51
[OP-2.15] Cannabis phytomolecules have anti-cancer and anti-angiogenesis activity related to ovarian cancer Prof. Hinanit Koltai <i>ARO, Volcani Institute, Israel</i>	52
[OP-3.1] Evaluation of the sedative effect of an herbal blend containing <i>Cleistocalyx operculatus</i> , <i>Mentha arvensis</i> , <i>Perilla ocymoides</i> , <i>Ocimum sanctum</i> , and <i>Stevia rebaudiana</i> . Assoc. Prof. Tran Thi Le Minh <i>Nong Lam University, Ho Chi Minh City, Vietnam</i>	53
[OP-3.2] Rheology and extrusion 3D printing of κ -carrageenan/olive oil emulsion gel tablets for release of vitamin C and curcumin. Prof. Prachi Thareja <i>Indian Institute of Technology Gandhinagar, Gujarat, India</i>	54
[OP-3.3] Formulation of microparticle systems containing polyphenols extracted from noni (<i>Morinda citrifolia</i> L.) fruits. Dr. Duong Thi Thuan <i>Duy Tan University, Da Nang City, Vietnam</i>	55
[OP-3.4] Anti-inflammatory activity of <i>Knema lenta</i> Warb.: from methanolic extract to a newly identified bioactive compound. Dr. Le Thanh Huong <i>University of Science and Technology of Hanoi, Vietnam</i>	56
[OP-3.5] Anticancer activity of extraction and nature compounds isolated from Chum Duong fruit (<i>Sphaerocoryne affinis</i>) on cervical cancer cell line. Dang Viet Tuan <i>University of Science, Vietnam National University Ho Chi Minh City, Vietnam</i>	57
[OP-3.6] Anticancer activity of <i>Sphaerocoryne affinis</i> fruit on human metastatic breast cancer cell line MDA-MB-231. Truong Thi Bich Ngoc <i>University of Science, Vietnam National University Ho Chi Minh City, Vietnam</i>	58
[OP-3.7] Ethyl acetate extract of <i>Elephantopus mollis</i> Kunth induced apoptosis and senescence in human lung cancer cells. Tran Thanh Long <i>University of Science, Vietnam National University Ho Chi Minh City, Vietnam</i>	59
[OP-3.8] A novel herbal-based ear drop with <i>Ocimum gratissimum</i> essential oil: an alternative strategy for managing otomycosis. Dr. Nguyen Phuoc Vinh <i>Faculty of Pharmacy, University of Health Sciences, Vietnam National University Ho Chi Minh City, Vietnam</i>	60
[OP-3.9] The effects of <i>Elephantopus mollis</i> extracts on the migration, invasion, and adhesion of human cervical cancer SiHa cells.	61

Assoc. Prof. Nguyen Thi My Trinh <i>University of Science, Vietnam National University Ho Chi Minh City, Vietnam</i>	
[OP-3.10] <i>Garcinia talbotii</i> fruit extract and its active principle Oblongifolin A sensitize chemoresistance in MIA PaCa-2/Panc-1 pancreatic cancer cell lines. Prof. Kumaraswamy Honnenahally Malleshappa <i>Kuvempu University, Karnataka, India</i>	62
[OP-3.11] Up-scaling study for optimized formulation and experimental validation of chitosan nanoparticles loaded-curcumin in hyperlipidemic rats. Dr. Varunakumara Julpi Bheemappa <i>Kuvempu University, Shivamogga, India</i>	63
[OP-3.12] <i>Pandanus tectorius</i> self-nanoemulsifying drug delivery system: a natural strategy to prevent atherosclerosis via the inhibition of HMG-CoA reductase. Alifa Husnun Kholieqoh <i>Universiti Malaysia Terengganu, Kuala Terengganu, Malaysia</i>	64
[OP-3.13] Weak affinity chromatography for herbal medicines: a tool for bioactivity, bioavailability, and drug-herb interactions research. Timothy Jay Bengala <i>De La Salle Medical and Health Sciences Institute, Dasmariñas, Cavite, Philippines</i>	65
[OP-3.14] Antioxidant and photoprotective potentials of <i>Diplopterygium giganteum</i> gametophyte extracts derived from <i>in vitro</i> culture. Nguyen Hoang Phuc <i>University of Science, Vietnam National University Ho Chi Minh City, Vietnam</i>	66
Poster talks	
[PP-1] Promiscuous and Complementary Activities of Bark-Expressed Terpene Synthases Underlies Monoterpene Diversification in Rubber Tree (<i>Hevea brasiliensis</i>). Thuong Thi Hong Nguyen <i>Faculty of Biology and Biotechnology, University of Science, Vietnam National University – Ho Chi Minh City, Ho Chi Minh City, Vietnam</i>	68
[PP-2] Isolation study of anti-inflammatory, anti-gout, and anti-Alzheimer's disease compounds from <i>Gnetum macrostachyum</i> Hook.f.: an <i>in silico</i> approach. Dang Hoang Cam <i>VNU-HCM High School for the Gifted, Ho Chi Minh City, Vietnam</i>	69
[PP-3] Comparative analysis of quercetin's alpha-amylase inhibitory activity using weak affinity chromatography. Maria Hyacinth Mendoza <i>De La Salle Medical and Health Sciences Institute, Dasmariñas, Cavite, Philippines</i>	70
[PP-4] Genetic homology verification and metabolites profiling of mountain ginseng and its adventitious roots. Han-Sol Lee <i>Chungbuk National University, Republic of Korea</i>	71
[PP-5] Cytotoxic components from <i>Pluchea pteropoda</i> Hemsl. stems: separation, biological activity, and molecular docking study. Ngo Hoang Long <i>Nguyen Tat Thanh University, Ho Chi Minh City, Vietnam; Center for Hi-Tech Development, Nguyen Tat Thanh University, Ho Chi Minh City, Vietnam</i>	72

[PP-6] Dihydroferulic acid attenuates muscle atrophy by preserving myogenic signaling and modulating glucocorticoid-related pathways. Yun Jeong Kang <i>ICON Co. Ltd., Republic of Korea</i>	73
[PP-7] From tribal diets to functional nutrients: evaluation of wild edible fruits of the Western Ghats as sustainable sources for nutraceutical supplements. Guru Megha <i>Kuvempu University, Karnataka, India</i>	74
[PP-8] Characterization, <i>in vitro</i> and <i>in silico</i> anticancer activity of abrin like ribosome inactivating protein isolated from endophytic fungi, <i>Colletotrichum cobbittense</i> of <i>Dendrophthoe falcata</i> . Govindappa Melappa <i>Davangere University, Karnataka, India</i>	75
[PP-9] Formulation and evaluation of herbal ointment containing ethanolic extracts of <i>Senna alata</i> leaves and <i>Alpinia galanga</i> rhizomes. Sysay Palamy <i>Faculty of Pharmacy, University of Health Sciences, Lao PDR</i>	76
[PP-10] Ethnobotanical network analysis of medicinal plants for skin health among Philippine ethnic groups: a framework for natural products prioritization and sustainable use. Rael S. Manriquez <i>MSU-Iligan Institute of Technology, Philippines</i>	77
[PP-11] Non-saponin components from upper parts of Lai Chau ginseng (<i>Panax vietnamensis</i> var. <i>fuscidiscus</i>). Truong Hoang Duy <i>University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam</i>	78
[PP-12] <i>In vitro</i> and <i>in vivo</i> assessment of the antidiabetic effects of <i>Phyllanthus amarus</i> Schum. et Thonn. ethanol extract. Vo Thanh Sang <i>Nguyen Tat Thanh University, Ho Chi Minh City, Vietnam</i>	79
[PP-13] Integrative morphological, molecular, and phytochemical characterization of a cultivated <i>Panax</i> sp. from Lam Dong. La Bao Ngoc <i>University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam</i>	80
[PP-14] Separation and determination of anticancer compounds composition against HeLa cells of the total extract from <i>Scytonema bilaspurens</i> NK13 cyanobacteria strain. Ngo Thi Trang <i>VNU University of Science, Hanoi, Vietnam</i>	81
[PP-15] Establishment of an efficient <i>in vitro</i> adventitious root culture system for biomass production of <i>Centella asiatica</i> (L.) Urb. Ngo Vu Bao Tran <i>Duy Tan University, Da Nang, Vietnam; University of Science and Education, The University of Danang, Vietnam</i>	82
[PP-16] Ethnobotanical survey and biological validation of medicinal plants used by the Thai people in Nghe An Province, Vietnam. Sangmi Eum	83

<i>Korea Research Institute of Bioscience and Biotechnology, Republic of Korea</i>	
[PP-17] Isolation of cucurbitacins from <i>Aquilaria crassna</i> pericarps and evaluation of cytotoxic activity. <i>Duy Linh Nguyen</i> <i>University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam</i>	84
[PP-18] Optimization of <i>in vitro</i> culture conditions for adventitious root biomass production in <i>Panax vietnamensis</i> . <i>Nguyen Thi Thu Thuy</i> <i>Duy Tan University, Da Nang, Vietnam</i>	85
[PP-19] Computational and experimental investigation of essential-oil compounds as antibacterial agents against <i>Vibrio parahaemolyticus</i> associated with AHPND in shrimp. <i>Dinh Thuy Duong</i> <i>University of Science and Technology of Hanoi, Vietnam</i>	86
[PP-20] Topical spermidine restores tear film stability and lacrimal gland immune homeostasis in desiccation stress-induced dry eye disease. <i>Hyesook Lee</i> <i>Simplycare Bio Co. Ltd., Republic of Korea</i>	87
[PP-21] Microwave-assisted extraction and antioxidant and antibacterial activities of curcuminoids from turmeric rhizomes. <i>Tran Thi Hoang Quyen</i> <i>Nha Trang University, Khanh Hoa, Vietnam</i>	88
[PP-22] Comparative chloroplast genome analysis and phylogenetic relationships of the genus <i>Bidens</i> in Vietnam. <i>Do Thi Mai Trinh</i> <i>Nong Lam University Ho Chi Minh City, Vietnam</i>	89
[PP-23] Preliminary observations on herbal and supplement use among primary care patients in the UK. <i>Agnes Chan & Thomas Clifford</i> <i>Lister Hospital, UK</i>	90
Sponsors	91

KEYNOTE LECTURES

Keynote lecture 1 (KO-01)

35 Years of Pioneering Research on Medicinal Plant Biotechnology and A New Direction in Microgravity-Validated Systems for Scalable Biomass and Metabolite Production

Many medicinal plant species are highly valued because they accumulate diverse secondary metabolites-including saponins, alkaloids, flavonoids, phenolics, and terpenoids-that underpin pharmacological activities such as anti-inflammatory, antioxidant, antidiabetic, hepatoprotective, neuroprotective, immunomodulatory, and anticancer effects. However, increasing demand and uncontrolled exploitation have placed numerous medicinal plants under pressure from over-harvesting, habitat loss, and genetic erosion, highlighting the need for conservation and sustainable production.

To address these challenges, *in vitro* culture and micropropagation provide an effective pathway for conserving medicinal plant germplasm while enabling large-scale production of uniform, high-quality planting materials and pharmaceutical raw biomass. Our group research program has focused on establishing and optimizing regeneration and propagation systems across medicinal plants, including shoot organogenesis, somatic embryogenesis, and complete plantlet regeneration, with parallel efforts to enhance plantlet vigor, rooting capacity, and acclimatization performance.

A key direction in my work is the use of Light-Emitting Diode (LED) lighting to improve *in vitro* propagation outcomes. By manipulating spectral quality and intensity, we have enhanced morphogenesis, promoted robust shoot multiplication and rooting, and improved physiological plantlet quality, which translates into higher survival rates and better performance during greenhouse transfer (Nhut *et al.*, 2017a; Nam *et al.*, 2022).

In parallel, we have systematically investigated nanotechnology-enabled interventions in tissue culture. Metal nanoparticles-particularly silver nanoparticles-have been applied to strengthen explant sterilization and reduce microbial contamination, while also stimulating shoot multiplication, improving rooting and rhizome formation, and supporting greenhouse establishment (Cuong *et al.*, 2021; Anh *et al.*, 2023). We have also evaluated iron nanoparticles as substitutes for conventional chelated iron sources in culture media, producing stronger and more hardened plantlets and significantly improving survival during acclimatization and greenhouse transfer (Nhut *et al.*, 2022).

Beyond standard micropropagation, our research has advanced multiple high-impact culture platforms, including single-cell culture (Cuong *et al.*, 2012; Chien *et al.*, 2012), artificial seeds (Huong *et al.*, 2015); elicitor supplement (Linh *et al.*, 2017); thin cell layer (TCL) techniques (Mai *et al.*, 2024), polyploid induction (Diem *et al.*, 2022), and transgenic root systems (Nhut *et al.*, 2017b) followed by successful regeneration of transgenic plantlets (Nhut *et al.*, 2022). These platforms provide both practical tools for propagation and powerful experimental systems to improve agronomic traits and enhance metabolite productivity.

Over the past decade, our group have also pursued an emerging frontier with global relevance: plant regeneration and propagation under simulated microgravity (Nhut *et al.*, 2017c; Khai *et al.*, 2021; Bien *et al.*, 2023). Using clinostat-based approaches, we have investigated how altered gravity-related signals affect cell proliferation, differentiation, rooting capacity, and organogenic competence. Building on this foundation, my current work extends toward single-cell systems, adventitious root culture, and transgenic root platforms in medicinal plants such as *Phyllanthus amarus*, *Cathanranthus roseus*, and

Panax vietnamensis Ha et Grushv., evaluated under both simulated microgravity and normal gravity using harmonized experimental designs for direct comparison. In parallel, we monitor mechanistic and performance indicators such as phytohormone dynamics, redox balance, nutrient-use efficiency, and accumulation of target metabolites.

Overall, this integrated research program delivers scalable protocols for high-efficiency regeneration and root-based biomass/metabolite production, while advancing mechanistic understanding relevant to next-generation plant biotechnology and space-enabled agriculture.

Keywords: *Panax vietnamensis*; micropropagation; simulated microgravity; single-cell culture; hairy root; saponins

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Biography:

- 1996- 2002, Plant Biotechnology, Kagawa University (Japan): PhD
- 2003 - now, Taynguyen Institute for Scientific Research (VAST): Deputy Director
- 2009 - now, National Foundation for Science and Technology Development (NAFOSTED): Vice, President (Former); Member
- 2013 - now, Vietnam Plant Physiology Society: Vice President
- 2018 - now, Plant Biotechnology: Professor
- 2019 - now, The State Council for Professorship: Member
- 2021 - now, Plant Cell, Tissue and Organ Culture Journal (Springer Nature, Q1 - IF: 3.0): Associate Editor

Keynote lecture 2 (KO-02)

Gut Metabolism of Polymethoxyflavones by the Cobalamin-Dependent *O*-Demethylase

Polymethoxyflavones and other dietary natural products containing aryl methyl ether groups are metabolized by the human gut microbiota into structurally distinct metabolites with enhanced biological activity. Among the few gut bacterial strains capable of catalyzing this rare transformation, *Blautia* sp. MRG-PMF1 has emerged as a key contributor. Its broad substrate specificity and ability to process large compounds underscore the need for further investigation into the enzyme responsible for this activity, which holds promise for biocatalytic applications such as lignin valorization. This unique biotransformation is mediated by a cobalamin-dependent *O*-demethylase complex, comprising a substrate-binding methyltransferase I, a cobalamin-dependent corrinoid protein, a tetrahydrofolate-dependent methyltransferase II, and a Co(II)-reducing activating enzyme. In this presentation, the biochemical properties of this *O*-demethylase system will be explored and its potential utility as a versatile biocatalyst will be discussed.

Keywords: *Blautia* sp. MRG-PMF1, gut metabolism, *O*-demethylase

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Biography:

Jaehong Han received his B.S. (1992) and M.S. (1996) degrees in Agricultural Chemistry from Seoul National University, Korea. His early research centered on natural products chemistry, but upon relocating to the United States, he transitioned to bioinorganic chemistry, investigating the dinitrogen reduction mechanism of nitrogenase through synthetic inorganic approaches. He earned his Ph.D. in 2001 from the University of Michigan and subsequently expanded his research focus to the enzymology of nitrogenase during his postdoctoral training at Virginia Tech. Since 2004, Dr. Han has been a faculty member at the College of Biotechnology, Chung-Ang University. His notable contributions include elucidating the stereochemical biosynthetic pathway of S-equol and characterizing the metabolism of curcuminoids by the human gut microbiota. His current research explores novel chemical transformations mediated by gut microbial metabolism and the development of biomimetic systems inspired by these processes. In addition to his scientific endeavors, Dr. Han is deeply committed to advancing the field of natural products research. He played a pivotal role in founding the Asian Society of Natural Products (ASNP) in 2018 and currently serves as Editor-in-Chief of *NATPRO Journal*, published by ASNP.

Keynote lecture 3 (KO-03)

Young Scientists and Plant Secondary Metabolites: Charting a One Health, Sustainable, and Ethical Roadmap for 2040

At a time when artificial intelligence is rapidly integrating into the daily lives of citizens and researchers, as global climate patterns grow increasingly chaotic and biodiversity loss accelerates alongside the rise of environmentally induced cancers, what should be the priorities of a young postdoctoral researcher in shaping their research strategies and objectives in the field of Medicinal Plants and Natural Products (MPNP)?

For economic purposes, greenwashing has become widespread, aiming to conceal the real environmental impacts of marketed products. Deception and misinformation abound. As early as the 1950s, pseudo-scientific studies were weaponized to obscure the link between lung cancer and smoking, all to protect a highly profitable industry. Since then, “science” has too often been misused to spread false messages in the service of commercial interests.

In this context, what key elements should a young researcher prioritize in developing applications of plant secondary metabolites for the benefit of humanity, health, and the environment—beyond mere economic imperatives?

Drawing on examples from various research programs, we aim to open this debate and illuminate the path for the next generation (...of scientists).

Keywords: *Plant Specialized Metabolites, Biotechnology, Metabolomics, in vitro culture, hydroponics, bioprotection, One-Health.*

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Biography:

Dr. PhD Eric GONTIER is Professor at the University of Picardie Jules Verne in the city of Amiens, France. He is the vice-Director of the “Plant Biology and Innovation Laboratory” BIOPI-UPJV, and member of the INRAE-1158 BioEcoAgro CrossBorder Research Unit. His research activity concerns the study of plant metabolism with a specificity including secondary metabolism but also plant lipids. He has always been interested in the development of biotechnological solutions for the valorization of plant metabolites. Between 1996 and 2006, as an Assistant professor at the Agronomical School of Nancy (ENSAIA), within his INRA Laboratory, he developed a technology called “plant milking technology” that consisted of growing plants in soilless condition and of harvesting phytochemicals from the roots of said plants. This patented invention led to the creation of the Plant Advanced Technologies Company that he co-founded in 2005 with JP Fèvre and Prof. F Bourgaud.



Keynote lecture 4 (KO-04)

Efficient Cannabis Cultivation Technologies in Vertical Farming Systems

The increasing frequency of climatic instability and the escalating global food security crisis necessitate a fundamental transition toward advanced agricultural systems capable of delivering stable, predictable, and resource-efficient biomass production. In this context, Controlled Environment Agriculture is rapidly evolving from conventional greenhouse cultivation toward data-driven, precision-managed vertical farming systems. These systems provide essential infrastructure for the global bio-industry by enabling standardized production with high qualitative consistency and optimized resource use efficiency. *Cannabis sativa* L. has emerged as a high-value medicinal crop driven by the clinical validation of plant-specialized metabolites (PSMs), particularly cannabinoids such as cannabidiol (CBD) and Δ^9 -tetrahydrocannabinol (Δ^9 -THC), alongside accelerating global legislative reforms. As a pharmaceutical-grade crop, its commercial viability depends on strict metabolic uniformity and rigorous quality control. However, the scalability of vertical cannabis production remains limited by high capital and operational expenditures, largely associated with energy demand. In multi-layer cultivation systems, insufficient regulation of morphological plasticity—especially plant height—reduces spatial efficiency, while regulatory heterogeneity further complicates product standardization. In this talk, we present our integrated research framework aimed at optimizing closed-type vertical farming systems for medicinal cannabis production. Our research focuses on the coordinated modulation of LED spectral composition and light intensity in combination with temperature, humidity, and CO₂ control to regulate plant architecture, physiological responses, and metabolite consistency. The scope of this work encompasses plant physiological and morphological analyses relevant to multi-layer cultivation efficiency and production turnover. By integrating intelligent environmental control strategies with automation-oriented cultivation protocols, our approach seeks to minimize energy inputs and labor requirements while maintaining high phytochemical uniformity. Ultimately, this work highlights the transition of vertical cannabis farming from conventional horticulture toward standardized bio-manufacturing platforms, contributing to the development of sustainable and globally compliant production systems for the medical cannabis supply chain.

Keywords: *Medicinal Cannabis; Vertical Farming; Phytochemical Consistency.*

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Biography:

Professor Jong-Seok Park earned his Ph.D. in Bio-Environmental Engineering from The University of Tokyo, following an M.S. in Horticulture from Seoul National University and a B.S. in Agricultural Engineering from Konkuk University. He is currently a Professor in the Department of Horticultural Science at Chungnam National University. His research specializes in controlled environment agriculture, plant factory systems, and the sustainable production of medicinal and functional plants.

Professor Park's work has significantly advanced our understanding of how environmental factors—such as LED light spectra, nutrient management, and abiotic stress—regulate plant growth, physiology, and secondary metabolite biosynthesis. A prolific scholar, he has published extensively in SCIE-indexed journals and serves as principal investigator for numerous high-profile projects focused on smart farming and digital cultivation. Additionally, he contributes to the broader scientific community as an editor and reviewer for leading international journals in plant science and environmental control.



Keynote lecture 5 (KO-05)

Constructing Complexity:

Biosynthesis and Engineering of Spirooxindole Alkaloids in Plants.

Plants synthesize an extraordinary diversity of nitrogen-containing heterocycles known as alkaloids, many of which have shaped modern medicine. Among these, monoterpene indole alkaloids (MIAs) represent one of the most structurally complex and pharmacologically important natural product families, giving rise to clinically relevant compounds such as the anticancer agent camptothecin, the antiarrhythmic drug ajmaline, and the immunomodulatory spirooxindole alkaloid mitraphylline.

A central challenge in the field is deciphering how plants transform shared precursors into highly diversified scaffolds through tightly controlled oxidative enzyme cascades. Many of the enzymes responsible for spirocyclization, rearrangement, and scaffold remodeling have only recently been discovered, and reconstructing these pathways in heterologous systems remains technically demanding.

In this talk, I will present our recent work on the discovery and functional reconstitution of the complete spirooxindole alkaloid biosynthetic pathway. We reveal how oxidative enzymes orchestrate scaffold diversification from common intermediates and demonstrate how synthetic biology and metabolic engineering strategies can be leveraged to expand MIA chemical space. Our work establishes a framework for elucidating complex alkaloid pathways and enables the sustainable production of high-value alkaloid derivatives for biomedical applications.

Keywords: *Monoterpene indole alkaloids (MIAs), Spirooxindole alkaloids, Alkaloid biosynthesis, Epimerization, Scaffolding, Synthetic biology, Yeast Engineering*

Speaker: Thu Thuy Dang

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Position: Ass. Prof.

Affiliation: The University of British Columbia, Canada

Biography:

Dr. Thu-Thuy T. Dang is an assistant professor in biochemistry in the Department of Chemistry, Irving K. Barber Faculty of Sciences, University of British Columbia, Canada. She is currently a Principal's Research Chair (Tier 2) and was Michael Smith Foundation for Health Research Scholar and at UBC. Dr. Dang obtained her PhD from the University of Calgary (Facchini group, Canada) and postdoc from John Innes Centre (O'Connor group, UK).

Dang's Plant Bioactive Compounds Research (Plant BioCoRe) group employs and develops multidisciplinary approaches, at the intersection between omics, biochemistry, molecular biology and synthetic biology, for discovering and engineering the biosynthesis of high-value phytochemicals, and thereby improving their accessibility for human needs. Dang has published more than 40 peer-reviewed papers and two international patents, which established new enzymatic mechanisms for constructing and tailoring complex alkaloid frameworks. Her research has directly enabled several multi-institutional collaborations and over \$2.1 million in competitive funding, including international partnerships with Germany, Japan, and the United States focused on enzyme discovery and sustainable production of bioactive alkaloids.

Dang's contributions have been recognized through the Phytochemical Society of North America–Plant Journal Early Career Award (2022), UBC Principal's Research Chair Tier II (2024), Michael Smith Health Research Scholar Award (2019-2025) and the Arthur C. Neish Young Investigator Award (2025).



Keynote lecture 6 (KO-06)

Integrating Plant Biotechnology and Natural Product Research for Sustainable Functional Food Development

The intersection of plant biotechnology and natural product research has created new opportunities to harness medicinal plants as renewable biofactories for functional ingredients. Plant cell, tissue, and organ culture (PCTOC) systems offer unparalleled control over the production of valuable metabolites such as ginsenosides, flavonoids, and phenolic acids. These *in vitro* approaches not only address supply limitations and environmental concerns but also ensure compositional uniformity critical for food and nutraceutical applications. Our ongoing studies with *Panax ginseng*, *Echinacea purpurea*, and *Dendrobium candidum* cultures demonstrate the effectiveness of elicitor-based bioreactor systems for enhancing metabolite biosynthesis. The accumulated evidence of safety from cultured ginseng root products underscores the feasibility of PCTOC materials in human consumption. However, scientific challenges remain in establishing global standards for safety evaluation and product traceability. By integrating metabolomic profiling, bioprocess modeling, and regulatory science, PCTOC-based production systems can advance the global adoption of medicinal plant-derived ingredients. This approach represents a forward-looking strategy for achieving sustainability, safety, and innovation in the natural products and functional food industries.

Keywords: *Plant biotechnology, Natural products, Functional foods*

Speaker: So-Young Park, PhD

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Position: Professor

Affiliation: Chungbuk National University, Republic of Korea



Biography:

Dr. So-Young Park is a Professor in the Department of Horticultural Science at Chungbuk National University, Korea. She received her Ph.D. in Horticultural Science from the same university in 2002 and conducted research training as a visiting scientist at the University of British Columbia, Canada (2007–2009). Her research focuses on plant cell trans-differentiation, large-scale production of bioactive compounds and biomass, secondary-metabolite pathway regulation, and somatic embryogenesis. She has published more than 150 papers in international journals and serves on the editorial boards of *Plant Cell Tissue and Organ Culture*, *Plant Biotechnology Reports*, *Horticulture, Environment and Biotechnology*, and *Journal of Plant Biotechnology*. From 2018 to 2022, she chaired the Orchid Working Group of the International Society for Horticultural Science (ISHS). She currently serves as Vice President of the Korean Society for Floricultural Science and the Korean Society for Plant Biotechnology. Her work bridges plant biotechnology and functional food research, with an emphasis on sustainability and industrial application.

Keynote lecture 7 (KO-07)

Integrating Traditional Knowledge and Modern Science: The Therapeutic Promise of Vietnamese Medicinal Plants.

Vietnam is home to a rich and diverse flora, with thousands of medicinal plant species used traditionally across different ethnic communities. These plants represent a valuable reservoir of bioactive compounds with potential applications in modern medicine. Here, we present an integrative study that combines ethnobotanical surveys, and biological evaluations to explore the therapeutic potential of Vietnamese medicinal plants.

Field investigations provided comprehensive data on the traditional uses, local knowledge, distribution, and pharmacological significance of medicinal species. Based on these findings, selected plant extracts were evaluated for *in vitro* biological activities related to wound healing, anticancer, and neuroprotective effects.

Several extracts demonstrated significant wound healing activity, including anti-inflammatory effects and the stimulation of fibroblast proliferation—key processes in tissue regeneration. In the context of cancer, a number of plant extracts showed strong cytotoxic activity with IC₅₀ values below 20 µg/mL and selectivity indices (SI) above 2. These extracts induced apoptosis in cancer cells and inhibited cell proliferation through the downregulation of PCNA gene transcription.

In addition, certain medicinal plants exhibited neuroprotective effects relevant to neurodegenerative diseases such as Parkinson's. These included improvements in motor function and protection against the degeneration of dopaminergic neurons. The impact of these plant extracts on organismal development and overall safety profiles was also assessed through *in vivo* models.

Collectively, these findings highlight the vast therapeutic potential of Vietnam's medicinal plant resources and emphasize the importance of integrating traditional knowledge with modern biomedical research to develop novel treatments for wound healing, cancer, and neurodegenerative disorders.

Keywords: *ethnomedicine, anticancer activity, anti-inflammation, neuroprotective effect*

Speaker: Dang Thi Phuong Thao, PhD

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Position: Professor

Affiliation: University of Science, VNU-HCM, Vietnam

Biography:

Prof. Dang Thi Phuong Thao earned a Ph.D. in 2008 from Kyoto Institute of Technology, Japan. She is currently a Professor at the University of Science, Vietnam National University Ho Chi Minh City (VNU-HCM). Her primary research focuses on the screening of natural compounds with pharmacological activities using cell culture and genetically modified fruit fly models, aiming to discover novel therapeutic agents. Additionally, she studies the expression and production of recombinant proteins for applications in medicine, food, and cosmetics. She also explores the application of yeast cell surface technology in the production of biological products for agriculture and aquaculture, and investigates gene and protein functions involved in human disease mechanisms using the fruit fly model.



Keynote lecture 8 (KO-08)

Research on Plant Specialized Metabolism and Synthetic Biology for a Sustainable Future: How to Produce Natural Products from Nature to Synthetic

Plant specialized metabolites (PSMs), often referred to as secondary metabolites (natural products, NR), are a cornerstone of the modern bio-economy, serving as essential ingredients in pharmaceuticals, high-end cosmetics, and sustainable industrial materials. NRs such as terpenoids, alkaloids, phenylpropanoids, and polyketides offer profound biological activities; however, their practical application is frequently hindered by their extremely low abundance in nature and the complex, often slow-growing characteristics of their source plants. Conventional chemical synthesis remains economically and environmentally unviable due to the intricate stereochemical configurations of these natural scaffolds and to their complex structures. Consequently, the transition toward a sustainable future necessitates a paradigm shift in how we source and produce these high-value compounds.

This keynote presentation will explore the integrated pipeline of omics, biochemistry, and synthetic biology to overcome the limitations of natural extraction. The journey begins with Biosynthetic Gene Mining, a critical prerequisite for reconstructing complex pathways in heterologous hosts. By leveraging cutting-edge Next-Generation Sequencing (NGS) and multi-omics analysis (genomics, transcriptomics, and metabolomics), we have identified key catalytic enzymes, including Scaffold enzymes (such as Terpene synthase) and Accessory enzymes (such as Cytochrome P450 monooxygenases (CYPs)), responsible for the unique structural diversification of NRs.

Central to our approach is the development of Advanced Platform Systems. Rather than simple gene expression, we focus on engineering "Biosystems as metabolic hubs" in microorganisms (e.g., *Escherichia coli* & *Saccharomyces cerevisiae*) and model plants (e.g., *Nicotiana benthamiana* & *Lactuca sativa*). These platforms are optimized to provide an abundant flux of precursor molecules, allowing for the rapid functional characterization of newly discovered enzyme candidates. A significant portion of this talk will highlight the strategic use of CRISPR/Cas9-mediated genome editing. This technology has been instrumental not only in validating gene function in planta but also in reconfiguring metabolic fluxes by knocking out competitive pathways, thereby maximizing the yield of target metabolites.

Furthermore, we will discuss the "Design-Build-Test-Learn" (DBTL) cycle in the context of Synthetic Biology. By modularizing biosynthetic pathways and employing synthetic promoters and spatial organization techniques, we can now reconstruct entire multi-step pathways in heterologous hosts. This enables the production of plant-derived compounds at industrial scales, ensuring a stable and standardized supply chain that is independent of seasonal variations or geographical constraints.

In conclusion, the synergy between plant specialized metabolism research and synthetic biology offers a robust solution for global sustainability. By decoding the "chemical intelligence" of plants and rewriting it into microbial or optimized plant factories, we can preserve biodiversity while providing the essential molecules needed for human health and industry. This presentation aims to provide a comprehensive overview of current breakthroughs and future perspectives in bio-manufacturing for a greener, more sustainable world.

Keywords: *Plant Specialized Metabolism, Synthetic Biology, Gene Mining, Platform System, Sustainable Bio-manufacturing*

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Acknowledgements: This research was funded by NRF (RS-2021-NR060105, RS-2023-00301974, and RS-2025-00517982)



Biography:

- 1998- 2005, Agriculture and Life Sciences, Seoul National University, Republic of Korea: BSc
- 2005- 2013, Agricultural Biotechnology, Seoul National University, Republic of Korea: Ph.D
- 2013- 2018, University of Calgary, Canada: Postdoctoral Fellow
- 2018- 2020, University of Calgary, Canada: Visiting Professor
- 2018- 2020, Association of Korean-Canadian Scientists and Engineers: R&D Canada Director
- 2018- 2022, PMBBRC, Gyeongsang National University (GNU), Republic of Korea: Research Professor
- 2022 - now, Division of Life Science, Gyeongsang National University, Republic of Korea: Assistant/Associate Professor
- 2021 - now, Anti-aging Bio Cell factory Regional Leading Research Center: Deputy Director
- 2023 - now, Research Institute of Molecular Alchemy: Director of International Relations
- 2022 - now, Frontiers in Plant Sciences: Associate Editor

Keynote lecture 9 (KO-09)

Analytical Perspectives on Plant Secondary Metabolites: Mass Spectrometry Based Metabolomics Approaches

Medicinal and nutraceutical plants have been central to human health for centuries, yet the molecular basis underlying their therapeutic potential remains incompletely understood. Plant metabolomes are highly dynamic, shaped by genetics, developmental stages, and environmental cues, and this chemical complexity presents both an opportunity and a challenge for modern plant and biomedical research. Understanding how primary and secondary metabolites coordinate stress adaptation, bioactivity, and health-promoting properties is critical for translating traditional knowledge into evidence-based applications.

The present keynote will highlight metabolomics-driven investigations across high altitude diverse medicinal plants. These studies address key challenges in the field, such as metabolic heterogeneity, identification of phytochemicals, limited standardization, and difficulties in linking metabolites to biological function. Using advanced mass spectrometry-based metabolomics, multivariate analytics, and integrative pathway analysis, our work dissects how biotic and abiotic stresses reshape metabolic networks and influence bioactive compound accumulation.

The scope of this research spans *vitro* assays, *in vivo* and stress-adaptation models, and molecular-level mechanistic insights, with relevance to agriculture, nutraceutical development, and translational health research. Connecting metabolic fingerprints with functional outcomes allows for assessing medicinal plant quality and uncovering metabolite-driven therapeutic mechanisms.

Looking ahead, integrating metabolomics with proteomics, genomics, and clinical translation will accelerate the development of novel plant-based interventions, sustainable crop improvement strategies, and precision phytomedicine for future healthcare needs.

Keywords: *Metabolomics, medicinal plants, mass spectrometry*

Speaker: Robin Joshi, PhD

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Position: Senior Research Investigator

Affiliation: University of Pennsylvania, United States

Biography:

Dr. Robin Joshi is an analytical scientist with over 17 years of experience in metabolomics, lipidomics, and mass spectrometry based spatial omics. His research focuses on the comprehensive characterization of targeted and untargeted metabolites, proteins and lipids in complex biological systems of plant, animal and human with their molecular pathways using advanced analytical workflows. He specializes in method development, optimization, and validation for high-resolution mass spectrometry platforms enabling accurate identification, quantification, and spatial mapping of small molecules. Dr. Joshi works at the interface of metabolomics, lipidomics, and proteomics, applying robust analytical strategies to plants and human samples with a strong emphasis on data quality, reproducibility, and standardization. In addition to research, he mentors graduate and medical students, supports interdisciplinary collaborations, and contributes to technical guidelines, review articles, and invited scientific presentations. His work advances analytical rigor and translational applications of mass spectrometry based omics in biomedical and life-science research.



Keynote lecture 10 (KO-10)

Medicinal Plants and Natural Products in Vietnam: Potentials, Opportunities, Challenges, and Strategic Requirements in the New Era

Vietnam possesses a remarkable resource base for medicinal plants and natural products by its high biodiversity, diverse agro-ecological zones, and traditional medical knowledge. More than 5,000 plant species with medicinal uses have been reported in the country, providing an important foundation for the development of herbal medicines, natural health products, and bioactive ingredients. In addition to conventional medicinal plants, Vietnam also has considerable potential to valorize agricultural by-products and underutilized biomass streams, such as coffee residues, rice bran, and discarded oil-bearing materials, as alternative sources of valuable natural compounds.

However, discussions on medicinal plants in scientific communities often focus primarily on extraction, isolation, structural elucidation, and bioactivity evaluation. While these areas remain essential, they do not by themselves ensure industrial competitiveness or sustainable development. In the current context shaped by digital transformation, circular bioeconomy, and increasing global demand for natural health solutions, medicinal plants should be viewed as strategic biological resources supporting multiple value layers, including standardized extracts, pharmaceutical ingredients, nutraceuticals, cosmeceuticals, functional products, and wellness-related services.

This paper provides a strategic overview of medicinal plants and natural products in Vietnam, highlighting their major potentials, emerging opportunities, and structural challenges. It argues that the next stage of development should move beyond discovery-oriented research toward integrated value-chain development. Future competitiveness will depend on stronger translational research, advanced analytical standardization, AI-assisted discovery, traceable supply chains, and ecosystem-based collaboration linking researchers, enterprises, local communities, and policymakers. In research organizations, in addition to forming and developing strong research teams, attention should also be paid to interdisciplinary innovation teams.

Keywords: *Vietnam; medicinal plants; natural products; biodiversity; traditional knowledge; circular bioeconomy; metabolomics; AI; value chain; interdisciplinary innovation teams.*

Speaker: Tran Van On, PhD

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Position: Associate Professor

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Biography:

Associate Professor Dr. Tran Van On is currently a senior lecturer at the Department of Botany – Hanoi University of Pharmacy (HUP). He graduated with a pharmacist degree in 1989 and received his PhD in Pharmacy in 2003 from HUP. He also pursued further studies in related fields, including plant taxonomy in Indonesia; ethnobotany in Malaysia and the Philippines; ecology in Australia; and botanical garden management in the United Kingdom. He also served as Head of the Department of Botany at HUP and held the position of Chairman and Director of the DK Pharma Co.Ltd – Hanoi University of Pharmacy. He and his colleagues have been pioneers in developing the herbal economy by establishing a system of enterprises and cooperatives for herbal development in Vietnam; as well as discovering, domesticating, researching, developing, and commercializing *Gymnema latifolium* for diabetes in Vietnam.



Keynote lecture 11 (KO-11)

Soil Microbiome Diversity and its Role in Medicinal Plants Growth and Quality.

Medicinal plants harbor distinctive microbial communities shaped by the diverse and structurally unique bioactive secondary metabolites they produce, which often confer high specificity to associated microorganisms. Among these communities, the soil and root-associated microbiome plays a pivotal role in regulating plant growth, health, and phytochemical quality. The rhizosphere hosts a complex consortium of bacteria, fungi, archaea, and actinomycetes that interact with plant roots through diverse biochemical and ecological processes. These microorganisms facilitate nutrient cycling, organic matter decomposition, and the mobilization of essential minerals, thereby enhancing plant growth and productivity. Emerging evidence suggests that many natural products attributed to medicinal plants may originate from microbes or from plant–microbe interactions. In several medicinal species, the plant-associated microbiome—particularly the endophytic microbiome—appears to contribute directly or indirectly to the biosynthesis or regulation of bioactive compounds. The soil microbiome can influence the synthesis and accumulation of key secondary metabolites, including alkaloids, phenolics, terpenoids, and flavonoids, which determine the therapeutic value of medicinal plants. Beneficial microorganisms, especially plant growth–promoting rhizobacteria (PGPR) and mycorrhizal fungi, enhance plant resilience to environmental stresses, pathogens, and nutrient limitations while stimulating metabolic pathways linked to phytochemical production. Conversely, the loss of soil microbial diversity caused by soil degradation, intensive agrochemical use, or environmental disturbances can adversely affect plant health and reduce the quality of medicinal compounds. Therefore, understanding the diversity, composition, and functional roles of soil microbial communities is essential for developing sustainable strategies for medicinal plant cultivation.

Advances in molecular and metagenomic approaches are providing deeper insights into plant–microbe interactions and enabling targeted manipulation of soil microbiomes to improve yield and phytochemical quality. Overall, medicinal plants can be regarded as meta-organisms comprising both the plant and its associated microbiome. This integrated system represents a vast and largely untapped reservoir of bioactive compounds and beneficial microorganisms with significant potential for applications in medicine, agriculture, and the pharmaceutical industry. Continued research is essential to fully harness this resource for sustainable and innovative biotechnological applications.

Keywords: *Rhizosphere, Microbial diversity, PGPR, Medicinal Plants, Bioactive Compounds, Secondary Metabolites*

Speaker: Govind Pratap Rao

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Position: ICAR-Emeritus Scientist & President, Medicinal Plant Society

Affiliation: ICAR-Indian Agricultural Research Institute, New Delhi, India

Biography:

Dr. Govind Pratap Rao is a distinguished Emeritus Scientist at the Indian Institute of Sugarcane Research, New Delhi. Previously, Dr Rao has illustrious career spans over 36 years, with notable positions including: Director, Institute of Agricultural Sciences, Gorakhpur University 2022-23; Principal Scientist (Plant Pathology), Indian Agricultural Research Institute, New Delhi (2010-2022) and various scientific and administrative roles, UP Council of Sugarcane Research (1987-2010).



He did his M.Sc (Botany) and Ph.D. in Plant Virology from Gorakhpur University. He also undertook postdoctoral research at the University of Illinois, Urbana-Champaign, USA (1994) and CIRAD, France (1998), focusing on sugarcane viruses. His research expertise encompasses the identification, characterization, epidemiology and management of viruses and phytoplasmas affecting agricultural and horticultural crops.

With an impressive record of over 200 research publications and 20 authored/edited books, Dr Rao has guided more than 20 PhD and 6 MSc students. Dr. Rao has received numerous prestigious national and international awards. Dr Rao is Editor-in-Chief of several international journals: Sugar Tech (Springer), Phytopathogenic Mollicutes and Medicinal Plants. He is President of Society for Conservation & Resource Development of Medicinal Plants, New Delhi. A fellow of the NAAS Academy and several academic Societies, Dr. Rao has visited over 30 countries as a visiting scientist, invited speaker, postdoctoral fellow, research training expert, panelist, and conference attendee.

INVITED SPEAKERS

Invited speaker 1 (IO-01)

Chemical constituents and hypoglycemic activity of *Gomphogyne bonii*: implications for product development research.

The aim of this study is to evaluate the hypoglycemic effect of the extract of the Vietnamese medicinal plant *Gomphogyne bonii* Gagnep. and to identify the bioactive compounds responsible for the therapeutic effects of this plant. The results revealed that the aqueous extract of *G. bonii* significantly reduced blood glucose levels and improved plasma lipid profiles, as well as attenuated hepatocyte injury in a high-fat diet- and alloxan-induced diabetic mouse model. A comprehensive phytochemical investigation of the Vietnamese medicinal plant *Gomphogyne bonii* led to the isolation of ten saponins, including eight previously undescribed dammarane-type saponins (**1-8**) and the two known oleanane-type saponins (**9** and **10**), using various chromatographic techniques. The chemical structures of all isolated compounds were elucidated based on extensive physicochemical properties and detailed spectroscopic analyses, including NMR and mass spectrometry. To evaluate their pharmacological potential, all compounds were subjected to biological assessment for insulin-mimetic activity using *in vitro* glucose uptake and AMP-activated protein kinase (AMPK) assays. The results revealed that compounds **1**, and **7-10** significantly enhanced glucose uptake in differentiated 3T3-L1 adipocytes. Notably, compounds **1**, **7**, **9**, and **10** also upregulated the expression of glucose transporter 4 (GLUT4) via AMPK activation. These findings represent the first report on the structural elucidation and biological activity of constituents from the *Gomphogyne* genus, highlighting their potential as novel agents for regulating glucose metabolism and as promising functional food ingredients for the management diabetes of the plant *G. bonii*.

Keywords: *Gomphogyne bonii*, Cucurbitaceae, management diabetes, 1-hydroxy dammarane, glucose uptake, AMPK activation.

Speaker: Phuong Thien Thuong, Associate Professor

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Position: Senior Researcher

Affiliation:

Division of Biotechnology, Vietnam-Korea Institute of Science and Technology, Hoa Lac, Hanoi, Vietnam

College of Pharmacy, Vietnam University of Traditional Medicine, Mo Lao, Hanoi, Vietnam



Biography:

- June, 2019 – present: Senior Researcher, Vietnam-Korea Institute of Science and Technology (VKIST), Hanoi, Vietnam.
- March, 2009 – May 2019: Principal Researcher, National Institute of Medicinal Materials (NIMM), Hanoi, Vietnam.
- September, 2006 – December, 2008: Researcher, Division of Drug Discovery, Korea Research Institute of Bioscience and Biotechnology (KRIBB), Daejeon, South Korea.
- March, 2003 – August, 2006: PhD Student, College of Pharmacy, Chungnam National University, Daejeon, South Korea.

Invited speaker 2 (IO-02)

Discovery of plant-based alkyl triphenylphosphonium derivatives as potent cytotoxic agents against cancer cell lines.

Although many natural products possess significant anticancer potential, their clinical application is often hampered by limited cellular uptake and suboptimal potency. To address this challenge, our research employs a mitochondria-targeting strategy. We conjugated natural products, such as pinostrobin, curcumin, ostruthin, dipterocarpol, pterostilbene, isatin, and dehydroepiandrosterone, with a lipophilic alkyl triphenylphosphonium (TPP⁺) cation. This approach is designed to enhance cytotoxic efficacy by promoting the mitochondrial accumulation of compounds. Our research scope integrated chemical synthesis with *in vitro* evaluation against several human cancer cell lines, including pancreatic (PANC-1), cervical (HeLa), breast (MCF-7), liver (HepG2), and lung (A549). Furthermore, preliminary biomolecular results from qPCR analysis helped demonstrate the mitochondrial targeting of a TPP⁺ derivative. We also employed *in silico* methods such as molecular docking, molecular dynamics simulations, and QSAR studies to investigate potential molecular interactions. Our results show that the TPP⁺-conjugated derivatives exhibit significantly enhanced anticancer potency compared to their parent compounds. However, the cytotoxic selectivity of these compounds against normal cells has not yet been evaluated and will be a focus of our future studies. These findings suggest that this design strategy is highly effective for developing natural product-based anticancer therapies with improved efficacy.

Keywords: *lipophilic alkyl triphenylphosphonium, cytotoxicity, in silico studies, qPCR.*

Speaker: Dang Hoang Phu, PhD

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Position: Associate Professor

Affiliation: Faculty of Chemistry, University of Science, VNU-HCM

Biography:

I was appointed Associate Professor of Organic Chemistry in 2024. As a proud alumnus of the University of Science, VNU-HCM, I completed my entire academic journey there, earning my Bachelor's in 2011, Master's in 2014, and PhD in 2020. To date, I have co-authored 84 articles in reputable international journals, which have garnered over 1000 citations. My research program focuses on natural product chemistry with two primary goals: discovering bioactive chemical constituents from native Vietnamese plants and synthesizing plant-based derivatives for cancer prevention and treatment.



Invited speaker 3 (IO-03)

Plant Enzyme Inhibitors:

Extraction, Biological Activity, and Application

Plant enzyme inhibitors are natural compounds extracted from a wide range of plant species that reduce the activity of specific enzymes. These inhibitors play important roles in pharmaceutical, agricultural, and industrial sectors due to their ability to regulate biological processes related to metabolic disorders, pest control, and environmentally friendly industrial applications. In medicine, plant-derived inhibitors such as serine protease, α -glucosidase, α -amylase, cholinesterase, pancreatic lipase, and xanthine oxidase inhibitors are widely studied and applied in the management of diabetes, obesity, gout, and Alzheimer's disease. In cosmetics, tyrosinase, collagenase, and elastase inhibitors are used for anti-aging and skin-brightening purposes by preventing collagen degradation and excessive melanin production. Traditional extraction methods, including maceration, percolation, decoction, and infusion, are commonly employed, while advanced techniques such as enzyme-assisted extraction, ultrasonic-assisted extraction, and supercritical fluid extraction have been developed to improve efficiency and preserve bioactivity. Major classes of plant enzyme inhibitors include polyphenols, protease inhibitors, and isothiocyanates. In addition, mixed inhibition, in which an inhibitor can bind to both the free enzyme and the enzyme-substrate complex, has been reported for several plant-derived compounds. In agriculture, protease and urease inhibitors act as natural pest and weed control agents by disrupting essential enzymatic processes in insects. In industry, plant enzyme inhibitors are increasingly recognized as sustainable "green" alternatives to synthetic chemicals, contributing to improved product stability, quality, and environmental safety in the food and beverage, cosmetic, agricultural, textile, detergent, biotechnology, and biofuel industries. Notably, many plant species in Vietnam have been identified as valuable natural sources of enzyme inhibitors with significant potential for further development.

Keywords: α -amylase, α -glucosidase, cholinesterase, inhibitors, pancreatic lipase, xanthine oxidase

Speaker: Nguyen Minh Chon, Associate Professor

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Position: Senior Lecturer

Affiliation:

Institute of Food and Biotechnology, Can Tho University, Vietnam



Biography

Dr. Nguyen Minh Chon is an Associate Professor at the Institute of Food and Biotechnology, Can Tho University, Vietnam. He received his BSc in Agriculture (1986) from Can Tho University, Vietnam, MSc (1999), and Ph.D. (2002) in Applied Biological Science from Tokyo University of Agriculture and Technology, Japan. He was a postdoctoral fellow in Bio-system Engineering at Clemson University and the USDA in the USA (2009-2010). His research interests focus on plant physiology, biotechnology, and sustainable agriculture, particularly the role of plant growth substances in clonal propagation, tissue culture, and crop nutrition. He has conducted extensive research on major crops, including rice, sugarcane, soybeans, peanuts, and tropical fruits, with a focus on improving productivity, controlling rice lodging, and managing stress. His expertise also includes natural compounds, enzymes, carbohydrate metabolism, biofuel production, and medicinal plants, linking biochemical mechanisms with practical applications for sustainable agriculture.

Invited speaker 4 (IO-04)

Exploration of Bacterial Natural Products with Genome Information and Molecular Networks

Microorganisms represent a prolific yet underexplored reservoir of chemical diversity, offering novel scaffolds that often differ fundamentally from those found in plants. Among them, culturable bacteria, particularly actinomycetes, have demonstrated exceptional capacity for producing structurally unique and functionally diverse small molecules. Harnessing this microbial potential remains challenging due to limitations in strain cultivation and natural product dereplication. However, advances in informatics and the widespread availability of genome sequences containing biosynthetic gene clusters (BGCs) have significantly improved our ability to identify promising bacterial producers from environmental sources.

In our research, we systematically collect bacterial isolates from diverse environments including sediments, salterns, and plants. Candidate strains are prioritized based on the presence of key biosynthetic genes revealed through genetic marker screening, complemented by comprehensive LC-MS analysis of culture extracts. To further accelerate discovery, we constructed BGC networks across over 2,000 *Streptomyces* genomes, enabling the prediction of new producer strains for secondary metabolites. Utilizing molecular networking of MS/MS data and parallel BGC analysis, we elucidated the structures of several new bioactive compounds without redundant re-isolation of previously known substances.

Our work spans the spectrum from molecular analysis to the development of methodologies for natural product discovery. Ultimately, these integrated approaches not only enhance the efficiency of discovering new bacterial metabolites but also provide a framework for future identification of potent molecules with pharmaceutical potential, contributing to a broader understanding and application of microbial chemical diversity.

Keywords: *bacterial secondary metabolites, biosynthetic gene clusters, molecular network, Streptomyces*

Speaker: Jin-Soo Park, PhD

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Position: Principal researcher

Affiliation: Korea Institute of Science and Technology,
Rep. of Korea



Biography:

Jin-Soo Park is Principal Researcher at the Center for Natural Product Systems Biology, Korea Institute of Science and Technology (KIST), and Associate Professor at KIST School, University of Science and Technology. He earned his Ph.D. in Biotechnology from the University of Tokyo, following M.S. and B.S. degrees in Agricultural Biotechnology and Applied Biology & Chemistry from Seoul National University. Trained in microbial natural products research, Dr. Park focuses on the discovery of new bacterial secondary metabolites, elucidation of biosynthetic pathways, and *in vitro* production of bioactive compounds.

Invited speaker 5 (IO-05)

Phenotypic Screening Based Discovery of Neuroprotective and Hepatic metabolic modulators

Phenotypic screening has re-emerged as a powerful strategy for identifying first-in-class therapeutic candidates without prior target bias. In this study, we conducted large-scale phenotypic screening to discover bioactive compounds targeting neurodegenerative and metabolic liver diseases.

High-throughput screening of a natural product library identified a potent neuroprotective candidate, the ethanol extract of *Polyscias spp.*. Glutamate-induced oxidative stress promotes neuronal injury through Ca^{2+} influx, ROS accumulation, MAPK activation, and mitochondrial dysfunction leading to AIF-mediated apoptosis. EEPG significantly improved viability of glutamate-treated HT22 neuronal cells, reduced intracellular Ca^{2+} and ROS levels, and suppressed MAPK activation and AIF nuclear translocation. In an ischemic brain injury rat model, EEPG markedly attenuated neuronal cell death, supporting its therapeutic potential in oxidative stress-associated neurodegeneration.

In an independent screening campaign, we identified DTC1225, a novel benzothiazole-based autophagy activator. DTC1225 enhanced autophagic flux via mTORC1 inhibition and TFEB nuclear translocation, activating the autophagy-lysosome pathway. The compound reduced lipid accumulation in steatotic HepG2 cells and differentiated 3T3-L1 adipocytes, and alleviated hepatic injury in a diet-induced MASLD mouse model by modulating autophagy, lipid metabolism, oxidative stress, and ferroptosis.

Collectively, these findings highlight the effectiveness of phenotypic drug discovery in linking screening-based identification to mechanistic validation and *in vivo* efficacy for complex diseases.

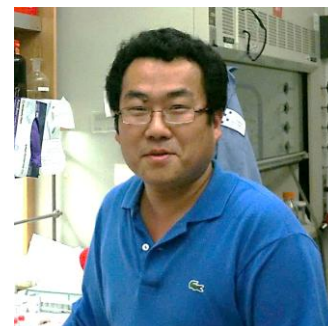
Keywords: *Phenotypic Screening, Neuroprotection, autophagy Activation*

Speaker: Jae Wook Lee, PhD

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Position: Principal Research Scientist

Affiliation: Institute of Natural Products, Korea Institute of Science and Technology, Natural product Applied Science, KIST school, University of Science and Technology, Republic of Korea.



Biography

I received my Ph.D. in Chemistry from New York University. Following my doctoral training, I conducted postdoctoral research at The Scripps Research Institute in San Diego, USA, where I further developed my expertise in chemical biology and small-molecule drug discovery.

I subsequently joined the Korea Institute of Science and Technology (KIST) as a Senior Research Scientist and currently serve as a Principal Research Scientist. In addition, I am the Head of the Department of Natural Product Applied Science at the KIST School, University of Science and Technology (UST). My research integrates phenotypic screening, mechanistic investigation, and *in vivo* validation to discover and develop innovative small-molecule therapeutics for complex diseases.

Invited speaker 6 (IO-06)

Elicitation as a tool to improve the profiles of high-value secondary metabolites.

Currently, *in vitro* cell, tissue, and organ cultures are used for the production of plant-based natural products, including medicines, nutraceuticals, and natural coloring agents. Numerous methods have been employed to generate biomass and bioactive secondary compounds *in vitro*. A practical method that has shown promise is the use of elicitors to elicit cultured cells and organs. Elicitors are compounds derived from both biotic and abiotic sources that, in response to stress, can either accelerate the synthesis and accumulation of specialized metabolites in plants. Specialized metabolite synthesis is greatly influenced by the kind of elicitor employed, the dosage, and the onset of treatment. In this study, we discuss the classification of elicitors, their mechanism of action, and their potential use in the production of bioactive natural products from plant cells, tissues, and organ cultures.

Keywords: *Elicitor, Plant Cell cultures, specialized metabolites.*

Acknowledgment: Hosakatte Niranjana Murthy is thankful for the “Brain Pool” (Grant No. RS-2025-25425249) of the National Research Foundation, Republic of Korea

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Biography

Professor Hosakatte Niranjana Murthy graduated from Karnatak University in Dharwad, India, with an M.Sc. and a Ph.D. Since 1986, he has been a professor at Karnataka University. He conducted post-doctoral research in the field of plant biotechnology at a number of universities, including Chungbuk National University in the Republic of Korea, the University of Nottingham in the United Kingdom, and the University of Guelph in Canada. His specialty is the elicitation and investigation of the bioactivities of plant specialized metabolites, as well as their production employing bioreactor technology.



ORAL TALKS

Oral talk 1.1 (OP-1.1)

Assessment of Genetic Diversity of Camellia Tea Varieties Cultivated in Phu hoi Commune, Dong Nai province Using SRAP markers

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ABSTRACT

Camellia tea is an economically important industrial crop and the primary raw material for tea production, a widely consumed beverage and a significant export commodity in many countries, including Vietnam. Genetic diversity in Camellia germplasm plays a crucial role in breeding programs and genetic resource conservation. However, only limited studies have assessed the genetic diversity of Camellia varieties in Vietnam. In this study, 30 SRAP markers (random combinations of five forward primers (Me) and six reverse primers (Em)) were used to evaluate and analyze the genetic diversity of 63 samples collected from 21 Camellia populations in Phu Hoi commune, Dong Nai Province. The results showed that all 30 SRAP markers successfully amplified a total of 567 bands, of which 556 were polymorphic, accounting for 97.6% polymorphism. The polymorphic information content (PIC) values ranged from 0.59 to 0.89. The Shannon diversity index ($I = 0.192$) and expected heterozygosity ($He = 0.129$) indicated a relatively low overall genetic diversity within the Phu Hoi tea populations. UPGMA cluster analysis based on the simple matching genetic similarity coefficient (SM), ranging from 0.392 to 0.977, grouped the 63 tea samples (from 21 populations) into three major genetic clusters at a similarity threshold of 0.611. This result suggests considerable genetic differentiation among individuals, even within the same population. Sequencing analysis of the matK and rbcL gene regions from representative samples indicated that group I likely belongs to *Camellia sinensis* var. *assamica*, whereas groups II and III may correspond to other Camellia species such as *Camellia pubicosta* and *Camellia grandibracteata*. These findings suggest that the tea populations in Phu Hoi possess notable genetic variability, reflecting a long cultivation history and the predominant use of seed-based propagation.

Keywords: *Camellia* spp., genetic diversity, SRAP, tea, varieties.

Oral talk 1.2 (OP-1.2)

Conservation and Commercialization of *Picrorhiza kurroa* and *Swertia chirayita*: The Case of Two Endangered Medicinal Herbs in the Western Himalaya

Authour Rajesh Chauhan*, Kaushalya Kapoor, S.K. Kapta, Shreshtha Nand, Sanjay Sood

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ABSTRACT

Picrorhiza kurroa (Kutki) and *Swertia chirayita* (Chirayita) are high-value, low-volume medicinal herbs indigenous to the Western Himalayas. *P. kurroa* is characterized by its iridoid glycosides (Picrosides), essential for treating liver and respiratory ailments. In contrast, *S. chirayita* contains key metabolites like amarogentin and chiratin, which offer significant hepatoprotective, hypoglycemic, antimalarial, and cardio-stimulant properties. Despite their critical roles in traditional Ayurvedic and Tibetan medicine—as well as modern pharmacology—both species face severe threats from narrow distribution ranges, small population sizes, and indiscriminate wild harvesting. Consequently, they are now ranked among the top 40 high-priority species for conservation and cultivation in the region. However large scale cultivation of these species remains unestablished. In addition to conservation efforts, mass propagation of *P. kurroa* and *S. chirayita* is currently expanding across the Western Himalayas through multi-sectoral collaborations. In Himachal Pradesh, the JICA (Japan International Cooperating Agency), Forestry Project is leading a massive expansion, increasing *P. kurroa* cultivation from 4.95 lakh plants in 2024–25 to 16.2 lakh plants in 2025–26. In Uttarakhand, institutional support from Research and Development Institute (HRDI), Gopeshwar (Chamoli) and High Altitude Plant Physiology Research Center (HAPPRC) has formalized cultivation practices. These efforts build upon established success stories, such as Ramni village in Chamoli, which has maintained a consistent annual output of 12 tons of Kutki for over a decade.

The cultivation of *Swertia* species is currently being popularized through seedling distribution programs by HP JICA and GB Pant National Institute (NIHE) in the Kullu, Chamba, and Kinnaur regions. While commercial farming is still in its pilot stages, the biological challenges of *S. chirayita* have led to the strategic promotion of *Swertia cordata*. This sister species is less prone to premature degeneration and possesses a more favorable 18-month growth cycle, making it a more resilient and profitable alternative for high-altitude agro-forestry.

To protect wild populations, it is essential to integrate traditional wisdom with modern agro-technology and financial subsidies. Collaborations with organizations like the Zandu Foundation offer buy-back guarantees that provide financial stability during the slow maturation of these crops. Furthermore, biotechnological interventions like synthetic seed production are bypassing traditional germination hurdles. Because these species thrive under "Natural Farming" conditions without synthetic fertilizers or pesticides, they are uniquely positioned for the lucrative organic trade.

Keywords: *Ethnobotany, Picrorhiza kurroa, Swertia chirayita, Western Himalaya, Conservation, JICA, Swertia cordata, Sustainable Harvesting.*

Oral talk 1.3 (OP-1.3)

Isolation and biophysical characterization of Endophytic actinomycetes with antibacterial, antioxidant and anti-inflammatory properties

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ABSTRACT

Endophytic actinomycetes are relatively unexplored as potential sources of novel natural products and continue to draw the attention of researchers worldwide. Metabolic potential of such endophytic actinomycetes have been proved to be beneficial in the field of agriculture and medicine. Endophytes are chemical synthesizers inside plants, in other words they play the role as a selection system for microbes to produce bioactive substances with low toxicity towards higher organisms. In our study we have focused to assign chemical class to the compounds obtained from endophytic actinomycetes, potential therapeutic applications of these compounds and the utility of endophytic actinomycetes in agriculture and environment. This study deals with identification and characterization of secondary metabolites by GCMS and FTIR produced by endophytic actinomycetes *Streptomyces flavoviridis*A3WK and its plant *Ocimum basilicum*. A comparative analysis of the FT-IR, GC-MS, antibacterial, antioxidant and anti-inflammatory properties of plant and endophytic actinomycetes extracts was conducted. 12 compounds each of *Streptomyces flavoviridis* A3WK and *O.basilicum* were identified by GC-MS. The FT-IR and GC-MS analysis reveals that *S.flavoviridis* A3WK has more antimicrobial, antioxidant activity and anti-inflammatory properties compared with the results of *O.basilicum*. Over all the activity of the endophytic actinomycetes was more compared to that of the *O.basilicum* extracts. The study reveals to show that the existence of endophytic actinomycetes may enhances medicinal value of the medicinal plants, and hence such studies help in the study of endophytic actinomycetes as well as their relevance in host plant. This is the first report of such studies isolating endophytic actinomycetes from the said medicinal plants and their characterization.

Keywords: Endophytic actinomycetes, *Ocimum basilicum*, FTIR, GCMS, medicinal plants.

Oral talk 1.4 (OP-1.4)

Integrated genomic, evolutionary, and applied research on duckweeds (Lemnaceae)

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ABSTRACT

I have been researching duckweed (Lemnaceae) for over 10 years, including taxonomy, cellular genetics, genomics, evolution, and applied studies. Our researches have provided important insights into the evolution and diversity of the duckweed genome by revealing significant interspecific variation in genome size, chromosome number, nuclear and cell volume, and rDNA organization (Hoang et al., 2019; Hoang et al., 2022). By combining long-read sequencing and cytogenetic mapping, we helped assemble the chromosome-scale genome of *Spirodela intermedia*, creating a crucial reference for comparative genomics (Hoang et al., 2020, Scientific Reports). I have also contributed significantly to the evolutionary studies and taxonomic revision of Lemna, notably Lemna sect. Uninerves, as well as research on the chromosome evolution, polyploidy, hybridization, and epigenomic regulation that underpin duckweed clonal reproduction and evolutionary success, especially in the *Lemna minor* complex (Bog et al., 2020; Hoang et al., 2021; Ernst et al., 2025; Michael et al., 2025). In addition to these basic researches, I have gathered and selected over 100 duckweed accessions from all around Vietnam, creating a special germplasm resource for studying genetic diversity and adaptive variation in indigenous populations. I have used this collection to investigate the potential applications of duckweeds, such as the uptake of heavy metals for phytoremediation, the optimization of cultivation and *in vitro* maintenance protocols, and the evaluation of biomass productivity and nutritional composition. This has laid the scientific groundwork for future applications in animal feed, functional foods, and dietary supplements.

Keywords: Duckweed (Lemnaceae), genome evolution, cytogenetics, genetic diversity, applied biotechnology.

Oral talk 1.5 (OP-1.5)

Research Advances in Medicinal Plants of The Genus *Centaurea* Grown in Algeria

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ABSTRACT

The genus *Centaurea* (Asteraceae family) comprises 500 species from which 45 plants grown in Algeria, characterized by their ability to biosynthesize a wide range of specialized metabolites such as phenolics, flavonoids, alkaloids, lignans and sesquiterpene lactones. These compounds are well-known for their interesting biological activities like antioxidant, antimicrobial, anti-inflammatory and anticholinesterase. The 70% ethanol extracts of dried species *Centaurea omphalotricha*, *C. tougourensis*, *C. dissecta* and *C. granatensis* were partitioned by liquid/liquid chromatography into three extracts PE, EtOAc and *n*-BuOH. Purification of the extracts using different chromatographic techniques (VLC, CC, HPLC and TLC) provided more than eighty secondary metabolites including lignans, flavonoids, polyphenols, sesquiterpenes and triterpenoids. Their structures were elucidated by 1D- and 2D-NMR (^1H , ^{13}C and DEPT, COSY, HSQC, HMBC, NOESY), LC/MS, UV-Vis, IR, and HR-ESI-MS, acid hydrolysis, measurement of optical rotation and comparison with literature data. Moreover, the antioxidant activity of extracts (PE, EtOAc and *n*-BuOH) and some phenolic compounds were assessed using six complementary methods (DPPH, TAC, FRAP, Fe^{2+} chelation, H_2O_2 scavenging, and ferric thiocyanate assays), revealing moderate activity in the extracts. Furthermore, the *in vitro* anti-inflammatory evaluation, based on the inhibition of bovine serum albumin denaturation, showed that the petroleum ether extracts of *C. granatensis* exhibited remarkable effects, surpassing those of diclofenac sodium used as a reference drug. In summary, chemotaxonomic studies have proven to be of great significance in providing essential insights into the classification and relationships among various taxa within the *Centaurea* genus.

Keywords: *Centaurea*, Phytochemicals, NMR, Biological potential, Chemotaxonomy.

Oral talk 1.6 (OP-1.6)

Quantitative Analysis and Bioactivity Evaluation of Methyl Gallate Isolated from the Vietnamese Lacquer Tree.

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ABSTRACT

Lacquer trees of the family Anacardiaceae, particularly *Toxicodendron succedaneum* and *Toxicodendron vernicifluum*, are rich in polyphenolic constituents and have long been utilized in traditional medicine. This study investigated the phytochemical profiles and biological activities of these two species, with a focus on methyl gallate (MG) and gallic acid (GA). Methyl gallate was isolated from the bark of *T. succedaneum* using chromatographic techniques. Comparative phytochemical profiling of both species was performed by TLC, HPLC-PDA, and LC-QToF/MS, enabling the establishment of characteristic chemical fingerprints. A validated HPLC method was developed to quantify MG, GA, and fisetin in different plant parts. Biological activities were evaluated through *in vitro* assays. Antioxidant capacity was assessed using radical scavenging and lipid peroxidation models, anti-inflammatory activity was determined by nitric oxide inhibition in LPS-stimulated macrophages, and hepatoprotective effects were examined in acetaminophen-induced cytotoxicity in HepG2 cells. The results revealed notable differences in chemical composition between the two species. MG exhibited significant antioxidant, anti-inflammatory, and hepatoprotective activities, supporting its role as a key bioactive constituent. Overall, this study provides comprehensive phytochemical and bioactivity data for *T. succedaneum* and *T. vernicifluum*, reinforcing their pharmacological relevance and supporting their traditional medicinal use.

Keywords: *Toxicodendron succedaneum*; *Toxicodendron vernicifluum*; methyl gallate; antioxidant; anti-inflammatory; hepatoprotection.

Oral talk 1.7 (OP-1.7)

Chemical constituents and bioactivities of the alkaloid enrichment from *Coptis chinensis* roots

Bui Thi Nhat Le^{1,2}, Nguyen Ngoc Lien³, Nguyen Tien Dat², Truong Ngoc Minh², Nguyen Thi Luyen², Nguyen Thi Thu Minh², Nguyen Thu Uyen², Hoang Thuy Duong², Nguyen Minh Trang², Nguyen Ngoc Quy², Do Hoang Giang^{2*}

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ABSTRACT

Coptis chinensis Franch. (Ranunculaceae) is a valuable medicinal plant renowned for its remarkable pharmacological properties and long-standing use in traditional medicine. This species is particularly rich in alkaloids, which represent its principal bioactive constituents and are responsible for a wide range of biological activities. In the present study, an alkaloid-enriched extract was prepared from the roots of *C. chinensis* through an optimized enrichment procedure. The major alkaloid constituents of the enriched extract were subsequently isolated and elucidated. Furthermore, the biological potential of the alkaloid-enriched extract was systematically evaluated, including its free radical scavenging activity, inhibitory effect on nitric oxide (NO) production, and cytotoxic activity against several human cancer cell lines. The results demonstrate that the alkaloid-enriched extract exhibits notable anti-inflammatory activity, along with significant cytotoxic effects on selected cancer cell lines, highlighting the important contribution of alkaloids to the pharmacological properties of *C. chinensis*. These findings provide scientific evidence supporting the traditional use of this medicinal plant and suggest its potential application as a promising source of bioactive alkaloids for pharmaceutical and functional product development.

Keywords: *Coptis chinensis*, isoquinoline alkaloid, anti-inflammation, cytotoxic.

Funding: This study was funded by the Vietnam Academy of Science and Technology (VAST) under the grant number QTBG01.03/26-27.

Oral talk 1.8 (OP-1.8)

Ethnobotanical Survey of Medicinal Plants and Practices of Traditional Healers in North Pemba Region of Zanzibar: Implications for Sustainable Use and Conservation.

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ABSTRACT

Ethnobotanical surveys of medicinal plants are essential for documenting both existing and endangered species, as well as for identifying their therapeutic uses. The objective of the current study is to identify medicinal plants obtained from North Pemba for implications of sustainable use and conservation. The method of survey used was semi-structured interviews, free listing, and guided field walks with 182 traditional healers and herbal practitioners across 23 Shehias (wards). The survey documented 96 medicinal plant species across 47 families, with Euphorbiaceae, Lamiaceae, Rubiaceae, and Asteraceae being the most common. Frequently cited species such as *Erythrina abyssinica* and *Guilandina bonduc* were mainly used to treat fevers, digestive, reproductive, and respiratory conditions. Decoction and oral administration were the primary methods of traditional preparation and use. Most plants (65.9%) were harvested from the wild—often from sensitive areas like Ngezi Forest Reserve—with leaves and roots most collected. Overharvesting and climate variability were each reported by 38% of practitioners as major causes of declining plant availability. Nearly all healers (92.3%) practiced without formal registration but expressed strong support for government recognition and regulation. Although most plant trade was local, several high-demand species were marketed beyond the region.

Keywords: Medicinal plants, Traditional medicine, Traditional healers, Conservation, and Community.

Oral talk 1.9 (OP-1.9)

Catalytic promiscuity of oxido-reductases in natural products metabolism

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ABSTRACT

Contrary to the conventional and simplistic concept that a single enzyme usually performs a single function with high specificity, enzyme promiscuity is common and has recently attracted significant attention. In natural products metabolism, the catalytic and substrate promiscuity of oxido-reductases such as cytochrome P450 monooxygenases and dehydrogenases can convolute biosynthetic studies and metabolic engineering efforts. Nonetheless, these broad activity spectra have crucial implications in the natural adaptive evolution of metabolism where promiscuous enzymes can be recruited for emerging pathways and/or provide remarkable levels of chemical diversity in living organisms. Importantly, enzymes with broad substrate and/or product ranges can be readily optimized for biotechnological applications. Examples of such promiscuous oxidoreductases characterised in our biosynthetic studies of sesquiterpene lactones, polyketides, iridoids, and monoterpenoid indole alkaloids in several lineages of medicinal plants and microbes are highlighted.

Keywords: *promiscuity, oxidase, reductase, dehydrogenase, P450, natural products.*

Oral talk 1.10 (OP-1.10)

Optimization of Ultrasound-Assisted Extraction Conditions for Piperine from Black Pepper (*Piper nigrum* L.) and its Characteristics

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ABSTRACT

Piperine is a major alkaloid in black pepper, typically accounting for ~2–7% of the fruit's dry weight, distinguished by its characteristic amide structure and strong crystalline nature that enables reliable spectroscopic and chromatographic identification. This study aimed to extract piperine from dried black pepper (*Piper nigrum* L.) collected in Dak Lak Province, Vietnam, in March 2025, using ultrasound-assisted extraction (UAE), quantify piperine by UV-Vis spectrophotometry, and confirm the identity of the isolated compound through structural characterization. Piperine quantification was performed at 345 nm using a calibration curve prepared from piperine standard in ethanol over 1–12 µg/mL. The calibration demonstrated excellent linearity enabling reliable determination of piperine in the obtained extracts. UAE was investigated under four selected conditions by varying ethanol concentration (70–100%), extraction time (20–60 min), and solid-to-solvent ratio (1:10–1:50, g/mL), at temperatures of 30–60°C. It was found that at ethanol concentration 85%, extraction time 60 min, solid-to-solvent ratio 1:10 and temperature of 60°C the piperine content reached 5.605 g/100 g dry weight. The identity of piperine was further confirmed by FTIR, XRD, and HPLC analyses. FTIR spectra exhibited characteristic bands around 1633–1638 cm⁻¹ (amide – CO–N / conjugated system) and ~1490 cm⁻¹ (aromatic C=C stretching), while XRD patterns showed sharp reflections consistent with crystalline piperine (2θ ≈ 14.74°, 19.64°, 22.35°, 25.73°, and 28.12°). HPLC analysis showed matching retention time with the standard under identical conditions. Overall, UAE provided an efficient approach for extracting piperine from black pepper, and the purified piperine obtained provides a reliable reference material for subsequent analytical and formulation studies.

Keywords: Piperine; Black pepper (*Piper nigrum* L.); Ultrasound-assisted extraction (UAE); Crystalline piperine.

Oral talk 1.11 (OP-1.11)

Evaluation of the biological activities of microfungal species isolated from the medicinal plant *Angelica sinensis*

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ABSTRACT

Angelica sinensis (commonly known as Đương quy) is a critical medicinal plant with a long history of utilization in traditional medicine, particularly for the treatment of various gynecological conditions. While the chemical compositions and biological activities of *A. sinensis* have been extensively analyzed to confirm their pharmacological potential, the plant's associated endophytic microbiota remains largely uninvestigated. This study aims to isolate and analyze the biological activities of endophytic fungi - with a specific focus on filamentous fungi - derived from *A. sinensis*. Roots and leaves from one-year-old specimens, cultivated in the experimental botanical garden at the Faculty of Biology, Hanoi National University of Education, were surface-sterilized and decorticated. The tissue samples were subsequently sectioned and cultured on Potato Dextrose Agar (PDA) medium under stable, dark conditions at 26°C for a duration of 10 days, three times repeated. Three distinct fungal species were successfully isolated from the root tissues. Preliminary biological screening indicated that all three isolates exhibit significant proteolytic and amylolytic capabilities, demonstrating strong potential for the decomposition of protein and starch compounds. Conversely, the isolates demonstrated low efficacy regarding antibacterial and antifungal activities. These findings highlight the potential of microfungal species isolated from *A. sinensis* in generating effective biological agents targeting protein and starch degradation. Future research will focus on the molecular identification of these isolates through the sequencing of their internal transcribed spacer (ITS) regions to establish precise phylogenetic classifications.

Keywords: *Angelica sinensis*, endophytic fungi, antibacterial activity, antifungal activity, proteolytic decomposition.

Oral talk 1.12 (OP-1.12)

Aptamine Inhibits Foam Cell Formation by Downregulating CD36 and SR-A Expression, and, Reducing oxLDL Uptake

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ABSTRACT

Cardiovascular diseases (CVDs) remain the leading cause of global mortality, with atherosclerosis serving as the primary underlying pathophysiology. The formation of macrophage-derived foam cells, driven by the uptake of oxidized low-density lipoprotein (oxLDL) via scavenger receptors such as CD36 and Scavenger Receptor A (SR-A), is a critical step in the development of atherosclerosis. This study investigated the potential of aptamine, a marine-derived alkaloid in reducing the formation of foam cells, by evaluating its effects on CD36 and SR-A expression, and oxLDL uptake in RAW 264.7 murine macrophages. Cell viability was determined using the MTS assay to ensure non-toxic dosing. Gene expression levels of CD36 and SR-A were quantified using real-time qPCR, while the uptake of fluorescence-labeled diI-oxLDL was analyzed via fluorescence microscopy and spectrophotometry. Our results demonstrated that aptamine did not exert any cytotoxicity effect on RAW264.7 cells and significantly downregulated the mRNA expression of both CD36 and SR-A. Consistent with these findings, fluorescence microscopy revealed a reduction in intracellular fluorescence intensity in aptamine-treated cells. Quantitative spectrophotometric analysis confirmed a significant decrease in diI-oxLDL uptake. These findings suggest that aptamine inhibited oxLDL uptake in macrophages, likely through the transcriptional downregulation of key scavenger receptors, CD36 and SR-A. In conclusion, aptamine represents a promising natural compound for further investigation as a therapeutic intervention against the progression of atherosclerosis and CVD.

Keywords: *Atherosclerosis, oxLDL, CD36, SR-A, Aptamine.*

Oral talk 1.13 (OP-1.13)

Effects of Simulated Microgravity on Growth and Lignan Biosynthesis in *Phyllanthus amarus* Single Cells

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ABSTRACT

Simulated microgravity has emerged as a novel physical factor capable of modulating plant cell growth and secondary metabolite biosynthesis. This study presents an *in vitro* single-cell culture protocol for *Phyllanthus amarus* developed to evaluate the effects of simulated microgravity on cell proliferation and lignan accumulation. Callus was induced from longitudinally sectioned second internodes of two-month-old shoots on Murashige and Skoog (MS) medium supplemented with 6-benzyladenine. Cell suspensions were established through liquid shaking culture, followed by isolation and cultivation of single cells on solid MS medium. Simulated microgravity conditions were generated using a low-speed clinostat operating at 5 rpm, while parallel cultures under normal gravity (1 g) served as controls. After 40 days of culture, cell biomass and the contents of phyllanthin and hypophyllanthin were quantified using HPLC analysis. Results demonstrated that simulated microgravity significantly enhanced both fresh and dry biomass accumulation compared to the control condition. Moreover, lignan biosynthesis was markedly stimulated, with phyllanthin detected exclusively under simulated microgravity and hypophyllanthin showing more than a threefold increase relative to normal gravity. These findings indicate that simulated microgravity acts as an effective elicitor for promoting cell growth and secondary metabolite production in *P. amarus*. The proposed protocol provides a practical experimental platform for microgravity-related plant biotechnology research and offers potential applications in the sustainable production of high-value medicinal compounds.

Keywords: hypophyllanthin; *Phyllanthus amarus*; phyllanthin; simulated microgravity; single-cell culture.

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Oral talk 1.14 (OP-1.14)

Fabrication of a bioactive biopolymer film integrating python fat and tamanu (*Calophyllum inophyllum* L.) oil

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ABSTRACT

This study aims to fabricate a bioactive biopolymer film that integrates python fat (Python fat) and tamanu oil (*Calophyllum inophyllum* L. oil) for application in burn wound care. Both tamanu oil and python fat have long been employed in traditional medicine to support burn treatment and promote wound healing. Prior studies indicate that these materials exhibit bioactive properties contributing to antimicrobial activity and wound protection.

Compositional analysis shows that tamanu oil is rich in unsaturated fatty acids (methyl oleate 40.5%; methyl linoleate 25.91%) alongside saturated fatty acids (methyl palmitate 17.19%; methyl stearate 15.33%). In contrast, python fat contains a high proportion of methyl oleate (59.83%), with notable levels of methyl palmitate (18.19%), methyl stearate (11.24%), and methyl linoleate (10.74%). This fatty acid profile suggests complementary roles: unsaturated species (particularly oleic and linoleic acids) may enhance skin permeation, modulate inflammation, and help restore the lipid barrier, whereas saturated species (palmitic and stearic acids) can provide occlusive coverage to reduce transepidermal water loss.

Experiments were designed to systematically vary formulation factors and evaluate physicochemical metrics alongside biological activities, with emphasis on antioxidant capacity and antimicrobial performance, to identify an optimized product. The findings underscore the potential of natural-origin ingredients in developing safe, eco-friendly biomaterials for biomedical applications, and open a pathway toward burn-focused wound dressings with targeted bioactivity.

Keywords: *tamanu oil; python fat; burn wounds; bioactive film; fatty acid profile; antioxidant; antimicrobial; biopolymer.*

Oral talk 2.1 (OP-2.1)

***In silico* molecular characterization and anticancer activity of bougainin of Bougainvillea plant**

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ABSTRACT

Bougainvillea spectabilis (Nyctaginaceae) is the most common plant, exhibited many biologically important phytochemicals. Bougainvillea extracts showed diverse biological activities viz., antioxidant, anti-inflammatory, antibacterial, anti-ulcer, anticancer and anti-fertility effects. Bougainvillea leaves showed specific protein, bougainin. The bougainin is a ribosome inactivating protein exhibited strong anticancer and anti-inflammatory activity. The present research was focused on molecular characterization and anticancer activity of bougainin using *in silico* experiments. Totally 19 bougainin protein sequences were retrieved from NCBI and subjected to phylogenetic (Clustal Omega), Primary structure (Expansy ProtParam), secondary structure (PSIPRED), Tertiary structure (Swiss-Model) analysis. The evolutionary relationships of 19 bougainin showed closed relationship in the amino acids composition. The Expansy results showed all bougainin proteins consists of 248-305 amino acids and they are in acidic in nature. The bougainin showed higher aliphatic index values, thermostable, non-polar and hydrophobic in nature. The amino acids compositions of bougainin suggesting potential validation in their protein structure. The bougainin showed all three structural components such as coils, helices and turns. The tertiary structure of bougainin studies confirms that protein is a absolute quality model for study. The PDB of bougainin, 3CTK was selected and evaluated against 2 lung cancer proteins (1X2J and 2XP2) for docking studies using PyDock server. The 3CTK interacted with 15 amino acids of 1X2J and interaction showed non-salt bridges, no disulphide bond, 4 hydrogen bonds, 174 non-bonded contacts with high binding affinity. The 3CTK with 2XP2 exhibited 2 salt bridges, 4 hydrogen bonds, 253 interacting non-hydrogen contacts. The results confirms that the structural validation and potential anticancer activity of 3CTK was significant. To validate our results further *in vivo* experiments and modeling techniques are needed.

Keywords: Bouganin, Primary structure, Secondary structure, Protein-protein interaction, *In silico* experiments.

Oral talk 2.2 (OP-2.2)

Optimization of synthesis conditions for *Calophyllum inophyllum* L.-loaded solid lipid nanoparticles

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ABSTRACT

This study aimed to optimize the synthesis conditions for solid lipid nanoparticles (SLNs) loaded with *Calophyllum inophyllum* L. (tamanu) oil, a natural extract known for its anti-inflammatory, antimicrobial, and wound-healing properties. SLNs were prepared using a hot homogenization–ultrasonication–cold homogenization method, and various formulation parameters were systematically evaluated, including the type and concentration of solid lipids, hydrophilic–lipophilic balance (HLB) of surfactants, sonication power, and homogenization speeds. Among the tested lipids, Naterol® SE produced stable SLNs and was selected for further optimization. Response Surface Methodology (RSM) with a Central Composite Design (CCD) was applied to model the effects of four key factors—HLB value, sonication power, hot homogenization speed, and cold homogenization speed—on particle size and polydispersity index (PDI). The optimized formulation achieved a mean particle size of 148.7 ± 1.39 nm and a PDI of 0.30, with spherical morphology confirmed by SEM and good physical stability under different storage conditions. These findings demonstrate that the optimized tamanu oil-solid lipid nanoparticles (TO-SLNs) possess favorable physicochemical characteristics, offering strong potential as a topical nanocarrier system for skin repair and regeneration applications.

Keywords: Solid lipid nanoparticles (SLNs); *Calophyllum inophyllum* L.; Tamanu oil; Sonication power.

Oral talk 2.3 (OP-2.3)

Isolation and Structural Characterization of a Triterpenoid Saponin, Barringtogenol C Glycoside, from *Barringtonia acutangula* Fruit and Its Anticancer Potential Against Hepatocellular Carcinoma

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ABSTRACT

Barringtonia acutangula (L.) Gaertn. (family Lecythidaceae) is a medicinal plant traditionally used for the treatment of liver disorders, inflammation, skin diseases, and gastrointestinal ailments. In the present study, bioactive phytoconstituents were isolated from the methanolic fruit extract of *B. acutangula* and evaluated for their *in vitro* anticancer potential against hepatocellular carcinoma. Methanolic extraction of dried fruits yielded a reddish-brown extract with a recovery of 7.06% (w/w). Preliminary phytochemical screening revealed the presence of saponins, alkaloids, flavonoids, phenolics, tannins, terpenoids, glycosides, and phytosterols. Column chromatographic fractionation using a polarity-gradient solvent system yielded 36 fractions, which were screened for cytotoxic activity using the MTT assay. Among the fractions, Fraction 28 exhibited potent cytotoxicity against HepG2 cells with an IC₅₀ value of 25.2 µg mL⁻¹ and comparatively lower toxicity toward NIH3T-3 normal fibroblasts. Colony formation assay demonstrated a significant dose-dependent suppression of clonogenic survival, while scratch wound-healing assay revealed marked inhibition of HepG2 cell migration. Acridine orange/ethidium bromide (AO/EB) staining confirmed apoptosis through nuclear condensation and membrane blebbing. Furthermore, intracellular reactive oxygen species (ROS) generation was significantly elevated in treated cells, indicating oxidative stress-mediated cell death. Structural characterization of the bioactive fraction using LC-MS, ¹H NMR, ¹³C NMR, and IR spectroscopy identified the compound as Barringtogenol C glycoside, a triterpenoid saponin. These findings highlight *B. acutangula* fruit as a promising source of anticancer triterpenoid saponins and support the potential of Barringtogenol C glycoside as a lead molecule for hepatocellular carcinoma therapy.

Keywords: *Barringtonia acutangula*, Barringtogenol C glycoside, hepatocellular carcinoma, anticancer activity, apoptosis, reactive oxygen species.

Oral talk 2.4 (OP-2.4)

Antioxidant-Linked Pharmacological Potential of a Traditionally Used Asian Wild Fruit: A Bioactive Metabolite Assessment of *Flacourtia montana*.

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ABSTRACT

The search for pharmacologically active metabolites from traditional Asian flora continues to contribute significantly to natural product research. *Flacourtia montana* J.Graham is a wild fruit tree native to South and Southeast Asia, occurring particularly in the Western Ghats and adjoining hill regions of India, where the fruit is locally consumed and recognised in traditional practices. Even though it has ethnobotanical significance, there isn't enough research on its possible medical uses. The present study evaluated the bioactive composition, antioxidant capacity, and nutritional relevance of *F. montana* fruit to human health.

Proximate analysis revealed a nutrient-rich composition, including carbohydrates (52.15%), dietary fibre (29.13%), protein (10.67%), and ash (5.43%). Essential minerals such as potassium (17 mg/100 g) and phosphorus (15 mg/100 g) were present in meaningful physiological levels, while antinutritional factors remained within acceptable safety limits. Pharmacologically relevant antioxidant potential was assessed using DPPH, ABTS and FRAP assays. The extract showed a DPPH IC₅₀ of 252.76 µg/mL, ABTS activity of 324.45 mg GAE/g, and a FRAP value of 30.39 mg Fe²⁺ equivalents/g. These activities were supported by substantial total phenolic (75.48 mg AAE/g) and flavonoid contents (140.33 mg QE/g), indicating efficient radical-scavenging and electron-donating capacity consistent with cytoprotective and disease-preventive mechanisms. LC–MS/QTOF profiling also revealed a diverse array of secondary metabolites commonly associated with antioxidant, anti-inflammatory and chemopreventive properties.

Overall, the findings support *Flacourtia montana* as a promising natural source of pharmacologically active metabolites. This work highlights the species as a medicinal resource within Asian wild flora, meriting further pharmacodynamic, bioavailability, and in-vivo efficacy investigations to support its translation into evidence-based nutraceutical and medicinal formulations, while promoting sustainable utilization of this underexplored tropical species.

Keywords: Medicinal plant pharmacology; wild edible fruit; antioxidant bioactivity; LC–MS/QTOF metabolites; cytoprotective potential; Asian tropical flora.

Oral talk 2.5 (OP-2.5)

Integrated Metabolomic Profiling, Antioxidant and Cytotoxic Evaluation, and Computational Target Validation of Bioactive Phytoconstituents from *Sargostigma klenii*

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ABSTRACT

Edible plants represent an important source of bioactive phytochemicals with potential antioxidant and anticancer properties. The present study systematically evaluated the phytochemical composition, *in vitro* antioxidant activity, cytotoxic potential, liquid chromatography mass spectrometry (LC-MS) profiling, and *in silico* molecular docking of *Sargostigma klenii*, an edible fruit-bearing plant. The hydroalcoholic extract exhibited appreciable total phenolic content (53.48 mg gallic acid equivalents/g dry extract at 25 µg/mL), considerable flavonoid content (39.55 mg quercetin equivalents/g dry extract at 100 µg/mL), and notable total antioxidant capacity (81.42 mg ascorbic acid equivalents/g dry extract at 200 µg/mL). *In vitro* antioxidant assays demonstrated free-radical scavenging activity with IC₅₀ values of 455.60 µg/mL in the DPPH assay and 146.09 µg/mL in the ABTS assay, along with significant ferric reducing antioxidant power (31.66 Fe²⁺ equivalents at 40 µg/mL). Cytotoxic evaluation using the MTT assay revealed antiproliferative activity with an IC₅₀ value of 57.62 µg/mL, indicating moderate *in vitro* anticancer potential. LC-MS analysis in both positive and negative ionization modes identified a diverse spectrum of phytoconstituents, including phenolics, flavonoids, stilbenoids, alkaloids, and terpenoid derivatives. Furthermore, *in silico* molecular docking studies against key pancreatic cancer associated molecular targets demonstrated favorable binding affinities and interaction profiles for selected LC-MS-identified compounds, supporting their prospective anticancer relevance. Overall, these findings suggest that *Sargostigma klenii* is a promising edible plant rich in bioactive phytochemicals with appreciable antioxidant and anticancer potential, warranting further mechanistic investigations and preclinical validation, particularly in pancreatic cancer.

Keywords: *Sargostigma klenii*, Metabolomic profiling, Antioxidant activity, LC-MS analysis, Molecular docking.

Oral talk 2.6 (OP-2.6)

Potential Anti-Melanogenic Secondary Metabolites from the Polar Extracts of *Gigantochloa levis* (Blanco) Merr. Shoots

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ABSTRACT

Bamboo shoot samples of *Gigantochloa levis* (Blanco) Merr., collected from Zamboanga City, Mindanao, Philippines, contain biologically active compounds. This finding is supported by the various isolation, biological assays, and structure elucidation techniques that were employed in the study. The isolation of three new compounds, designated as Gigantolevisins A-C (**1-3**), further highlights the study. Alongside these, (*E*)-3-(4-hydroxyphenyl)-2-phenylacrylaldehyde (**4**) and (*E*)-2,3-bis(4-hydroxyphenyl)acrylaldehyde (**5**) were the two known compounds that formed part of the pure isolates. Despite being commercially available, the detection of compound **4** in *G. levis* shoots confirms, for the first time, its natural occurrence. On the other hand, the 1D NMR spectroscopic data of compound **5** coincided with those of the compound isolated by Long et al., 2016, as confirmed through X-ray crystallography. All of the isolated compounds originated from a phenolic moiety. Other features of the compounds include the presence of benzylidene, acetaldehyde, and carboxylic acid groups. These were all derived from both the aromatic and aliphatic side chains. In comparison to the positive control, Kojic acid (100% inhibition, IC₅₀ value of 43 ± 3 µM), the isolated compounds demonstrated moderate inhibitory effects against tyrosinase, ranging from 42% to 58% (IC₅₀ values of >400 to 286 ± 15 µM). Notably, Gigantolevisin C (**3**) manifested an IC₅₀ value of 286 ± 15. This suggests relatively greater inhibitory potency than the other isolates.

Human tyrosinase or polyphenol oxidase is a copper-binding enzyme that converts L-tyrosine to dopaquinone, thereby initiating melanin production. Although melanin is considered photo-protective, it may also be implicated in melanogenesis, which can exhibit mutagenic activity following ultraviolet (UV) radiation exposure, contributing to the initiation and progression of melanoma. Due to the unfavorable effects associated with tyrosinase activity, research efforts have been focused on seeking new and potent tyrosinase inhibitors that suppress melanin production. Consequently, this paves the way for therapeutic applications in the medical, cosmetic, and food industries. Among other natural sources, such as arbutin and vanillin, *G. levis* shoots represent an additional reservoir of compounds exhibiting this type of inhibitory activity. Therefore, their cultivation can be recognized and further promoted to fulfill the substantial demand for naturally derived compounds with medicinal benefits.

Having demonstrated significant pharmacological potential, further *in vitro* and *in vivo* bioassays are recommended to assess the therapeutic properties of *G. levis* shoots. Structure-activity relationship (SAR) studies and other combinatorial techniques are also encouraged to accelerate the development of the isolated compounds into therapeutic applications.

Keywords: *Gigantochloa levis*; Poaceae; bamboo shoots; benzylidene derivatives; tyrosinase inhibitors; gigantolevisin

Oral talk 2.7 (OP-2.7)

Bioactivity Guided Fractionation of *Toona ciliata* M. Roem Leaf Extract as a source of Anti-leishmanial compound.

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ABSTRACT

Leishmaniasis remains a major global health concern, largely because current treatments are limited, often toxic, and increasingly compromised by the emergence of drug-resistant *Leishmania* strains. These challenges highlight the pressing need for safer, more affordable, and effective therapeutic options. In this regard, medicinal plants have attracted growing interest, as they represent rich and largely untapped sources of structurally diverse bioactive compounds with therapeutic potential. *Toona ciliata* M. Roem (family Meliaceae), a medicinal plant traditionally used to manage chronic inflammatory and infectious conditions, emerged as a promising candidate for exploration. In the present study, we investigated the anti-leishmanial potential of crude metabolites obtained from *T. ciliata* M. Roem leaves. Fresh leaves were extracted using ethyl acetate in a Soxhlet apparatus to obtain a crude extract. Preliminary phytochemical analyses revealed a high content of phenolics (327.22 µg gallic acid equivalents/mg) and flavonoids (202.28 µg quercetin equivalents/mg), while HPTLC profiling indicated a chemically diverse mixture of secondary metabolites. Further characterization using HPLC-MS, GC-MS, and FTIR analyses confirmed the presence of multiple bioactive constituents and functional groups. Biological evaluation showed that the extract effectively inhibited both promastigote and intracellular amastigote stages of *Leishmania donovani* in J774A.1 and RAW264.7 macrophages, demonstrating activity against clinically relevant parasite forms. Equally important, cytotoxicity assessments in J774A.1, RAW264.7, and THP-1 cell lines, as well as in human PBMCs and erythrocytes, indicated minimal toxicity, supporting a favorable preliminary safety profile. To directly connect chemical composition with biological activity, the crude extract was further fractionated using HPLC. The resulting one of three pure fraction designated as F3 displayed significant antileishmanial activity against both promastigote and amastigote stages, and this fraction have been prioritized for detailed study for possible molecular mechanisms. Overall, this study highlights *T. ciliata* M. Roem as a promising source of anti-leishmanial molecules and places a strong foundation for future bioactivity-guided isolation and development of novel therapeutics.

Keywords: *Leishmaniasis; Ethnopharmacology; Medicinal plants, Toona ciliata* M. Roem; Bioactivity-guided fraction.

Oral talk 2.8 (OP-2.8)

PTM-Guided Natural Product Discovery for Targeting Pathological Tau and α -Synuclein Assembly

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ABSTRACT

Protein misfolding and aggregation of tau and α -synuclein are central molecular events in Alzheimer's and Parkinson's disease. A key translational challenge is "proteoform heterogeneity". In patient tissues these proteins exist as ensembles of post-translationally modified (PTM) species whose aggregation kinetics, fibril architecture, and proteotoxicity can differ substantially from unmodified forms. Consequently, many reported aggregation modulators show variable performance across experimental preparations, and screening hits obtained under simplified conditions do not appear to hold up in even model systems.

Our laboratory has developed a PTM-aware peptide-based high-throughput screening pipeline that has the potential to integrate a library of medicinal plant extracts with purified major phytochemical components, focusing on polyphenols and alkaloids, to identify modulators of tau and α -synuclein self-assembly that remain effective under PTM-relevant contexts. The workflow couples high-throughput aggregation kinetics assays with orthogonal confirmation using complementary biophysical readouts, enabling confident prioritization of true aggregation modulators. Based on the aggregation kinetics data, the candidate molecules can be binned using mechanism-oriented analyses to distinguish compounds that suppress nucleation, limit fibril growth, remodel oligomeric species, or redirect assemblies toward off-pathway states. Together, this approach aims to improve the reproducibility of natural-product hit discovery in protein aggregation and to generate PTM-robust leads suitable for downstream validation in cellular proteotoxicity models.

Keywords: *medicinal plants; natural products; plant extracts; polyphenols; alkaloids; tau; α -synuclein; protein aggregation; post-translational modifications; neurodegeneration.*

Oral talk 2.9 (OP-2.9)

Enhancing kinsenoside production and antibacterial potential in *Anoectochilus lylei* rhizome cultures via elicitation

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ABSTRACT

Anoectochilus lylei is a high-value medicinal orchid currently threatened by overexploitation. To address this, this study developed a sustainable *in vitro* strategy for biomass and bioactive compound production. Following the optimization of culture parameters, identifying ¾ MS medium supplemented with 2.0 mg/L BA, 0.5 mg/L NAA, 0.2 mg/L Kin, and 35 g/L sucrose was most effective for rhizome proliferation (127.33 g/L FW and 20.40 g/L DW). After optimizing culture conditions, the study investigated the effects of chemical elicitors and bioreactor cultivation on secondary metabolite accumulation. While methyl jasmonate (MeJA) increased kinsenoside levels by approximately 2.5-fold, salicylic acid (SA) at 200 µM proved highly effective, inducing an 11-fold increase in kinsenoside content (26.78 mg/g DW) without compromising biomass. Furthermore, bioreactor-based cultivation with an optimized inoculum density (30 g/L) successfully scaled up production, maximizing kinsenoside accumulation while maintaining stable growth and metabolite profiles. Extracts derived from these elicitor-treated, bioreactor-grown rhizomes maintained strong antibacterial efficacy, with minimum inhibitory concentrations (MIC) of 6.25 mg/mL. Collectively, these findings establish a robust, scalable framework for the large-scale production of *A. lylei* rhizomes, significantly enhancing both biomass and the yield of medicinally valuable compounds. This approach offers a viable solution for conserving wild populations while meeting the pharmaceutical demand for *A. lylei*-derived bioactive metabolites.

Keywords: *Anoectochilus lylei*; antibacterial activity; bioreactor culture; kinsenoside; methyl jasmonate; salicylic acid.

Oral talk 2.10 (OP-2.10)

Purification of aqueous *Syzygium cumini* (L.) seed extract using ultrafiltration: Identification of fouling mechanism and development of steady state and unsteady state model for prediction of permeate flux

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ABSTRACT

Ultrafiltration membrane process was successfully used for the purification of phenolic compounds from aqueous jamun (*Syzygium cumini* L.) seed extract. Ultrafiltration experiments were performed in both stirred cell and cross flow cell. Experimental results revealed that ultrafiltration aqueous jamun seed extract (optimal extraction conditions: 49.2°C, 89.4 min, and L/S: 51.6:1 mL/g) at operating pressures (276–414 kPa) using 100 kDa PES membrane resulted in a permeate flux of 18–25 L/m² h and 59–66.7% recovery of total polyphenol content in the clarified extract with increase in purity of 49–58.3% from 39.2%, and increase in DPPH free radical scavenging capacity from 75.5 to 90.2%, in comparison with the feed. The major problem associated with the application ultrafiltration process in the purification of jamun seed extract is the decline in process throughput with time due to membrane fouling. This occurs due to development of concentration polarization, pore blocking, and cake/gel type layer formation etc. on the membrane surface caused by the presence of higher molecular weight solutes such as pectin, starch, hemicelluloses, cellulose, etc. in the extract. This leads to shortening of membrane self-life and increase in purification cost. Therefore, modelling of flux decline phenomena and understanding of flux decline mechanism are essential. An unsteady state model was developed based on resistance-in-series theory coupled with Hermia's constant pressure filtration laws for explaining the flux decline behavior during ultrafiltration of aqueous jamun seed extract in stirred cell. The model assumed that decline in permeation flux was due to occurrence of two different fouling mechanisms, namely complete pore blocking and cake layer formation, sequentially. The expression for the transition time of the fouling mechanism was obtained. Using the phase space plot, the dominating fouling mechanism was identified during ultrafiltration of jamun seed extract. For the prediction of steady state permeate flux during cross flow ultrafiltration of aqueous seed extract, a steady-state gel polarization model incorporating the effect of operating pressure and viscosity variation was proposed. Using the developed model, the effective diffusivity of gel forming solutes in the extract and gel concentration, as model parameters, were evaluated. The predicted flux values were successfully compared with the experimental results under various operating conditions such as operating pressure, stirrer speed/cross flow velocity. The model parameters namely, complete pore blocking constant and cake filtration constant, were estimated under a range of operating conditions, which may be useful for system design and scale-up to the industrial level.

Keywords: *Syzygium cumini* (L.), polyphenol, ultrafiltration, membrane fouling, permeate flux.

Oral talk 2.11 (OP-2.11)

AI-Guided Chemical and Bioactivity Mapping to Accelerate Drug Discovery from Vietnamese Medicinal Plants

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ABSTRACT

Medicinal plants are an irreplaceable source of physiologically active compounds, yet the discovery of such molecules is increasingly difficult because crude extracts contain hundreds to thousands of structurally related metabolites. Conventional bioassay-guided isolation is often slow, resource-intensive, and biased toward abundant compounds, potentially overlooking minor but highly potent constituents. To address this challenge, we propose an AI-guided, network-based strategy that integrates high-resolution mass spectrometry with biological data to accelerate the discovery and prioritization of active compounds from Vietnamese medicinal plants. In this study, untargeted UHPLC–HRMS/MS profiling was performed to capture the comprehensive chemical composition of plant extracts. Feature-based molecular networking on the GNPS platform was then used to visualize structural relationships among detected compounds, generating an interpretable “chemical landscape” that organizes metabolites into related families rather than treating them as isolated entities. To directly link chemistry with biological function, we applied bioactivity-based molecular networking (BBMN), in which LC–MS/MS features were integrated with cytotoxicity data to identify molecular clusters most strongly associated with biological effects. This data-driven mapping enables rational prioritization of candidate compounds before labor-intensive isolation. In parallel, AI-based *in silico* target prediction using SwissTargetPrediction was employed to propose putative molecular targets and pathways, providing mechanistic hypotheses to guide subsequent experimental validation. The utility of this workflow is demonstrated through two terrestrial Vietnamese medicinal plants: *Cibotium barometz* and *Sesbania grandiflora*. In *C. barometz*, molecular networking revealed glycosylated and phenolic derivatives as dominant chemical classes, while computational predictions suggested potential involvement in inflammation modulation and tissue repair, aligning with its traditional medicinal uses. In *S. grandiflora*, BBMN combined with cytotoxicity screening against A549 and HepG2 cell lines highlighted triterpenoid glycosides and saponins as key contributors to anticancer activity, enabling focused isolation and validation of representative compounds. Overall, this work illustrates how AI-assisted molecular networking and bioactivity mapping can transform complex analytical data into actionable insights for discovering physiologically active compounds from medicinal plants. By bridging traditional knowledge with modern computational and analytical tools, this approach offers a more efficient and mechanism-oriented pathway toward natural product drug discovery.

Keywords: *AI-assisted discovery; feature-based molecular networking; bioactivity-based molecular networking; medicinal plants; bioactivity mapping; in silico prediction.*

Oral talk 2.12 (OP-2.12)

A Green and Scalable Process for Flavonoid Enrichment from Immature Pomelo Fruit Using Diaion HP-20 Adsorption Resin

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ABSTRACT

Immature pomelo fruits (*Citrus maxima*), which are commonly discarded during pomelo cultivation, represent an underutilized agricultural by-product. From a biological perspective, this material constitutes a valuable natural resource due to its high flavonoid content. In this study, an efficient flavonoid enrichment process from immature pomelo fruit extract was developed using Diaion HP-20 adsorption resin. The effects of ethanol–water mixtures on flavonoid desorption were investigated, and the results indicated that 40–50% (v/v) aqueous ethanol was the optimal eluent for recovering flavonoids from the Diaion HP-20 column. The major bioactive flavonoid, naringin, in the enriched extract was quantitatively determined. The naringin content in the enriched fraction was found to be 3.65-fold higher than that of the crude extract, demonstrating the high efficiency of the enrichment process. In addition, the antioxidant activities of the enriched extract were evaluated using DPPH and hydroxyl radical scavenging assays. The proposed process avoids the use of toxic organic solvents, and the adsorption resin can be regenerated and reused for multiple cycles, highlighting its suitability for industrial application. This approach provides a sustainable and economically viable strategy for valorizing immature pomelo fruit as a high-value flavonoid-rich product.

Keywords: Immature pomelo fruits, *Citrus maxima*, flavonoid, naringin, Diaion HP-20.

Oral talk 2.13 (OP-2.13)

Green Deep Eutectic Solvent–Assisted Extraction of Flavonoids and Phenolics from *Kaempferia galanga* Rhizomes

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ABSTRACT

Kaempferia galanga L. (Zingiberaceae) is a medicinal perennial herb widely distributed in China and Southeast Asia. Its rhizomes are widely used in traditional medicine, with therapeutic effects attributed to the synergistic action of flavonoids and other phytochemicals. However, the low abundance of flavonoids in the raw material limits their efficient recovery and downstream applications. Herein, a choline chloride - ethylene glycol (ChCl - EG) deep eutectic solvent (DES) was employed as a green extraction medium to enhance the recovery of flavonoids and phenolics from *K. galanga* rhizomes. Extraction performance was evaluated by comparing the total flavonoid content (TFC) and total phenolic content (TPC) obtained using ethanol and DES with varying ChCl:EG ratios. The DES with a ChCl:EG ratio of 1:1 showed extraction efficiency comparable to ethanol, yielding a TFC of approximately 7%. Increasing the EG fraction (from 1.5- to 5-fold relative to ChCl) significantly enhanced extraction efficiency, with TFC values reaching up to 12%. A similar trend was also observed for TPC, indicating that EG-rich DES systems favor phenolic enrichment. Notably, the DES retained extraction efficiencies above 80% after three reuse cycles, demonstrating good recyclability and process stability. Overall, ChCl–EG-based DES enables efficient and sustainable extraction of bioactive compounds from *K. galanga* rhizomes.

Keywords: *Kaempferia galanga* L., deep eutectic solvent, flavonoid extraction, choline chloride, ethylene glycol.

Oral talk 2.14 (OP-2.14)

Stress-adapted traits of plant growth-promoting bacteria associated with native *Musa* species in Vietnam.

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ABSTRACT

This study characterizes the plant growth-promoting (PGP) and stress-tolerating capabilities of endophytic bacteria isolated from native *Musa* species in Vietnam. Thirty-four isolates were screened for PGP traits, identifying eleven superior strains primarily belonging to *Bacillus* and *Priestia* genera based on 16S rRNA gene sequencing. These selected strains exhibited significant PGP activities, with indole-3-acetic acid (IAA) production reaching 74.16 µg/mL, ammonia production up to 2.31 µg/mL, and phosphate solubilization exceeding 1.60 µg/mL. Stress tolerance assays revealed strain-specific adaptive strategies. Generally, the selected isolates maintained robust viability (>60%) under moderate stress conditions (pH 5.0, 4% NaCl). However, distinct resilience profiles emerged under extreme conditions. *Priestia* strains, particularly *P. megaterium* BTS2-B10, demonstrated exceptional halotolerance, sustaining growth at up to 10% NaCl. In terms of acidity, while most strains showed reduced growth below pH 5.0, *Bacillus stratosphericus* BTS2-B5 exhibited remarkable resilience, maintaining 97.9% viability at pH 4.0. Regarding thermotolerance, *Bacillus* strains displayed broad adaptability; notably, *Bacillus cereus* BTS2-L3 sustained high viability (77.4%) at 45°C, while *Bacillus stratosphericus* BTS2-S5 and *Lysinibacillus macroides* BTS2-S8 were the only strains capable of surviving at 50°C. These findings highlight the potential of these native endophytes as robust, multi-stress tolerant bio-inoculants for sustainable banana cultivation under climate change scenarios.

Keywords: *Endophytic bacteria, Musa genus, abiotic stress tolerance, plant growth promotion, Bacillus, sustainable agriculture.*

Oral talk 2.15 (OP-2.15)

Cannabis phytomolecules have anti-cancer and anti-angiogenesis activity related to ovarian cancer

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ABSTRACT

Cannabis (*Cannabis sativa*) is widely used to alleviate numerous symptoms associated with medical conditions. Ovarian cancer (OC) is the most lethal gynecologic malignancy in the western world. Phytocannabinoids were shown to have anticancer activity in a number of cancers, but only a few studies have examined the effectiveness of cannabis against OC. Our aim is to examine the effectiveness of combinations of cannabis phytomolecules against OC cells and the related angiogenesis processes, toward development of new cannabis-based medical products. Gene expression profiles were determined by mRNA profiling and quantitative PCR. Microscopy was used to determine actin and protein localization. Scratch and sprouting assays were used to determine cell migration and sprouting, respectively. Western blotting was used to determine protein levels. Flow cytometry was used to determine apoptosis and cell cycle. A specific fraction of cannabis extract, containing among the phytocannabinoids mainly Δ^9 -tetrahydrocannabinol (THC), cannabichromene (CBC) and cannabigerol (CBG), exhibited a significant anti-cancer activity against OC. Furthermore, a synergistic interaction between the cannabis-extract fraction and a chemotherapy drug (niraparib PARP1 inhibitor) was demonstrated. The combined treatment by fraction and niraparib led to cell cycle arrest and endoplasmic reticulum (ER) stress, inhibited cell migration and actin rearrangement and enhanced PARP1 cleavage. Multiple genetic pathways, including Hippo/Wnt, TGF- β /Activin and MAPK were enriched with genes differentially expressed by the combined treatment. Moreover, treatment with the cannabis-extract fraction alone reduced HUVEC cell migration and sprouting and the related gene and protein expression. Confocal microscopy verified the reduction of stress fiber and focal adhesion points formation at the protruding edges of HUVEC cells. To conclude, by affecting multiple pathways, treatment with cannabis-extract fraction and PARP1 inhibitor caused OC cell death and apoptosis and inhibited cell migration crucial for metastasis. Moreover, the cannabis phytomolecules reduced endothelial cell migration and sprouting related to OC tumor angiogenesis. Identification of specific phytomolecules that affect OC cells and angiogenesis provides a scientific basis for cannabis-based medicines for OC patients. Clinical trials with these phytomolecules in combination with chemotherapy are needed to reveal the potential of cannabis as anti-OC drug.

Keywords: ovarian cancer; cannabis; phytocannabinoids; phytomolecules; apoptosis; cell cycle; endoplasmic reticulum stress; Hippo/Wnt pathway; TGF- β /Activin pathway; MAPK pathway; PARP1; angiogenesis.

Oral talk 3.1 (OP-3.1)

Evaluation of the sedative effect of an herbal blend containing *Cleistocalyx operculatus*, *Mentha arvensis*, *Perilla ocymoides*, *Ocimum sanctum*, and *Stevia rebaudiana*

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ABSTRACT

Flavonoids and terpenoids are well-known important bioactive compounds. They have attracted considerable interest due to their potential benefits for human health, including the prevention and treatment of various diseases. These active constituents are present in medicinal herbs such as *Cleistocalyx operculatus*, *Mentha arvensis*, *Perilla ocymoides*, *Ocimum sanctum*, and *Stevia rebaudiana*. The total flavonoid and terpenoid contents of the herbal blend were quantified using ultraviolet-visible (UV-Vis) spectroscopy. Flavonoid and terpenoid contents were determined using quercetin and menthol as reference standards, respectively, and were found to be 85.55 mg quercetin equivalents (QE)/g and 0.59 mg menthol equivalents (ME)/g of dry herbal blend. The sedative effect of the herbal blend extract was evaluated based on its sleep-prolonging effect in a pentobarbital-induced sleep model. The herbal blend significantly prolonged pentobarbital-induced sleep duration at a dose of 5 g/kg.

Keywords: *Cleistocalyx operculatus*, *Mentha arvensis*, flavonoids, terpenoids, ultraviolet-visible spectroscopy, diazepam, pentobarbital sodium, stress, sedative effect.

Oral talk 3.2 (OP-3.2)

Rheology and Extrusion 3D Printing of kappa-Carrageenan/Olive Oil Emulsion Gel Tablets for Release of Vitamin C and Curcumin

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ABSTRACT

In this study, we created emulsion gels by homogenizing κ -carrageenan and olive oil at different oil to κ -carrageenan ratios (OCR). Notably, confocal imaging revealed that the oil droplets were stabilized within the κ -carrageenan gel matrix without the use of surfactants. Rheological studies demonstrated that the presence of oil droplets increased the oscillatory yield stress and the maximum printable height of the emulsion gels. Using OCR ratios between 1:9 and 3:7 improved the structural integrity of extrusion-printed structures. Specifically, the emulsion gel with an OCR of 3:7 effectively encapsulated vitamin C in the aqueous phase and curcumin in the hydrophobic oil phase, allowing for the extrusion-based 3D printing of tablets with various surface area-to-volume (SA/V) ratios. The release profiles for vitamin C and curcumin were influenced by the preparation method (printing versus casting) and the SA/V ratio of the tablets. Among the structures tested, the hollow cylinder with the highest SA/V ratio exhibited the greatest release of vitamin C. In contrast, the printed tablets showed a higher release of curcumin compared to the cast tablets. Furthermore, rheo-dissolution experiments indicated that the 3D-printed disc had a lower modulus and a higher vitamin C release compared to the cast disc tablet, which had a higher modulus and a lower vitamin C release.

Keywords: 3D printing, carrageenan, emulsions, gels, rheology.

Oral talk 3.3 (OP-3.3)

Formulation of Microparticle Systems Containing Polyphenols Extracted from Noni (*Morinda citrifolia* L.) Fruits

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ABSTRACT

Morinda citrifolia L. (commonly known as Noni) is rich in polyphenolic compounds exhibiting diverse biological activities, including antioxidant, anti-inflammatory, and antihypertensive effects, as well as therapeutic potential in the management of chronic diseases. However, the clinical application of polyphenols is often limited by their physicochemical instability and susceptibility to environmental degradation, resulting in poor bioavailability. This study aimed to develop microparticle delivery systems encapsulating polyphenol-rich extracts derived from *Morinda citrifolia* L. fruits and to evaluate their physicochemical characteristics and *in vitro* release behavior. Noni fruits were collected from Da Nang City, Vietnam, and polyphenol-rich extracts were obtained via maceration using 80% (v/v) ethanol. Microparticles were prepared by spray drying with various carriers, including gum arabic (GA), hydroxypropyl methylcellulose E6 (HPMC E6), chitosan, and β -cyclodextrin, at an extract-to-carrier ratio of 1:6 (w/w). Spray-drying yield, encapsulation efficiency, and particle characteristics were subsequently assessed using scanning electron microscopy (SEM), X-ray diffraction (XRD), and Fourier-transform infrared spectroscopy (FTIR). *In vitro* polyphenol release was evaluated using a dissolution test. The total polyphenol content of the 1:1 extract (NE) reached 10.02 ± 3.58 mg GAE/mL. The spray-drying yield and encapsulation efficiency were $63.05 \pm 6.47\%$ and $40.17 \pm 1.08\%$ for Sample 1 (NE : 5% β -cyclodextrin), $58.44 \pm 8.82\%$ and $49.78 \pm 1.91\%$ for Sample 2 (NE : mixture of 5% GA and HPMC E6 (70: 30)), and $63.78 \pm 6.78\%$ and $43.27 \pm 1.25\%$ for Sample 3 (NE: mixture of 5% GA and 1% chitosan in glacial acetic acid (5:1)), respectively. SEM analysis revealed that the resulting microparticles exhibited distinct morphological characteristics depending on the carrier composition, with either wrinkled or smooth surface structures. XRD patterns indicated that both the carriers and encapsulated polyphenols predominantly existed in an amorphous state following spray drying. FTIR spectra confirmed the presence of characteristic functional groups of both polyphenols and carrier materials within the microparticles. Dissolution studies demonstrated that polyphenol release exceeded 70% within the first 30 minutes across all formulations. Notably, the formulation containing mixture of GA and HPMC E6 (70:30) achieved the highest encapsulation efficiency and released up to $82.27 \pm 4.30\%$ of polyphenols within the same time frame. These findings highlight the effectiveness of the selected carrier system in enhancing the encapsulation efficiency and release performance of polyphenol-rich extracts, thereby providing a promising strategy for improving the stability and bioavailability of plant-derived polyphenols.

Keywords: *Morinda citrifolia* L., polyphenol, micro-particle system, spray drying, FTIR, XRD.

Oral talk 3.4 (OP-3.4)

Anti-inflammatory Activity of *Knema lenta* Warb.: From Methanolic Extract to a Newly Identified Bioactive Compound

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ABSTRACT

Knema lenta Warb. has been traditionally used in folk medicine for inflammatory-related disorders; however, its pharmacological evidence remains limited. This study investigated the anti-inflammatory activity of the methanolic leaf extract of *K. lenta* (KLE) and further identified its bioactive constituents.

In LPS-stimulated RAW 264.7 macrophages, KLE significantly inhibited nitric oxide (NO) production with an IC_{50} value of 23.07 ± 0.35 μ g/mL without cytotoxicity. KLE markedly reduced the secretion of IL-6 and TNF- α and downregulated the mRNA expression of inducible nitric oxide synthase (iNOS), cyclooxygenase-2 (COX-2), IL-6, and TNF- α in a dose-dependent manner. At 10–40 μ g/mL, KLE decreased iNOS and COX-2 protein expression by approximately 3- and 4-fold, respectively, compared with the LPS-treated group, as confirmed by Western blot analysis. These findings indicate that KLE suppresses inflammatory responses at both transcriptional and translational levels.

Bioactivity-guided fractionation of KLE resulted in the isolation of ten compounds. Among them, compound 1, a newly identified natural product structurally elucidated by spectroscopic analysis, exhibited the most prominent NO inhibitory effect in a concentration-dependent manner ($IC_{50} = 44.22 \pm 0.90$ μ M) while maintaining high cell viability. Further analysis revealed that compound 1 significantly suppressed the mRNA expression of iNOS, COX-2, IL-6, and TNF- α in LPS-stimulated macrophages.

Collectively, these results demonstrate that *K. lenta* exerts potent anti-inflammatory effects and identify a new bioactive compound contributing to its activity, supporting its potential for further therapeutic development.

Keywords: *Knema lenta* Warb.; anti-inflammatory; RAW 264.7; iNOS; COX-2; natural product.

Oral talk 3.5 (OP-3.5)

Anticancer activity of extraction and nature compounds isolated from Chum Duong fruit (*Sphaerocoryne affinis*) on cervical cancer cell line

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ABSTRACT

Sphaerocoryne affinis (Annonaceae) is a Southeast Asian medicinal plant traditionally used for treating dizziness, hypertension, and fever; however, its anticancer potential remains insufficiently characterized. In this study, the fruit extract of *S. affinis* and its isolated compound were evaluated for cytotoxic effects against the human cervical cancer cell line SiHa. The tested compound exhibited moderate growth inhibition with an IC₅₀ value of 66.5 µM and a selectivity index (SI) greater than 2, indicating preferential toxicity toward cancer cells.

Mechanistic investigation demonstrated significant upregulation of caspase-3 and caspase-8, whereas caspase-9 expression remained unchanged, suggesting activation of a caspase-8–associated apoptotic pathway independent of mitochondrial involvement. To explore potential molecular targets, *in silico* docking studies were performed on key apoptotic and survival-related proteins. No significant binding affinity was observed toward the death receptor DR5 (TNFRSF10B) or the caspase-8 regulator c-FLIP (CFLAR), arguing against direct modulation of classical death receptor signaling. In contrast, strong binding interactions were detected with Akt1 (AKT1), while weaker interactions were observed with IKKβ (IKBKB).

Collectively, these findings suggest that the compound may induce caspase-8–dependent apoptosis potentially through suppression of Akt-mediated survival signaling, with possible partial modulation of the IKKβ/NF-κB axis, rather than via mitochondrial or direct death receptor pathways. Further biochemical validation is required to confirm target engagement and downstream signaling alterations.

Keywords: *Sphaerocoryne affinis*, melodorinol, cervical cancer, cytotoxicity assay, apoptosis.

Oral talk 3.6 (OP-3.6)

Anticancer activity of *Sphaerocoryne affinis* fruit on human metastatic breast cancer cell line MDA-MB-231

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ABSTRACT

Breast cancer is the most common cancer in women and remains challenging due to drug resistance and metastasis, highlighting the urgent need for novel therapeutic agents. Natural products, especially plants, are a major source of bioactive compounds with potential anticancer properties. In this study, we investigated *Sphaerocoryne affinis*, a plant species native to Southeast Asia, for its potential anticancer activity. Its fruit extract using petroleum ether in combination with ethyl acetate showed cytotoxicity against metastatic triple-negative breast cancer MDA-MB-231 cells ($IC_{50} = 44.27 \pm 7.17 \mu\text{g/mL}$) and could trigger apoptotic programmed cell death, as evidenced by cell shrinkage, membrane blebbing, and caspase-3 activation. The isolated compound (Z)-melodorinol also exhibited a cell-growth inhibitory impact ($IC_{50} = 33.42 \pm 5.95 \mu\text{M}$, $SI > 2$) via the apoptosis-inducing mechanism, suggesting that this compound might contribute to the anticancer activity of the extract. More particularly, (Z)-melodorinol could induce DNA damage and activation of apoptosis via both extrinsic and intrinsic pathways. The intrinsic pathway was regulated by the transcriptional increases in pro-apoptotic genes, including *BID*, *NOXA*, *BAK*, *APAF1*, *MCL1S*, and *CAS2*, while the extrinsic pathway could be triggered by the enhanced mRNA expression of FAS death receptors on the cell membrane. These preliminary findings indicated that the fruits of *Sphaerocoryne affinis* possess anti-triple-negative metastatic breast cancer activity, and (Z)-melodorinol is a promising candidate for further drug development research.

Keywords: apoptosis, breast cancer, cytotoxicity, melodorinol, *Sphaerocoryne affinis*.

Oral talk 3.7 (OP-3.7)

Ethyl acetate extract of *Elephantopus mollis* kunth. induced apoptosis and senescence in human lung cancer cells

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ABSTRACT

Elephantopus mollis Kunth. (**EM**) is an emerging candidate for anticancer studies due to its long record of use in traditional medicine. As lung cancer is the most widespread and among the most lethal carcinomas, we assessed the toxicity of EM extract(s) on the lung cancer NCI-H1299 cell line. Our primary toxicity screening based on IC₅₀ value and selectivity index (SI) indicated that the ethyl acetate fraction (**EMEA**) was the most lethal extract against NCI-H1299 cells with impressive selective effect. Noteworthy, HPLC analysis reaffirmed the exclusive presence of tannins in our EM samples. Most attractively, we found that EMEA induced both apoptosis and senescence in NCI-H1299 population. To our knowledge, this is the very first study showing that EM constituents can provoke two different and promising cytotoxicity mechanisms in a single cancer cell line. Furthermore, we initially found that EMEA might activate the extrinsic apoptotic pathway, trigger DNA damage, and activate p21-dependent cell cycle arrest. Therefore, our work contributed considerably to the knowledge of anticancer properties of EM and cemented its role as a promising source for novel cancer treatment research.

Keywords: *Elephantopus mollis*, lung cancer, ethyl acetate extract, apoptosis, senescence.

Oral talk 3.8 (OP-3.8)

A novel herbal-based ear drop with *Ocimum gratissimum* essential oil: an alternative strategy for managing otomycosis

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ABSTRACT

Otomycosis is a recurrent fungal infection of the external auditory canal. This disease is difficult to manage with current topical antifungal agents due to irritation, ototoxicity risk, and emerging resistance. Natural essential oils have been proposed as alternatives, yet their clinical application in otic formulations remains limited due to its extremely poor solubility and stability. In this study, we report the first nano-microemulsion ear-drop formulation combining *Ocimum gratissimum* essential oil and acetic acid for otomycosis treatment. The essential oil was quality-validated with eugenol content superior to 60%. A systematic formulation study was performed, and the Tween-20/isopropanol (4:1, w/w) mixture was selected as the optimal surfactant system, yielding a stable microemulsion with high encapsulation efficiency (~98%) and relevant physicochemical stability (up to 28 days). The final formulation containing 1% acetic acid and 0.3% nanoformulated essential oil met pharmacopeial requirements in terms of appearance, pH, viscosity, and microbial limits. Importantly, this nano-based eardrop demonstrated significantly greater *in vitro* antifungal activity than 3% boric acid and 2% acetic acid ear drops in twelve clinical fungal isolates obtained from Vietnamese swimmers, especially on *Curvularia*, *Cunninghamella*, *Aspergillus terreus*, and *Bipolaris*. Although less pronounced than 1% clotrimazole in terms of antifungal activity, the selected formulation showed better antifungal kinetics and broader activity spectrum, highlighting its potential as a more efficient and safer herbal alternative. This work provides relevant experimental evidence on the use of *Ocimum gratissimum* essential oil in nano-otic delivery systems and demonstrates its efficacy against clinically relevant otomycosis pathogens. The results establish a foundation for future *in vivo* and clinical studies toward developing plant-derived, low-toxicity treatments for fungal ear infections.

Keywords: *Ocimum gratissimum* (L.) essential oil, acetic acid, nano-based eardrop, microemulsion.

Oral talk 3.9 (OP-3.9)

The effects of *Elephantopus mollis* extracts on the migration, invasion, and adhesion of human cervical cancer SiHa cells

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ABSTRACT

Extracts and compounds from *Elephantopus mollis* (EM), a medicinal plant of the Asteraceae family, have been shown to exhibit significant cytotoxic effects against various cancers, including cervical carcinoma. However, its anti-metastatic potential remains unclear. In this study, we investigated the effects of EM extracts on the migration, invasion, and adhesion of cervical cancer SiHa cells.

Non-toxic concentrations were determined using the MTT assay and microscopic observation. Sub-lethal doses were subsequently evaluated for their effects on cell migration using a wound healing assay. Among the four fractions tested (ethyl acetate, ethanol, water, and petroleum ether), the ethyl acetate fraction (EM-EA) demonstrated the greatest potency, reducing cell migration by 26% and 54% at 5 and 10 µg/mL, respectively.

Further analyses using Geltrex-coated Transwell invasion and Collagen I adhesion assays revealed that EM-EA significantly inhibited basement membrane invasion and extracellular matrix (ECM) attachment in SiHa cells. Moreover, EM-EA treatment decreased the expression of the key metastasis-related gene *EZR* by approximately 40%, suggesting a potential molecular mechanism underlying its anti-metastatic activity.

Collectively, these findings provide the first evidence that EM extracts suppress metastatic traits in cervical cancer cells and offer insight into their underlying mechanism of action.

Keywords: *Elephantopus mollis*, cervical cancer, ethyl acetate extract, migration, invasion, adhesion.

Oral talk 3.10 (OP-3.10)

***Garcinia talbotii* fruit extract and its active principle Oblongifolin A sensitizes chemoresistance in MIA PaCa-2/Panc-1 Pancreatic cancer cell lines**

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ABSTRACT

Garcinia talbotii, an evergreen tree endemic to the Western Ghats of India, produces edible fruits that are traditionally used in culinary preparations and folk medicine. Our present investigation assessed the nutritional composition, phenolic and flavonoid content, and pharmacological activities of *Garcinia talbotii* fruit extract. The fruit exhibited a high Vitamin C content (188.51 ± 20.38 mg/100 g) along with essential macro- and micronutrients. Antioxidant activity of *Garcinia talbotii* fruit ethanol extract (GFE) was evaluated using ROS scavenging assays demonstrating significant antioxidative potential. Furthermore, GFE was investigated for its protective effects on HEK-293 cells against H₂O₂-induced oxidative stress. The study assessed cell viability and intracellular reactive oxygen species (ROS) using the MTT assay and nitric oxide release assay respectively, highlighting the extract's potential in mitigating oxidative damage in normal cells. Antiproliferative effects of GFE studied against pancreatic cancer cells PANC-1 and MIA PaCa-2 resulted in reduced cell proliferation and clonogenicity. GFE treatment on PC cells enhanced ROS, triggered mitochondrial membrane depolarization, apoptosis via DNA damage; activation of DNA Damage Response (DDR) pathway was studied by immunoblotting. Oblongifolin A, a polyprenylated benzoylphloroglucinol, was isolated from the fruits of *Garcinia talbotii*. The chemosensitizing effects of this novel bioactive constituent was evaluated in chemoresistant pancreatic cancer cells. Oblongifolin A (OA) exhibited significant potential in overcoming chemoresistance by effectively inhibiting cellular proliferation and metastasis in resistant cancer cells. Additionally, OA enhanced the chemosensitivity of these cells, augmenting the efficacy of conventional chemotherapeutic agents such as gemcitabine. The synergistic interaction of OA with gemcitabine resulted in heightened cytotoxicity, underscoring its role as a promising adjunctive therapy in the treatment of chemoresistant pancreatic cancer. Notably, Gem+OA-induced mitochondrial apoptosis via ROS modulation in gemcitabine-resistant pancreatic cancer cells was observed for the first time, providing novel insights into the mechanisms of chemoresistance and its therapeutic reversal.

Keywords: *Garcinia talbotii*, Oblongifolin A, Pancreatic Cancer, Gemcitabine, Chemosensitivity.

Oral talk 3.11 (OP-3.11)

Up-scaling study for optimized formulation and Experimental Validation of Chitosan Nanoparticles loaded-Curcumin in Hyperlipidemic Rats

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ABSTRACT

A natural compound curcumin, despite its potent antioxidant and anti-inflammatory activity, suffers from extremely poor oral bioavailability. Although nanomedicine offers a strategy for enhancing delivery, many formulations fail during *in vivo* validation. Curcumin were encapsulated into chitosan nanoparticles using ionic gelation method. A 50-fold process scale-up to 1L was achieved using high-amplitude ultrasonication (60 amplitude, 30 min, 19 mm probe), generating U-BCNS1 and U-CCNS1 samples. Hyperlipidemia was induced in Wistar rats (n = 6/group) fed a high-fat diet. The therapeutic groups included free drugs and curcumin nanoformulations. Scale-up preserved critical physicochemical attributes, maintaining nanometer-scale particle size, low PDI, positive surface charge, high yield, and encapsulation efficiency across drug-loaded formulations. *In vivo*, U-CCNS1 demonstrated the most significant therapeutic benefit, producing superior improvements in serum lipid profiles, cardiac and hepatic antioxidant markers, and aortic and hepatic histopathology compared with free drugs. Liter-scale chitosan nanoparticle loaded- curcumin is technically robust and biologically superior.

Keywords: *Chitosan nanoparticles, Ionic gelation, Curcumin; Scale-u, nanomeicine.*

Oral talk 3.12 (OP-3.12)

***Pandanus tectorius* Self-Nanoemulsifying Drug Delivery System: a Natural Strategy to Prevent Atherosclerosis via the Inhibition of HMGCoA Reductase**

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ABSTRACT

An underutilized source of coastal medicinal plant, *Pandanus tectorius*, has potential as an antihypercholesterolemia drug by inhibiting the activity of HMG-CoA reductase (HMGCR). However, the extract's bioavailability may be hindered by its semi-polar properties. Utilizing a self-nanoemulsifying drug delivery system (SNEDDS) could improve the extract's bioavailability and solubility. This could make the extract more efficient in inhibiting HMGCR. The inhibitory activity of the *P. tectorius* fruit ethanol extract (PTFE) and its SNEDDS formulation (PTFE-SNEDDS) towards the HMGCR enzyme was assessed in this study using an HMGCR assay kit. Sprague Dawley rats fed with a high-cholesterol diet were used in an *in vivo* study to examine the extract and PTFESNEDDS dose-dependent efficacy in reducing elevated cholesterol levels, as well as their toxicity to the rats' liver and kidney. The results showed that compared to the PTFE, the PTFE-SNEDDS had more potent HMGCR inhibitory activity. A thorough lipid-regulatory system on hepatic metabolism is indicated by PTFE-SNEDDS's simultaneous lowering of triglycerides and LDL levels. Remarkably, there was no significant difference ($p>0.05$) between PTFE's total cholesterol and LDL cholesterol levels compared to its half-dose in PTFE-SNEDDS form. According to the atherosclerosis index plasma (AIP) and Castelli's risk index (CRI), PTFE and PTFE-SNEDDS effectively reduced atherogenic risk. Furthermore, the evaluation of renal toxicity revealed that the elevated cholesterol levels did not directly cause any renal toxicity. PTFE-SNEDDS could be suggested as a suitable and safe alternative for an atherosclerosis drug that avoids hypercholesterolemia condition by inhibiting HMGCR activity.

Keywords: HMGCR, bioavailability, lipid profile, renal function, liver toxicity.

Oral talk 3.13 (OP-3.13)

Weak Affinity Chromatography for Herbal Medicines: A Tool for Bioactivity, Bioavailability, and Drug-Herb Interactions Research

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Dr. Mariano Que College of Pharmacy, De La Salle Medical and Health Sciences Institute, City of Dasmariñas, Cavite, Philippines.

ABSTRACT

This study is focused on developing Weak Affinity Chromatography (WAC) as a tool for assessing the efficacy and safety of herbal medicines. The promise of this technology lies on its ability to reuse the protein targets used in the ligand binding assays. This is possible by covalently immobilizing it into a suitable material. The established pharmacopeial tests for herbal medicines rely on either chemical assays of selected chemical markers or bioassays against the known protein targets. WAC is a possible adjunct to these two techniques since it can be used to quantify the selected chemical markers and measure bioactivity. Currently, there two affinity columns being tested, amylase-WAC (AMY-WAC) and human serum albumin-WAC (HSA-WAC). Research on AMY-WAC showed acceptable precision when it comes to measuring the dissociations constants (KD) and concentration of common herbal medicine markers such as quercetin. The AMY-WAC was also able to measure the affinity of the amylase-binders present in the model herbal medicines, *Vitex negundo* and *Blumea balsamifera*. Studies using HSA-WAC and *Vitex negundo*, showed that this herbal medicine contained phytochemicals that are up to 80%- bound to HSA. Drug-herb interaction (DHI) studies with HSA-WAC also showed possible positive allosteric interaction between salbutamol and the phytochemicals in *Vitex negundo*. In another DHI study with HSA-WAC and garlic tablets, it showed possible direct competition between allicin in garlic and common corticosteroids such as prednisone and hydrocortisone. All of these experiments were run in an HPLC platform for an average run-time of 6-12 minutes. All of these show that WAC can be easily integrated into existing analytical chemistry laboratories.

Keywords: WAC, chromatography, pharmacopeia, affinity.

Oral talk 3.14 (OP-3.14)

Antioxidant and Photoprotective Potentials of *Diplazium giganteum* Gametophyte Extracts Derived from *In Vitro* Culture

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ABSTRACT

Despite their medicinal relevance across Asia, *Diplazium* ferns (Gleicheniaceae; “Ráng Tây Sơn” in Vietnam) remain poorly studied, especially at the gametophyte stage, which is rarely encountered in nature and can be sustainably obtained via *in vitro* culture. *Diplazium giganteum* (Wall. ex Hook.) Nakai has been reported in Vietnam, yet its chemical and biological properties are largely unexplored. This study assessed the antioxidant and UVB-protective activities of *D. giganteum* gametophyte extracts produced entirely from *in vitro* culture and compared their bioactivities among solvent fractions. Gametophyte biomass was generated from surface-sterilized spores and maintained under sterile, controlled *in vitro* conditions to obtain pure and stable material. The dried biomass was extracted and fractionated with hexane, ethyl acetate (EtOAc), and ethanol. Among the tested fractions, the semi-polar EtOAc extract showed the strongest and most balanced antioxidant and UVB-protective performance. At 1 mg/mL, its Sun Protection Factor (SPF) reached 23.25 ± 0.61 , exceeding those of the hexane (17.79 ± 0.56) and ethanol (10.73 ± 0.13) fractions. The EtOAc fraction also exhibited moderate ferric-reducing power ($OD_{700} = 0.127 \pm 0.007$) and the lowest IC_{50} for lipid peroxidation inhibition (1.27 ± 0.03 mg/mL), while the ethanol fraction displayed the strongest DPPH radical scavenging activity ($IC_{50} = 1.75 \pm 0.03$ mg/mL). These findings demonstrate that *D. giganteum* gametophytes possess measurable antioxidant and UV-protective potentials, with the semi-polar EtOAc fraction contributing most to the observed effects. The establishment of *in vitro* culture provides a sustainable and reproducible source of plant biomass for future phytochemical and pharmacological investigations. Overall, this study highlights the novelty and potential of fern gametophytes as renewable natural resources for developing safe, plant-based antioxidant and photoprotective agents.

Keywords: *Diplazium*; gametophyte; *in vitro* culture; antioxidant; anti photoprotection; UVB; sustainable utilization; medicinal fern.

POSTER TALKS

Poster presentation (PP-01)

Promiscuous and Complementary Activities of Bark-Expressed Terpene Synthases Underlies Monoterpene Diversification in Rubber Tree (*Hevea brasiliensis*).

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ABSTRACT

Terpene synthases (TPSs) frequently exhibit catalytic promiscuity, which contributes to the structural diversification of plant terpenoids. In the rubber tree (*Hevea brasiliensis*), bark tissues emit complex monoterpene mixtures associated with environmental adaptation and stress responses, yet the enzymatic basis of this diversity remains incompletely understood. Here, we present a combined functional analysis of two bark-preferential TPS-b enzymes with emphasis on their substrate and product promiscuity. Recombinant enzyme assays showed that both enzymes utilize multiple prenyl diphosphate substrates, including geranyl diphosphate (GPP) and neryl diphosphate (NPP), but differ significantly in product outcomes. *HbTPS20* specifically catalyzed the formation of the acyclic monoterpene linalool from both substrates, indicating clear substrate promiscuity but strong product specificity. In contrast, *HbTPS24* accepted both GPP and NPP and exhibited pronounced product promiscuity, generating multiple cyclic monoterpenes, including α -thujene, β -pinene, α -terpinene, α -terpinolene, and α -terpineol, through complex carbocation rearrangements. Gene expression profiling revealed bark-enriched transcription for both genes, while stress inducibility has been experimentally validated for *HbTPS20* but not yet examined for *HbTPS24*. Together, these integrative insights suggest that complementary catalytic promiscuity among bark-expressed TPS enzymes represents an important mechanistic basis for monoterpene diversification and provides a conceptual framework linking enzyme plasticity to adaptive volatile metabolism in rubber tree.

Keywords: *catalytic promiscuity, Hevea brasiliensis, monoterpene biosynthesis, terpene synthase (TPS), volatile metabolism.*

Poster presentation (PP-02)

Isolation study of anti-inflammatory, anti-gout, and anti-Alzheimer's disease compounds from *Gnetum macrostachyum* Hook.f.: an *in silico* approach.

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ABSTRACT

Inflammation acts as a pivotal link between gout, driven by uric acid-induced joint inflammation, and Alzheimer's disease, where chronic neuroinflammation exacerbates neurodegeneration, underscoring the therapeutic potential of anti-inflammatory compounds targeting these interconnected pathways. Currently, both gout and Alzheimer's disease (AD) impose a growing global health burden, motivating the discovery of plant-derived small molecules that can be efficiently prioritized for followup testing. *Gnetum macrostachyum* Hook.f. is a stilbenoid-rich medicinal species distributed in Vietnam and Southeast Asia, yet Vietnamese-sourced material remains under-characterized, and workflows linking compound isolation to target-oriented screening are limited. In this study, *G. macrostachyum* stems collected in Ma Da (Dong Nai, Vietnam) were extracted via hot, reduced-pressure water extraction, followed by solvent fractionation to obtain an n-butanol fraction. The fraction was purified using silica gel column chromatography and preparative HPLC (C18) to isolate seven stilbenoids/oligostilbenoids: trans-Resveratrol, Isorhapontigenin, Bisisorhapontigenin A, cis-Shegansu B, trans-Shegansu B, Gnetifolin K, and ϵ -Viniferin. To prioritize these isolates for gout-, AD-, and inflammation-relevant hypotheses, molecular docking (AutoDock4) was conducted against a small target panel comprising xanthine oxidase (XO PDB code: 3NVY), γ -secretase (PDB code: 6IYC), and IL-1 β (PDB code: 1ITB). Several isolates showed higher predicted affinity in docking, with ϵ -Viniferin and cisShegansu B ranking highest toward γ -secretase (best affinities -9.0 and -8.6 kcal/mol, respectively). For XO, cis-Shegansu B and ϵ -Viniferin showed the strongest affinities (both -7.2 kcal/mol), while trans-Shegansu B and ϵ -Viniferin displayed comparatively favorable binding to IL-1 β (-7.7 and -7.5 kcal/mol, respectively). Overall, this integrated isolation-to-docking workflow highlights oligostilbenoids from Vietnamese *G. macrostachyum* as candidates for subsequent experimental validation and supports the utility of docking-guided triage to prioritize natural products early in discovery.

Keywords: *Gnetum macrostachyum*, stilbenoids, isolation, molecular docking, gout, alzheimer, inflammation.

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#Authors equally contribute to the work.

Poster presentation (PP-03)

Comparative Analysis of Quercetin's Alpha-Amylase Inhibitory Activity Using Weak Affinity Chromatography.

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ABSTRACT

Quercetin is a plant-derived flavonoid that exhibits inhibitory activity against α -amylase, a key therapeutic target in the control of postprandial glucose levels. Weak affinity chromatography (WAC), a variant of affinity chromatography designed to characterize weak ligand–target interactions, offers a promising approach for studying such inhibitory mechanisms. This study aimed to evaluate the α -amylase inhibitory activity of commercially available and standard quercetin using WAC and to validate the performance of Amylase Weak Affinity Chromatography (AMYWAC) for the simultaneous quantification and chromatographic identification of quercetin in accordance with ICH Q2 and U.S. FDA bioanalytical method validation guidelines.

The AMYWAC column was prepared via the Schiff base reduction method by immobilizing 133 mg of α -amylase per gram of silica and packing it into a 2.5 mm $\times$ 50 mm stainless steel column operated on a PerkinElmer HPLC system. Five concentrations of quercetin were analyzed in triplicate across three separate days. Method performance was evaluated through determination of the WAC dissociation constant, area under the curve (AUC), and figures of merit specified by ICH and U.S. FDA guidelines.

Results demonstrated the ability of WAC to resolve biological interactions and differentiate weak from strong binders. Quercetin exhibited increased retention on the amylase column compared to the blank column, confirming its inhibitory interaction with α -amylase. The validated method showed acceptable linearity and compliance with regulatory performance criteria. These findings support the applicability of WAC as a reliable analytical tool for assessing the inhibitory activity and quality of quercetin-containing supplements.

Keywords: *Alpha-Amylase, Weak Affinity Chromatography, Quercetin.*

Poster presentation (PP-04)

Genetic Homology Verification and Metabolites Profiling of Mountain Ginseng and Its Adventitious Roots.

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ABSTRACT

Mountain ginseng (*Panax ginseng* C.A. Meyer) is a high-value medicinal resource that accumulates diverse ginsenosides and bioactive metabolites during prolonged growth in natural habitats, offering substantial academic and industrial potential. However, rigorous investigation has been hampered by the rarity of authentic specimens, high acquisition costs, and extremely limited biomass. Recent advances in omics technologies now enable comprehensive analyses from minute samples, overcoming prior constraints. Here, we verified the genetic identity between wild mountain ginseng and its derived cultured adventitious roots (Mg-AR) and performed comparative metabolomics to define metabolites specific to Mg and Mg-AR. A 150-year-old wild mountain ginseng (Mg) collected in Hwasun, Jeollanam-do, Republic of Korea, and cultured adventitious roots derived from this specimen (Mg-AR) were analyzed alongside a 6-year-old cultivated *P. ginseng* as a control (C-Pg). Genomic DNA from Mg and Mg-AR was subjected to SNP genotyping using a Fluidigm SNP array designed from the ginseng reference genome. Metabolite profiles of Mg, Mg-AR, and C-Pg were assessed by HPLC and LC-MS to identify and compare characteristic metabolites. Population assignment against more than 1,400 ginseng accessions/genomes placed Mg in Group 4, which contains the largest number of resources. Mg and Mg-AR exhibited 100% identical genotypes across 192 SNP markers, providing the first direct confirmation that the cultured roots originated from the wild parent. Metabolomic comparisons revealed that C-Pg and Mg shared 39 metabolites, with 26 Mg-specific and 49 C-Pg-specific metabolites. In the C-Pg versus Mg-AR comparison, 72 metabolites were detected, 39 of which were shared with C-Pg and included 21 ginsenosides (e.g., Rb1, Rb2, Rb3). Comparing Mg with Mg-AR identified 30 total metabolites, with 9 shared, including ginsenosides Rb2, Rd, Re, Rb1, Rb3, Rg3, Rk1, Rg1, and Rg2. Mg harbored 15 unique metabolites, including ginsenosides Ck, Ra1, Ra2, Rc, and notoginsenosides R2 and R3, whereas Mg-AR uniquely contained ginsenoside XVII, ginsenoside F2, and four unknown peaks. These results indicate that Mg-AR retains a ginsenoside-centered metabolic signature comparable to Mg while maintaining a distinct repertoire relative to C-Pg. SNP genotyping confirmed complete genetic identity between Mg-AR and its parental mountain ginseng. Comparative metabolomics demonstrated metabolites specific to Mg and Mg-AR relative to cultivated ginseng, with broadly shared ginsenoside classes but differing relative abundances. Mg-AR thus represents a tractable research material for elucidating mountain ginseng-specific bioactivities and a viable platform for the stable, continuous production of functional ginsenosides and novel metabolites.

Keywords: *Mountain ginseng, genetic homology, adventitious root, metabolite profiling, tissue-specific metabolites.*

Acknowledgement

This work was supported by the Technology Innovation Program (Grant number P0018148) funded by the Ministry of Trade, Industry & Energy (MOTIE, Korea).

Poster presentation (PP-05)

Cytotoxic components from *Pluchea pteropoda* Hemsl. stems: Separation, biological activity, and molecular docking study.

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ABSTRACT

Vietnamese traditional medicine uses *Pluchea pteropoda* to treat fever, inflammation, and respiratory irritation. This research is important since there is only phytochemical study on *P. pteropoda*, which detected seven thiophene chemicals from a hexane extract, but its chemical makeup and anticancer potential are unknown. This work extracted different compounds from *P. pteropoda* stem, then analyzed and tested their antiproliferative effects on HepG2 cells *in vitro*. Repeated C18 column chromatography and preparative HPLC purified the dried *P. pteropoda* stem powder after extraction with 70% ethanol, fractionation with hexane, ethyl acetate, and n-butanol. NMR and high-resolution mass spectrometry identified the structures of the isolated compounds. An MTT experiment on HepG2 cells using doxorubicin as a positive control investigated the antiproliferative effects. *P. pteropoda* developed five new compounds, including a unique dicaffeoylcyclopentanol derivative (1 α ,3 β -O-dicaffeoylcyclopentan-2 β -ol, compound 1). Compound 2 (1 α ,2 β -O-dicaffeoylcyclopentan-3 β -ol) showed minor antiproliferative activity (IC₅₀ $\approx$ 0.89 mM) against HepG2 cells, whereas other isolates showed no significant inhibition (up to 1 mM). Compound 2 has 200-fold lower potency than doxorubicin, with an IC₅₀ of 4 μ M under similar circumstances. Compound 2's lower efficiency than doxorubicin may be due to structural issues, such as minor hydroxyl group placement on the cyclopentane core (between compounds 1 and 2). In conclusion, this work presents the first phytochemical profile of *P. pteropoda* and identifies a new caffeoyl derivative. The ability of *P. pteropoda* to generate novel anti-cancer compounds highlights its biological significance and suggests further research into optimization strategies (e.g., structural modifications or synergistic formulations) to improve efficacy. These results help fill a knowledge gap and encourage the study of *P. pteropoda*-derived compounds as prospective complementary cancer treatments, especially compared to current plant-derived treatments.

Keywords: *Pluchea pteropoda*; antiproliferation; HepG2; dicaffeoyl derivatives.

Poster presentation (PP-06)

Dihydroferulic Acid Attenuates Muscle Atrophy by Preserving Myogenic Signaling and Modulating Glucocorticoid-Related Pathways.

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ABSTRACT

Dihydroferulic acid (dFA) is a plant-derived phenolic phytochemical derived from ferulic acid and is known for its antioxidant and cytoprotective properties. While phenolic compounds have attracted attention as natural pharmacological agents, the role of dFA in muscle atrophy remains poorly understood. Here, we investigated the protective effects of dFA against muscle atrophy using *in vitro* and *in vivo* models. Specifically, dexamethasone (DEX)-induced muscle atrophy was modeled in differentiated C2C12 myotubes and in mice, allowing assessment of dFA-mediated changes in myogenic signaling, muscle function, systemic biochemical parameters, and immune cell homeostasis. In addition, molecular docking analysis was performed to elucidate the underlying mechanisms at the receptor level. In C2C12 myotubes, dFA markedly alleviated DEX-induced structural atrophy, preserving myotube length and organization without cytotoxic effects. dFA treatment significantly restored the expression of myogenic regulators suppressed by DEX, particularly Myogenin and MyoD, while partially normalizing aberrant Myf5 expression. In the DEX-induced mouse model, dFA administration improved muscle strength and endurance, as evidenced by enhanced grip strength and rotarod performance approaching those of non-atrophic controls. Although changes in gross muscle mass were limited, dFA reversed DEX-induced reductions in serum albumin, indicating improved systemic muscle metabolic status. Moreover, dFA partially corrected DEX-induced immune dysregulation in bone marrow by restoring T- and B-cell populations and reducing excessive neutrophil and monocyte proportions. Docking analysis revealed stable binding affinities of dFA to the glucocorticoid receptor and activin type IIB receptor, suggesting modulation of glucocorticoid- and myostatin-associated atrophic signaling. Collectively, these findings demonstrate that dFA provides multi-level protection against muscle atrophy by preserving myogenic signaling, improving muscle function, and modulating immune and receptor-mediated pathways, supporting its potential as a phytochemical-based pharmaceutical or medicinal candidate.

Keywords: Dihydroferulic acid, Muscle atrophy, dexamethasone, Myogenic signaling, Glucocorticoid-related pathways.

Poster presentation (PP-07)

From Tribal Diets to Functional Nutrients: Evaluation of Wild Edible Fruits of the Western Ghats as Sustainable Sources for Nutraceutical Supplements.

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ABSTRACT

The Western Ghats of India serves as a vast, natural chemical library where wild edible fruits function as potent matrices for specialized bioactive metabolites. The transition from "wild edible fruits" to a formalized **food supplement** hinges on the strategic concentration and standardization of the specific compounds identified in this study. This research into 10 wild fruits from the Karnataka region provides the empirical foundation for such products by documenting essential nutritional properties, including carbohydrate more in *Ziziphus rugosa* ($44.515 \pm 4.714\%$) and significant dietary fibre in *Canthium dicoccum* ($6.8 \pm 0.403\%$). For the supplement industry, these fruits represent high-purity sources for mineral complexes specifically phosphorus, potassium, calcium, iron, and magnesium found in *Carissa gangetica* and *Nothopegia racemose* and potent vitamin concentrates, such as the vitamin C in *Elaeagnus conferta* ($0.797 \pm 0.21 \text{ mg/g}$), and the vitamin B complex in *Embelia basaal* ($0.248 \pm 0.311 \text{ mg/g}$).

Furthermore, the viability of these fruits as food supplements is dictated by their bioactive efficacy and the management of anti-nutritional factors. The study highlights *Garcini spicata* and *Canthium dicoccum* as rich sources of phenolic acids, including gallic acid, caffeic acid, epicatechin, and rutin. These compounds are the "active ingredients" in antioxidant supplements, where *Madhuca nerifolia* demonstrated exceptional potency with IC_{50} values of (DPPH) ($38.468 \pm 0.4857 \mu\text{g/ml}$) and ($28.350 \pm 0.149 \mu\text{g/ml}$) (ABTS). By identifying antiproliferative effects in *Aporosa lindleyana* against MIA PaCa-2 cancer cells with IC_{50} value ($5.48 \pm 2.50 \mu\text{g/ml}$). The core of the "supplement concept" in this research lies in the **Bioaccessibility Index (BI)** derived from *in vitro* gastrointestinal simulation. This critical metric elevates the study from basic nutrition to pharmaceutical grade science by determining exactly how much of a phenolic compound remains active and absorbable after passing through the human digestive system. This data is essential for formulating supplements with precise dosages, ensuring that the health-promoting properties such as the moderate antioxidant capacity and phenolic compound content in *Garcini spicata* and *Madhuca nerifolia* are not just present in the raw fruit but are effectively delivered to the systemic circulation. Ultimately, this research provides the empirical evidence needed to transform underutilized indigenous fruits into standardized, shelf-stable health products that bridge the gap between traditional tribal knowledge and modern preventative medicine.

Keywords: Nutritional, Antinutritional, Bioactive compounds, antiproliferative and Bioavailability.

Poster presentation (PP-08)

Characterization, *in vitro* and *in silico* anticancer activity of abrin like ribosome inactivating protein isolated from endophytic fungi, *Colletotrichum cobbittiense* of *Dendrophthoe falcata*.

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ABSTRACT

The endophytic fungi, *Colletotrichum cobbittiense* was isolated from leaves of *Dendrophthoe falcata*, a parasitic plant. The mass cultured *C. cobbittiense* was subjected to isolation of ribosome inactivating protein, characterized by SDS-PAGE, PAS staining, hemeagglutination, MALDI-TOF-MS, LC-MS/MS analysis. The CcRIP was evaluated against anticancer activity (cytotoxicity, cell growth analysis, DNA fragmentation, dual staining, cell cycle, caspase enzymes analysis) against human colorectal cancer cell line HCT-116. The CcRIP was a molecular weight of 48kDa with 4 peptide isoforms (similar to abrin) and 96% of cancer cells were died at 25 µg/ml treatment of CcRIP in cytotoxicity and fragmented DNA was also observed. The 79.8% of the cancer cells were died after treatment with CcRIP by cells becoming orange and red colour. Most of the cells were arrested in G0/G1 phase of cancer cells and significant caspase enzymes activity was observed. 1abr protein was selected for molecular characterization and *in silico* anticancer activity against cancer colorectal proteins (2fvd, 3m11, 3vhd, 5uql, 6gue) using PyDock. The 1abr was proven as quality protein with dependable 36 residues from WhatCheck validity. Verified the 1abr protein using Verify3D and approved protein structure by ERRAT tool. The highest binding energy was observed with 6gue (-831.7) by showing 4 salt bridges, 1 disulphide bond, 13 hydrogen bonds, 175 non contact bonds followed by 3m11, 2fvd, 3ruk, 5uql, 3vhd. The endophytic fungi, *C. cobbittiense* showed 68kDa RIP which is similar to abrin. The CcRIP was characterized and showed strong anticancer activity from *in vitro* and *in silico* experimental studies.

Keywords: *C. cobbittiense*, characterization, anticancer activity, *in vitro* experiments, *in silico* experiments.

Poster presentation (PP-09)

Formulation and evaluation of herbal ointment containing ethanolic extracts of *Senna alata* leaves and *Alpinia galanga* rhizomes

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ABSTRACT

Senna alata (*S. alata*) and *Alpinia galanga* (*A. galanga*) are well-known as medicinal plants traditionally used for treating skin infections. This study aimed to formulate and characterize the ointments containing extracts of *S. alata* leaves and *A. galanga* rhizomes, and evaluate physicochemical and antimicrobial activity of the ointments. The extracts were obtained by maceration and screened antimicrobial activity against *Staphylococcus aureus* and *Candida albicans* using agar diffusion, and determined MIC, MBC, MFC and synergistic activity. The ointments (F1-F5) were prepared with different extract concentrations, and evaluated for appearance, pH, viscosity and antimicrobial performance compared with a marketed product. The extract of *A. galanga* showed strong antimicrobial activity against *S. aureus* (inhibition zone 29.65 ± 0.56 mm, MIC 0.78 mg/ml, MBC 6.25 mg/ml) and *C. albicans* (inhibition zone 30.98 ± 1.24 mm, MIC 0.39 mg/ml, MFC 0.78 mg/ml). In contrast, *S. alata* exhibited only moderate antibacterial activity against *S. aureus* (inhibition zone 10.77 ± 0.20 mm, MIC 3.12 mg/ml) and weak antifungal activity against *C. albicans* (MIC 3.12 mg/ml, MFC 6.25 mg/ml, no visible inhibition zone). The combination of extracts showed an additive effect against *S. aureus* (FICI = 1.0) and indifferent interaction against *C. albicans* (FICI = 1.5). All ointments were homogeneous, smooth with pH value range of 5.37-5.86 suitable for skin application. The viscosity increased with the increase in extract concentrations. All ointments exhibited against *S. aureus* and *C. albicans* by reduced microbial growth despite the absence of clear inhibition zones. Ointments containing *A. galanga* extract showed better inhibitory effects than those containing of *S. alata* extract, with 1% *A. galanga* formulation (F5) showed the highest antimicrobial potential. The mixed formulation showed moderate activity, suggesting an additive but not synergistic effect. These results indicated the ointments provide bacteriostatic and fungistatic activity suitable for topical application.

Keywords: *Senna alata*, *Alpinia galanga*, herbal ointments, antimicrobial, synergistic.

Poster presentation (PP-10)

Ethnobotanical Network Analysis of Medicinal Plants for Skin Health Among Philippine Ethnic Groups: A Framework for Natural Products Prioritization and Sustainable Use.

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ABSTRACT

Medicinal plants are major sources of bioactive compounds for managing skin conditions, particularly in tropical regions where traditional medicine supports primary healthcare. We synthesized ethnobotanical evidence on plants used for skin health across Philippine ethnic groups to (i) identify predominant plant families, species, plant parts, and preparation methods; (ii) examine convergence and diversity in plant use; and (iii) assess knowledge structure using network analysis to prioritize natural products research and sustainable utilization. Using PRISMA, we reviewed studies published in 1994–2024; 55 met inclusion criteria. The curated dataset contained 3,594 use-reports from 43 ethnic groups, 349 plant species (96 families), 17 plant parts, 27 preparation modes, and 66 dermatological use categories. Use-reports converged on a small set of families, led by Fabaceae, Asteraceae, Euphorbiaceae, Malvaceae, and Myrtaceae, and on a subset of widely shared species. Leaves dominated (49.7%), and preparation relied on accessible methods, chiefly decoction (17.8%) and pounding (17.1%). Wound care was the primary indication (34.1%), followed by boils and scabies. A tripartite ethnic group–plant–use network (127 nodes, 232 edges) revealed five modularity clusters and key hubs (Wound, Manobo, *Gliricidia sepium*); centrality metrics (weighted degree and PageRank) highlighted additional priority taxa, including *Psidium guajava* and *Senna alata*. Integrating systematic synthesis with network analysis provides a transparent basis for prioritizing bioculturally validated taxa for phytochemical screening, pharmacological testing, and sustainable resource planning in the biodiversity-rich Philippines.

Keywords: *ethnobotany; medicinal plants; skin health; network analysis; indigenous knowledge; natural products; Philippines.*

Poster presentation (PP-11)

Non-saponin components from upper parts of Lai Chau ginseng (*Panax vietnamensis* var. *fuscidiscus*).

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ABSTRACT

Panax vietnamensis Ha et Grushv. (Araliaceae), an endemic medicinal species of Vietnam, was first discovered in 1973. Based on genetic characteristics, two new varieties, Lai Chau ginseng (*P. vietnamensis* var. *fuscidiscus*, PVF) and Langbian ginseng (*P. vietnamensis* var. *langbianensis*), have recently been identified, opening new perspectives for studies on their chemical constituents and biological activities. Although all parts of *P. vietnamensis* possess medicinal value, most previous investigations have focused mainly on the rhizomes, while the chemical composition of the aerial parts remains poorly characterized. In this study, fifteen non-saponin compounds belonging to phenolic acids, flavonoids, and alkaloids were isolated and structurally elucidated from the leaves and flowers of PVF through solvent partitioning, chromatographic techniques (column chromatography, preparative TLC, and semi-preparative HPLC), and spectroscopic analyses (QToF/MS and NMR). Among them, eleven compounds were reported for the first time from the aerial parts of Lai Chau ginseng. These findings significantly enrich the phytochemical profile of the genus *Panax*, and *P. vietnamensis* in particular, providing a scientific basis for further pharmacological investigations and the development of therapeutic applications from this valuable medicinal plant.

Keywords: *Lai Chau ginseng, Panax vietnamensis* var. *fuscidiscus*, non-saponin compounds, flavonoid, alkaloid, phenolic acid.

Poster presentation (PP-12)

In Vitro and In Vivo Assessment of the Antidiabetic Effects of *Phyllanthus amarus* Schum. et Thonn. Ethanol Extract.

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ABSTRACT

Phyllanthus amarus has been widely used in traditional medicine for the management of metabolic disorders, including diabetes mellitus; however, its antidiabetic efficacy still requires scientific validation. This study aimed to evaluate the potential antidiabetic activity of an ethanol extract of *P. amarus* through both *in vitro* and *in vivo* models. The *in vitro* antidiabetic activity was assessed by determining the inhibitory effects of the extract on key carbohydrate-hydrolyzing enzymes, α -amylase and α -glucosidase, using standardized commercial assay kits. In addition, the *in vivo* hypoglycemic effect was investigated in streptozotocin-induced diabetic rats following oral administration of the ethanol extract for a period of 21 consecutive days. The results demonstrated that the ethanol extract of *P. amarus* exhibited significant inhibitory activity against α -amylase and α -glucosidase, with IC₅₀ values of 125.7 μ g/mL and 77.4 μ g/mL, respectively. Furthermore, oral treatment with the extract markedly reduced fasting blood glucose levels in diabetic rats to 158 mg/dL, compared to 354 mg/dL observed in the untreated diabetic control group after 21 days. Overall, these findings suggest that the ethanol extract of *P. amarus* possesses promising antidiabetic potential, which may be attributed to its dual action on digestive enzyme inhibition and effective reduction of hyperglycemia.

Keywords: α -amylase, α -glucosidase, *Phyllanthus amarus*, hypoglycemic effect, streptozotocin.

Poster presentation (PP-13)

Integrative Morphological, Molecular, and Phytochemical Characterization of a Cultivated *Panax* sp. from Lam Dong.

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ABSTRACT

The genus *Panax* (Araliaceae) comprises highly valued medicinal species, several of which are endemic to Vietnam. During the investigation of cultivated *Panax* populations in Lam Dong province, a specimen exhibiting atypical morphological characteristics was identified, raising questions regarding its taxonomic status. This study aimed to clarify its identity using an integrative approach combining morphological, histological, molecular, and phytochemical analyses. Comparative morphological assessment against the three recognized varieties of *Panax vietnamensis* revealed partial similarities but consistent differences, particularly in reproductive structures and rhizome characteristics. While certain vegetative traits overlapped with *P. vietnamensis* var. *fuscidiscus*, distinct features of the bracts and nectar disc were observed. Clear morphological distinctions were also recorded when compared with *P. vietnamensis* var. *vietnamensis*, *P. vietnamensis* var. *langbianensis*, and *P. zingiberensis*, allowing exclusion of close affinity based solely on morphology. DNA barcoding analysis indicated relatively high genetic similarity to *P. vietnamensis* var. *fuscidiscus*; however, the molecular data did not fully resolve the taxonomic placement. Complementary chemotaxonomic evaluation using TLC, HPLC-PDA-ELSD, and LC-QToF/MS demonstrated a distinct ginsenoside fingerprint compared to the three recognized varieties of *P. vietnamensis*, suggesting a differentiated chemical profile. The convergence of morphological, molecular, and phytochemical evidence indicates that the studied specimen represents a taxonomically distinct entity and may constitute a previously unrecognized *Panax* species in Vietnam. These findings highlight the importance of integrative approaches in resolving taxonomic ambiguities within medicinally important plant groups.

Keywords: *Panax*, DNA barcoding, Integrative taxonomy, Chemotaxonomy, Ginsenoside.

Poster presentation (PP-14)

Separation and Determination of Anticancer Compounds Composition Against HeLa cell of the Total Extract from *Scytonema bilaspurese* NK13 cyanobacteria strain.

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ABSTRACT

In our previous study, the crude extract from the cyanobacterial strain *Scytonema bilaspurese* NK13 exhibited potent cytotoxicity against HeLa cells, with an IC₅₀ value of 3.8 µg/mL. This study aimed to fractionate and identify the bioactive compounds responsible for the anticancer activity from the total extract of the NK13 strain. Liquid-liquid extraction of the total extract yielded four fractions: *n*-hexane, ethyl acetate (EtOAc), methanol (MeOH), and an aqueous fraction. Cytotoxicity evaluation against HeLa cells using the MTT assay revealed that the EtOAc and *n*-hexane fractions showed strong inhibitory effects, with IC₅₀ values of 2.2 and 12.0 µg/mL, respectively. After that, the EtOAc fraction was further separated by LH-20 column chromatography and HPLC to yield 2.4 mg (named the F6 fraction), which demonstrated significant cytotoxicity against HeLa cells with an IC₅₀ value of 3.5 µg/mL. The LC-HRMS analysis of the F6 fraction identified 74 natural compounds belonging to diverse chemical classes, including lipopeptides, phospholipids, polyketides/alkaloids, halogenated compounds, diterpenoids, and sulfur-containing glycosides. Among them, two major compounds have accurate masses of 387.0571 (corresponding to the molecular formula of C₁₂H₁₄N₅O₈P) and 389.0531 (corresponding to the molecular formula of C₁₁H₁₉NO₁₀S₂), respectively. None of the anticancer compounds corresponding to these formulas has been found. Additionally, 26 compounds among these 74 compounds were reported to possess anticancer activity; however, none have previously been detected in cyanobacterial species. These findings highlight the potential of domestic cyanobacterial strains as promising sources of novel anticancer agents.

Keywords: anticancer, cyanobacteria, cytotoxicity activity, *Scytonema bilaspurese* NK13

Poster presentation (PP-15)

Establishment of an efficient *in vitro* adventitious root culture system for biomass production of *Centella asiatica* (L.) Urb.

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ABSTRACT

Centella asiatica (L.) Urb. (Apiaceae) is highly valued in traditional medicine for its diverse therapeutic properties, particularly as a rich source of centelloids such as asiaticoside and madecassoside, which are known for their roles in wound healing and neuroprotection. However, the pharmaceutical industry's reliance on wild-harvested populations faces critical challenges, notably the heterogeneity of bioactive compound accumulation driven by environmental fluctuations. To address these issues, this study aimed to establish a stable *in vitro* adventitious root culture system for high-quality biomass production. Our results demonstrated that root explants cultured on MS medium supplemented with 0.5 mg/L IBA yielded the most favorable response, achieving a 100% rooting frequency and 16.33 roots per explant with minimal callus formation (6.67%). Regarding the cutting method, segmented root explants exhibited superior regeneration capacity, producing 26.28 roots per explant. During the proliferation phase, roots derived from these explants proved to be the optimal material, achieving a maximum multiplication rate of 48.33 roots per explant after four weeks. Finally, for biomass production in liquid shake culture, MS medium supplemented with 5~7% sucrose was identified as the optimal condition, yielding the highest dry biomass (0.25 g DW/flask) and a significant growth index (GI) of 4.42. By integrating efficient induction protocols, precise cutting techniques, and optimized liquid culture conditions, this study provides a sustainable and standardized framework for the production of *C. asiatica* raw materials, effectively bridging the gap between traditional medicinal value and modern industrial pharmaceutical demands.

Keywords: *Adventitious root, biomass production, Centella asiatica, centelloids, sustainable agriculture.*

Funding: This research is funded by Viet Nam National Foundation for Science and Technology Development (NAFOSTED), under Grant number 106.01-2021.34.

Poster presentation (PP-16)

Ethnobotanical survey and Biological Validation of Medicinal Plants Used by the Thai People in Nghe An Province, Vietnam.

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ABSTRACT

In the medicinal plant knowledge used in traditional folk medicine, the knowledge held by ethnic minorities in each country occupies an important position. In this study, an investigation on the traditional utilization of medicinal plants by the Thai people, who account for 12-13% of the 54 ethnic groups in Vietnam, was conducted. From 2024 to 2025, members of the Thai ethnic group inhabiting the Nghe An region, a central area, were interviewed. The purpose of the study was to collect and document information on medicinal plant use by the Thai people and to verify the reliability of the data by comparatively analyzing the bioactivity results of the utilized plant species. As a result of the investigation, 88 families, 217 genera, and 281 species were documented. The most frequently utilized plant species were *Senna tora* (L.) Roxb. with a Use Value (UV) of 0.32, followed by *Scoparia dulcis* L. (0.31) and *Chromolaena odorata* (L.) R.M.King & H.Rob. (0.25). Based on the bioactivity screening of 105 selected species, promising results were observed: 40 species showed anti-inflammatory activity, 1 species exhibited insecticidal properties, 94 species affected cell viability, 3 species demonstrated antioxidant effects, and 10 species displayed anti-cancer potential. Through this investigation, a significant link was established between the traditional medicinal plant knowledge of the Thai people in Nghe An and modern pharmacological activities, suggesting the potential for more systematic investigation and research in the future.

Keywords: *Ethno-botany, Medicinal plant, Thai ethnic group, Viet Nam.*

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Poster presentation (PP-17)

Isolation of Cucurbitacins from *Aquilaria crassna* Pericarps and Evaluation of Cytotoxic Activity.

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ABSTRACT

Pericarps of *Aquilaria crassna* represent a potential source of bioactive triterpenoids, particularly cucurbitacins. In this study, triterpene constituents were isolated from ethanol extracts of the pericarps through solvent partitioning and chromatographic techniques. Structural identification was conducted using mass spectrometry and NMR analyses, leading to the characterization of four cucurbitacin-type compounds, including cucurbitacin E, cucurbitacin E 2-O- β -D-glucopyranoside, neocucurbitacin A, and neocucurbitacin B. The isolated compounds were evaluated for their antiproliferative activity against HepG2 human liver cancer cells. All tested compounds suppressed cell viability at micromolar concentrations. Among them, cucurbitacin E and neocucurbitacin A exhibited comparatively stronger inhibitory effects and were selected for further mechanistic investigation. Biological assays indicated that these compounds promoted cancer cell death through apoptosis induction and cell cycle regulation. Cucurbitacin E was associated with enhanced intracellular reactive oxygen species production and accumulation of cells in the G0/G1 phase, whereas neocucurbitacin A showed distinct cell cycle modulation with enrichment in the G2/M phase. Both compounds significantly increased apoptotic cell populations. Overall, the findings highlight the potential of cucurbitacin derivatives from *A. crassna* pericarps as promising candidates for further development in liver cancer research.

Keywords: *Aquilaria crassna* pericarps, cucurbitacin, cucurbitacin E, HepG2, apoptosis, cytotoxic activity.

Poster presentation (PP-18)

Optimization of *in vitro* culture conditions for adventitious root biomass production in *Panax vietnamensis*.

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ABSTRACT

Panax vietnamensis Ha et Grushv. (Ngoc Linh ginseng) is a high-value medicinal plant with significant therapeutic potential. Plant tissue culture, specifically liquid shake culture, offers a sustainable approach for the mass propagation of adventitious roots (ARs) and the controlled production of bioactive compounds. This study aimed to optimize *in vitro* culture conditions for maximal ARs biomass production. Explant sources-derived ARs (root, rhizome, leaf, petiole, and callus) were evaluated; while no significant difference in total biomass was observed among sources, leaf-derived ARs achieved the highest dry weight (10.9 g/L DW). Further optimization identified 3/4SH medium as the most effective basal medium, yielding 14 g/L DW of biomass, significantly outperforming SH, B5, 3/4B5, MS, and 3/4MS media. The process was further refined by establishing an optimal sucrose concentration (45–60 g/L) and an initial inoculum density of 10 g/L, which maximized biomass accumulation. Notably, chemical analysis confirmed that the produced ARs maintained high saponin content, demonstrating quality comparable to that of naturally grown ginseng. These findings establish a robust, scalable protocol for the commercial production of *P. vietnamensis* ARs, providing a sustainable resource for the pharmaceutical, cosmetic, and functional food industries.

Keywords: Adventitious root, biomass production, liquid shake culture, *Panax vietnamensis* Ha et Grushv., saponin.

Funding: This research is funded by Viet Nam National Foundation for Science and Technology Development (NAFOSTED), under Grant number 106.01-2021.34.

Poster presentation (PP-19)

Computational and Experimental Investigation of Essential-Oil Compounds as Antibacterial Agents against *Vibrio parahaemolyticus* Associated with AHPND in Shrimp.

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ABSTRACT

Acute hepatopancreatic necrosis disease (AHPND) caused by *Vibrio parahaemolyticus*, is a major threat to shrimp aquaculture. Sustainable alternatives to antibiotics are urgently needed, and essential oils (EOs) represent a promising option due to their antibacterial and antivirulence properties. This study combined computational and experimental approaches to identify EOs constituents with activity against *V. parahaemolyticus*. A curated dataset of 323 compounds from ChEMBL was used to build a quantitative structure–activity relationship (QSAR) classification model in KNIME (version 5.5.1) using the Random Forest algorithm. The model showed strong predictive performance, with accuracies of 0.83, 0.935, and 0.844 for training, internal validation, and external testing sets, respectively, and AUC values above 0.89. Virtual screening of 13 EOs, based on GC–MS profiles, identified limonene, γ -terpinene, terpinene-4-ol, anethole, and linalool as potential anti-*Vibrio* candidates. In vitro minimum inhibitory concentration (MIC) assays showed that *Citrus grandis*, *Illicium verum*, and *Coriandrum sativum* oils inhibited bacterial growth at lower than 1000 $\mu\text{g/mL}$, while *Calophyllum inophyllum* and *Homalomena occulta* displayed weaker activity. Molecular docking further supported these findings, showing that limonene exhibited strong binding affinity toward the bile salt receptor protein (5KEV) (-7.4 kcal/mol) through dominant hydrophobic interactions, while linalool formed hydrogen bonds with key residues in thermolabile hemolysin (4XGY) and the PirA toxin (3X0T). Overall, this integrated workflow highlights the potential of essential oils as natural antimicrobial agents for controlling AHPND and provides a practical framework for accelerating natural product discovery in aquaculture.

Keywords: *Vibrio parahaemolyticus*, essential oil, QSAR, KNIME, molecular docking, MIC assay

Poster presentation (PP-20)

Topical Spermidine Restores Tear Film Stability and Lacrimal Gland Immune Homeostasis in Desiccation Stress-Induced Dry Eye Disease.

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ABSTRACT

Spermidine, a naturally occurring polyamine, has been reported to exert cytoprotective and immunomodulatory effects; however, its role in desiccation stress (DS)-induced dry eye disease (DED) and lacrimal gland immune homeostasis remains insufficiently defined. DED is characterized by tear film instability and ocular surface inflammation, in which lacrimal gland immune dysregulation plays a critical pathogenic role. This study evaluated the protective effects of topical spermidine on tear film stability and lacrimal gland inflammation in a DS-induced DED model. DED was induced in C57BL/6 mice by low-humidity exposure combined with systemic scopolamine administration. Following DS induction, mice were treated with topical spermidine eye drops (0.2% or 0.5%) for up to 14 days, with normal saline and cyclosporine A (0.05%) used as vehicle and reference controls. Tear secretion, corneal epithelial damage, tear film stability, and lacrimal gland inflammation were assessed using standard ocular surface and immunohistochemical analyses. As a result, desiccation stress markedly disrupted tear film homeostasis, as evidenced by reduced tear secretion and tear breakup time (TBUT) and increased corneal fluorescein scores. Topical spermidine improved tear production and tear film stability in a dose- and time-dependent manner. Notably, 0.5% spermidine significantly restored tear volume at DS 21d/Tx 14d (0.12 ± 0.08 vs. 0.03 ± 0.01 in DS controls), prolonged TBUT, and attenuated corneal epithelial damage, whereas 0.2% spermidine showed only modest improvement. Immunohistochemical analysis revealed increased macrophage (F4/80) and CD4⁺ T-cell infiltration and elevated expression of pro-inflammatory cytokines, including IL-6, IL-17, and TNF, in DS and vehicle-treated groups. In contrast, 0.5% spermidine substantially suppressed these inflammatory markers, restoring lacrimal gland immune profiles toward normal levels, with efficacy comparable to cyclosporine A. Collectively, topical spermidine restored tear film stability and re-established lacrimal gland immune homeostasis in DS-induced DED, supporting its potential as a pharmacological candidate for dry eye disease management.

Keywords: Spermidine, Dry eye disease, Tear film stability, Desiccation stress, Lacrimal gland inflammation.

Poster presentation (PP-21)

Microwave-Assisted Extraction and Antioxidant and Antibacterial Activities of Curcuminoids from Turmeric Rhizomes.

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ABSTRACT

Turmeric rhizome (*Curcuma longa* L.) is a natural source rich in curcuminoids – polyphenolic compounds with strong antioxidant and antibacterial activities, which are suggested to arise from their phenolic hydroxyl groups through scavenging ROS and free radicals and potentially inducing oxidative stress in bacterial cells. In this study, microwave-assisted extraction (MAE) was optimized to recover total curcuminoid content (TCC) from turmeric rhizomes by varying ethanol concentration (70–100%), microwave power (600–1000 W), solvent-to-material ratio (10:1–50:1, v/w), and extraction time (20–60 min). Under 100% ethanol, 800 W, a 30:1 (v/w) ratio, and 60 min, TCC reached 10.472 g/100 g dry weight. The extracted curcuminoids were characterized and purified. FTIR spectra evidenced characteristic functional groups of curcuminoids, including broad O–H stretching (phenolic groups), C=O stretching of the conjugated diketone/ β -diketone system, aromatic C=C vibrations, and C–O/C–O–C bands associated with phenolic and methoxy functionalities. For purification, curcuminoids were purified by column chromatography using a chloroform:methanol (95:5, v/v) solvent system, and the purified curcuminoids were confirmed by HPLC. Notable antibacterial activity of purified curcuminoids against *Escherichia coli* was observed, with a minimum inhibitory concentration (MIC) of 50 μ g/mL. Remarkably, the MIC of purified curcuminoids (24.51 $\pm$ 0.54 μ g/mL) indicated superior antibacterial potency compared with commercially pure curcuminoids (31.50 μ g/mL). In addition, the antioxidant activity of purified curcuminoids was evaluated using the DPPH radical scavenging assay, yielding an IC₅₀ of 15.2 μ g/mL. Compared with the crude extract (IC₅₀ = 21.18 $\pm$ 1.75 μ g/mL), purified curcuminoids exhibited significantly stronger antioxidant activity and were comparable to common reference antioxidants. In summary, MAE effectively enhanced TCC and yielded purified curcuminoids with promising antioxidant and antibacterial potential for pharmaceutical, cosmetic, and functional food applications.

Keywords: Curcuminoids; turmeric rhizome (*Curcuma longa* L.); MAE; antioxidant; anti-*E. coli* activity.

Poster presentation (PP-22)

Comparative Chloroplast Genome Analysis and Phylogenetic Relationships of the Genus *Bidens* in Vietnam.

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ABSTRACT

This study presents a comparative analysis of chloroplast genomes from four *Bidens* samples collected across different ecological regions of Vietnam, including Bac Giang, Quang Nam, Kon Tum, and An Giang. High-throughput sequencing data were quality-checked and assembled *de novo* to obtain complete chloroplast genomes. The results showed that all four genomes exhibit a typical quadripartite structure, consisting of a large single-copy (LSC) region, a small single-copy (SSC) region, and two inverted repeat (IR) regions, with genome sizes ranging from 151,633 to 151,634 bp. A total of 129 genes were annotated, including 85 protein-coding genes, 36 tRNA genes, and 8 rRNA genes, with highly conserved genome organization and GC content among the samples. Codon usage analysis revealed a strong bias toward A/U-ending codons, with consistent patterns across all samples, indicating evolutionary conservation. Analyses of simple sequence repeats (SSRs) and long repeats also showed high similarity, reflecting the structural stability of the chloroplast genomes. Comparison of IR boundary regions indicated an overall conserved genome structure with only minor variations. Phylogenetic analyses based on ITS sequences and complete chloroplast genomes produced consistent results for the Bac Giang, Quang Nam, and Kon Tum samples, all of which clustered within the *Bidens alba* group. However, the An Giang sample showed incongruence between datasets: ITS data grouped it with *B. alba*, whereas chloroplast genome data suggested a closer relationship with *Bidens aurea*. This discrepancy may be attributed to complex evolutionary processes such as hybridization or chloroplast capture. Overall, this study provides valuable insights into the structural characteristics, conservation patterns, and phylogenetic relationships of the genus *Bidens* in Vietnam, serving as a foundation for future taxonomic and genetic resource conservation studies.

Keywords: *Bidens*; chloroplast genome; comparative genomics; phylogenetic analysis; DNA barcoding.

Poster presentation (PP-23)

Preliminary Observations on Herbal and Supplement Use Among Primary Care Patients in the UK.

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ABSTRACT

Herbal and natural supplements are becoming increasingly popular in the UK, yet usage patterns in primary care remain underreported. Understanding patient habits is important for safe clinical practice and for tailoring evidence-based advice. A snap-shot observational study was conducted in a London primary care setting. 100 randomly selected patients were asked about their current use of herbal or alternative supplements. They were also asked what condition they were taking the supplements for. The results concluded that approximately 20% of respondents reported recent use of herbal remedies. Of these nearly 85% were not recorded on the patient's formal medical record. Usage is most commonly related to chronic conditions such as osteoarthritis, diabetes, and general wellness. Many patients do not proactively disclose supplement use to their physicians and often physicians do not enquire about usage. These preliminary observations suggest widespread and often unmonitored use of natural products in UK primary care. Preliminary observations indicate that herbal and supplement use is common among primary care patients in the UK. Routine enquiry by physicians can enhance patient safety, identify potential interactions, and inform clinical decisions. Further systematic data collection is warranted to quantify these trends and guide evidence-based recommendations.

Keywords: *Herbal medicine, natural supplements, primary care, observational study, London, UK.*

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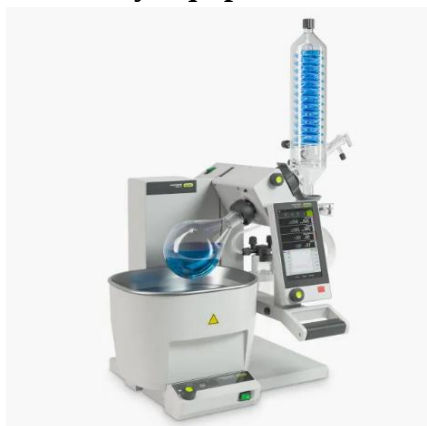
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