THE 5th INTERNATIONAL SYMPOSIUM ON MARINE & FISHERIES SCIENCE & TECHNOLOGY

MFST 2025

Held at Nha Trang University
From March 27-28, 2025

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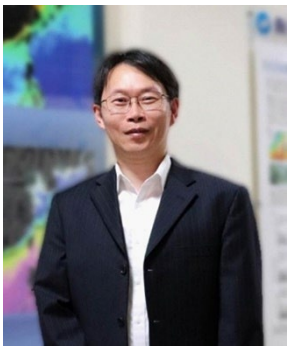
- Mr. **Tran Nhat Tan**, Department of Science and Technology, Nha Trang University

PLENARY KEYNOTE SPEAKERS



Prof. Ming-An Lee
Vice President, National Taiwan Ocean University

Stakeholder perspectives on climate change impacts: A comparative study of small-scale fisheries in india, papua new guinea, and Taiwan

Prof. Marco Abbiati
Science and Technology Counsellor, Embassy of Italy in Hanoi

Integrative approaches to monitor biodiversity changes for the conservation of urbanized areas along the south-central coast of Vietnam

Prof. Cheng-Yu Ku
Vice President, National Taiwan Ocean University

Sustainable groundwater management and mitigation of land subsidence in Taiwan

Prof. Trang Si Trung
Vice Chairman of University Council.
Professor at Faculty of Food Technology, Nha Trang University

Valorization of shrimp by-products from the seafood processing sector in Vietnam: Opportunities and challenges

MFST 2025 PROGRAM

NHA TRANG UNIVERSITY, 27-28 MARCH, 2025

MORNING, 27 March, 2025	
8h00 - 8h30	**Registration**
8h30 - 9h00	**Opening session** - Opening speech by Nha Trang University (***Prof. Pham Quoc Hung*** – *Vice Rector*) - Welcome speech by National Taiwan Ocean University (***Prof. Cheng Yu Ku*** – *Vice President*) - Congratulatory speech by Taipei Economic and Cultural Office in Ho Chi Minh City (***Mr. Hank Han*** – *Director General*) - Sponsor appreciation - Speech of the sponsor's representative (***Mr. Chen Ming Hsien*** - *Deputy General Director of Thang Long Biotechnology Co., Ltd*) - Symposium information from the PC Chairs - Group photos *Room: Hall No.1*
9h00 - 9h30	Keynote 1: ***STAKEHOLDER PERSPECTIVES ON CLIMATE CHANGE IMPACTS: A COMPARATIVE STUDY OF SMALL-SCALE FISHERIES IN INDIA, PAPUA NEW GUINEA, AND TAIWAN*** by **Prof. Ming-An Lee**, Vice President, National Taiwan Ocean University, Taiwan *Chair:* ***Prof. Trang Si Trung*** *Room: Hall No.1*
9h30 - 10h00	Keynote 2: ***INTEGRATIVE APPROACHES TO MONITOR BIODIVERSITY CHANGES FOR THE CONSERVATION OF URBANIZED AREAS ALONG THE SOUTH-CENTRAL COAST OF VIETNAM*** by **Prof. Marco Abbiati**, Science and Technology Counsellor, Embassy of Italy in Hanoi *Chair:* ***Prof. Cheng-Yu Ku*** *Room: Hall No.1*
10h00 - 10h30	**Coffee break, Poster session and Product exhibition**
10h30 - 11h00	Keynote 3: ***SUSTAINABLE GROUNDWATER MANAGEMENT AND MITIGATION OF LAND SUBSIDENCE IN TAIWAN*** by **Prof. Cheng-Yu Ku**, Vice President, National Taiwan Ocean University *Chair:* ***Prof. Marco Abbiati*** *Room: Hall No.1*
11h00 - 11h30	Keynote 4: ***VALORIZATION OF SHRIMP BY-PRODUCTS FROM THE SEAFOOD PROCESSING SECTOR IN VIETNAM: OPPORTUNITIES AND CHALLENGES*** by **Prof. Trang Si Trung**, Deputy Chairman of the University Council, Nha Trang University *Chair:* ***Prof. Ming-An Lee*** *Room: Hall No.1*
12h00-13h30	**Lunch**

AFTERNOON, 27 March, 2025

Time	Session
13h30 – 13h50	**Session 1-1: AQUACULTURE TECHNOLOGY** Chairs: **Prof. Vu Ngoc Ut (CTU), Prof. Nguyen Phu Hoa (NLU)** Secretary: **MSc. Mai Nhu Thuy** *Room: Hall No.1* POTENTIAL CONTRIBUTION OF SEAWEED FARMING TO ACHIEVING CARBON NEUTRALITY IN VIETNAM *Authors:* ***Le Anh Tuan***
	Session 1-2: AQUACULTURE TECHNOLOGY Chairs: **Prof. Nguyen Thanh Phuong (CTU), Prof. Yu-Wei Chang (NTOU)** Secretary: **MSc. Pham Thi Anh** *Room: P01 (G4 building)* SYNERGISTIC EFFECTS OF GARLIC (ALLIUM SATIVUM) SKIN AND GUAVA (PSIDIUM GUAJAVA) LEAF EXTRACTS ON GROWTH, FEED EFFICIENCY, MORPHOMETRY, MOLTING DYNAMICS AND HISTOLOGY IN WHITELEG SHRIMP (LITOPENAEUS VANNAMEI BOONE, 1931) *Authors:* ***Lee Van Cleff M. Labsan****, Rudy Liza B. Cadiong, Richelle Jane D. Cornites, Prince John Rudolf V. Badilla, and Jaynos R. Cortes*
	Session 2: MARINE ENVIRONMENT AND CLIMATE CHANGE ADAPTATION Chairs: **Prof. Tien-Hsi Fang, Prof. Dang Thuy Binh (NTU)** Secretary: **Dr. Nguyen Thi Hai Thanh** *Room: P02 (G4 building)* BUILDING RESILIENT COMMUNITIES: A PARTICIPATORY APPROACH TO FLOOD DISASTER PREPAREDNESS IN THAILAND *Authors:* ***Maitree Thronsao****, Kiattisak Chaiyaprom, Chollada Thronsao,Chattarin Sripol, Souksathaphone Chanthamath, Ranee Wongkongdech*
	Session 3: SUSTAINABLE FISHING AND CONSERVATION OF MARINE RESOURCES Chairs: **Prof. Ming-An Lee (NTOU), Prof. Le Kim Long (NTU)** Secretary: **MSc. Tran Nhat Tan** *Room: P03 (G4 building)* ANALYZING FISHING CAPACITY OF THE KHANH HOA'S OFF-SHORE HANDLINE FISHING VESSELS IN THE EAST SEA, VIET NAM *Authors:* ***Le Kim Long****, Binh, T. T. Pham*
	Session 4: SEAFOOD PROCESSING AND POST-HARVEST Chairs: **Prof. Pang-Hung Hsu (NTOU), Prof. Huynh Nguyen Duy Bao (NTU)** Secretary: **Dr. Bui Tran Nu Thanh Viet** *Room: P04 (G4 building)* FUCOIDAN AMELIORATES RADIATION-INDUCED SKIN FIBROSIS: A COMPREHENSIVE PROTEOMIC INSIGHTS INTO MOLECULAR RECOVERY MECHANISMS *Author:* ***Pang-Hung Hsu***
	Session 5: MARINE INFRASTRUCTURE, TRANSPORTATION, AND SMART AQUACULTURE Chairs: **: Prof. Shyi-Chyi Cheng (NTOU), Dr. Huynh Van Vu (NTU)** Secretary: **Dr. Mai Nguyen Tran Thanh** *Room: P05 (G4 building)* VISION SYSTEM FOR STRUCTURAL MODAL ANALYSIS USING CONSUMER CAMERA *Authors:* ***Truong Thanh Chung****, Bui Huu Nhan, Trinh Minh Quan, Pham Hoang Nhat Minh, Nguyen Truong Xuan, Le Huu Chien*
	Session 6: GREEN MARINE ECONOMY AND TOURISM Chairs: **Dr. Vuong Vinh Hiep (LONG SINH CO., LTD), Prof. Le Chi Cong (NTU)** Secretary: **MSc. Luong Ngoc Ha Trang** *Room: 104 (G5 building)* OFFSHORE WIND POWER IN TAIWAN: UNIQUE OR UNIVERSAL IMPACTS AND CHALLENGES? *Authors:* ***Po-Hsing Tseng****, Nick Pilcher*

13h50 – 14h10	**Session 1-1: AQUACULTURE TECHNOLOGY** Chairs: **Prof. Vu Ngoc Ut (CTU), Prof. Nguyen Phu Hoa (NLU)** Secretary: **MSc. Mai Nhu Thuy** *Room: Hall No.1* STUDY ON IMPROVING AQUATIC PLANT GROWTH EFFICIENCY USING SPECIFIC LED SPECTRUMS COMBINED WITH MICROSTRUCTURE ARRAY LENSES *Author:* ***Nguyen Xuan Huy***
	Session 1-2: AQUACULTURE TECHNOLOGY Chairs: **Prof. Nguyen Thanh Phuong (CTU), Prof. Yu-Wei Chang (NTOU)** Secretary: **MSc. Pham Thi Anh** *Room: P01 (G4 building)* BEHAVIORAL SHIFTS AND THE SEROTONIN BLUEPRINT IN ALL-MALE GIANT FRESHWATER PRAWN (MACROBRACHIUM ROSENBERGII): IMPLICATIONS FOR CULTURE PRACTICES *Author:* ***Jaynos R. CortesF***
	Session 2: MARINE ENVIRONMENT AND CLIMATE CHANGE ADAPTATION Chairs: **Prof. Tien-Hsi Fang, Prof. Dang Thuy Binh (NTU)** Secretary: **Dr. Nguyen Thi Hai Thanh** *Room: P02 (G4 building)* IMPACT OF CLIMATE CHANGE ON THE BLUE SHARK CAUGHT BY THE TAIWANESE LARGE-SCALE LONGLINE FISHERY THE NORTH PACIFIC *Authors:* ***Kwang-Ming Liu****, Kuan-Yu Su*
	Session 3: SUSTAINABLE FISHING AND CONSERVATION OF MARINE RESOURCES Chairs: **Prof. Ming-An Lee (NTOU), Prof. Le Kim Long (NTU)** Secretary: **MSc. Tran Nhat Tan** *Room: P03 (G4 building)* EXPLORING THE LABOR SHORTAGE IN VIETNAM'S CAPTURE FISHERIES: CAUSES, IMPACTS, AND POTENTIAL SOLUTIONS *Authors:* ***To Van Phuong****, Robert S. Pomeroy*
	Session 4: SEAFOOD PROCESSING AND POST-HARVEST Chairs: **Prof. Pang-Hung Hsu (NTOU), Prof. Huynh Nguyen Duy Bao (NTU)** Secretary: **Dr. Bui Tran Nu Thanh Viet** *Room: P04 (G4 building)* EFFECTS OF DRYING METHODS ON BIOACTIVE COMPOUNDS, ANTIOXIDANT CAPACITY, AND NATURAL FOOD COLORING IN PITAYA (HYLOCEREUS POLYRHIZUS) PEELS *Authors: Chih-Yu Chan,* ***Shao-Fu Tsou****, Anastacio Iii Cagabhion, Yu-Wei Chang*
	Session 5: MARINE INFRASTRUCTURE, TRANSPORTATION, AND SMART AQUACULTURE Chairs: **Prof. Shyi-Chyi Cheng (NTOU), Dr. Huynh Van Vu (NTU)** Secretary: **Dr. Mai Nguyen Tran Thanh** *Room: P05 (G4 building)* ONTOLOGY-BASED DECISION SUPPORT SYSTEM FOR ENHANCING AQUACULTURE MANAGEMENT *Authors:* ***Pham Thi Thu Thuy****, Kim Hwa Soo*
	Session 6: GREEN MARINE ECONOMY AND TOURISM Chairs: **Dr. Vuong Vinh Hiep (LONG SINH CO., LTD), Prof. Le Chi Cong (NTU)** Secretary: **MSc. Luong Ngoc Ha Trang** *Room: 104 (G5 building)* FACTORS INFLUENCING ACCOMMODATION SELECTION OF GENERATION Z DOMESTIC TOURISTS TRAVELING TO NHA TRANG: INSIGHTS FOR SUSTAINABLE MARINE TOURISM DEVELOPMENT *Author:* ***Quang N. Thanh***

14h10 – 14h30	**Session 1-1: AQUACULTURE TECHNOLOGY** Chairs: **Prof. Vu Ngoc Ut (CTU), Prof. Nguyen Phu Hoa (NLU)** Secretary: **MSc. Mai Nhu Thuy** *Room: Hall No.1* ISOLATION AND IDENTIFICATION OF AMMONIA-OXIDIZING BACTERIA FROM THE BOTTOM OF LOBSTER FARMING AREA, XUAN DAI BAY, PHU YEN PROVINCE *Authors: Truong Phuoc Thien Hoang, Vo Tran Quoc Thang, Pham Cong Hoat,* ***Nguyen Phu Hoa***
	Session 1-2: AQUACULTURE TECHNOLOGY Chairs: **Prof. Nguyen Thanh Phuong (CTU), Prof. Yu-Wei Chang (NTOU)** Secretary: **MSc. Pham Thi Anh** *Room: P01 (G4 building)* ABILITY TO CONVERT NUTRIENTS FROM THE WASTEWATER OF SHRIMP FARMING INTO ARTERMIA BIOMASS: EFFECTS OF DENSITY AND MICROALGAE ON ARRTEMIA BIOMASS *Authors:* ***Huy D. Nguyen****, Dung V. Tran, Giang TT Nguyen, Hong TB. Truong, Sy T. Nguyen, Thong V. Le*
	Session 2: MARINE ENVIRONMENT AND CLIMATE CHANGE ADAPTATION Chairs: **Prof. Tien-Hsi Fang, Prof. Dang Thuy Binh (NTU)** Secretary: **Dr. Nguyen Thi Hai Thanh** *Room: P02 (G4 building)* AQUACULTURE WASTEWATER TREATMENT TECHNOLOGIES: AN APPROACH TO CLIMATE CHANGE ADAPTATION *Authors:* ***Phuong Linh Ngo****, Thanh Son Nguyen*
	Session 3: SUSTAINABLE FISHING AND CONSERVATION OF MARINE RESOURCES Chairs: **Prof. Ming-An Lee (NTOU), Prof. Le Kim Long (NTU)** Secretary: **MSc. Tran Nhat Tan** *Room: P03 (G4 building)* SIMULTANEOUS AND SEQUENTIAL RECOVERY OF HYDROXYAPATITE, CHITOSAN AND PROTEIN HYDROLYSATE FROM BLUE CRAB SHELLS (PORTUNUS PELAGICUS) *Authors:* ***Quyen T.H. Tran****, Tang V. Nguyen, Thuong T.N. Nguyen, Hau T. Nguyen, Thanh T. Dang, Thinh V. Phan*
	Session 4: SEAFOOD PROCESSING AND POST-HARVEST Chairs: **Prof. Pang-Hung Hsu (NTOU), Prof. Huynh Nguyen Duy Bao (NTU)** Secretary: **Dr. Bui Tran Nu Thanh Viet** *Room: P04 (G4 building)* DOSE-DEPENDENT EFFICACY OF ERGOTHIONEINE-LOADED CHITOSAN NANOPARTICLES ON LIPID OXIDATION AND DISCOLORATION OF YELLOWFIN TUNA MUSCLE DURING REFRIGERATED STORAGE *Authors:* ***Huynh Nguyen Duy Bao****, Nguyen Trong Bach, Nguyen Hong Ngan, Do Trong Son, Pham Thi Hien, Ngo Thi Hoai Duong, Trang Si Trung*
	Session 5: MARINE INFRASTRUCTURE, TRANSPORTATION, AND SMART AQUACULTURE Chairs: **Prof. Shyi-Chyi Cheng (NTOU), Dr. Huynh Van Vu (NTU)** Secretary: **Dr. Mai Nguyen Tran Thanh** *Room: P05 (G4 building)* DATA-DRIVEN COLD DAMAGE PREDICTION FOR FISH MORTALITY PREVENTION USING WEATHER OBSERVATION OPEN DATA *Authors: Hsun-Yu Lan,* ***Guan-Ting Lin****, Shyi-Chyi Cheng, Cheng-Ting Huang*
	Session 6: GREEN MARINE ECONOMY AND TOURISM Chairs: **Dr. Vuong Vinh Hiep (LONG SINH CO., LTD), Prof. Le Chi Cong (NTU)** Secretary: **MSc. Luong Ngoc Ha Trang** *Room: 104 (G5 building)* THE ROLE OF THE CHAM COMMUNITY IN DEVELOPING GREEN TOURISM IN NINH THUAN *Authors:* ***Khang Nguyen Hoang Thai****, Ngan Ha Thi Thu, Nga Dinh Thi*

14h30 – 14h50	**Session 1-1: AQUACULTURE TECHNOLOGY** Chairs: **Prof. Vu Ngoc Ut (CTU), Prof. Nguyen Phu Hoa (NLU)** Secretary: **MSc. Mai Nhu Thuy** *Room: Hall No.1* INVESTIGATING ULVA LACTUCA HYDROLYSATE AND SACCHAROMYCES CEREVISIAE AS SUSTAINABLE SOLUTIONS IN PACIFIC OYSTER DEPURATION *Authors:* ***Hai T.M. Pham****, Hai T.T Nguyen, Uyen N. Le*
	Session 1-2: AQUACULTURE TECHNOLOGY Chairs: **Prof. Nguyen Thanh Phuong (CTU), Prof. Yu-Wei Chang (NTOU)** Secretary: **MSc. Pham Thi Anh** *Room: P01 (G4 building)* EFFECT OF DENSITY AND PELLET FOOD ON GROWTH, SURVIVAL RATE, SHOCK RESISTANCE ON GIANT TREVALLY Caranx ignobilis, Forsska l 1775 *Authors:* ***Anh T. Pham****, Manh V. Ngo, Hung D. Pham, Thanh T. Hoang, Linh P. Pham*
	Session 2: MARINE ENVIRONMENT AND CLIMATE CHANGE ADAPTATION Chairs: **Prof. Tien-Hsi Fang, Prof. Dang Thuy Binh (NTU)** Secretary: **Dr. Nguyen Thi Hai Thanh** *Room: P02 (G4 building)* RIVERBANK EROSION UNDER THE IMPACT OF CLIMATE CHANGE IN THE MEKONG DELTA *Authors:* ***Yu-Jia Chiu****, An-Thai Nguyen, Ty-Van Tran*
	Session 3: SUSTAINABLE FISHING AND CONSERVATION OF MARINE RESOURCES Chairs: **Prof. Ming-An Lee (NTOU), Prof. Le Kim Long (NTU)** Secretary: **MSc. Tran Nhat Tan** *Room: P03 (G4 building)* ESTIMATING THE STANDING BIOMASS OF DEMERSAL FISH IN NINH THUAN WATERS BY SWEPT AREA METHOD *Author:* ***Nguyen Lam Anh***
	Session 4: SEAFOOD PROCESSING AND POST-HARVEST Chairs: **Prof. Pang-Hung Hsu (NTOU), Prof. Huynh Nguyen Duy Bao (NTU)** Secretary: **Dr. Bui Tran Nu Thanh Viet** *Room: P04 (G4 building)* QUALITY CHANGES IN POMPANO (TRACHINOTUS BLOCHII) FILLETS STORED UNDER SUPERCHILLING CONDITIONS AT -2 ± 0.2 °C *Authors:* ***Huynh Thi Ai Van****, Mai Thi Tuyet Nga*
	Session 5: MARINE INFRASTRUCTURE, TRANSPORTATION, AND SMART AQUACULTURE Chairs: **Prof. Shyi-Chyi Cheng (NTOU), Dr. Huynh Van Vu (NTU)** Secretary: **Dr. Mai Nguyen Tran Thanh** *Room: P05 (G4 building)* OPTIMAL SITE SELECTION FOR CLAM MERETRIX LYRATA (SOWERBY, 1851) FARMING TO MINIMIZING ENVIRONMENTAL IMPACTS USING FUZZY OVERLAY ANALYSIS *Authors: Nguyen Phuc Thuong, Nguyen Huynh Truong Gia, Vu Van Quang, Tran Thi Kim Nhung,* ***Nguyen Phu Hoa***
	Session 6: GREEN MARINE ECONOMY AND TOURISM Chairs: **Dr. Vuong Vinh Hiep (LONG SINH CO., LTD), Prof. Le Chi Cong (NTU)** Secretary: **MSc. Luong Ngoc Ha Trang** *Room: 104 (G5 building)* THE RELATIONSHIP BETWEEN PERCEIVED ENVIRONMENT IMPACTS AND COMMUNITY SUPPORT FOR SUSTAINABLE TOURISM DEVELOPMENT *Author:* ***Doan Nguyen Khanh Tran***

14h50 – 15h10	**Session 1-1: AQUACULTURE TECHNOLOGY** Chairs: **Prof. Vu Ngoc Ut (CTU), Prof. Nguyen Phu Hoa (NLU)** Secretary: **MSc. Mai Nhu Thuy** *Room: Hall No.1* EFFECTS OF MORINGA OLEIFERA EXTRACT SUPPLEMENTED FEED ON THE GROWTH PERFORMANCE AND STRESS RESISTANCE IN STRIPED CATFISH (PANGASIANODON HYPOPHTHALMUS) *Author: Sach T. Lam, **Thy T.T.Ho**, Nhi Y.T.T.Truong, Quy T. Nguyen, Quy M. Ong*
	Session 1-2: AQUACULTURE TECHNOLOGY Chairs: **Prof. Nguyen Thanh Phuong (CTU), Prof. Yu-Wei Chang (NTOU)** Secretary: **MSc. Pham Thi Anh** *Room: P01 (G4 building)* MULTI-STRAIN PROBIOTICS FROM HEALTHY FISH INTESTINE ENHANCE THE GROWTH AND IMMUNITY OF WHITE SHRIMPS (LITOPENAEUS VANNAMEI) TO RESIST THE INFECTION OF VIBRIO PARAHAEMOLYTICUS *Authors: **Germain Maurus**, Joan Tang Xiao Joe, Shih-Chao Lin, Ming-Wei Lu*
	Session 2: MARINE ENVIRONMENT AND CLIMATE CHANGE ADAPTATION Chairs: **Prof. Tien-Hsi Fang, Prof. Dang Thuy Binh (NTU)** Secretary: **Dr. Nguyen Thi Hai Thanh** *Room: P02 (G4 building)* NUTRIENTS POLLUTION, DISTRIBUTION AND PARTITIONING IN THE DANSHUEI RIVER ESTUARY, NORTHERN TAIWAN *Author: **Tien Hsi Fang***
	Session 3: SUSTAINABLE FISHING AND CONSERVATION OF MARINE RESOURCES Chairs: **Prof. Ming-An Lee (NTOU), Prof. Le Kim Long (NTU)** Secretary: **MSc. Tran Nhat Tan** *Room: P03 (G4 building)* AUTOMATED FISH DETECTION USING ARTIFICIAL INTELLIGENCE: ADVANCEMENTS AND APPLICATIONS *Author: **Nguyen Khac Cuong***
	Session 4: SEAFOOD PROCESSING AND POST-HARVEST Chairs: **Prof. Pang-Hung Hsu (NTOU), Prof. Huynh Nguyen Duy Bao (NTU)** Secretary: **Dr. Bui Tran Nu Thanh Viet** *Room: P04 (G4 building)* EXAMINE THE QUALITY CHANGES IN PEELED WHITE-LEG SHRIMP (Litopenaeus vannamei) COATED WITH AN EDIBLE ALGINATE/$CaCl_2$ FILM UNDER REFRIGERATED STORAGE CONDITIONS (4±1°C) *Authors: **Thuy T. B. Tran**, Phuong H. Le*
	Session 5: MARINE INFRASTRUCTURE, TRANSPORTATION, AND SMART AQUACULTURE Chairs: **Prof. Shyi-Chyi Cheng (NTOU), Dr. Huynh Van Vu (NTU)** Secretary: **Dr. Mai Nguyen Tran Thanh** *Room: P05 (G4 building)* SELECTING THE KIND OF FISH CAGES BY COMPOSITE MATERIAL IN THE COASTAL AQUACULTURE *Authors: **Van Vu Huynh**, Hong-Thai H. Le*
	Session 6: GREEN MARINE ECONOMY AND TOURISM Chairs: **Dr. Vuong Vinh Hiep (LONG SINH CO., LTD), Prof. Le Chi Cong (NTU)** Secretary: **MSc. Luong Ngoc Ha Trang** *Room: 104 (G5 building)* ENERGY SAVING POLICIES IN ACCOMMODATION BUSINESSES – A CASE STUDY IN NHA TRANG CITY *Author: **Nguyen Ngoc Thao***

15h10 – 15h30	Coffee break, Poster session and Product exhibition
15h30 – 15h50	**Session 1-1: AQUACULTURE TECHNOLOGY** Chairs: **Prof. Do Thi Thanh Huong (CTU), Prof. Pham Duc Hung (NTU)** Secretary: **MSc. Mai Nhu Thuy** *Room: Hall No.1* SEAWEED CULTIVATION IN ASIA-PACIFIC AREAS: AN INTEGRATED RESOLUTION FOR THE GLOBAL FOOD SHORTAGE AND CLIMATE CHANGE MITIGATION *Authors: **Ngo Dang Nghia**, Pham Thi Minh Thu, Ngo Thi Hoai Duong*
	Session 1-2: AQUACULTURE TECHNOLOGY Chairs: **Prof. Nguyen Thanh Phuong (CTU), Prof. Yu-Wei Chang (NTOU)** Secretary: **MSc. Pham Thi Anh** *Room: P01 (G4 building)* DETERMINATION LIPID REQUIREMENT OF SWAMP EEL (MONOPTERUS ALBUS) 20 G INITITAL WEIGHT *Authors: **Lan M. Lam**, Hien T. T. Tran, Viet Q.C. Phan, Yutaka Haga and Tu L. C. Tran*
	Session 2: MARINE ENVIRONMENT AND CLIMATE CHANGE ADAPTATION Chairs: **Prof. Tien-Hsi Fang, Prof. Dang Thuy Binh (NTU)** Secretary: **Dr. Nguyen Thi Hai Thanh** *Room: P02 (G4 building)* GENETIC DIVERSITY OF SYMBIODINIACEAE IN CORAL REEFS ACROSS FIVE MARINE REGIONS IN CENTRAL VIETNAM *Authors: **Thu Thi Anh Nguyen**, Cam Hong Van, Nguyen Thi Nguyet Hue, Cuong Thanh Le*
	Session 3: SUSTAINABLE FISHING AND CONSERVATION OF MARINE RESOURCES Chairs: **Prof. Ming-An Lee (NTOU), Prof. Le Kim Long (NTU)** Secretary: **MSc. Tran Nhat Tan** *Room: P03 (G4 building)* OPTIMIZING ENVIRONMENTAL DNA (eDNA) COLLECTION AND EXTRACTION FOR METABARCODING: INSIGHTS INTO REEF FISH DIVERSITY IN NINH THUAN PROVINCE *Authors: **Cam H. Van**, Sang Q. Tran, Oanh T. Truong, Long V. Nguyen, Binh T. Dang*
	Session 4: SEAFOOD PROCESSING AND POST-HARVEST Chairs: **Prof. Pang-Hung Hsu (NTOU), Prof. Nguyen Van Minh (NTU)** Secretary: **Dr. Bui Tran Nu Thanh Viet** *Room: P04 (G4 building)* CROCODILE BONE AS A POTENTIAL MATERIAL FOR BIOACTIVE CALCIUM PRODUCTION AND ITS APPLICATION *Authors: **Duy X. Nguyen**, Hanh T.M. Tran, Dat V. Pham*
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	Session 1-2: AQUACULTURE TECHNOLOGY Chairs: **Prof. Nguyen Thanh Phuong (CTU), Prof. Yu-Wei Chang (NTOU)** Secretary: **MSc. Pham Thi Anh** *Room: P01 (G4 building)* INFLUENCE OF FUCOIDAN ON ANTIBACTERIAL ACTIVITY AND NITRO BLUE TETRAZOLIUM PRODUCTION IN GOLDEN POMPANO (TRACHINOTUS OVATUS) MACROPHAGES *Authors:* ***Thu Thi Anh Nguyen****, Cuong Thanh Le, Cam Hong Van, Sang Van Vu*
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	Session 4: SEAFOOD PROCESSING AND POST-HARVEST Chairs: **Prof. Pang-Hung Hsu (NTOU), Prof. Nguyen Van Minh (NTU)** Secretary: **Dr. Bui Tran Nu Thanh Viet** *Room: P04 (G4 building)* SYNERESIS PROPERTIES OF MIXED GELS OF IOTA- AND KAPPA- CARRAGEENAN IN PRESENCE OF IONS *Author:* ***Bui Tran Nu Thanh Viet***

16h30 – 16h50	**Session 3: SUSTAINABLE FISHING AND CONSERVATION OF MARINE RESOURCES** Chairs: **Prof. Ming-An Lee (NTOU), Prof. Le Kim Long (NTU)** Secretary: **MSc. Tran Nhat Tan** *Room: P03 (G4 building)* ASSESSMENT OF CLAM CATCHING STATUS IN COASTAL AREAS OF CU LAO DUNG DISTRICT, SOC TRANG PROVINCE *Authors: Vu Cam Luong, Nguyen Van Trai, Nguyen Phuc Thuong,* ***Nguyen Phu Hoa***
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OPENING SESSION

Keynote 1

STAKEHOLDER PERSPECTIVES ON CLIMATE CHANGE IMPACTS: A COMPARATIVE STUDY OF SMALL-SCALE FISHERIES IN INDIA, PAPUA NEW GUINEA, AND TAIWAN

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ABSTRACT

Small-scale fisheries (SSF) play a pivotal role in sustaining livelihoods, fostering economic development, and supporting global food systems in emerging economies. However, these communities face mounting challenges due to climate change, which disrupts coastal ecosystems and exacerbates the vulnerabilities of fisherfolk. This study undertakes a comparative assessment of the impacts of climate change on SSFs in India, Papua New Guinea (PNG), and Taiwan, focusing on stakeholder perceptions and adaptive responses. Participatory engagements with 230, 209, and 120 fisherfolk in India, PNG, and Taiwan, respectively, revealed common vulnerabilities and socio-ecological challenges. Fisherfolk identity, often tied to traditional fishing practices, is under threat due to declining fish stocks, aging populations, and inadequate adoption of modern preservation techniques. Semi-literate fisherfolk, particularly in PNG, remain reliant on century-old methods, limiting their capacity to adapt to changing environmental and socio-economic conditions. Taiwan's coastal communities are particularly susceptible to climate-induced risks, including intensifying typhoons, coastal erosion, and habitat shifts, which have significantly impacted fisheries and local livelihoods. Over the last three decades, Taiwan has experienced 3–4 severe cyclones annually, exacerbating vulnerabilities. In India, noticeable ecosystem degradation and unsustainable fishing practices highlight the urgent need for integrated coastal management strategies. Globally, addressing climate change impacts on SSFs requires location-specific, systematic interventions that blend socio-ecological resilience with sustainable development principles. This research underscores the importance of engaging vulnerable fisherfolk in sustainability planning and highlights the shared challenges and unique regional responses among SSFs in the tropics. Establishing adaptive, community-centric management frameworks is imperative to safeguarding these ecosystems and their dependent communities.

Keywords: Small-scale fisheries (SSF), Climate change impacts, Stakeholder perspectives, Sustainable fisheries management, India-Papua New Guinea-Taiwan,

Keynote 2

INTEGRATIVE APPROACHES TO MONITOR BIODIVERSITY CHANGES FOR THE CONSERVATION OF URBANIZED AREAS ALONG THE SOUTH-CENTRAL COAST OF VIETNAM

Marco Abbiati[1,2], Massimo Ponti[3], Nguyen H. Huan[4], Phan M. Thu[4], Eva Turicchia[3], Barbara Mikac[2], Marina A. Colangelo[3], Alessandro Piazza[3], Tran T. Thu[5], Barbara Lainz[3], Sofia Ghione[3], Federica Costantini[3,*]

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ABSTRACT

Coral reefs of Vietnam host high biodiversity and hold significant ecological and economic value (e.g., fisheries, tourism) for the country. However, in recent years, increasing anthropogenic and climate pressures have caused drastic degradation of these habitats. Reliable monitoring protocols and programs are essential for their conservation and protections. To be truly effective, these protocols must incorporate innovative approaches that complement traditional monitoring methods. Advanced techniques such as video recording, photogrammetry, and remote sensing enable the rapid three-dimensional digital reconstruction of coral reefs. Additionally, environmental DNA metabarcoding offers a promising, non-invasive, and fast method for monitoring marine communities. As part of the 8th Executive Program for Scientific and Technological Cooperation between Vietnam and Italy, the University of Bologna (UNIBO) and the Vietnam Institute of Oceanography (IO) are carying on the VIBRANT project (https://site.unibo.it/vibrant/en) which aim is to integrate well-established monitoring approaches with innovative techniques, including imagery and molecular analysis, to assess the health of coral reef' along the South-Central coast of Vietnam. An integrative sampling and data analysis protocol for the shallow coral reefs of Nha Trang Bay and Nui Chua Park, which encompass areas with different levels of protection and anthropogenic pressures (e.g., urbanization and tourism) has to be developed. We expect to obtain an assessment of the coral reefs' health, structure, and associated communities across the different site conditions, such as urbanized areas/MPA, weather, currents, and depths. The collaboration between Italian and Vietnamese researchers will provide valuable long-term data to track changes in these fragile ecosystems. The findings will allow the development and implementation of effective habitat conservation policies and conservation and restoration programs for the coral reefs of the South-Central Vietnam.

Keywords: *Coral reef monitoring, Vietnam coast, Conservation, eDNA metabarcoding, 3D mapping.*

Keynote 3

SUSTAINABLE GROUNDWATER MANAGEMENT AND MITIGATION OF LAND SUBSIDENCE IN TAIWAN

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ABSTRACT

Land subsidence from excessive groundwater extraction has been reported worldwide. In the 1970s, subsidence in Taiwan's Choshui Delta caused infrastructure damage and other issues. Mitigating subsidence is crucial for preventing coastal hazards and ensuring sustainable water resource development. The most severely affected area by land subsidence in Taiwan, with the highest recorded annual subsidence rate reaching 6.2 cm in 2023. The inland areas of Yunlin County exhibit significant subsidence where the shallow soil layer (60 meters) accounts for 42% of the total subsidence of the entire soil profile (300 meters). This study implemented a cyclic pumping and reduction experiment at the study area and conducted three-dimensional groundwater numerical simulations to verify and predict various scenarios, aiming to assess the impact of cyclic pumping and reduction on land subsidence. The results indicate a significant positive correlation between surface water extraction and groundwater level changes, as well as between groundwater level fluctuations and land subsidence rates. The in-situ sandbox experiment further revealed a correlation coefficient of 0.90 between groundwater levels and soil compression. Additionally, both cyclic pumping and reduction strategies demonstrated effectiveness in reducing groundwater drawdown compared to the current pumping conditions. This study provides a quantitative assessment of the impacts of cyclic pumping and reduction on groundwater levels and land subsidence, offering valuable insights for the development of land subsidence mitigation strategies.

Keywords: *Groundwater, Land subsidence, Sustainable, Water resource, Pumping.*

Keynote 3

VALORIZATION OF SHRIMP BY-PRODUCTS FROM THE SEAFOOD PROCESSING SECTOR IN VIETNAM: OPPORTUNITIES AND CHALLENGES

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ABSTRACT

The seafood processing sector in Vietnam generates a substantial amount of shrimp by-products, accounting for up to 45 wt.% of the total raw material, including shrimp shells and heads. Annually, this sector produces approximately 500,000 metric tons of shrimp by-products that are rich in valuable compounds such as protein, chitin, lipids, minerals, and a small amount of carotenoids, primarily astaxanthin. This review explores the valorization potential of shrimp by-products within the framework of a circular economy, focusing on their chemical composition, recovery processes, and the production of high-value-added products. It discusses innovative strategies for optimizing the utilization of shrimp by-products and examines the opportunities and challenges associated with enhancing their efficiency in the aquaculture industry, thereby closing the resource loop. This study highlights the role of shrimp by-product valorization in fostering sustainable development, minimizing waste, and enhancing economic value in Vietnam's seafood sector.

Keywords: *Shrimp by-products, Circular economy, Valorization, Sustainable development*

ORAL SESSION

Sec.1-Oral-01

ASSESSING MECHANIZATION LEVELS IN SHRIMP AND FISH FARMING IN THE MEKONG DELTA: A SURVEY-BASED APPROACH

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ABSTRACT

This study investigates the current state of mechanization in aquaculture practices across the Mekong Delta region of Vietnam. Focusing on shrimp and fish farming in Soc Trang, Ca Mau, and Bac Lieu provinces, we conducted in-person interviews with approximately 250 farmers. This survey gathered detailed information on the types of machinery and equipment utilized across various stages of the aquaculture production cycle, including pond preparation: mechanized tilling, aeration systems, and water quality monitoring; stocking and feeding: automated feeders, grading systems, and fish/shrimp counters; harvesting and processing: mechanical harvesters, transport systems, and processing equipment, and adopting wastewater treatment practices: sedimentation ponds, filtration systems, and bioremediation techniques.

The potential results of this research provide valuable insight into the current levels of mechanization adoption, identifying recent trends and pros and cons across different farming systems and scales. This research contributes to a better understanding the factors influencing machinery selection, including farming resources, technology availability, and socioeconomic aspects. The findings will support the strategies to enhance appropriate mechanization processes that can help farmers gain better productivity, improve efficiency, and contribute to the sustainable development of aquaculture in the Mekong Delta.

Keywords: *Mekong Delta, Aquaculture, Mechanization Level, Shrimp Farming, Fish Farming.*

Sec.1-Oral-02

EFFECTS OF *Moringa oleifera* EXTRACT SUPPLEMENTED FEED ON THE GROWTH PERFORMANCE AND STRESS RESISTANCE IN STRIPED CATFISH (*Pangasianodon hypophthalmus*)

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ABSTRACT

The study aimed to evaluate the effects of Moringa leaf extract (MLE) on the growth performance and stress resistance in striped catfish after 4 weeks of trial. The experiment was conducted with four treatments at varying concentration of MLE in feed: T1 (0%), T2 (10%), T3 (15%), and T4 (20%). The experiment was designed randomly with three replicates in each group. Survival rate was observed in stress challenge and analyzed parameters included cortisol and hematological indicators (red blood cell count-RBCs, white blood cell count-WBCs, % hematocrit, and differentiate white blood cell counts-DWBCs) at the 3 and 48h of stress trial. Results showed that T3 (15%) achieved the highest growth rate (49.77 g/fish), although no statistically significant differences were observed compared to other treatments ($p>0.05$). The lowest feed conversion ratio (FCR) was also recorded in T3 (FCR = 1.16), which was significantly different from the control group ($p < 0.05$). In stress challenge with ammonia (1 ppm unionized ammonia) for 48 hours, T3 (15%) exhibited the highest survival rate (68.33%) compared to the control group (50%), with a statistically significant difference ($p < 0.05$). In blood characteristic parameters, T3 showed significantly higher in RBCs (409 ×106 cells/mm³), WBCs (54.33×106 cells/mm³), lymphocyte counts (51,47 cells/mm^3) compared to other treatments at the 3h of stress challenge ($p < 0.05$). Meanwhile, non-significant alterations in those parameters in four experimental groups at the 48h of challenge. Additionally, stress resistance indices showed higher improvement in T3, with the higher cortisol level (235.33 mg/L) significantly compared to other treatments and rapidly return to normal state with the lowest cortisol (47 mg/L) at the 48h of stress period, significant differences to other treatment ($p < 0.05$). In conclusion, supplementing 15% of MLE in feed positively enhances growth performance, blood indices, and stress resistance in striped catfish.

Keywords: *Striped catfish, Growth performance, Stress resistance, Moringa oleifera.*

Sec.1-Oral-03

INFLUENCE OF FUCOIDAN ON ANTIBACTERIAL ACTIVITY AND NITRO BLUE TETRAZOLIUM PRODUCTION IN GOLDEN POMPANO (*Trachinotus ovatus*) MACROPHAGES

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ABSTRACT

Fucoidan, a sulfated polysaccharide from brown seaweed, exhibits antibacterial, antioxidant, and immunomodulatory properties. It enhances immune responses by promoting dose-dependent Nitro Blue Tetrazolium (NBT) production in macrophages and demonstrates potent antibacterial activity, particularly against Gram-positive bacteria including *Streptococcus iniae*. Fucoidan also stimulates macrophage activation, enhances natural killer (NK) cell activity, and regulates cytokine production, outperforming other polysaccharides like β-glucans in NBT production. In aquaculture, dietary supplementation with fucoidan has been shown to improve growth performance, antioxidant capacity, and disease resistance in species such as *Litopenaeus vannamei* and *Paralichthys olivaceus*, highlighting its potential applications in both healthcare and aquaculture. This tudy investigates the effects of fucoidan on bacterial growth and NBT production in *Trachinotus ovatus* macrophages. Fucoidan concentrations (0–800 µg/mL) influenced the optical density (OD_{600nm}) of five bacterial species, with trends varying across species. *Streptococcus iniae* and *Vibrio anguillarum* showed steady growth stimulation, while *V. harveyi* and *V. alginolyticus* exhibited significant increases at specific concentrations (100 µg/mL and 400 µg/mL, respectively). In contrast, *showed an initial decrease in growth, followed by recovery at higher concentrations.* Fucoidan also stimulated NBT production in fish macrophages, with significant increases at 50 µg/mL. The response plateaued at 400 µg/mL and 800 µg/mL, indicating a saturation effect. These enhanced oxidative responses suggest that fucoidan acts as an effective immunostimulatory agent, enhancing the fish's innate immune defenses and improving resistance to pathogens. Overall, these findings suggest fucoidan's potential as a natural therapeutic agent for boosting immune health and combating bacterial infections across diverse biological systems.

Sec.1-Oral-04

INVESTIGATING *ULVA LACTUCA* HYDROLYSATE AND *SACCHAROMYCES CEREVISIAE* AS SUSTAINABLE SOLUTIONS IN PACIFIC OYSTER DEPURATION

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ABSTRACT

The depuration phase is critical in the maintenance of Pacific oysters (*Crassostrea gigas*), facilitating the removal of contaminants to enhance product safety and quality. The high cost and variable efficacy of commercial algae-based and probiotic feeds necessitate the development of sustainable and cost-efficient alternatives. This study investigates the potential of *Ulva lactuca* hydrolysate and its synbiotic combination with *Saccharomyces cerevisiae* biomass as innovative depuration feed solutions. Three experimental formulations were evaluated: *S. cerevisiae* biomass (S1), *S. cerevisiae* combined with *U. lactuca* hydrolysate (S2), and *U. lactuca* hydrolysate alone (S3). These were compared with commercial algae-based feeds (Chaetoceros, A1; Spirulina, A2), probiotic products (P1, multi-strain; P2, single-strain), and an unfed control group during a 72-hour trial. Key performance indicators included survival rate, weight loss, gut ratio, total aerobic microbial count, and sensory attributes.

Among the tested feeds, S2 demonstrated superior survival rates (93.43±1.12%), significantly outperforming other groups ($p<0.05$). Sensory evaluation of S2 (19±1%) was comparable to Spirulina (A2; 20.2±1.89%) ($p<0.05$), with both achieving high acceptability. Although total aerobic microbial counts in S2 (3.2±0.1 cfu/g) ranked slightly below P1, they remained within acceptable thresholds. Weight loss rates for the experimental feeds (S1, S2, S3) were higher than those observed in commercial feeds (A1, A2) and probiotic products (P1, P2), yet significantly lower than the unfed control group ($p<0.05$). The gut ratio for S2 (20%) exceeded that of algae-based feeds (A1, A2) but was lower than P2 (28.3±2.1%) ($p<0.05$).

These results underscore the potential of *U. lactuca* hydrolysate, particularly in combination with *S. cerevisiae*, as a sustainable and effective depuration feed. Its economic and environmental benefits position it as a viable alternative to conventional feeds, promoting sustainable practices in Pacific oyster depuration systems.

Keywords: *depuration, Pacific oyster, Saccharomyces cerevisea, synbiotic, Ulva lactuca hydrolysate*

Sec.1-Oral-05

CORRUPTION ABILITY REGULATING EFFECTS OF *Luxs* IN *Shewanella Putrefaciens*: ANALYSIS FROM THE PERSPECTIVE OF QUORUM SENSING AND ACTIVATED METHYL CYCLE

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ABSTRACT

Shewanella putrefaciens (SHP) is one of common specific spoilage organisms (SSOs) which results in the typical corruption in aquatic product. Current research found that the corruption characteristics of *Shewanella* species may be regulated via quorum sensing (QS) system while the AI-2 QS system which is mediated via gene *luxS* has been reported having potential regulating effects on the corruption characteristics expression in in *Shewanella* species. Meanwhile, the gene *luxS* is not only involved in the synthesis of QS molecule Autoinducer-2 (AI-2), but also a vital regulatory gene in the activated methyl cycle (AMC). The complex metabolic cycle indicates that the impacts of metabolic pathways and involved key circulating substances mediated via *luxS* should be considered when explore the regulating effects of *luxS* in a more comprehensive way. In our study, the *luxS* mutant strain of SHP was constructed for revealing the corruption ability regulating effects of gene *luxS*. The impacts of AI-2/*luxS* quorum sensing (QS) system and activated methyl cycle (AMC) were considered, and the involved key circulating substances were supplied to clarify the roles of two pathways mediated via *luxS*. Growth experiments indicated that the *luxS* deletion did not lead to significant growth differences, but certain growth defects associated with culture environment and exogenous additives were found in mutant strains. The less biofilm formation, diminished H_2S production capacity and weaker corrupting effects on fish juice were observed in mutant strains, while these characteristic down regulations could be offset via the supplements of *luxS* mediated circulating substance including S-adenosylmethionine (SAM), S-adenosylhomocysteine (SAH), methionine (Met), homocysteine (Hcy) and 4,5-dihydroxy-2,3-pentanedione (DPD). Our results suggested that the *luxS* deletion declined the corruption ability of SHP, which may be closely related to the disorder of AMC and non-generation of QS molecule AI-2.

Keywords: *Shewanella putrefaciens*, *luxS*, quorum sensing, activated methyl cycle, corruption ability

Sec.1-Oral-06

ISOLATION AND IDENTIFICATION OF AMMONIA-OXIDIZING BACTERIA FROM THE BOTTOM OF LOBSTER FARMING AREA, XUAN DAI BAY, PHU YEN PROVINCE

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ABSTRACT

From 132 samples of bottom sludge from lobster farming area in Xuan Dai Bay, Phu Yen province, was isolated, identified and tested for ammonia-oxidizing bacteria strains. Results of selecting 10 colonies with different morphology and color, capable of converting ammonia fastest in 10 days. Based on biochemical reactions using API 20NE kit, API 20E and 16S-rRNA region sequencing method, 10 bacterial strains were tested for their ability to handle ammonia on media containing 10 mg/l NH4+- N, obtained 5 strains: *Sphingoacterium multivorum* KL26, *Providencia stuartii* KL30, *Alcaligenes faecalis* KL33 fastest ammonia metabolism in 4 days with treatment efficiency over 90%, *Pseudomonas stutzeri* KL15 and *Micrococus luteus* KL35 have ammonia conversion efficiency of over 80% in 7 days. In addition, these strains can grow on media containing up to 6% NaCl.

Keywords: *ammonia-oxidizing bacteria, bottom sludge, lobster farming area, Xuan Dai Bay*

Sec.1-Oral-07

POTENTIAL CONTRIBUTION OF SEAWEED FARMING TO ACHIEVING CARBON NEUTRALITY IN VIETNAM

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ABSTRACT

Carbon neutrality has been proposed due to growing concerns about the consequences of increased CO_2 in the atmosphere. This study evaluates the potential contribution of seaweed farming to achieving Vietnam's carbon neutrality by 2050 using a novel approach that includes lost particulate organic carbon (POC_l) and dissolved organic matter (DOC) excreted from seaweed cultivation. Based on seaweed production during the years of 2019–2023 in Vietnam, harvested seaweed removed 31,898 tons of carbon from seawater and farmed seaweed sequesters 18,118 tons of carbon annually. Among the three groups/species of cultivated seaweed, the Eucheumatoid group has the highest ability to remove (5.16 tons ha-1 year-1) and sequester (2.93 tons ha-1 year-1) carbon. This study shows that seaweed cultivation can play an important role in achieving carbon neutrality in Vietnam by 2050.

Key words: *Carbon neutrality, seaweed, Vietnam.*

Sec.1-Oral-08

SEAWEED CULTIVATION IN ASIA-PACIFIC AREAS: AN INTEGRATED RESOLUTION FOR THE GLOBAL FOOD SHORTAGE AND CLIMATE CHANGE MITIGATION

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ABSTRACT

The whole world is now facing the two main life-or-death imperatives: food security and climate change. The cause of this dramatic situation is from many sources, including very high population, over emission of greenhouse gases, society disorders, wars and epidemics. Among them, the long-time problems come from burden population and over greenhouse gases emission. There were many different measures from global organizations, governments, and scientists to face this situation, ranging from international funds, policies, urgent activities for supplying food and medicines in the crisis areas. However, to resolve these problems basically and obtain long-term results, it is necessary to sustainable and integrated measures that can simultaneously increase food and reduce GHG emission. The potential candidate for that measure may be the seaweed. With 12,000 species in the oceans and containing nutritional compositions, seaweed is the rich source for selection and aquaculture. Through photosynthesis, seaweed reduce the CO_2 and supply the O_2 to the atmosphere. Especially, the red seaweed Asparagopsis, when added to feed, can reduce methane emission from ruminants. Seaweed can substitute vegetables for supplying vitamins, carbohydrates, protein, fibers and many necessary elements as iodine, zinc, copper and magnesium. Seaweed cultivation saves the sources of earth and reduces pollution because it does not use lands, waters, fertilizers, and pesticides. Among the seaweed aquaculture areas, Asia-Pacific countries dominate with 97% of global production, leading by China (56% of global production), then Indonesia (28% of global production), South Korea, Philippines, North Korea and Japan. Obtaining rich human resource of experiences in cultivation, processing and trading, geographics and ocean environments and climate suitable, long coastal lines based on thousand islands, the Asia-Pacific areas will be the seaweed world center for resolving the same time the global food shortage and climate change mitigation.

Keywords: *seaweed, Asia-Pacific, food shortage, climate change*

Sec.1-Oral-09

STUDY ON IMPROVING AQUATIC PLANT GROWTH EFFICIENCY USING SPECIFIC LED SPECTRUMS COMBINED WITH MICROSTRUCTURE ARRAY LENSES

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ABSTRACT

Cultivating seagrass and seaweed is increasingly recognized as a sustainable and environmentally friendly approach to marine agriculture. However, traditional lighting systems employed in these cultivation practices often lead to significant energy consumption and inefficiencies. Transitioning to LED lighting offers a viable solution, as it significantly reduces power usage while enabling the selection of specific spectral bands that are conducive to photosynthesis. Furthermore, integrating microstructure array lenses can enhance the lighting range, thereby mitigating energy wastage and inefficiency issues. This study focuses on determining the optimal spectral wavelength ratios for aquatic plants by experimenting with various proportions of red and blue light sources tailored to the performance of chlorophyll under different spectral conditions. The ultimate objective is to design microstructure array lenses that effectively diffuse asymmetric light sources across a suitable range. By achieving even light diffusion, the growth outcomes of aquatic plants can be improved substantially. Observations indicate that aquatic plant growth varies significantly with different spectral ratios. Microstructure array lenses ensure an even light distribution, enhancing average growth results. Experimental findings affirm the potential for further optimization in the design and arrangement of these microstructures, with particular attention to reducing manufacturing costs without compromising efficiency. This study highlights the dual benefits of integrating advanced lighting technologies into aquatic cultivation systems: optimizing energy usage and promoting sustainable growth in aquatic ecosystems. By addressing key challenges in energy efficiency and plant growth performance, this research contributes valuable insights to developing more sustainable practices in marine agriculture, ultimately paving the way for scalable, cost-effective solutions that align with environmental conservation objectives.

Keywords: *Aquatic plant lighting, optical lens design, LED, microstructure array lens*

Sec.1-Oral-10

THE BEST TRANSECT LINE DESIGNED TO EVALUATE WHITE SHRIMP (*Litopenaeus vannamei*) STANDING STOCK AND CARBO VALUE IN A POND USING FISHERY ACOUSTICS

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ABSTRACT

To assess the value of carbon value in white shrimp farming, a method using drone-mounted fishery acoustic equipment (EY-60 Scientific Echo sounder) was designed to survey white shrimp (Litopenaeus vannamei) in ponds at an aquaculture farm in Kaohsiung, Taiwan. The results show: 1. Three types of transect lines were designed to calculate the standing stock and compare with the net harvest results after ten repeated samplings, the difference with the net harvest results of 2.3 tons is highly significant ($F= 13.18^{**}$, $p < 0.01$); 2. Compared with the total harvest weight, the standing volume (from echo sounder) and harvest volume calculated by cycling method is more accurate than the other two methods (search-line and zig-zag way) ($t=12.47^{**}$, $p < 0.01$; $t=8.57^{*}$, $p < 0.01$, individually); 3. The cycling method's result (2.22 tons) is not only very accurately to the real harvest but also quit different from the other two methods; 4. The layer length of white shrimp is between 3.5 and 10.3 cm, with an average length of 5.4 cm. 5. The total carbon value of white shrimp farming is 2.85 CO2e/kg. The study concluded that using acoustic methods to measure the weight of white shrimp in culture ponds is more efficient, accurate, and safer than net fishing. Innovating aquaculture using self-power generating systems, artificial intelligence, drones, and scientific echo sound

Keywords: *fishery acoustics, Litopenaeus vannamei, standing stock, carbon sink*

Sec.1-Oral-11

ABILITY TO CONVERT NUTRIENTS FROM THE WASTEWATER OF SHRIMP FARMING INTO *ARTERMIA* BIOMASS: EFFECTS OF DENSITY AND MICROALGAE ON *ARRTEMIA* BIOMASS

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ABSTRACT

The study was conducted to evaluate the ability to convert nutrients from the wastewater of shrimp farming into *Artemia* biomass, using microalgae *(Chaetoceros mueller)* as an intermediate link, aiming at the ability to utilize *Artemia* as feed and water re-circulation in aquaculture.

The experiment was arranged in 24 plastic bottles with a volume of 8 L/bottle, for a period of 35 days.The initial density of *Artemia* was arranged: 100 individuals /L, 200 individuals /L and 300 individuals /L, which were raised entirely with shrimp wastewater and fed with *C. muelleri* microalgae in the Autotrophic (MA) shrimp farming system and microalgae cultured from shrimp wastewater (MWW). Each treatment was repeated four times and the growth parameters of *the Artemia* population were determined every 7 days.

The experimental results showed that *Artemia* biomass reached its highest on the day 14th (1.07±0.09 g/L (MWW) - 0.85±0.03 g/L (MA) at a density of 300 animals/L) and 1.1±0.08 g/L (MWW) - 0.92±0.04 g/L (MA) on day 21th. However, the biomass has declined rapidly after day 21st and was lowest at day 35th (0.2±0.01 g/L (MWW) and 0.12±0.01 g/L (MA) at a density of - 100 individuals/L). The survival rate gradually decreases during the rearing time; in the period of 14-21 days, the survival rate reached 51±1.08% (MA) to 80.25±0.48% (MWW). The survival rate decreased rapidly after the 21st day of rearing, on the 35th day it was dropped from 6.75±0.85% to 13.5±1.32%. In other hands, the size of *Artemia* has grown with the rearing time. On the 14th day it was 6.25±0.11mm (MA – at the density 300 individuals /L) - 6.83±0.16 mm (MWW-100 individuals /L), on the 21st it was from 7.68±0.5 mm (MA-300 individuals /L) - 8.08±0.03 mm (MWW-100 individuals /L), and on the 35th *Artemia* reached 9.2±0.09 mm (MA-300 individuals /L) - 9.48±0.05 mm (MWW-100 individuals /L).

Thus, both experimental models such as Autotrophic shrimp farming system (MA) and shrimp wastewater (MWW)) showed the ability to convert wastewater into *Artemia* biomass and reached its highest biomass on days 14-21st. In particular, the density of 300 individuals/L gave the best biomass in the three test densities. The results of this study have shown that *Artemia* has the potential to be used to recover nutrients from wastewater from aquaculture. The outcomes of this research provide esential information for sustainable developing aquaculture, productivity and quality improving, while reducing environmental impacts.

Keywords: *Artemia, wastewater, microalgae, shrimp farming, nutrient recycling.*

Sec.1-Oral-12

BEHAVIORAL SHIFTS AND THE SEROTONIN BLUEPRINT IN ALL-MALE GIANT FRESHWATER PRAWN (*MACROBRACHIUM ROSENBERGII*): IMPLICATIONS FOR CULTURE PRACTICES

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ABSTRACT

Serotonin is a critical neuromodulator that significantly influences the physiology of the Giant Freshwater Prawn (*Macrobrachium rosenbergii*), impacting key behaviors such as aggression, social dominance, and reproduction. Its dual role as a neurotransmitter and neurohormone enables it to regulate neural and hormonal pathways, making it essential for adaptive behavioral responses in crustaceans. In aquaculture, serotonin's effects are particularly relevant as they contribute to optimizing productivity in all-male populations, which are preferred for their superior growth performance. This review delves into the biological mechanisms through which serotonin exerts its influence in *M. rosenbergii*. It regulates male differentiation via the androgenic gland by stimulating insulin-like androgenic gland hormone production, which enhances reproductive capability and establishes dominance hierarchies. Additionally, serotonin modulates vitellogenin synthesis and ovarian maturation in females, highlighting its broad regulatory capacity across the sexes. The evolutionary conservation of serotonin's role in behavioral modulation across species underscores its importance in both crustacean neuroscience and aquaculture applications. Understanding serotonin pathways can guide the development of strategies to manage behaviors such as aggression and mitigate challenges like size variation and cannibalism in farming systems. By synthesizing current research, this review aims to identify knowledge gaps, propose future research directions, and explore serotonin-based interventions to enhance sustainable aquaculture practices. These insights emphasize the transformative potential of serotonin in improving the productivity and welfare of *M. rosenbergii* and other aquaculture species.

Keywords: *Serotonin, Behavioral modulation, Macrobrachium rosenbergii, Aggression and reproduction, Crustacean aquaculture*

Sec.1-Oral-13

DETERMINATION LIPID REQUIREMENT OF SWAMP EEL (MONOPTERUS ALBUS) 20 G INITITAL WEIGHT

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ABSTRACT

The study investigated the dietary lipid requirement for optimal growth in swamp eel (*Monopterus albus* Zuiew, 1793) with an initial weight of 20 g. An experiment was conducted using formulated feed treatments containing five lipid levels (3%, 6%, 9%, 12%, and 15%) and a fixed protein level of 45%. Each treatment was replicated three times. Swamp eel fingerlings were cultured over an 8-week period. The lipid requirement was determined using a quadratic growth curve, following the method described by Zeitoun et al. (1976). The results indicated that the survival rate of swamp eels (from 80 – 91%) was unaffected by dietary lipid levels ($p>0.05$). Growth performance of swamp eels was effected by lipid levels in the diet. The optimal daily weight gain (DWG, 0,62 g/day), food conversion ratio (FCR), and lipid efficiency ratio (LER) were observed at a 9% lipid level. The body lipid content of swamp eels increased proportionally with dietary lipid levels, ranging from 3% to 15%. Higher dietary lipid levels resulted in greater lipid accumulation in the body. The optimal lipid level for maximum growth of swamp eel fingerlings was determined to be 8.75%.

Keywords: *lipid, Monopterus albus, swamp eel, requirement*

Sec.1-Oral-14

EFFECT OF DENSITY AND PELLET FOOD ON GROWTH, SURVIVAL RATE, SHOCK RESISTANCE ON GIANT TREVALLY *Caranx ignobilis*, Forsska l 1775

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ABSTRACT

In marine fish aquaculture, particularly for Giant trevally (*Caranx ignobilis*), the larval stage is often associated with low survival rates due to its relatively prolonged development period. Stocking density and feed type are critical factors influencing larval survival during this phase. This study examined the effects of three different stocking densities (3, 4, and 5 fish/L) and three commercial feed types (Inver, Caviar, Otohime) on the survival and development of Giant trevally larvae. The results indicated that the Inver feed significantly enhanced growth rate, survival rate, reduced the coefficient of variation (CV), and improved shock resistance when compared to the other feed types ($P<0.05$). At a stocking density of 3 fish/L, larvae exhibited the highest growth rate, survival rate, CV, and shock resistance, followed by 4 fish/L, with the lowest values observed at 5 fish/L ($P<0.05$). No significant interaction between feed type and stocking density was found in relation to growth rate, survival rate, CV, or shock resistance of the larvae.

Keywords: *Giant trevalley, survival, density, commercial feed, growth.*

Sec.1-Oral-15

EVALUATION OF THE TOTAL CARBON VALUE OF MILKFISH (CHANOS CHANOS) FARMING IN A POND

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ABSTRACT

To assess the total value of carbon sequestration in milkfish farming, a method using a drone-mounted fishery acoustic device (EY-60 Scientific Echo Sounder) was designed to survey fish species in ponds at an aquaculture farm in Kaohsiung, Taiwan. The results show: 1. TS120 = 34.634 log (TL) – 86.961 (R2=0.9918); 2. TS200 = 33.63 log (TL) – 84.03 (R2=0.9942). The layer length is 5.5~40.2 cm, with an average length of 25.3 cm. The total number of live fish in the experimental breeding pond measured at the two frequencies was significantly different (t=3.85*, $p < 0.05$); 3. Compared with the net sampling result after 100 repeated samplings, it was significantly lower than the result of 5.6 tons (F= 5.69 **, $p < 0.01$); 4. Compared with the total harvest weight, the standing volume and harvest volume calculated at 120KHz are close to 99%, which is more accurate than 200KHz. 5. The total carbon value of milkfish farming is 3.64 CO2e/kg. The study concluded that using acoustic methods to measure the number of milkfish in breeding ponds is more efficient, more accurate and safer than net fishing. Innovating aquaculture using self-generating artificial intelligence, capital and carbon waste could save a lot of time.

Keywords: *fishery acoustics, back scattering strength, standing stock, carbon sink*

Sec.1-Oral-16

MULTI-STRAIN PROBIOTICS FROM HEALTHY FISH INTESTINE ENHANCE THE GROWTH AND IMMUNITY OF WHITE SHRIMPS (*LITOPENAEUS VANNAMEI*) TO RESIST THE INFECTION OF *VIBRIO PARAHAEMOLYTICUS*

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ABSTRACT

This study evaluated the benefits of a commercial probiotic, Aqua Fortuna probiotic (AFPB), containing multiple bacterial strains isolated from fish gut microbiota, on the physiological performance of white-leg shrimp (*Litopenaeus vannamei*). Juvenile *L. vannamei* were fed varying doses of probiotic (0.5%, 1%, 2%, and 5%) during their maturation period and their growth indices, including weight, growth rate, feed conversion ratio, and survival rate, were measured. Additionally, the expression of growth factor genes was determined to assess the effects of AFPB on the growth performance after 8 weeks of feeding. Furthermore, *L. vannamei* were challenged with a common shrimp pathogen, *Vibrio parahaemolyticus*. Survival rates were monitored alongside the gene expressions of immune-related genes, such as antimicrobial peptides (penaeidin-3a, crustin and lysozyme), pattern recognition receptors (β-1, 3 glucans binding protein, lipopolysaccharide and β-glucan binding protein), detoxication enzyme (SOD, and GPx), prophenoloxidase, and the oxygen transport protein haemocyanin. The results revealed that AFPB supplementation significantly enhanced the growth performance of *L. vannamei*. Notably, 1% of AFPB yielded the greatest improvements in the final weights and the specific growth rates along with better survival rates. During the lethal challenge with *V. parahaemolyticus*, groups treated with 5% and 1% AFPB showed higher survival rates following 4 and 8 weeks of probiotics supplementation, respectively. Gene expression analyses showed that 1% AFPB upregulated immune-related genes, such as penaeidin-3a, crustin, lysozyme, proPO, SOD, and β-1, 3 glucans binding protein, in digestive tissues. Whereas 2% AFPB additionally upregulated immune genes like proPO and lysozyme. Our findings highlighted the role of shrimp microbiota in promoting growth and enhancing disease resistance, providing robust evidence for the use of probiotics as a strategy to improve shrimp cultivation productivity.

Keywords: *Multi-strain probiotics, Growth performance, Bacterial infection, Disease resistance, White shrimp*

Sec.1-Oral-17

MANGROVE FOREST MAPPING USING SAR SENTINEL – 1 AND MACHINE LEARNING IN CAN GIO BIOSPHERE RESERVE, VIETNAM

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ABSTRACT

Mangrove forest provides valuable ecosystem services, and recently a special attention on the carbon sequestration, which supports a nature-based solution to tackle the climate change. Habitats of mangrove ecosystem, however have been degraded in decades and lead to a high demanding of mangrove habitat inventory using remote sensing. Following this approach, multi-spectral imagery has been widely applied to a degree of success. Despite, high coverage of cloud is a big obstacle that directs the community to the using of the Synthetic Aperture Radar (SAR) for mangrove mapping. Here, we validate the performance of the SAR Sentinel – 1 (S-1) C band and machine learning model (CatBoost) in mapping the spatial distribution of mangrove forest in Can Gio Biosphere Reserve. Four scenarios were experimented, including (1) using only the two original bands VH, VV; (2) VH, VV with additional band transformation; (3) VH, VV, band transformation and the Gray-Level Co-Occurrence Matrix (GLCM); and (4) VH, VV with the two Principle Component Analysis (PCA) extracted from scenario (2) and (3). Results indicated that the two VH, VV bands are capable of mapping mangrove at an overall accuracy of 0.83, ROC AUC 0.88, F_1 score 0.85 for mangrove class. Surprisingly, transformative and the GLCM bands did not improve the accuracy for the mangrove class, which raise the question on the using of C band for mangrove ecosystem. Future research will compare the SAR short wavelength C (Sentinel - 1) and longer wavelength L (ALOS 2 PALSAR 2) bands for mangrove monitoring in the (sub)tropical regions.

Keywords: *mangrove, SAR, Sentinel – 1, machine learning, CatBoost, mapping*

Sec.1-Oral-18

PROXIMATE COMPOSITION AND NUTRITIONAL PROFILE OF ANCHOVY BY-PRODUCTS COLLECTED FROM SABAH, MALAYSIA

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ABSTRACT

The processing of anchovies generates a considerable amount of by-products, which diminish the seller's profits. These by-products are often discarded into the environment, leading to economic losses and contributing to the eutrophication of aquatic ecosystems. The main objective of this study was to examine the proximate composition, amino acids profiles, fatty acids profile and mineral profiles of anchovy by-products collected from the seas surrounding Sabah. Anchovy by-products (ABP) were collected from the three main anchovy landings in Sabah (Pitas, Tawau and Papar districts). Anchovy by-products from Pitas were abundant in crude protein (54.0 %). There was no significant difference in crude lipid content between Pitas and Tawau (6.5 % and 6.8 %), but it was significantly higher than Papar. Crude ash content was considered high in all ABP sources. Anchovy by-product's crude ash content from Tawau and Papar was significantly higher (37.5 % and 36.0 %) than Pitas samples (34.0 %). Generally, ABP from all sample sources had a balanced amino acid content. There was a trend in all ABP samples that Lysine, Leucine and Arginine were abundant while Histidine was the least found EAA. Fatty acids of ABP Tawau (270.5 ug/ml) were the highest. Most FA had no significant difference between the sample sources. There was no significant difference in PUFA/SFA ratio between all treatments. Papar had the highest content of minerals (9.4 g/kg), followed by Tawau and Pitas. Anchovy by-products from all sources were rich in sodium, calcium and phosphorus. There was no significant difference of the minerals between the ABP sources. Therefore, these data suggest that anchovy by-products from Sabah waters can be utilized for the production of value-added products such as fish meal, hydrolysates and minerals.

Keywords: *Biochemical composition, anchovy waste, Sabah seas*

Sec.1-Oral-19

SYNERGISTIC EFFECTS OF GARLIC (*ALLIUM SATIVUM*) SKIN AND GUAVA (*PSIDIUM GUAJAVA*) LEAF EXTRACTS ON GROWTH, FEED EFFICIENCY, MORPHOMETRY, MOLTING DYNAMICS, AND HISTOLOGY IN WHITELEG SHRIMP (*LITOPENAEUS VANNAMEI*, BOONE, 1931)

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ABSTRACT

Understanding the impact of plant-based dietary supplementation in aquaculture holds significant potential for enhancing productivity and sustainability. This study investigated the synergistic effects of garlic skin extract (GSE) and guava leaf extract (GLE) on growth, feed efficiency, morphometry, and molting dynamics in Litopenaeus vannamei (Boone, 1931) during a 60-day feeding trial. Four dietary treatments—Control, GSE, GLE, and Complex—were evaluated using a completely randomized design, assessing final length (FL), final weight (FW), survival rate (SR%), feed conversion ratio (FCR), biomass, condition factor (CF), and microbial load (Vibrio spp.) in the digestive tract and gills, along with morphometric characteristics and molting frequency. Results showed that the GSE diet significantly enhanced biomass (100.80 ± 20.00 g) and survival rate (60.00 ± 8.66%), while the Control group exhibited the highest final length (10.77 ± 0.23 cm). The GLE diet resulted in the highest final weight (9.02 ± 1.76 g) and condition factor (1.30 ± 0.56), indicating improved physiological condition. GSE supplementation also led to the highest molting rate (11.47 ± 0.26) and the shortest molt cycle (2.99 ± 1.09 days), suggesting enhanced molting dynamics. Microbial analysis revealed the lowest Vibrio counts in the Control group, with GSE reducing Vibrio loads in the digestive tract but slightly increasing them in the gills, while GLE maintained balanced microbial control across both sampled areas. Positive correlations were observed between final length, biomass, and survival rate, whereas the feed conversion ratio was inversely correlated with the condition factor. Histological analysis showed significant alterations in the hepatopancreas and muscle tissues of L. vannamei supplemented with GSE and GLE, where GSE boosted cellular activity, tissue repair, and hepatopancreatic function, and GLE preserved muscle fiber integrity and overall tissue health. The Complex treatment produced mixed effects, likely due to interactions between its bioactive compounds. In conclusion, both GSE and GLE diets improved growth, survival, tissue integrity, and microbial management in L. vannamei, with GSE excelling in biomass production and molting efficiency. These findings underscore the potential of plant-based dietary supplements in enhancing shrimp production and emphasize the importance of optimizing formulations for sustainable aquaculture practices.

Keywords: Feed utilization, Growth modulation, Morphometric analysis, Plant-based feed additives, Sustainable aquaculture practices

Sec.1-Oral-20

OPTIMIZING PHOTOPERIOD AND LIGHT INTENSITY FOR DIATOM GROWTH AND BIOCHEMICAL COMPOSITION IN VIETNAM'S SHRIMP INDUSTRY

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ABSTRACT

Diatoms play a cruicial role in shrimp larviculture as one of the best feed sources for early larval stages. However, the effects of photoperiod and light intensity on their population growth and biochemical composition remain poorly understood, particularly in Vietnam. This study investigated the impact of different light conditions on two commonly used diatom species in shrimp larval cultivation, *Thalassiosira weissflogii* and *Chaetoceros muelleri*. A factorial experiment was conducted with three photoperiod treatments (12hL:12hD, 18hL:6hD, and 24hL:0hD) and three light intensities (75, 100, and 125 µmol/m²/s). Key population growth parameters—including maximum cell density, exponential growth rate, and maximal daily growth rate—were quantified alongside biochemical composition analyses. The results indicated that photoperiod was the most influential factor, significantly and positively regulating diatom growth, followed by light intensity. A significant negative interaction between photoperiod and light intensity suggested that prolonged lighting reduced the efficiency of increasing light intensity in enhancing algal growth. Furthermore, different light conditions led to species-specific variations in biochemical composition. Our findings suggest that an optimal combination of moderate light intensity and photoperiod can enhance diatom population growth and nutritional value, contributing to improved shrimp hatchery management.

Keywords: Biochemical composition, Diatom, Light intensity, Photoperiod, Population growth

Sec.2-Oral-01

ASSESSMENT OF DISSOLVED OXYGEN DEFICIENCY AND EUTROPHICATION FOR MARICULTURE SUSTANAIBLE MANAGEMENT IN XUAN DAI BAY, VIETNAM

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ABSTRACT

Aquaculture in Xuân Đài Bay, Phú Yên, Vietnam, plays a vital role in the local economy, but its rapid expansion has raised significant concerns about its environmental impact, particularly on coastal water quality. This study aims to assess dissolved oxygen deficiency and eutrophication using the UNTRIX index to guide sustainable marine management. The study measured water quality parameters such as temperature, salinity, dissolved oxygen, chlorophyll-a, and nutrient concentrations (DIN and DIP). The results revealed that levels of dissolved oxygen deficiency ranged from 0 to 2.19 mg O_2/L, with an average of 0.63 ± 0.71 mg O_2/L. The UNTRIX index ranged from 3.69 to 6.72 (average: 5.10 ± 0.91), highlighting eutrophication, especially in mariculture zones. Oxygen deficiency was found to reach up to 34.07%, posing a serious threat to marine life and the aquaculture areas. The findings underscore the need for targeted management strategies to reduce nutrient runoff, optimize stocking densities, maintain the stability of biodiversity and related ecosystems in the Xuan Dai Bay as seagrass beds, mangroves forest, and verify that aquaculture operations adhere to global environmental protection requirements.

Keywords: *Eutrophication, UNTRIX, oxygen deficit, mariculture.*

Sec.2-Oral-02

BUILDING RESILIENT COMMUNITIES: A PARTICIPATORY APPROACH TO FLOOD DISASTER PREPAREDNESS IN THAILAND

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ABSTRACT

Climate change has intensified flooding, posing significant challenges for vulnerable communities in Thailand .This study aimed to develop and evaluate a model community for flood disaster preparedness and climate change adaptation .Conducted in Tha Song Khon Subdistrict, Mueang Maha Sarakham District, Maha Sarakham Province, the 2023 study involved 250 participants from 14 flood-prone villages, including community leaders, emergency responders, local officials, and public health workers .The research followed four phases :1 (assessing flood impacts, response strategies, and recovery efforts; 2 (designing a disaster prevention and emergency management model 4) Adopting and implementing the program; and 4 (evaluating the model's outcomes . Findings revealed that external assistance during floods was moderate but often delayed, with most support coming from within the community .Key deficiencies were observed in water and sanitation access, waste management, electrical safety, disease prevention, and emergency care, though healthcare access was generally satisfactory .Through collaborative efforts, the community established a volunteer emergency response team, trained local instructors, and created two pilot learning centers to enhance public knowledge and disaster response skills. The model also improved early warning systems, agency coordination, shelter readiness, and access to essential safety equipment .Regular reviews of preparedness systems, team capacity, equipment, and periodic emergency drills are recommended to sustain effectiveness .This study demonstrates that a model community approach can strengthen disaster preparedness and resilience, providing a scalable framework for adaptation to climate change-induced flood risks.

Keyword: *Climate Change, Floods, Emergency Response Volunteer, Flood Disaster Preparedness, Community Resilience*

Sec.2-Oral-03

AQUACULTURE WASTEWATER TREATMENT TECHNOLOGIES: AN APPROACH TO CLIMATE CHANGE ADAPTATION

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ABSTRACT

Aquaculture is a rapidly growing sector in global food production, with an average annual growth rate of 3.2%. However, its sustainability is challenged by environmental concerns and climate change. This review examines aquaculture wastewater treatment technologies, focusing on conventional systems, recirculating aquaculture systems (RASs), and integrated approaches like aquaponics. Conventional systems often face limitations, including high costs, energy demands, greenhouse gas emissions, and inefficient nutrient recovery. RASs, operating in controlled indoor environments, offer a more sustainable alternative by reducing daily water replacement to 10% and minimizing climate-related impacts. Constructed wetlands exhibit high efficiency in removing nitrogen compounds, achieving NH_4-N removal rates of 86–98% and NO_2-N removal rates exceeding 99%. The use of low-trophic biomass, such as microalgae, as feedstock mitigates environmental impacts while enabling biomass and lipid production, with harvesting efficiencies surpassing 90%. Integrated multi-trophic aquaculture (IMTA), which combines fed aquaculture with organic extractive systems, enhances yields and profitability. IMTA improves shellfish production by 20%, with profits exceeding monoculture systems by 230% for shellfish and 68% for finfish. This review underscores the potential of advanced wastewater treatment technologies to improve aquaculture sustainability, ensuring resilience against climate change.

Keywords: Aquaculture wastewater, Climate change, Recirculating aquaculture systems, Aquaponic

Sec.2-Oral-04

GENETIC DIVERSITY OF *SYMBIODINIACEAE* IN CORAL REEFS ACROSS FIVE MARINE REGIONS IN CENTRAL VIETNAM

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ABSTRACT

Coral reefs, critical to marine biodiversity and human economies, depend significantly on the health of their symbiotic relationships with *Symbiodiniaceae*, a group of algae vital for coral nutrition and energy through photosynthesis. In the face of increasing environmental pressures, understanding the biodiversity and distribution of these symbiotic algae within coral ecosystems is crucial. This study investigated the diversity of symbiotic algae associated with coral reefs across five different sites in central Vietnam: Khánh Hòa (Hòn Chồng, Bãi Tiên), Đầm Thủy Triều, Phú Yên (Hòn Yến), Bình Định, and Bình Thuận. Employing molecular biology techniques, including DNA sequencing of the ITS2 marker, we analyzed samples for genetic diversity and phylogenetic relationships. Results revealed a notable variation in the presence of different clades among the sites, with a significant presence of Clade D, known for its high thermal tolerance, across all locations. This suggests a potential adaptive strategy by the coral hosts against thermal stress and bleaching events. The study underscores the importance of genetic diversity in symbiotic algae for the resilience of coral reefs to climate change and environmental disturbances, highlighting the need for conservation efforts that preserve this genetic diversity. Findings from this research contribute to our broader understanding of coral symbiotic mechanisms and offer insights into the management and preservation of coral reef ecosystems in Vietnam.

Keywords: *Symbiodiniaceae, coral, genetic diversity, central Vietnam, ITS2 sequencing*

Sec.2-Oral-05

HOW DOES NILE TILAPIA (*Oreochromis niloticus*) BROODSTOCK RESPOND TO A BIVALENT VACCINE?

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ABSTRACT

Aeromonas veronii and *Streptococcus agalactiae* are important bacterial pathogens that pose significant challenges to Nile tilapia (*Oreochromis niloticus*) aquaculture worldwide. The prevalence of coinfections underscores the need for effective bivalent vaccination strategies. This study evaluated the humoral immune response in Nile tilapia broodstock after immunization with a bivalent vaccine containing killed *A. veronii* and *S. agalactiae*, and maternal antibody transfer. The vaccinated broodstock displayed specific immunoglobulin M (IgM) production against both pathogens, with significantly higher levels of anti-*A. veronii* antibodies compared to anti-*S. agalactiae* after both primary and booster doses, as measured by enzyme-linked immunosorbent assay (ELISA). Maternal IgM was detected in fertilized eggs, confirming maternal immune transmission. However, these antibodies decreased to undetectable levels in fry after yolk sac depletion, indicating a limited duration of passive immunity. Passive immunization trials further demonstrated a relative percent survival (RPS) of 35.7% against *A. veronii* and 83.3% against *S. agalactiae* in juveniles that received sera from vaccinated broodstock. These findings highlight the essential role of humoral immunity in combating bacterial infections and support broodstock vaccination as a viable biosecurity measure to reduce vertical transmission risks and enhance fry immunity.

Keywords: *Nile tilapia, Broodstock, Streptococcus agalactiae, Aeromonas veronii, Bivalent vaccine, Humoral immunity, Maternal immunity, Passive immunization*

Sec.2-Oral-06

IMPACT OF CLIMATE CHANGE ON THE BLUE SHARK CAUGHT BY THE TAIWANESE LARGE-SCALE LONGLINE FISHERY THE NORTH PACIFIC

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ABSTRACT

This study compiled catch data from observer records of Taiwanese large-scale longline fishery in the North Pacific from 2004 to 2022. Environmental data were sourced from the IPCC AR6, encompassing historical data from 1850-2014 and model projections from 2015-2100 with a 1° grid resolution. Environmental variables included sea surface temperature (SST), sea surface salinity (SSS), sea surface height (SSH), mixed layer depth (MLD), net primary productivity (NPP), and dissolved oxygen (DO). The Partial Least Squares Regression (PLSR) method was used to identify key environmental factors affecting blue sharks. The Delta-Lognormal Model (DLM) was then applied for CPUE (catch per unit effort) standardization. Using the Habitat Suitability Index (HSI), this study estimated spatial distribution changes for the blue shark under different climate change scenarios. Using HSI ≥ 0.6 as the threshold for suitable habitat, the blue shark in the North Pacific were found to prefer SST between 17.9-29.4°C, SSS between 34.3-35.2‰, and NPP values of 2.15-5.15 (10^{-7}). The HSI variation maps of blue shark in the North Pacific show a gradual decline in suitable habitats over time under five different scenarios, with the reduction being more pronounced in more severe scenarios. In tropical waters of the North Pacific, the suitable habitat areas have shifted gradually from east to west, while in temperate waters, the previously widespread distribution has contracted and is now concentrated between 30°N and 35°N. For the region north of 25°N, the suitable habitat SST ranges between 16.1-19.3°C, SSS between 34.3-34.7‰, and NPP values of 1.77-3.57 (10^{-7}). South of 25°N, the suitable habitat SST ranges from 27.1-29.5°C, SSS between 34.6-35.1‰, and NPP values of 3.02-5.83 (10^{-7}). The HSI variation maps for the region north of 25°N show minimal changes across five scenarios, with the primary habitat remaining between 30°N and 35°N. However, as scenarios intensify, the suitable habitat distribution shifts slightly eastward in the Pacific Ocean. In the region south of 25°N, HSI variation maps reveal a gradual decrease in suitable habitat range over time across all five scenarios. The suitable habitat range, initially between 0-15°N latitude and 150°E-135°W longitude, has been progressively shrinking. These results suggest that the impact of climate change on blue shark in the North Pacific is moderate, possibly due to their ability to regulate body temperature and adapt to varying water temperatures. Continued monitoring is recommended to ensure sustainable management of the blue shark stock.

Keywords: *Climate change, Prionace glauca, Habitat Suitability Index, Adaptation policy recommendations*

Sec.2-Oral-07

NUTRIENTS POLLUTION, DISTRIBUTION AND PARTITIONING IN THE DANSHUEI RIVER ESTUARY, NORTHERN TAIWAN

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ABSTRACT

The Danshuei River flows through the densely populated metropolitan area of Taipei City and New Taipei City in northern Taiwan and more than seven million people, over a quarter of Taiwan's entire population, reside in the Danshuei River system catchment area. Owing to the river system receiving the treated and untreated domestic sewage, the upper estuary of the Danshuei River Estuary (DRE) contained the relatively higher ammonium (304-557 μM) and dissolved total phosphorus (DTP) (4.3–12.4 μM) concentrations. The ammonium concentration completely dominated (>95%) the total N (dissolved total N plus particulate total N) pool within the DRE. Ammonium played a crucial role in controlling the speciation variation of dissolved inorganic N (DIN) and partitioning between dissolved and particulate phases. The concentration of dissolved inorganic P (DIP) generally dominated the total P pool (DTP+PTP) within the estuary. However, dissolved organic P (DOP) became the important fraction in the salinity > 25 region, probably attributed to phytoplankton production because the higher DOP concentration was generally accompanied with the higher chl. *a* concentration. The particulate total P concentrations generally correlated well with the particulate total Fe and Mn concentrations, suggesting that particulate Fe and Mn played crucial roles influencing the P distribution within the DRE.

Keywords: *Nutrients, nitrogen, phosphorus, partitioning, the Danshuei River Estuary*

Sec.2-Oral-08

PRELIMINARY UTILIZATION OF ENVIRONMENTAL DNA (eDNA) FOR PATHOGEN DETECTION IN MARINE WATERS

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ABSTRACT

Environmental DNA (eDNA) technology offers a transformative approach for the surveillance of pathogenic bacteria in marine aquaculture environments. This study applies eDNA analysis using quantitative PCR (qPCR) to detect and quantify four critical pathogens—*Streptococcus iniae, Vibrio harveyi, Vibrio parahaemolyticus,* and *Nocardia seriolae*—in five aquaculture sites in Nha Trang, Vietnam. Results demonstrated notable variations in pathogen concentrations, correlating with specific environmental conditions such as temperature, salinity, and dissolved oxygen levels. The highest concentrations of *Streptococcus iniae* were found in high-density farming areas, while *Vibrio* species were more prevalent in warmer, less oxygenated waters. This study underscores the efficacy of eDNA as a non-invasive, sensitive, and efficient method for pathogen detection and monitoring, facilitating early intervention and promoting sustainable aquaculture practices. By integrating eDNA into routine health assessments, aquaculture operations can enhance disease management and biosecurity, thus mitigating economic losses and supporting environmental sustainability.

Keywords: *Environmental DNA, qPCR, marine aquaculture, pathogen detection, disease management in aquaculture*

Sec.2-Oral-09

RIVERBANK EROSION UNDER THE IMPACT OF CLIMATE CHANGE IN THE MEKONG DELTA

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ABSTRACT

This study investigates riverbank erosion in the Mekong Delta, specifically in the Long Xuyen area of An Giang Province, under the impacts of climate change from 2018 to 2023. Results from the HEC-RAS 1D hydrodynamic and sediment transport model are used as boundary conditions for the HEC-RAS 2D model, which simulates flow dynamics and sediment transport in a two-dimensional space, capturing more complex interactions. Additionally, the Slope/W module of GeoStudio is used to analyze riverbank slope stability by calculating the stability factor (K_{at}), with a threshold of 1.15 for Class 4 infrastructure, to assess the risk of bank failure. Climate change scenarios, based on rainfall data from the CSIRO-Mk3-6-0 model (RCP 4.5 and RCP 8.5), are incorporated into the HEC-RAS 2D model to predict future erosion risks in the study area. The results indicate an increased vulnerability of the riverbanks to erosion under climate change impacts, emphasizing the need for adaptive management strategies to mitigate the ongoing erosion issues.

Keywords: *Riverbank erosion, Mekong Delta, HEC-RAS, sediment transport, slope stability, climate change*

Sec.3-Oral-01

ANALYZING FISHING CAPACITY OF THE KHANH HOA'S OFF-SHORE HANDLINE FISHING VESSELS IN THE EAST SEA, VIET NAM

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ABSTRACT

Khanh Hoa is a province on the coast of Southern Central Vietnam in the South China Sea. This study analyzes the fishing capacity of the multi-species Khanh Hoa's offshore handline fleet in the context of the World Trade Organization agreement on subsidies for fisheries using a sample of 45 fishing vessels (15% of the total population). The results indicate that the fleet's excess capacity is quite moderate—in the range of 10.77%–24.62% for yellow fin tuna and 15.72%–28.28% for big eye tuna—compared to current catches, if the technical efficiency of the fishing vessels were improved. The partial excess capacity in this fishing fleet is, however, quite considerable—up to 47.83% for yellow fin tuna and 80.62% for big eye tuna. It means that if fishers only target one species and the other outputs remain unchanged, the partial excess capacity of the fleet would be significantly large. Large vessels have higher fuel subsidies than small vessels, but they have lower fishing capacity utilization than the smaller vessels. Larger vessels also overuse fuel, which should, on average, decrease by 13.6% compared to the optimal level. The fuel support policy for this fishing fleet should thus be reconsidered and revised.

Keywords: *Fishing capacity, capacity utilization, fuel subsidy, Viet Nam*

Sec.3-Oral-02

ASSESSMENT OF CLAM CATCHING STATUS IN COASTAL AREAS OF CU LAO DUNG DISTRICT, SOC TRANG PROVINCE

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ABSTRACT

The study aims to assess the current status of clam catching in Cu Lao Dung coastal area, Soc Trang province to have a database to serve the management and planning of sustainable development of natural clam resources in the locality. Data was collected through a survey of 80 clam catching households from September to November 2024. Method of selecting survey households representative of fishing grounds, fishing gear and fishing methods. The survey results show that the source of clam seeds appears concentrated from March to April (61.5-74.4% of surveyed households). However, the number of people exploiting clams is quite large during the clam spawning season, leading to a significant decrease in clam output. In addition to the amount of clam seeds, the above area also has adult clams, although the output is not high, it also brings a significant source of income to coastal residents. The average daily clam harvest of surveyed households was less than 10 kg/day/household, accounting for the highest proportion (89.74%), followed by the estimated harvest of 10 - 20 kg/day/household (5.12%). The size of clam seeds exploited by surveyed households reached 0 - 50,000 individuals/kg, accounting for the highest proportion (33.33%), followed by the size of clam seeds exploited > 500,000 and 100,000 - 200,000 individuals/kg, accounting for (30.76%) and (7.7%) respectively. It is proposed that Cu Lao Dung clam beds should be zoned for cultivation to preserve the source of clam seeds and parent clams in order to improve the livelihoods of local people.

Keywords: *Clam, Cu Lao Dung, Soc Trang, catching status*

Sec.3-Oral-03

AUTOMATED FISH DETECTION USING ARTIFICIAL INTELLIGENCE: ADVANCEMENTS AND APPLICATIONS

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ABSTRACT:

The integration of Artificial Intelligence (AI) into marine biology and aquaculture has opened new frontiers in fish detection, providing innovative solutions for monitoring and managing aquatic ecosystems. This paper presents a comprehensive approach to fish detection using advanced AI techniques, including deep learning and computer vision. By leveraging convolutional neural networks (CNNs) and other state-of-the-art models, our methodology achieves high accuracy in detecting and classifying fish species under varying underwater conditions. The study explores the challenges posed by occlusions, light variations, and diverse habitats, proposing robust preprocessing techniques and model architectures to address these issues. Experimental results demonstrate the effectiveness of the proposed system, achieving significant improvements over traditional detection methods. Applications in ecological monitoring, fisheries management, and conservation efforts are discussed, highlighting the potential of AI-driven fish detection to revolutionize aquatic research and sustainability initiatives.

Keywords: AI in Fish Detection, Deep Learning for Aquatic Ecosystems, CNNs in Marine Biology, AI Applications in Fisheries Management and Conservation, Challenges and Innovations in Underwater Fish Detection.

Sec.3-Oral-04

ESTIMATING THE STANDING BIOMASS OF DEMERSAL FISH IN NINH THUAN WATERS BY SWEPT AREA METHOD

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ABSTRACT

In order to estimate the biomass of demersal fish in Ninh Thuan waters to support allocating exploitation quotas, the area method was used. Four survey trips by trawler were conducted at 30 stations during the Southwest and Northeast monsoon seasons in 2022 and 2023. Research results encountered 77 species, including 61 species of fish, 8 species of cephalopods and 8 species of crustaceans in both surveys. Of which, 41 species of fish, 7 species of cephalopods and 5 species of crustaceans were recorded in the northeast monsoon season. During the southwest monsoon season, the number of fish species encountered was lower with only 28 species, 5 species of cephalopods and 6 species of crustaceans. The resources pointed out the catch-per-unit-effort (CPUE) fluctuated greatly between survey stations. CPUE in inshore areas is higher than in coastal areas, CPUE in the southwest monsoon season is higher than in the northeast monsoon season. The catch-per-unit-area (CPUA) of fish also varied widely between survey stations and was mainly concentrated in inshore areas. CPUA in the southwest monsoon season is higher than in the northeast monsoon season. The standing biomass of demersal fish in Ninh Thuan waters was estimated at 6,088 tons, of which biomass of coastal area account for 9.5% (576 tons), and the biomass of inshore areas account for 90.5% (5,512 tons).

Keyword: *CPUE, CPUA, swept area method, standing biomass, Ninh Thuan waters*

Sec.3-Oral-05

EXPLORING THE LABOR SHORTAGE IN VIETNAM'S CAPTURE FISHERIES: CAUSES, IMPACTS, AND POTENTIAL SOLUTIONS

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ABSTRACT:

The fishing industry plays an essential role in Vietnam's socioeconomic development, providing jobs to millions of workers. In recent years, fishing labor shortages have occurred on many fishing vessels in all capture fisheries, including small-scale and larger-scale fisheries in Vietnam. However, knowledge of the issues of Vietnam's fishing laborers has been limited for many years. In this study, a combination of secondary data methods and analysis of survey interviews with fishers who are fishing vessels' owners and fisheries authorities in some key coastal provinces was used to answer the following questions: i) What are the difficulties related to fishing labor in Vietnam's capture fisheries? ii) How do fishing vessel owners respond to fishing labor's difficulties? Study results show many difficulties in crew labor issues in Vietnam in terms of finding crew members and maintaining minimum conditions for the number of workers on fishing vessels. Many reasons are found that cause the shortage of fishing laborers working on vessels. The owners of the fishing vessel have various ways to address this situation, including forcing fishing vessels to lie ashore or go fishing in the case of labor shortage, switching to alternatives that require fewer human resources, actively seeking labor in other areas such as remote and mountainous areas, and increasing the share rate and deposit for fishing vessels fishing mates. Several solutions are proposed according to the results to overcome the labor shortage in Vietnam's fishing sector.

Keywords: *fishing labor, shortages, capture fisheries, Vietnam*

Sec.3-Oral-06

FAILURE ANALYSIS FOR DIESEL GENERATOR ON MARINE SHIP BASED CONVOLUTIONAL NEURAL NETWORK

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ABSTRACT

The diesel generator is a critical component for providing electrical power on marine ships, ensuring seamless operation of onboard systems and infrastructure. However, unexpected failures in diesel generators can lead to significant operational disruptions and maintenance costs. This research proposes an advanced failure analysis approach using Convolutional Neural Networks (CNNs) to identify and classify different failure conditions of diesel generators on marine ships. By leveraging the powerful feature extraction capabilities of CNN, this method enables accurate identification of failure patterns based on historical operational data. The study incorporates key diagnostic indicators such as temperature, vibration, oil pressure, voltage, and current signals, which serve as input features for the model. To validate the effectiveness of the proposed approach, we compare the performance of CNN with Recurrent Neural Networks (RNN). Extensive experimental evaluations under various failure scenarios highlight the superior classification accuracy and generalization capability of CNN compared to RNN, with percentage improvements from 6.863% to 93.030% in all evaluating indexes. The results demonstrate the potential of CNN to serve as a reliable diagnostic tool, offering timely and precise failure predictions for maintenance services. This research provides critical insights into the design of intelligent maintenance frameworks for marine diesel generators, paving the way for predictive maintenance strategies that minimize downtime, optimize operational efficiency, and reduce overall maintenance costs. The findings contribute to enhancing the reliability and sustainability of marine ship operations in the maritime industry.

Keywords: *Convolution Neural Network, Deep learning machine, Diesel Generators, Failue analysis, Maintenance services, Marine ship*

Sec.3-Oral-07

OPTIMIZING ENVIRONMENTAL DNA (eDNA) COLLECTION AND EXTRACTION FOR METABARCODING: INSIGHTS INTO REEF FISH DIVERSITY IN NINH THUAN PROVINCE

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ABSTRACT

Environmental DNA (eDNA) combined with metabarcoding represents a powerful and promising tool for assessing species composition and biodiversity in aquatic ecosystems. eDNA metabarcoding has been increasingly applied to evaluate fish diversity; however, a standardized and cost-effective protocol for eDNA collection in coral reef areas has yet to be fully developed. In this study, we compared and evaluated various collection methods (including sizes and types of filtration membranes) and eDNA extraction methods using different commercial kits to identify the most suitable approach for monitoring fish diversity in coral reef ecosystems in Ninh Thuan province. The extracted products were assessed using the Qubit method, Nanodrop, and gel electrophoresis. Evaluation parameters included DNA concentration, purity, fragmentation, and cost. The results indicated that a mechanical filtration system using 0.22 µm membrane filters combined with the DNeasy Blood and Tissue Kit (Qiagen) produced high-quality and purified eDNA, with a consistent water volume of 1 liter. In comparison, the Wizard SV Genomic DNA Purification System (Promega) generated higher eDNA yields but lower purity, which could be improved by increasing the number of washing steps. Across all tested eDNA collection and extraction methods, incorporating an inhibitor removal step significantly enhanced the sensitivity of COI gene amplification (the initial PCR step in metabarcoding), particularly for PCR-inhibitory samples that were previously unsuitable for amplification. These findings underscore the critical role of high-quality DNA in metabarcoding and highlight the need for further studies on species identification and contamination assessment from mixed-species DNA.

Keywords: *coral reef fish, eDNA collection, eDNA extraction, metabarcoding*.

Sec.3-Oral-08

SIMULTANEOUS AND SEQUENTIAL RECOVERY OF HYDROXYAPATITE, CHITOSAN AND PROTEIN HYDROLYSATE FROM BLUE CRAB SHELLS *(Portunus pelagicus)*

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ABSTRACT

Blue crab shell is an available resource, a natural composite consisting of highly mineralized chitin–protein fibers. The study aims to recover simultaneously and sequentially protein hydrolysate (PHyd), chitin, and calcium carbonate from blue crab shells and convert them to valuable products: chitosan (CTS) and nano-sized hydroxyapatite (HA). In crab shells, there were approximately 54.8% of $CaCO_3$ and 22.5% chitin fibrils existed with 17.4% protein. The recovery yield was 94.7 %. The recovered protein in PHyd was estimated by Biuret method after deproteination (NaOH 3.0%, 1:10 (w/v), 72h). The content of chitin was determined by gravimetric analysis. Chitin was transformed into CTS by deacetylation (NaOH 40%, 2h, 105ºC). The demineralization for recovery of $CaCO_3$ was performed by acid treatment (HCl 2.0%, 72h). The percentage of acid-soluble calcium in the form of $CaCO_3$ was analyzed by complexometric titration with EDTA as titrant. The Ca-HA is synthesized by reacting $CaCO_3$ and $(NH_4)_2HPO_4$ 0.2 M in a hydrothermal synthesis autoclave reactor (200ºC, 24h) and then sintering (900ºC, 6h). The morphological properties of CTS and HA were assessed with SEM. Significantly well-separated HA particles in nano size (100–500nm) with sphere-like form were also observed by TEM image. The crystallinity and characteristic chemical groups of CTS and HA were examined by XRD and FTIR, respectively. Moreover, by EDX, the Ca/P molar ratio in HA was approximately 1.91, so an insignificant amount of Ca-rich phase was intimately mixed with created HA particles, and traces of Mg^{2+} and CO_3^{2-} ions are presented in HA crystalline structure. By acid-base titration, CTS degree of deacetylation of 90.69% was calculated from the percentage of free NH_2 groups in deacetylated chitin. CTS viscosity-average molecular weight of 1187.63 (kDa) using intrinsic viscosity measurement was calculated by the Mark-Houwink formula. PHyd, nanoHA, and CTS can be used in various fields of applications.

Keywords: *Crab shell, Chitosan, Hydroxyapatite, Protein hydrolysate*

Sec.3-Oral-09

THE GUT MICRBIOME OF THE TOMATO ANEMONEFISH *Amphiprion frenatus* UNDER A DEGRADED CORAL REEF HABITAT

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ABSTRACT:

Anemonefish in association with anemones is an iconic image of tropical coral reefs and essential to maintaining the structure and function of coral reefs. While it is well recognized that the global loss of coral reefs reduces species diversity and alters the structure of anemonefish and their host anemones, the effects of environmental degradation on microbial communities associated with fish remain unknown. In this study, we examined the variability and composition of the gut microbiome of the anemonefish, Amphiprion frenatus, occupying the anemone host E. quadricolor, which live in two contrasting ecosystems with different levels of reef degradation: the relatively pristine bay of Van Phong Island and Hon Mun Island as the disturbed bay. Although overexploitation did not affect the Shannon metrics or Evenness metrics, we found a significantly higher number of the amplicon sequence variants (ASVs) and Chao metrics of gut microbiome composition in fish living in the entire Van Phong bay compared to the disturbed Hon Mun bay. Beta indexes and Principal Coordinates Analysis (PCA) showed statistically significant differences in microbial composition and density between sample groups in Hon Mun and Van Phong. We also demonstrated that fish gut microbiomes on degraded reefs have a lower abundance of Cyanobacteria and Actinobacteria—anaerobic fermentative bacteria, and a higher diversity of anaerobic fermentative bacteria, such as Firmicutes and Proteobacteria. The observed shifts in fish gut bacterial communities across the habitat gradient extend to a small set of potentially beneficial host-associated bacteria, suggesting that essential fish microbiome interactions may be vulnerable to coral degradation.

Keywords: *anemonefish, microbiome, degraded coral reef, Nha Trang Bay, biodiversity*

Sec.4-Oral-01

CROCODILE BONE AS A POTENTIAL MATERIAL FOR BIOACTIVE CALCIUM PRODUCTION AND ITS APPLICATION

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ABSTRACT

The increasing demand for crocodile leather products has led to the mass farming of crocodiles in recent years. Consequently, significant environmental waste has been generated from the leftover materials after harvesting crocodile skin. Among these, bones account for a substantial proportion, second only to meat. This has resulted in severe environmental pollution, for which no effective utilization solutions have been implemented. In this study, we initially approached the utilization of crocodile bones to produce useful by-products and evaluated their potential applications in various fields. We successfully produced calcium-rich bone powder from crocodile bones. The quality properties of the calcium powder were assessed from multiple perspectives, including sensory and physicochemical characteristics. The whiteness index of the calcium powder from crocodile bones was recorded at 92.4. The calcium and phosphorus contents were 35.4% and 11.3%, respectively. The solubility of the powder at pH 2 and pH 7 was 99.3% and 11.5%, respectively. Moreover, the crocodile bone powder demonstrated high bioactivity with an IC_{50} value of 1,300 nM. The bone powder was also incorporated into shrimp crackers as an ingredient to enhance the product's quality. The results of this study indicate the potential of utilizing crocodile bones as a promising resource for producing calcium-rich mineral powder and expanding its practical applications.

Keywords: *Bioactive calcium, Crocodile, Crocodile bone, Calcium powder, Mineral powder*

Sec.4-Oral-02

DOSE-DEPENDENT EFFICACY OF ERGOTHIONEINE-LOADED CHITOSAN NANOPARTICLES ON LIPID OXIDATION AND DISCOLORATION OF YELLOWFIN TUNA MUSCLE DURING REFRIGERATED STORAGE

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ABSTRACT

This study investigates the effect of different dosages of ergothioneine-loaded chitosan nanoparticles (ECNP) on lipid oxidation and discoloration of yellowfin tuna (*Thunnus albacares*) muscle during refrigerated storage. ECNP was prepared using ionic gelation with tripolyphosphate, and varying concentrations were sprayed into tuna muscle samples. Changes in color, metmyoglobin concentration, lipid peroxides, and thiobarbituric acid reactive substances (TBARS) values were measured over the storage period. Results indicated that higher dosages of ECNP significantly reduced metmyoglobin formation and lipid oxidation in tuna meat, thereby preserving its natural red color. Samples treated with 400 mg ECNP per kg of fish meat maintained a grade A (excellent) redness index after 5 days, while samples treated with 100 mg or 200 mg ECNP per kg maintained a grade A redness index for 2 days. In contrast, the control samples only retained a grade B redness index after 1 day. These findings demonstrate that ECNP is a promising preservative for extending the color stability of tuna meat by preventing metmyoglobin formation and lipid oxidation.

Keywords: *antioxidant activity; ionic gelation; metmyoglobin; redness index; sashimi*

Sec.4-Oral-03

EFFECTS OF DRYING METHODS ON BIOACTIVE COMPOUNDS, ANTIOXIDANT CAPACITY, AND NATURAL FOOD COLORING IN PITAYA (HYLOCEREUS POLYRHIZUS) PEELS

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ABSTRACT

Pitaya (Hylocereus spp.), widely cultivated in Taiwan and Asia, generates significant waste during processing, as its peel, comprising one-third of the fruit, is often discarded. Rich in bioactive compounds such as betalains with antioxidant properties and free radical-scavenging abilities, the peel offers potential health benefits against oxidative stress-related diseases. However, its high moisture content necessitates drying, which can degrade its appearance, color, and nutrients. Moreover, natural pigments like betalains are inherently unstable during processing and storage. Microencapsulation has emerged as an effective strategy to protect these compounds, enhance stability, and extend shelf life, thereby broadening their potential applications. This study aimed to evaluate the effects of hot air drying (HAD), microwave vacuum drying (MVD), and freeze drying (FD) on the active components and antioxidant capacity of pitaya peel. Additionally, pitaya peel extract was microencapsulated using maltodextrin (MD), whey protein isolate (WPI), and brown rice protein (BRP) to improve betalain stability. The results showed that FD retained the highest levels of total betacyanin, betanin, total phenolics, and flavonoids, as well as a more intense red-purple color, compared to HAD and MVD. Economically, MVD retained 65–76% of betanin content relative to FD while reducing drying time by up to 92%. Microcapsules made with MD and WPI exhibited the highest encapsulation efficiency (87.51%), solubility (>90%), and lower water activity, enhancing preservation. In vitro digestion tests demonstrated that MD- and WPI-based microcapsules retained the highest levels of active compounds and antioxidant capacity, improving bioaccessibility. In conclusion, FD was most effective in preserving bioactive components, while MVD offered significant time and energy savings. Microencapsulation with MD and WPI further enhanced the stability and application potential of betalains, providing a sustainable and economically viable approach for utilizing pitaya peel as a natural food pigment.

Keywords: *pitaya peel; drying methods; microencapsulation; betalains; antioxidant activity.*

Sec.4-Oral-04

EFFECTS OF HARVESTING SEASON ON FATTY ACID COMPOSITION AND ANTICANCER ACTIVITY OF NEUTRAL AND POLAR LIPIDS IN PACIFIC OYSTER (*Crassostrea gigas*) MUSCLE CULTURED IN NHA PHU LAGOON

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ABSTRACT

In this study, we investigated the fatty acid composition and anticancer activity of neutral and polar lipid fractions extracted from Crassostrea gigas oysters cultured in Nha Phu Lagoon, Khanh Hoa Coast, harvested during the five months of January, April, May, September, and November. Analysis revealed that saturated fatty acids (SFAs) were the most abundant fatty acids in the neutral lipid fraction, followed by monounsaturated fatty acids (MUFAs) and polyunsaturated fatty acids (PUFAs). Conversely, the polar lipid fraction exhibited a different order, with PUFAs being the most abundant, followed by MUFAs and SFAs. Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) were identified as the most prevalent polyunsaturated fatty acids, while oleic acid and palmitic acid were the predominant monounsaturated and saturated fatty acids, respectively. Notably, the combined content of EPA and DHA in the polar lipid fraction consistently exceeded 30% throughout all five months of analysis. Thrombogenicity index (TI) values ranged from 0.13 to 0.29 for the polar lipid fraction and from 0.6 to 1.1 for the neutral lipid fraction. Moreover, the polar lipid fraction exhibited significantly higher n3/n6 ratios compared to the neutral lipid fraction. The polar lipid fraction exhibited stronger inhibitory effects on the growth of the three cancer cell lines (HepG2, MDA-MB-231, and RD) compared to the neutral lipid fraction. The findings of the present study show that lipids extracted from C. gigas oysters cultured in Khanh Hoa Coast have a weak anticancer activity but may still aid in prevention and treatment of certain cancer types.

Keywords: *Anticancer activity, fatty acid profile, lipid fraction, n3/n6 ratio, thrombogenicity index*

Sec.4-Oral-05

EXAMINE THE QUALITY CHANGES IN PEELED WHITE-LEG SHRIMP (*Litopenaeus vannamei*) COATED WITH AN EDIBLE ALGINATE/CACL$_2$ FILM UNDER REFRIGERATED STORAGE CONDITIONS (4±1°C)

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ABSTRACT

White-leg shrimp (*Litopenaeus vannamei*) are highly perishable after harvest due to microbiological changes and chemical and enzymatic alterations. This study examines the quality changes in peeled white-leg shrimp coated with an edible Alginate/$CaCl_2$ film under refrigerated storage conditions (4±1°C). Parameters such as weight loss, melanosis, TVB-N (total volatile basic nitrogen), total aerobic bacteria, and sensory evaluation were used to assess the effects of the coating and compare them with the control samples at 0, 4, 8, 12, and 16 days. The results indicated that the weight loss ratio and melanosis inhibition ability of the coated samples were better than those of the uncoated samples throughout the refrigerated storage period. After 16 days of storage, the coated shrimp samples had a weight loss of approximately 5.09%, and the melanosis inhibition score was 7.2, compared to 5.4% and 7.8, respectively, for the control samples. The findings also showed that shrimp samples coated with Alginate/$CaCl_2$ exhibited significantly better results in terms of total volatile basic nitrogen (TVB-N) and total aerobic bacteria. Throughout the refrigerated storage period, the TVB-N content and total aerobic bacteria count in the coated shrimp samples increased much less than in the uncoated control samples. After 16 days of storage, the TVB-N content and total aerobic bacteria in the coated samples were 1.428 mg/100g and 28.7x10^6 CFU/g, respectively, which were less than half of the values observed in the uncoated control samples. Additionally, the sensory quality score of shrimp coated with the alginate-gelatin film (3.6) was higher than that of the uncoated control samples (3.23). Therefore, it can be concluded that the quality of white-leg shrimp can be effectively preserved by applying an edible Alginate/$CaCl_2$ coating under refrigerated storage conditions.

Keywords: *edible coatings, white-leg shrimp, Alginate,*

Sec.4-Oral-06

FUCOIDAN AMELIORATES RADIATION-INDUCED SKIN FIBROSIS: A COMPREHENSIVE PROTEOMIC INSIGHTS INTO MOLECULAR RECOVERY MECHANISMS

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ABSTRACT

Radiation therapy, while critical in cancer treatment, often leads to severe skin complications, including fibrosis and tissue damage. Low molecular weight fucoidan (LMWF), a sulfated polysaccharide derived from brown seaweed, emerges as a promising therapeutic agent to mitigate these radiation-induced injuries. This study comprehensively investigated the molecular mechanisms underlying fucoidan's protective and regenerative effects on radiation-damaged skin using an integrated experimental approach. Utilizing a rat hind limb irradiation model, we examined the histomorphological and molecular changes following radiation exposure and subsequent LMWF treatment. Histological assessments revealed significant skin thinning and reduction in hair follicle density post-irradiation. Immunohistochemical analyses exposed elevated levels of inflammatory markers, including TGF-β1, IL-1β, PDGFR, NF-κB, and collagen-I, which were substantially ameliorated by LMWF intervention. Mass spectrometry-based proteomics provided unprecedented insights into the global protein expression dynamics during radiation-induced fibrosis and fucoidan treatment. Pathway analysis highlighted degranulation processes in neutrophils and macrophages as the most significantly disturbed biological function. Protein interaction network analysis identified tight junction and actin cytoskeleton regulation as critical molecular modules in the recovery process. Notably, we identified a panel of seven key proteins—Actb, Ezr, Msn, Cdc42, Actr3, Arpc2, and Cfl1—that play crucial roles in progression and inhibition of radiation-induced skin fibrosis. These proteins potentially represent novel biomarkers for fucoidan-assisted recovery, offering new perspectives on managing radiation therapy-related skin complications.

Keywords: *low molecular weight fucoidan, radiation-induced skin fibrosis, proteomic analysis, molecular recovery, inflammatory markers*

Sec.4-Oral-07

INDUCTION OF THE VIABLE BUT NON-CULTURABLE STATE AND PROTEOMIC ALTERATION IN LISTERIA MONOCYTOGENES BY NON-THERMAL TREATMENT TECHNOLOGIES

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ABSTRACT

Food safety is critically linked to global human health, with foodborne illnesses caused by microbial contamination receiving significant attention. Listeria monocytogenes, a facultative anaerobic bacterium, can survive in low-temperature environments, making refrigerated foods particularly susceptible to contamination and posing a severe threat to high-risk populations. Recent studies have shown that bacteria under adverse conditions can enter a viable but non-culturable (VBNC) state, in which they remain metabolically active despite being unable to grow on conventional culture media. These bacteria may regain their ability to proliferate once environmental conditions improve, presenting a potential food safety hazard. Several non-thermal treatment technologies are exhibiting broad-spectrum antimicrobial activity and already being applied in food sterilization. However, the efficacy of these treatments in eliminating Listeria monocytogenes after entering the VBNC state, as well as its effects on bacterial cells, remain to be thoroughly investigated. This study aims to comprehensively examine the quantitively proteomic changes of non-thermal treatment technologies on Listeria monocytogenes in different physiological states and to analyze the physiological changes in bacterial cells following treatment. The findings will contribute to evaluating the potential application of non-thermal treatment technologies in the sterilization of seafood products.

Keywords: *Non-thermal processing, Quantitative proteomics, Listeria monocytogenes, Viable but nonculturable state*

Sec.4-Oral-08

QUALITY CHANGES IN POMPANO (*Trachinotus blochii*) FILLETS STORED UNDER SUPERCHILLING CONDITIONS AT -2 ± 0.2 °C

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ABSTRACT

This study aimed to evaluate the quality changes in Pompano (*Trachinotus blochii*) fillets stored under superchilling conditions at -2 ± 0.2 °C for 40 days. Two packaging methods were employed: vacuum packaging and plastic film. Physical and chemical parameters, including texture, color, pH, water-holding capacity (WHC), total volatile basic nitrogen (TVB-N), and total aerobic plate count (TPC), were monitored every five days during the storage period. The results indicated deterioration in both texture and color after 40 days, with the vacuum-packed fillets exhibiting less discoloration compared to those wrapped in plastic film. No significant changes in WHC were observed throughout the storage period. TVB-N levels remained below the European Union's permissible limit for seafood, staying under 30 mgN/100g after 30 days. TPC levels exceeded the acceptable threshold (>106 CFU/g) in the plastic film-wrapped samples on day 25, while the vacuum-sealed samples crossed the limit on day 30. Vacuum packaging was found to be more effective in preserving the quality of Pompano fillets stored at superchilling temperatures (-2 ± 0.2°C) for up to 30 days.

Keywords: *Pompano, Trachinotus blochii, vacuum packaging, superchilling, quality changes*

Sec.4-Oral-9

SYNERESIS PROPERTIES OF MIXED GELS OF IOTA- AND KAPPA-CARRAGEENAN IN PRESENCE OF IONS

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ABSTRACT

Syneresis usually occurs in strong carrageenan gels in the presence of ions, causing the loss of contact between the gel and the plate and the release of fluid from the gel. The purpose of this study is to observe the syneresis properties of pure carrageenan gel (κappa- or ιota- carrageenan) and mixture of κappa- and ιota- carrageenan gels in presence of potassium/ calcium ions using syneresis measurement, confocal laser scanning microscopy (CLSM), and rheology in parallel. Understanding the syneresis properties of mixtures of κappa-carrageenan and ιota-carrageenan is important not only because the two types of carrageenan are often present together in commercial samples, but also because the synergetic rheological properties of mixtures compared to individual systems can potentially be exploited in applications.

In this study, carrageenan was extracted from *K.alvarezii* and *E.denticulatum* cultivated in Cam Ranh Bay (Khanh Hoa province). Water extraction method was used to keep the natural structure of carrageenan. The rheological measurements were determined using a rheometer. The storage modulus (G')/ loss modulus (G") were determined as a function of the frequency and the temperature using plate – plate geometry. The microstructure was used CLSM. The syneresis measurements were performed at room temperature by measuring the amount of solvent release by the hydrogels after various time intervals.

The results showed that at room temperature, the syneresis ratio of pure and mixed carrageenan gels depended on KCl/ $CaCl_2$ concentration in the gel and polysaccharide concentration. The syneresis ratio of the gels in presence of KCl were much higher than those with added $CaCl_2$. Increasing potassium led to increased stiffness (G') with G' rapidly increasing for all samples, but the syneresis occurred when [KCl] > 30 mM. Syneresis ratio of the pure gels were higher than in the mix gels. Increasing proportion of ι- carrageenan in the mixture gels rapidly decreased fluid release. The weakest syneresis was observed in the gel with a κappa- to ιota-carrageenan ratio of 50/50. The dynamic syneresis process, in which syneresis fluid was not withdrawn, was also observed using CLSM and rheology. The results suggest that elasticity of ι-carrageenan prevents fluid release in the gel.

It is concluded that the syneresis of the κ-carrageenan network is lower in the mixed gels than in the corresponding individual gels. The syneresis ratios of the mixed gels also depend on concentration of ιota-carrageenan.

Keywords: *syneresis, microstructure, rheological properties, carrageenan*

Sec.4-Oral-10

THE EFFECT OF SMOKING PARAMETERS ON THE QUALITY OF SMOKED CARANX IGNOBILIS FILLTES

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ABSTRACT

This study was undertaken to investigate the effect of smoking parameters on the quality of smoked Caranx ignobilis fillets. Fish fillets were immersed in brine (1:1) containing 20g/L NaCl at 0-5°C for 30 minutes, allowed to drain at room temperature for 10 minutes. Fish fillets were marinated with recepies: sugar 4%, seasoning powder 0.5%, chili powder 6%, and commercial liquid smoked flavourings ratio 0,5-1,5% for 30 minutes then smoked directly with wood smoked in a smoked chamber at a temperature of 50-90°C; smoking time of 65-85 minutes and smoked speed 1-3m/s. The best product quality was done in the process with commercial liquid smoked flavourings ratio 1%, smoked temperature of 70°C; smoking time of 75 minutes and smoked speed of 1,5m/s. The results showed that sensory quality of the final product was good according to TCVN 3215-79, microbiological and physicochemical criteria meet the requirements according to QCVN 8-3:2012/BYT và TCVN 11042:2015.

Keywords: *Caranx ignobilis, liquid smoked, wood smoked*

Sec.5-Oral-01

VISION SYSTEM FOR STRUCTURAL MODAL ANALYSIS USING CONSUMER CAMERA

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ABSTRACT

Recent advancements in vision-based systems have greatly improved the measurement of dynamic displacements of structures. Nonetheless, these studies face challenges such as the need for installing artificial targets and utilizing expensive high-speed, high-resolution cameras. To address these challenges, this paper proposes a target-free method that utilizes a cost-effective and robust consumer camera for structural modal analysis. Experiments were conducted to evaluate the effectiveness of this approach.

Keywords: *Camera-vison, Feature Tracking, Modal Analysis*.

Sec.5-Oral-02

ONTOLOGY-BASED DECISION SUPPORT SYSTEM FOR ENHANCING AQUACULTURE MANAGEMENT

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ABSTRACT

Effective aquaculture management, particularly in diagnosing diseases in shrimp and fish, demands precise and context-sensitive decision-making tools. This study presents an Ontology-Based Decision Support System (DSS) designed to enhance the diagnostic accuracy for aquaculture diseases. The system leverages domain ontologies to model the complex relationships among environmental parameters, disease symptoms, and causative factors. Using Semantic Web Rule Language (SWRL) and SPARQL queries, the system performs advanced reasoning to identify potential diseases and recommend mitigation strategies. The proposed DSS was evaluated against traditional diagnostic methods, demonstrating improved accuracy and consistency in disease identification. Comparative analysis highlights the advantages of ontology-based reasoning in integrating diverse datasets and applying structured rules to derive actionable insights. The results underline the potential of this approach in promoting sustainable and efficient aquaculture management by minimizing losses and ensuring prompt disease mitigation.

Keywords: *Ontology, Decision support system, Aquaculture, SWRL, SPARQL*

Sec.5-Oral-03

DATA-DRIVEN COLD DAMAGE PREDICTION FOR FISH MORTALITY PREVENTION USING WEATHER OBSERVATION OPEN DATA

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ABSTRACT

In recent years, the impact of climate change has significantly increased the risks of fish mortality in aquaculture, particularly due to the rising frequency of cold damage caused by abnormally low seawater temperatures. This results in substantial economic losses for the aquaculture industry. Data-driven cold damage prediction based on time-series deep learning models is thus an important AI application for fish mortality prevention. However, the difficulties of deploying multi-modal sensors in ocean environments limit the ability to collect fish and environmental big data from offshore aquaculture cages, which are essential for training accurate prediction models. In this study, we address the data collection challenge by deploying temperature sensors at experimental aquaculture sites to collect real-time seawater temperature time-series data. This dataset is then integrated with publicly available weather observation open datasets provided by the Taiwan Central Weather Administration to construct a comprehensive ocean weather dataset, which serves as the foundation for training the proposed prediction models.

The data at each time unit in the time series records multiple critical ocean weather parameters including timestamp, GPS location, tide height, wave height, wave direction, wave period, wind speed, wind direction, maximum wind speed, air temperature, sea temperature, ocean current direction, and ocean current speed. This ocean weather dataset is used to train a seawater temperature prediction model, which maps an ocean weather time-series to a long-term time series of seawater temperatures. Furthermore, for a specific fish species, a deterministic fish mortality model is designed to calculate the probability of fish mortality based on the value of seawater temperature. For each time unit, a back-traced seawater temperature time series is cropped from the ocean weather dataset and further labeled with the probability of cold damage. This generates an additional fish mortality training dataset for training the proposed fish mortality evaluation model.

The proposed cold damage prediction model is then developed, consisting of the seawater prediction model and the fish mortality evaluation model. With a time series of ocean weather predictions as input, the proposed cold damage prediction model outputs a long-term probability list of fish mortality. These time-series predictions are processed by a cold damage avoidance model, which employs reinforcement learning to determine the optimal sequence of actions to reduce risk and prevent economic losses. The proposed system considers various intervention

strategies, including intelligent heating systems, oxygenation mechanisms, early harvesting, stock density adjustments, and relocating aquaculture facilities to safer locations. The primary goal

of the cold damage avoidance model is to provide cost-effective, data-driven solutions that minimize economic losses.

The key contributions of this research include: (1) the development of a low-cost, multimodal early warning model for real-time cold damage prevention using deep learning techniques; (2) the application of reinforcement learning to formulate optimal risk mitigation strategies; and (3) achieving a 30% reduction in economic losses, as validated by experimental results. To the best of our knowledge, this is the first early warning model specifically designed for cold damage in aquaculture. Furthermore, this research aligns with the United Nations' Sustainable Development Goals (SDGs), particularly Climate Action (Goal 13) and Life Below Water (Goal 14), by promoting sustainable and resilient aquaculture practices. The findings of this study not only address an urgent issue in the aquaculture industry but also contribute to advancing global efforts to combat climate change and protect marine ecosystems.

Keywords: *Time series deep learning model; Seawater prediction, Fish mortality model, Cold damage evaluation, Reinforcement learning, Climate Action, Life Below Water.*

Sec.5-Oral-04

OPTIMAL SITE SELECTION FOR CLAM *Meretrix lyrata* (Sowerby, 1851) FARMING TO MINIMIZING ENVIRONMENTAL IMPACTS USING FUZZY OVERLAY ANALYSIS

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ABSTRACT

This study presented a spatial analysis approach to identify optimal locations for clam Meretrix lyrata (Sowerby, 1851) farming. We integrated multiple environmental factors critical for clam growth and production by utilizing a fuzzy overlay technique in a Geographic Information System (GIS). The key layers are incorporated including water quality suitability, food availability, and tidal regime suitability, as long as relative factors such as phytoplanton, turbidity, salinity, pH, temperature and tidal regime are performed. By applying fuzzy logic to these layers, we generate a suitability map highlighting areas with the highest potential for successful clam farming. Furthermore, this approach allows for the incorporation of uncertainty and variability inherent in environmental data. Also, the resulting maps provided valuable information for planning and management in clam farming, adding in the selection of sites that maximize production while minimizing environmental impacts. Finally, this study demonstrates the potential of fuzzy overlay analysis as a decision-support tool for sustainable aquaculture development.

Keywords: *Meretrix lyrata, environmental impacts, farming site selection, fuzzy overlay, GIS*

Sec.5-Oral-05

SELECTING THE KIND OF FISH CAGES BY COMPOSITE MATERIAL IN THE COASTAL AQUACULTURE

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ABSTRACT

This paper selected the best fish cage structure which was made from FRP (Fiberglass Reinforced Plastic) material by comparison between three types of suggested structures. The fish cage was selected to be the highest strength which was comparised displacement of the same position in each fish cages, each case having the same loads and boundary conditions. Totally 48 cases of strengths and displacements were conducted, the result is the structure of fish cage number 2 was selected. The strength of fish cages generated by Abaqus software.

Keywords: *FRP material, Fish cages, Displacement, Strength*

Sec.5-Oral-06

SHORT-TERM SOLAR POWER PREDICTION ON MARINE SHIP BASED DEEP GRU NETWORK

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ABSTRACT

The integration of renewable energy sources in marine ship is a promising approach to mitigating carbon dioxide (CO_2) emissions and enhancing energy management efficiency. This study introduces a deep Gated Recurrent Unit (GRU) network for short-term solar power prediction on a marine ship equipped with a solar power system. By leveraging the temporal dependencies and non-linear dynamics of solar power generation, the proposed GRU model offers precise and reliable predictions, facilitating optimal energy management strategies. The GRU model's performance was benchmarked against a traditional Recurrent Neural Network (RNN) model, showcasing its superiority in terms of prediction accuracy and robustness in handling variable solar power outputs. Experiments indicate that the GRU-based method significantly improves the utilization of renewable energy resources, thereby reducing reliance on conventional fuel sources and mitigating the environmental impact of maritime operations. This research contributes to the advancement of energy management systems in the marine industry, emphasizing the role of advanced deep learning models in promoting sustainable practices and highlights the potential of integrating deep learning algorithm with renewable energy systems to support the global transition toward cleaner and greener maritime operations.

Keywords: *Deep learning machine, Gate recurrent unit, Solar power system, Short-term solar prediction, marine ship, cleaner maritime operations.*

Sec.5-Oral-07

ENHANCING MECHANICAL AND THERMAL PROPERTIES OF SUSTAINABLE POLYPROPYLENE COMPOSITES WITH HYBRID BIOCHAR FILLERS AND COUPLING AGENTS

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ABSTRACT

This study explores the development and characterization of polypropylene-based hybrid composites reinforced with natural fibers and bio-based fillers. The composites, formulated with 25 wt% short woven flax fibers, 20 wt% basalt fibers, 6 wt% maleic anhydride grafted polypropylene (MAPP), and varying contents (6%, 12%, 18%) of rice husk biochar powder (RHBP) and rice husk–eggshell biochar powder ((RH-ES)BP), demonstrate remarkable enhancements in mechanical and thermal properties. The addition of biochar fillers significantly improved tensile and flexural strength, increasing by up to 23.24% and 20.24%, respectively, in comparison to composites without biochar fillers. Dynamic mechanical analysis revealed that RHBP and (RH-ES)BP fillers improved storage modulus and thermal stability, with the highest recorded storage modulus being 3245.07 MPa. Morphological analyses confirmed uniform filler dispersion and improved fiber-matrix adhesion facilitated by MAPP. Infrared spectroscopy validated the chemical interactions between biochar fillers, fibers, and the matrix. The hybrid composites' enhanced stiffness, strength, and thermal performance make them suitable for sustainable, eco-friendly applications, such as automotive interiors and structural components in construction.

Keywords: *Rice husk biochar powder; (Rice husk – eggshell) biochar powder; Mechanical properties; Dynamic mechanical analysis, Thermal stability*

Sec.5-Oral-07

RESEARCH ON FUEL INJECTION SCHEME ADJUSTMENT FOR ENGINE USING METHANE GAS WITH 40% CARBON DIOXIDE

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ABSTRACT

With the strong shift in the use of alternative energy sources for gasoline engines on waterway and road vehicles to gradually reduce the concentration of toxic emissions into the environment according to the roadmap towards Net zero by 2050 according to Vietnam's commitment at COP26. With this goal, the article presents the results of a research test of an engine using methane gas fuel containing 40% impurities. The research engine is a Honda JA52E gasoline engine with a pre-set ECU and Juken engine control software connected to a computer. Thanks to the support of Juken software and devices connected to the engine, the methane and CO2 fuel injection diagram into the engine intake manifold was calibrated and established. The stable engine operation with suitable diagram opens up future in-depth research directions in using engines with methane fuel of different compositions and impurity ratios, and possibly even many other alternative fuels to gasoline.

Keywords: *methane, carbon dioxide, engine, juken,…*

Sec.6-Oral-01

ENERGY SAVING POLICIES IN ACCOMMODATION BUSINESSES – A CASE STUDY IN NHA TRANG CITY

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ABSTRACT

Energy saving has become a familiar trend for accommodation businesses, not only reducing costs but also addressing the growing public concern about health and the environment, especially in the aftermath of the COVID-19 pandemic. Today's travelers tend to prioritize hotels that engage in environmental protection activities. Recognizing this, hotels in Vietnam, particularly in Nha Trang, have placed greater emphasis on energy saving as an optimal solution to attract customers.

This article focuses on studying the energy-saving policies of hotels in Nha Trang, analyzing the advantages and challenges of implementation. It further proposes solutions to overcome these challenges, aiming to promote and enhance the effectiveness of such activities, making energy saving an essential factor in accommodation business operations and fostering sustainable development for hotels.

Sec.6-Oral-02

ESG IN GOVERNING FISHERIES ENTERPRISES

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ABSTRACT

ESG (Environment, Society, Governance) is gradually becoming an important concept to measure factors related to sustainable development and the influence and impact of businesses on the community. As a comprehensive assessment method for sustainable development of businesses, ESG is an important basis for finding business partners in the global supply chain.

Adopting an ESG program brings fisheries enterprises many benefits, based on the priority of ESG, customers today care about what an enterprise does to protect the environment, therefore, enterprises are ESG compliant can retain and attract more customers. Working for ESG oriented enterprises helps employees increase job satisfaction, which in turn leads to positive results and increased employee retention rates. Aiming for ESG goals allows enterprises to save operating costs, at the same time, contributing to minimizing environmental impacts and sustainable corporate governance.

Some Vietnamese fisheries enterprises find that integrating ESG strategies into producing and trading operations is essential to ensure long-term and sustainable growth. However, approaching and choosing the appropriate ESG framework and implementing an ESG program can pose many challenges, and at the same time, many opportunities also open up for Vietnamese fisheries enterprises.

Keywords: *ESG, sustainability, framework, governance, fisheries enterprises*

Sec.6-Oral-03

EVALUATING THE SUSTAINABLE DEVELOPMENT OF MARINE AND ISLAND TOURISM IN BICH DAM: A SWOT ANALYSIS AND POLICY RECOMMENDATIONS

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ABSTRACT

Nha Trang - Khanh Hoa, located in Vietnam's South-Central Coast region, is rich in tourism resources and diverse terrain, including plains, forests, seas, and islands. With its natural and cultural attractions and distinct local cultural identity, the area has great potential for general tourism and community-based tourism. Resolution No. 08-NQ/TW, dated January 16, 2017, by the Politburo, highlights tourism as a shared responsibility of the political system and society, emphasizing the roles of enterprises and communities while encouraging policies to support community-based tourism.

Nha Trang has identified the Bích Đầm island area in Vĩnh Nguyên Ward as a prime location for developing community-based ecotourism. Key features include a centuries-old fishing village, a communal house with five royal decrees, stunning landscapes, and visits to the Mũi Điện lighthouse. Despite its potential, tourism in Bích Đầm remains fragmented, lacking coordination among stakeholders, and underutilizing the roles of local authorities and enterprises.

This article explores green tourism principles and examines conditions for sustainable marine and island tourism development in Bích Đầm. Using data from the Khanh Hoa Department of Tourism and surveys, it presents a SWOT analysis, strategic vision, and recommendations to make tourism a key economic sector driving growth in Bích Đầm island.

Keywords: *Marine and Island Tourism; Green Tourism; Sustainable Development; Bich Dam.*

Sec.6-Oral-04

FACTORS INFLUENCING ACCOMMODATION SELECTION OF GENERATION Z DOMESTIC TOURISTS TRAVELING TO NHA TRANG: INSIGHTS FOR SUSTAINABLE MARINE TOURISM DEVELOPMENT

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ABSTRACT

As Nha Trang emerges as a prominent destination for marine tourism in Vietnam, understanding the preferences and decision-making factors of Generation Z (aged 18-27) becomes vital for the hospitality and tourism sectors. This study explores the factors influencing accommodation selection among Vietnamese Gen Z tourists visiting Nha Trang, a city known for its rich marine biodiversity and coastal attractions. Using the theory of planned behavior and a sample of 212 domestic travelers analyzed via SPSS23 software, the research identifies key determinants such as perceived price, security and safety, online reviews, and promotional efforts. The findings highlight the importance of tailoring accommodation services to align with Gen Z's unique habits and values, while also addressing their interest in sustainable and eco-friendly practices. Recommendations are proposed to enhance service quality, boost competitiveness, and support the development of sustainable marine tourism in Nha Trang, contributing to its reputation as a leading coastal destination.

Keywords: *Generation Z, Accommodation Selection, Sustainable Marine Tourism*

Sec.6-Oral-05

OFFSHORE WIND POWER IN TAIWAN: UNIQUE OR UNIVERSAL IMPACTS AND CHALLENGES?

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ABSTRACT

Offshore wind power is an alternative green energy in the maritime economy and has gradually brought many potential benefits in the world. However, developing offshore wind power still faces many potential negative impacts regardless of where it is built (e.g. environment and fish group rivalry, dolphin, bird, etc.) and un-predictable factors (e.g. typhoon, earthquake, etc.) during various development stages (e.g. planning design, manufacturing, installation, and de-commissioning). These issues have become common problems in many countries (UK, Taiwan, and others). Taking Taiwan as an example, , this paper aims to explore key potential impacts of when developing offshore wind power through expert interviews (6) analyzed using grounded theory. The interview experts include operators and governmental authorities. Results of this paper can help identify key barriers and provide potential solutions for ameliorating any negative impacts for the stakeholders (e.g. investors) and reduce potential investment and operational risk in the offshore wind power industries. Also, policy recommendations will be provided to strengthen the cooperation correlations between upstream and downstream of the industrial chains operators and governmental authorities (e.g. Traffic Separation Scheme, insurance, human training etc.). The research findings can further be applied to other countries who exists similar problems.

Keywords: *Offshore Wind Power, Interview, Taiwan*

Sec.6-Oral-06

THE RELATIONSHIP BETWEEN PERCEIVED ENVIRONMENT IMPACTS AND COMMUNITY SUPPORT FOR SUSTAINABLE TOURISM DEVELOPMENT

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ABSTRACT

The purpose of this article is to examine the perception of environmental impacts on local community support for sustainable tourism development. The research is based on social exchange theory and the bottom-up spillover theory, utilizing a quota sampling method to gather data from 650 respondents, which were analyzed using SmartPLS software. The results indicate that the local community perceives both positive and negative environmental impacts on their quality of life. Additionally, the quality of life is identified as a predictor of community support for tourism development. The study provides recommendations for local authorities to develop strategies that improve the community's quality of life, increase support for tourism, and steer the coastal city of Nha Trang toward sustainable tourism development.

Keywords: *environmental impacts, community support, quality of life.*

Sec.6-Oral-07

THE ROLE OF THE CHAM COMMUNITY IN DEVELOPING GREEN TOURISM IN NINH THUAN

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ABSTRACT

This study examines the critical role of the Cham community in developing green tourism in Ninh Thuan province, Vietnam. The study highlights how the Cham people's traditional knowledge and cultural practices contribute to sustainable tourism initiatives. The study examines key opportunities and challenges in incorporating community participation into green tourism development through qualitative methods, including field observations and interviews with local stakeholders. The findings emphasize that empowering the Cham community preserves their cultural identity and enhances the economic sustainability of tourism in the region. This paper provides practical recommendations for policymakers to foster inclusive, community-driven green tourism models in Ninh Thuan.

Keywords: *Cham people, Community participation, Green tourism, Sustainable tourism*

POSTER SESSION

Sec.1-Poster-01

DEVELOPMENT OF SWAMP EEL (*Monopterus albus*) FARMING TECHNIQUES IN RECIRCULATING AQUACULTURE SYSTEM

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ABSTRACT

Asian swamp eel (*Monopterus albus*) is one of the most widely freshwater fish for human consumption in the Mekong Delta. Currently, swamp eel is cultured in tanks without soil instead nylon rope or net used as substrate. Commercial feed and high density (500 ind./m^2) were applied, yields can be up to 160 kg/m^2 with an FCR of 1.1 and a survival rate of 85% after 8 months of culture. Water quality management was carried out by water exchange at least 4 times per day (400% of culture volume). With these techniques, some major constraints linked to sustainable development such as water use and waste release, health management, and product quality have been emerged. An advanced technique, recirculation aquaculture system (RAS), was applied for swamp eel farming since 2019 in Can Tho City. Achieved results revealed high potential techniques with water use reduction 16-20 times, survival rates reached up to 80%, and good meat quality. These techniques have been successfully applied at farms in provinces around the Mekong Delta (Can Tho, Dong Thap, Hau Giang, and Kien Giang) and continue improving to meet the demand not only for local consumption but also for export markets in terms of production and products quality.

Keys words: *advanced techniques, swamp eel farming, recirculation aquaculture system*

Sec.1-Poster-02

EFFECTS OF FEEDING DENSITY AND STOCKING DENSITY ON THE DEVELOPMENT OF HERMIT CRAB *CLIBANARIUS LONGITARSUS* LARVAE

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ABSTRACT

The study aimed to determine the effects of stocking density and different feeding densities on the development of hermit crab *Clibanarius longitarsus* larvae. The experiment was designed completely randomly in a system of 48 1-L glass beakers with 16 treatments, three replicates, with 4 stocking densities (50, 100, 200, and 300 larvae/L) and four different feeding densities. During the Zoea 1 and Zoea 2 stages, the larvae were fed rotifers (*Brachionus plicatilis*) at densities of 8, 10, 12, and 14 rotifers/mL. Upon reaching the Zoea 3 stage, rotifer density was increased by 10 rotifers/mL in each treatment, supplementing the existing rotifer density, and *Artemia* nauplius were provided at densities of 1, 2, 3, and 4 nauplii/mL, corresponding to the feeding density treatments. Larval stage index (LSI), metamorphosis duration, and larval survival rate were determined regularly at each stage. All stages were observed and recorded from Zoea 1 to Glaucothoe. The results showed that the highest survival rate to the Glaucothoe stage (10±2.0%) was observed in the 50 larvae/L and 14 rotifers/mL treatment. Larval survival was not observed in treatments with feeding densities below 10 rotifers/mL. Additionally, a high survival rate of larvae was also observed in the 200 larvae/L and 14 rotifers/mL treatment. The results indicated that high feeding density of rotifers resulted in better metamorphosis duration and survival rate of hermit crab *C. longitarsus* larvae. Stocking density and feeding density had an effect on metamorphosis duration and survival rate of hermit crabs, but did not affect the larval size ($p>0.05$).

Keywords: *Clibanarius longitarsus*, *density, feeding, hermit crab, survival rate.*

Sec.1-Poster-03

MICROALGAL SELECTION AND FEED PREFERENCE IN BLACK TIGER SHRIMP (*Penaeus Monodon*) LARVICULTURE

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ABSTRACT

The criteria for selecting microalgal feed in the larviculture of black tiger shrimp (*Penaeus monodon*) remain insufficiently studied, particularly regarding cell size and distribution capacity under rearing conditions. This study investigates the feeding preference and utilization of microalgal diets in the zoea stage of *P. monodon* larvae. Three experimental treatments were implemented, involving (T1) a mono-diet of *Thalassiosira weissflogii*, (T2) a mono-diet of *Chaetoceros muelleri*, and (T3) a combined diet of *T. weissflogii* and *C. muelleri* in a 1:1 ratio. Key parameters related to microalgae (nutritional value, cell size, and sinking rate) and shrimp larval performance (feeding rate, survival rate, and growth) were assessed. The results showed that *T. weissflogii* had a significantly larger cell size and a higher sinking rate than *C. muelleri*. Shrimp larvae exhibited a strong preference for and higher ingestion of the larger microalgal species (*T. weissflogii*). However, the highest survival rate and larval growth were observed in the treatment combining both microalgal species. These findings suggest that the combined use of *T. weissflogii* and *C. muelleri*, along with a staggered feeding strategy, can improve larval rearing efficiency.

Keywords: *Feed preference, Larviculture, Microalgal, Penaeus monodon*

Sec.1-Poster-04

NATURAL-BASED AQUACULTURE: A CASE OF IMPROVED EXTENSIVE AND ALTERNATIVE RICE-SHRIMP FARMING MODELS

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ABSTRACT

Nature-based aquaculture offers one of the most integrated and sustainable approaches to climate adaptation by harnessing the power of natural ecosystems to mitigate risks and enhance resilience. Aquaculture in the Mekong Delta, Vietnam, is diverse, encompassing integrated and alternative models in both freshwater and brackish water areas. All of these systems are, to some extent, nature-dependent and also vulnerable to climate-related risks, including salinity intrusion, rapid temperature changes, intense rainfall events, and more. However, the degree of nature-based orientation and climate resilience varies among these systems. This paper presents the preliminary survey results of two typical farming models: 30 farmers practicing improved extensive shrimp farming (Penaeus monodon) and 32 farmers practicing an alternative rice-shrimp system (P. monodon in the dry season) and integrated rice and giant freshwater prawn (Macrobrachium rosenbergii) in the rainy season. These farming models take advantage of natural ecological conditions, such as the availability of water surface, euryhaline aquatic plants, and natural food, in combination with technical interventions, including stocking hatchery-reared shrimp and prawn. The improved extensive shrimp system achieved a productivity of 343±104 kg/ha with a net income of 56.8±15.9 million VND/ha. The alternative rice-shrimp system yielded 275±89.2 kg/ha with a net income of 110±19.0 million VND/ha in the dry season, plus 311±68.8 kg/ha of prawn with a net income of 25.3±7.5 million VND/ha in the rainy season. These farming models demonstrate that nature-based aquaculture is a reliable solution for adapting to climate-related risks.

Keywords: *alternative rice-shrimp, climate-related risks, improved extensive shrimp, nature-based aquaculture.*

Sec.1-Poster-05

POTENTIAL OF EURYHALINE SPECIES FOR BRACKISHWATER AQUACULTURE: A CASE STUDY OF *PANGASIUS KREMPFI* FARMING PRACTICES IN THE MEKONG RIVER DELTA, VIETNAM

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ABSTRACT

The Mekong Delta of Vietnam, which predominantly relies on a few species, primarily marine shrimp and striped catfish, together accounting for over 54% of the region's total production, is facing many challenges due to climate change, particularly salinity intrusion. The predicted threats of climate change and the dependence on a limited number of species raise pressing concerns about the long-term sustainability of the aquaculture industry in the region. This study consists of two main components: (1) identifying potential species for coastal aquaculture and (2) evaluating the farming status of Pangasius krempfi through a structured survey of farmers in three provinces of the Mekong Delta. Among the 1,219 fish species recorded in the Lower Mekong Basin, 176 belong to Siluriformes, which exhibit traits suitable for aquaculture, such as less intra-muscular bones, adaptability to intensive culture conditions, high fecundity, resistance to a broad range of infectious diseases, and efficient feed conversion ratios. Of these, 18 species were classified as euryhaline, inhabiting a wide range of salinities. P. krempfi, P. mekongensis, Mystus gulio, and Plotosus canius were identified as the most promising candidates using a selection framework. These selected species are currently in the early phases of domestication. Survey results indicated that P. krempfi requires a culture period of approximately 18 months. Fingerlings (~5.46 cm) are typically stocked at a density of 1-2 individuals per m². Fish were harvested with a mean productivity of 15.2 tons/ha/crop and a survival rate of 72.1%. The production cost was 37,167±8,750 USD/ha/crop. Total revenue was 73,542±57,625 USD/ha/crop, and the average profit was 36,375±52,208 USD/ha/crop. The farming practice of this fish faces many challenges, including limited access to export markets, reliance on wild seed, and the lack of standardized farming protocols. P. krempfi is considered one of the potential species for domestication research under the project entitled "Diversification of farmed fishes in the Mekong Delta through the selection of new euryhaline fish candidates: A multidisciplinary approach for sustainable aquaculture", which is jointly conducted by Can Tho University and Namur University and Liege University (Belgium).

Keywords: domestication, euryhaline species, Pangasius krempfi

Sec.1-Poster-06

RESEARCH ON GROW – OUT CULTURE PROCESS OF DOG CONCH (Strombus Canarium) IN VIETNAM

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ABSTRACT

Dog conch *Strombus canarium* is a potential economic aquaculture species in Vietnam with high nutritional value. This research was conducted to build the grow-out process of dog conch in Khanh Hoa province. The results showed that a grow-out culture of dog conch model in the earthen pond had a highest survival rate of 71.0 ± 1.51%. After 10 months, the size of dog conch was 27.0 ± 1.8 g/ind., growth rate of 0.195 ± 0.004 mm/day, feed conversion ratio of 1.91 ± 0.15 and productivity was 1.54 ± 0.06 kg/m^2. The model of dog conch grow-out culture in the intertidal zone showed a highest survival rate of 62.8 ± 1.32% with size of 22.9 ± 1.2 g/ind., and the productivity was 1.15 ± 0.05 kg/m2 after 10 months. Both models of dog conch showed a high economic efficiency, which profit margins was ranged from 30.4% in the intertidal farming model to 50.9% in the earthen pond farming model.

Keywords: *dog conch, farming model, growth rate, survival rate.*

Sec.2-Poster-01

QUANTIFYING BIOFOULING IMPACT ON LOBSTER CAGES: A STUDY IN XUAN DAI BAY, PHU YEN PROVINCE, VIETNAM

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ABSTRACT

This study aimed to investigate the composition and biomass of fouling algae and fauna on lobster cages in Xuan Dai Bay. Monthly samples were collected from the sides and bottom of five lobster cages in Xuan Dai Bay, Phu Yen Province, from July to December 2017. The results revealed that the fouling algae consisted of 20 genera from two families. Bacillariophyceae was the dominant group with 19 genera, accounting for 95% of the total, while one genus belonged to Chrysophyceae. The fouling fauna comprised 21 species belonging to three classes. Among these, 14 species were classified under seven families of bivalve mollusks (Anomiidae, Arcticidae, Limidae, Mytilidae, Ostreidae, Pinnidae, and Veneridae), representing 67% of the total. Additionally, six families of Gastropoda (Cystiscidae, Buccinidae, Neritidae, Thiaridae, Pyramidellidae, and Vermetidae) accounted for 28% of the total fouling fauna. The highest biomass of fouling algae was observed in September, with 25,140 cells per square decimeter (dm2), while the lowest biomass was recorded in November, with 4,169 cells/dm^2. In terms of fouling fauna, the highest density was observed in July, with 81 individuals/dm^2, whereas the lowest density was recorded in December, with 10 individuals/dm^2. Canonical correlation analysis (CCA) revealed that the biofouling communities were influenced by various factors, including pH, salinity, NH_3, NO_2, total nitrogen, soluble phosphorus, and total phosphorus.

Keywords: *Algae, Bivalve mollusc, Fouling, Lobster cage, Phu Yen Province*

Sec.2-Poster-02

THE SUCCESS OF ACTIVE MANGROVE RESTORATION EFFORT OF THE PERI-URBAN MANGROVES IN KENYA

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ABSTRACT

Mangrove ecosystems support more than 80% of the marine fisheries resource of economic importance. The degradation of these critical marine habitats poses a significant threat to the species diversity of marine fisheries. The rate of degradation of the peri-urban mangrove forest in Kenya is approximately 5% per year. Restoration efforts to regenerate mangroves have been initiated by local community groups adjacent to the mangrove ecosystems. However, these efforts lack a definite tracking model to influence sustainability. This study assessed the success of mangrove restoration efforts at Tudor creek Mombasa, under the Big Ship Community Based Organization. The forest structures of different mangrove forest classes (pristine, degraded, and restored) at a section of Tudor creek were compared. GIS technology was used to assess the degradation scale of the pristine sites. Oneway ANOVA analysis showed that there was a significant variation in the forest structures of degraded sites and pristine, and restored sites ($P < 0.05$). Logging of mature mangrove trees was identified as the main stressor or causative agent for the degraded site. There was a strong and positive correlation ($r = 85\%$) between parent trees' number and the density of naturally regenerated saplings. The high number of tree stumps showed that deforestation is the main cause of the degradation of mangroves at Tudor creek. The study argues that success cannot be measured solemnly on the survival rate of the planted trees. Instead, a sustainable forest management model addressing the livelihood gaps of the adjacent communities should be embraced hence addressing logging as a stressor. Therefore, the study recommended a model which informs sustainable management of mangrove forests, the Adopt-A-Site Model. Similarly, the study recommends a socio-economic study be done in order to quantify and define a suitable financial model for the sustainable active restoration of the mangrove ecosystems.

Keywords: *Mangrove Ecosystems, Sustainability, Adopt-A-Site, Restoration, Peri-urban mangroves*

Sec.2-Poster-03

DATA SHARING AS DRIVER FOR CIRCULAR BUSINESS MODEL – A CASE OF VIETNAM PANGASIUS VALUE CHAIN

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ABSTRACT

The traditional "take, make, waste" model of production and consumption will not be sustainable in a world with ever-expanding consumption rates, and businesses are starting to understand the financial and ethical risks that this entails. Sharing data across the value chain makes new insights available to improve efficient use of resources. With 30 years of establishment and development, the pangasius value chain is gradually improving its value in four dimensions: reduction of costs, improvement of brand image, reduction of risk and increase in revenue. Meanwhile, the level of data sharing maturity from businesses in the pangasius industry is still low, mainly sharing internally within the company or between a few trusted actors in the chain. However, some leading industry companies have taken new initiatives in data sharing. Through secondary data of the pangasius industry in the period 2010 - 2023 and a few typical businesses, the article focuses on value creation in the pangasius value chain, the current level of data sharing among businesses, barriers to data sharing for circular business model and policy recommendations as drivers to promote data sharing.

Key words: *barries, circular business model, data sharing, Pangasius, Value Chain, Vietnam*

Sec.2-Poster-04

RESEARCH ON CREATING MICROBIAL ORGANIC FERTILIZER BY COMBINING A MICROBIAL MIXTURE WITH SEAWEED RESIDUE (*Sargassum* sp.)

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ABSTRACT

In the South Central Coast of Vietnam, particularly in the provinces of Khanh Hoa and Ninh Thuan, seaweed is a prevalent species. During the seaweed season, which runs from April to August each year, a significant amount of seaweed that is not completely harvested frequently pollutes the environment, water, and odors. In this study, seaweed residue was pre-treated before being composted with a variety of microorganisms, including strains of *Bacillus* sp., *Lactobacillus* sp., *Streptomyces* sp., and yeast, in order to create organic microbial fertilizer from waste seaweed. Using the criteria outlined in TCVN 7185: 2002 on organic microbial fertilizers, the quality of seaweed fertilizer was assessed. These criteria included maturity (rotting), uniformity, pH, CHC content, total nitrogen content, and useful microorganisms density. The findings demonstrated that the incubation temperature was between 30 and 35°C for approximately 25 days when fresh seaweed residue was added at a ratio of 1.0% of the mixture of microorganisms with an initial density of 10^6 cfu/ml. This met the current standards for microbial organic fertilizers.

Keywords: *Seaweed fertilizer, microbial mixture, organic microbial fertilizer*

Sec.2-Poster-05

TOWARDS A CIRCULAR BUSINESS MODEL - A CASE OF VIETNAM PANGASIUS INDUSTRY

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ABSTRACT

Pangasius is mainly farmed in 10 Mekong Delta provinces including: An Giang, Dong Thap, Tien Giang, Can Tho, Vinh Long, Ben Tre, Hau Giang, Soc Trang, Tra Vinh, Kien Giang, Tay Ninh and Quang Nam. Among them, Can Tho, An Giang and Dong Thap provinces are the largest pangasius farming areas in the Mekong Delta, accounting for more than 75% of the country's total pangasius production (VASEP, 2020). A farming area of about 6,000 hectares and an annual output of about 1.3 million tons, Vietnam's pangasius industry is currently exporting to 140 countries with a total export value of 1.8 billion USD, creating jobs for 200,000 workers. In order to the pangasius industry to develop sustainably, the circular business model is a strategy that export processing enterprises should maintain and develop: (1) value addition in value chain; (2) capacity utiliation improvement; (3) value regeneration of end - of – life products ans less use of raw materials/less waste. Based on pangasius industry data 2010 – 2023, the article focuses on analyzing the pangasius value chain and state of circular business model. On that basis, it is recommended that the pangasius industry should promote circular business model to increase efficiency and reduce environmental impact.

Keywords: *circular business model, Pangasius, Value Chain, Vietnam*

Sec.2-Poster-06

EFFECTS OF DRYING TEMPERATURE ON THE SENSORY QUALITIES OF DRIED BALI SARDINES (Sardinella lemuru) INFUSED WITH HERBS AND SPICES

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ABSTRACT

Herbs and spices have been very essential to every home and people with different needs and lifestyle mainly as ingredients for food, beverages, cosmetics, perfumery, and medicine. In this study, dried Bali Sardines (Sardinella lemuru Bleeker 1758) were infused with varying levels of herbs and spices and was exposed to different drying temperatures. Each treatment was dried for six hours in a mechanical dryer and was subjected for sensory evaluation in terms of color, aroma, taste, aftertaste, texture, flavor, and general acceptability. There were nine treatments in the study and the results revealed that Treatment 3 with 6g of herbs and spices and heated at 400C had the highest acceptability rating of 8.86 which fall under the “like very much” category in the 9-point Hedonic scale while Treatment 1 which contains 4g of herbs and spices and heated at 400C had the lowest acceptability rating of 7.14 which falls under to “like moderately”. Among the sensory attributes, only aftertaste was significantly affected by drying temperature at 5% of significance. In addition, a two-way interaction was observed between levels of herbs and spices and drying temperature that greatly affects the aroma of the dried Bali Sardines showing 1% significance. Moreover, each treatment possessed sensory attributes that are acceptable to the panelists with an acceptability rating that ranges from 7.14 to 8.86 which falls under the “like moderately” to “like very much” category in the 9-point Hedonic Scale.

Keywords: Bali sardines, herbs and spices, sensory attributes, sensory evaluation

Sec.2-Poster-07

VIRULENCE AND ANTIBIOTIC RESISTANCE CHARACTERISTICS OF A *Vibrio parahaemolyticus* MUTANT STRAIN FROM FARMED *whiteleg shrimps* WITH ACUTE HEPATOPANCREATIC NECROSIS DISEASE

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ABSTRACT

Acute hepatopancreatic necrosis disease (AHPND) in shrimp is caused by highly virulent strains of *Vibrio parahaemolyticus* (VP) that harbor plasmids encoding two toxin genes (*pirA* and *pirB*). In this study, we report the emergence of a type II (*pirA*−, *pirB*+) natural mutant, VpAHPND (strain NH_04), isolated from a *Litopenaeus vannamei* farm experiencing an AHPND outbreak in Vietnam. PCR analysis for hemolysin-associated gene detection revealed that NH_04 was positive for the *tlh* gene but negative for *trh* and *tdh* genes. In virulence bioassays, shrimp challenged with *pirAB* strains exhibited 100% mortality and characteristic AHPND symptoms, while shrimp infected with NH_04 strain showed no mortality and minimal hepatopancreatic damage. Antibiotic susceptibility testing against 14 commonly used antibiotics revealed that *pirAB* VP strains were resistant to a greater number of antibiotics compared to *pirB* VP strains. All strains were sensitive to Trimethoprim-sulfamethoxazole (25 µg) and Azithromycin (15 µg) but resistant to Streptomycin (10 µg). Although the pathological findings from this study suggest that the *pirB* VP strain poses a lower risk to farmed shrimp than *pirAB* VP strains, further research on the pathogenicity of these strains is needed to elucidate their virulence mechanisms.

Keywords: *Vibrio*, shrimp, disease, *V. parahaemolyticus*, AHPND

Sec.3-Poster-01

THE PREVALENCE OF INFECTION AND IMPACT OF THE CRUSTACEAN PARASITE *Sacculina angulata* ON THE MORPHOLOGY OF SWIMMING CRAB HOST *Charybdis hellerii* DISTRIBUTE IN NHA TRANG BAY

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ABSTRACT

Parasitic crustaceans Rhizocephala often affect their hosts' morphology, physiology, behavior, and reproductive capacity. Among the hosts of Rhizocephala, the swimming crab *Charybdis hellerii* (Brachyura: Portunidae) is widely exploited and has economic value, however, there has been no record of crustacean parasite infection of this crab species in Vietnam. Our study assessed the infection prevalence and effects of *Sacculina angulata* (Rhizocephala: Sacculinidae) on the external morphology of *C. hellerii* collected in Nha Trang Bay. A total of 622 individuals including 387 male and 235 female crabs were collected from January to December 2023. The results showed that the overall infection rate of *S. angulata* was 3.2%. Statistical analysis showed no difference in infection rates by sexes, host sizes, or seasons. Male crabs infected with *S. angulata* exhibited feminization (male crabs had a morphology similar to that of females) including increased segments and abdominal size, and reduced size of the male crab's claws. Meanwhile, female crabs infected with *S. angulata* showed no morphological changes. These preliminary findings highlight the further needed studies in order to fully assess the impact of parasitic Rhizocephala on economically valuable crab species in Vietnam.

Keywords: *Swimming crab, Charybdis hellerii, Crustacean parasite, Sacculina angulata, Infection prevalence*

Sec.3-Poster-02

A STUDY ON PREPARING FISH PROTEIN POWDER FROM DARK TUNA MUSCLE AND ADDING IT TO BISCUITS

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ABSTRACT

The purpose of this study was to determine the proper conditions for preparing fish protein powder from tuna dark muscle and adding it to biscuits in order to increase protein nutritional value. The study found that the proper conditions for preparing fish protein powder from tuna dark muscle were to use a 3% citric acid solution with a fish muscle to citric acid solution ratio of 1:1 (w/v) and treatment for 10 minutes at 90 ºC. The fish protein powder obtained did not contain histamine and had a protein content of 75.47%, with 32.91% being essential amino acids, accounting for 46.34% of total amino acids. A consumer preference survey revealed that biscuits supplemented with 3% fish protein powder received an average score of 7.5, indicating that these biscuits could be commercialized.

Keywords: *Fish protein isolate, tuna dark muscle, protein-enriched biscuits, fish processing waste*

Sec.3-Poster-03

GENDER PARTICIPATION IN THE FISHERIES SECTOR OF KHANH HOA PROVINCE, VIETNAM

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ABSTRACT

In 2023, Khanh Hoa Province had approximately 3,190 fishing boats, with a total marine capture fisheries production of 101,243.5 tons, creating jobs for 23,165 workers. Assessing the level of participation, access, and control over resources by male and female labors will promote sustainable development and encourage gender equality in the marine capture fisheries and fisheries logistics in Khanh Hoa province. Specifically, the study uses the Harvard Analytical Framework to identify the roles of men and women in different fishing activities and describe the socio-economic profile of fishers. A total of 293 workers were randomly selected for interviews, of which 49.49% were female and 50.51% were male. Men were predominantly involved in production activities, as boat owners (44.71%) and crew members (3.41%), while women primarily played key roles in post-harvest activities, such as processing (11.6%) and food preparation (7.85%). There were statistically significant differences between men and women's activity profiles, access and control over resources. Specifically, men had higher access and control over household resources, marine capture fisheries, financial resources and social capital than women. The study highlights factors influencing gender role differences, particularly considered to be barriers for women, such as training and education, community norms, social hierarchy, demographic factors and customs. The study recommends the need for more innovative policies and programs with stakeholders to promote women's empowerment and gender equitable outcomes in the fisheries sector of Khanh Hoa province.

Keywords: gender equality, access and control, Harvard Analytical Framework, fisheries sector

Sec.3-Poster-04

ICHTHYOPLANKTON DATA REVIEW EEL SPECIES (ANGUILLIFORMES: OPHICHTHIDAE) IN THE VIETNAMESE COASTAL WATERS

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ABSTRACT

Eggs, larvae, and transitional stages (Ichthyoplankton) - early stages of fish development - are tiny, not fully developed, and transparent, therefore, accurate species identification is always challenging. This study aims to investigate the species diversity and distribution of Anguilliform ichthyoplankton in 2023. Ichthyoplankton samples were collected from three sites (Hai Phong – north; Ninh Thuan, Binh Thuan – center, and Bac Lieu – southwestern) along the Vietnamese coastal waters at two spawning seasons. Fish eggs and larvae were initially identified morphologically and later confirmed using the COI mtDNA marker. Seven species (of eleven DNA barcodes), representing four genera, were detected, among which four were successfully identified to the species level. All fish eggs observed were pelagic and horizontally distributed within the water column. Interestingly, misol snake eel (*Yirrkala misolensis*) eggs were found in August in Binh Thuan, while larvae occurred in April in Hai Phong. For *Callechelys* sp1., eggs and larvae were detected in March at Ninh Thuan. These findings provide initial insights into the species composition and distribution of Anguilliform ichthyoplankton, highlighting the significant potential of DNA barcoding for identifying fish at early developmental stages. This approach is particularly effective for determining spawning locations and seasons, contributing to improved fisheries management.

Keywords: *Anguilliformes, DNA barcode, ichthyoplankton, morphological, Vietnam*.

Sec.3-Poster-05

SPATIAL DISTRIBUTION AND SPAWNING SEASONS OF COMMON SMALL PELAGIC FISH (ORDER: LUPEIFORMES) IN VIETNAMESE WATER

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ABSTRACT

Clupeiformes, an order of small pelagic fish, plays a vital role in marine ecosystems and fisheries. Understanding Information of their early life stages (eggs, larvae, and juveniles) is limited due to taxonomic challenges. This study aims to examine the spatial distribution and developmental stages of three species (*Stolephorus insularis*, *Encrasicholina punctifer*, and *Escualosa thoracata*) in Vietnamese waters. In 2023, Ichthyoplankton samples were collected from four ecological regions (North, Central, Southeast, and Southwest) at two spawning seasons: March–May (primary) and July–September (secondary). Fifteen sites (5 transects) per region were determined, and both horizontal and vertical samples were collected. Early developmental stages (including egg (E1-3, E4-6), flexion larvae (FL), post-flexion larvae (PoL), and juveniles (J)) were morphological and molecular (COI mtDNA markers) identified. The results showed that mean genetic distance (Kimura 2-parameter model) was 0.119 (SE: 0.008) among the three species. Spatialy, *E. thoracata* exhibited a broad distribution across all four (North to South), while *S. insularis* at three (North, Southeast and Southwest), and *E. punctife* was only discovered at two (Central and Southeast) ecological regions. Egg and flexion larvae were found spatial and seasonally abundant, while PoL and J stages seemed to be restricted to species geographic distribution. This study offers valuable insights into the ecological and seasonal distribution of small pelagic fish, thereby contributing to sustainable fisheries management and conservation initiatives in Vietnam.

Keywords: *Clupeiformes, spawning season, spatial distribution, early life stages, Vietnamese waters*

Sec.4-Poster-01

A STUDY ON PREPARING CHITOSAN NANOPARTICLES LOADED WITH STRAW MUSHROOM EXTRACT AND TESTING THEIR ANTI-MELANOSIS EFFECT ON PACIFIC WHITE SHRIMP

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ABSTRACT

The purpose of this study was to determine the proper conditions for preparing chitosan nanoparticles loaded with straw mushroom extract (NCSME) using the ionic gelation method, as well as to evaluate the anti-melanosis effect of NCSME on Pacific white shrimp. The study discovered that the proper conditions for preparing NCSME by the ionic gelation method were using 0.1% chitosan in 1% ascorbic acid solution, the ratio of straw mushroom extract to chitosan solution was 1.5/10 (v/v), the stirring speed was 750 rpm, and the ratio of 0.1% sodium tripolyphosphate solution to chitosan solution was 1/4 (v/v). The NCSME had a particle size of 207.3 ± 22.9 nm, a DPPH free radical scavenging of 48.1 ± 2.0 µM, a total reducing power equivalent to 7.6 ± 1.0 µg BHT/ml, a lipid oxidation inhibition activity of 20.87 ± 1.8%, and a better anti-melanosis effect in Pacific white shrimp during refrigerated storage at 3 ± 2 ^{o}C than chitosan nanoparticles, straw mushroom extract, or 1.25% sodium metabisulfite (SMS). This finding suggests that NCSME can be used instead of SMS to prevent melanosis development in Pacific white shrimp during refrigerated storage.

Keywords: Melanosis, shrimp, polyphenoloxidase, *Volvariella volvacea*

Sec.4-Poster-02

EFFECTS OF ENZYMATIC HYDROLYSIS COMBINED WITH MEMBRANE ULTRAFILTRATION ON THE QUALITY AND BITTERNESS OF THE PROTEIN HYDROLYSATE FROM SNAKEHEAD FISH (*Channa striata*) HEAD

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ABSTRACT

This study investigated the effects of three lipid separation methods, four enzymatic hydrolysis systems, and different ultrafiltration membrane pore sizes on the hydrolysis efficiency, nutritional qualities, and bitterness of fish protein hydrolysates (FPH) from snakehead fish heads (SFH). The results revealed that enzymatic hydrolysis without heating or solvent pretreatment resulted in a high lipid separation efficiency (78.4%), degree of hydrolysis (DH of 38.5%), protein recovery (8.7%), and amino acid content (11.6 g/L) but a low ammonia content (0.249 g/L). The hydrolysate produced using the sequential (Alcalase (A) > Flavourzyme (F)) system exhibited the highest DH (54.8%), total amino acid (80.59%), and total essential amino acid (24.56%) content but the lowest bitterness value (score = 1.86). The hydrolysate that contained peptides with a molecular weight below 3 kDa had the highest soluble protein recovery (72.1%), total amino acid recovery (85.0%), and lowest bitterness value (score = 1.42).

Keywords: *Enzymatic hydrolysis, fish protein hydrolysis, membrane ultrafiltration, nutritional qualities, lipid separation*

Sec.4-Poster-03

GELATION OF PANGASIUS (*Pangasianodon hypophthalmus*) MINCED MUSCLE BY HIGH PRESSURE PROCESSING: THE EFFECTS ON SELECTED QUALITIES

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ABSTRACT

The application of high-pressure processing (HPP) for the gelation of minced fish muscle has demonstrated numerous advantages, including improved gel texture, higher water-holding capacity (WHC), and a smoother microstructure compared to conventional heat-induced gels (HIG). To identify suitable HPP conditions for gelling pangasius minced muscle, the minced muscle was subjected to 13 different HPP treatments, ranging from 400 to 500 MPa for 20–30 minutes at 10–15°C, and the resulting gels were compared with HIG (control). The effects of HPP and heat induction were evaluated based on gel mechanical properties, color, protein solubility, WHC, Fourier transform infrared spectroscopy (FTIR), SDS-PAGE, and scanning electron microscopy (SEM). The results revealed that HPP gels exhibited higher gel strength and hardness compared to HIG, except under extreme conditions at 500 MPa/25°C/10 min, 500 MPa/25°C/15 min, and 500 MPa/30°C/12.5 min. However, the springiness of HPP gels was comparable to that of HIG. HPP gels were significantly whiter than HIG ($p < 0.05$), while protein solubility showed no significant differences across all treatments. The treatments at 400 MPa/20°C/12.5 min, 400 MPa/25°C/10 min, 400 MPa/25°C/15 min, 400 MPa/30°C/12.5 min, 450 MPa/20°C/10 min, and 450 MPa/20°C/15 min exhibited higher WHC compared to the remaining HPP treatments and HIG ($p < 0.05$). FTIR analysis showed similar protein patterns between HPP and HIG, while SDS-PAGE results indicated only minor differences among treatments. SEM analysis of gels treated at 400 MPa/20°C/12.5 min, 400 MPa/25°C/10 min, and 450 MPa/20°C/10 min revealed a smoother and more compact microstructure compared to other treatments.

Keywords: *high pressure processing, gelation, pagasius fish, FTIR, scanning electron microscope*

Sec.4-Poster-04

QUALITY PROPERTIES OF INSTANT DRIED TUNA UTILIZING THE FREEZE-DRYING TECHNIQUE

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ABSTRACT

This research project proposes a process for processing dried tuna products using freeze-drying technology from the low-value yellowfin tuna slime. Process of drying 0.5cm cubed tuna in 3 freeze drying modes (primary drying time is the same; secondary drying time of 3 drying conditions are 4h, 5h, and 6h respectively). After drying, tuna products will be tested for physicochemical and sensory properties to select the most suitable freeze-drying method. The results showed that the dried tuna products of all 3 freeze-drying modes had moisture below 10% and aw below 0.4. Processing productivity depends on each specific freeze-drying modes, ranging from 72.26% to 74.4%; The best water reabsorption rate is 4 hours in the secondary drying mode. The color of the product is measured by colorimeter and sensory evaluation, 5-hour drying mode gives the most even and stable color. The secondary drying duration of 5 hours yields optimal crispiness and a spongy texture in the product, aligning well with the sensory evaluation outcomes. A 5-hour secondary drying method was selected for drying tuna based on the research findings.

Keywords: *tuna, dried tuna, freeze-dried*

Sec.4-Poster-05

SEASONAL VARIATION IN BIOCHEMICAL COMPOSITION AND ANTIOXIDANT ACTIVITY OF THE RED SEAWEED *Tricleocarpa cylindria*

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ABSTRACT

Red algae are rich in essential nutrients such as proteins, vitamins (especially vitamin A, B, and C), and minerals (such as iodine, calcium, and iron). They also contain dietary fiber and bioactive compounds, including antioxidants. This study investigates the seasonal variations in the nutritional composition, heavy metal content, and antioxidant activity of *Tricleocarpa cylindria*, a red alga harvested from Ly Son Island, Vietnam. Over the course of one year, samples were collected in different seasons (dry and rainy) to assess fluctuations in key nutrients, including protein, lipid, carbohydrate, vitamins, minerals, and polyphenol content, as well as to measure heavy metal concentrations and antioxidant activity. The results indicated that the nutritional composition and heavy metal levels of *Tricleocarpa cylindria* remained relatively stable across seasons, with no significant fluctuations in protein, lipid, or carbohydrate contents. However, polyphenol and antioxidant activity, measured using standard assays, were significantly higher during the rainy season. These findings suggest that while the overall nutritional profile and heavy metal contamination of the algae remain consistent, its antioxidant potential is enhanced during the rainy season. This research provides insights into the optimal harvesting periods for maximizing the antioxidant benefits of *Tricleocarpa cylindria*, contributing to its sustainable use in food, nutraceutical, and environmental applications.

Keywords: antioxidant, red seaweed, chemical composition, *Tricleocarpa cylindria, seasonal Variation*

Sec.4-Poster-06

SENSORY, PHYSICOCHEMICAL, AND MICROBIOLOGICAL CHANGES OF SEASONED DRIED OYSTER (*Crassostrea gigas*) DURING STORAGE TIME

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ABSTRACT

The seasoned dried oyster product developed by VINABS Company uses Pacific oysters harvested in the northern farming area of Khánh Hòa province. The product will be consumed as a ready-to-eat item in vacuum packaging and cold storage at a temperature of 5 ± 1°C. This is a new product not only for the company but also for the Vietnamese market. The product quality was evaluated after the production process. To ensure food safety, the product's quality changes over time were monitored by evaluating sensory, physicochemical, and indicator microbiological parameters. The monitoring results showed that after 13 weeks, the product maintained relatively stable quality. The product's color started to darken from the 11th week but did not significantly affect the sensory evaluation results, with scores ranging from 15.2 to 18.5 (according to TCVN3215-79). The product had stability in moisture content and water activity, thus there were no significant changes in hardness, which remained quite stable after a slight decrease in the 4th week. Although the peroxide value slightly increased, it was still within control limits. The variation of indicator microorganisms, including total plate count (TPC), *E.coli, S. aureus, C. perfringens, Coliform, Salmonella, V. parahaemolyticus*, mould, and yeast, also did not exceed the permissible limits. It can be seen that the established vacuum packaging and cold storage conditions allowed for maintaining product quality over 13 weeks.

Keywords: *Cold storage, Dried oyster, Microbiological indicator, Quality changes, Seasoned dried oyster.*

Sec.4-Poster-07

STUDY ON ANTIOXIDANT ACTIVITIES OF PROTEIN ISOLATE HYDROLYSATES DERIVED FROM TUNA DARK MEAT

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ABSTRACT

This study was to investigate the effect of enzymatic hydrolysis time on the antioxidant activity of protein fractions derived from yellowfin tuna dark meat protein isolate. Protein hydrolysates were prepared using the alcalase enzyme and subsequently fractionated using molecular-weight cut-off membranes. The hydrolysates had antioxidant properties due to the presence of a wide range of hydrophobic and negatively charged amino acids. Three peptide fractions were separated from the hydrolysates which were investigated for Total Reducing Power (TRPA), Lipid Peroxidation Inhibition (LPIA), and DPPH free radical scavenging (DPPH). Peptides <3 kDa exhibited the highest in TRPA and DPPH and the whole hydrolysates exhibiting lower antioxidant activity than peptides <10 kDa. But LPIA was higher in peptides >10 kDa. Hydrolysis time influenced significantly the antioxidant activity. TRPA and LPIA decreased after 3 hrs and 6-9 hrs, respectively, while DPPH increased with increasing of hydrolysis time (up to 9 hrs). The obtained results showed that the hydrolysates and their peptide fractions derived from tuna dark meat protein isolate exhibited antioxidant ability could be used as functional food ingredients.

Keywords: *antioxidant activity, alcalase, hydrolysate, tuna dark meat*

Sec.4-Poster-08

SURVEYING THE MASS COMPOSITION, ASSESSING THE QUALITY OF SALINE-TOLERANT STRIPED CATFISH *(Pangasianodon hypophthalmus)* AND ASSESSING THE EFFECTIVE RECOVERY OF PROTEIN AT DIFFERENT SALT CONCENTRATIONS

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ABSTRACT

This study investigated the composition of striped catfish, aiming to optimize protein recovery. White meat comprised the largest portion (31.85%), while by-products represented 65.56% of the total mass. Analysis revealed that white meat had a high protein content (20.52%) and low lipid content (3.62%), in contrast to the belly meat's high lipid content (24.98%). Optimal protein solubility for both white meat (91.2%) and belly meat (82.13%) was achieved using a 4.64% salt solution. These findings highlight the potential of striped catfish as a valuable protein source, with different meat sections offering distinct nutritional profiles.

Keywords: Protein recovery, Lowry method, salt concentrations, saline-tolerant striped catfish

Sec.4-Poster-09

THE EFFECTS OF FOOD ADDITIVES ON FISH BALL FROM SALINE-TOLERANT STRIPED CATFISH *(Pangasianodon hypophthalmus)* MEAT

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ABSTRACT

This study investigated the effects of various food additives on the quality of fish balls made from saline-tolerant striped catfish (Pangasianodon hypophthalmus) meat. The goal was to identify optimal additive ratios to improve the quality and value of these fish ball products. Four different additives were tested at various concentrations: modified starch (3.5%, 4.5%, 5.5%), gelatin (0.2%, 0.3%, 0.4%), egg white (9%, 10%, 11%), and sorbitol (1%, 2%, 3%). Each additive influenced the fish ball's color, texture, and water-holding capacity differently. Fish balls with 4.5% modified starch, 0.3% gelatin, 10% egg white, or 2% sorbitol exhibited the best sensory qualities and texture. Notably, 10% egg white produced the most desirable color and structure, with a whiteness of 77.5%, gel strength of 343 g.cm, and chewiness of 3619 g.

Keywords: Egg white, fish ball, gelatin, modified starch, saline-tolerant catfish, sorbitol

Sec.4-Poster-10

THE EFFECTS OF USING SHORTWAVE INFRARED LAMP DRYING, HALOGEN LAMP DRYING AND ALKALINE PRETREATMENT SUBSTITUTE TRADITIONAL SUN DRYING ON GONGLIAO SEAWEED GEL

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ABSTRACT

Gelidium jelly is a popular beverage in Taiwan's northeastern coastal areas. Traditionally, it is made by washing and sun-drying Gelidium seaweed seven times to remove impurities, pigments, and odors. The dried seaweed is then boiled and cooled to form the jelly. However, this process is time-consuming, labor-intensive, and dependent on sunny weather, leading to a decline in its practice. Infrared radiation heating, such as halogen lamp and short-wave infrared lamp, may serve as an alternative for drying Gelidium seaweed. Additionally, alkaline pretreatment can enhance the gelling strength of certain types of Gelidium seaweed. In this study, we investigated the use of halogen lamp, short-wave infrared lamp, and alkaline pretreatment to replace traditional sun-drying. Results showed that the moisture content of dried seaweed in all experimental groups ranged from 8% to 13%, which was significantly lower than the control group. The groups with alkaline pretreatment showed higher ash content, likely due to the dissolution or removal of soluble organic compounds during sodium hydroxide soaking. The highest L* value, indicating whiteness, was found in the group with alkaline pretreatment and exposed to sunlight seven times. Groups with alkaline pretreatment and exposed to sunlight three or seven times had a higher b* value, resulting in a golden-yellow color of the seaweed. In terms of texture, the hardest Gelidium jelly was produced by the groups with alkaline pretreatment and exposed to sunlight seven times or the groups exposed to sunlight seven times. The highest springiness was observed in the group exposed to sunlight seven times. While halogen lamp drying did not achieve the same hardness as sun-dried samples, it showed significant results. Overall, halogen lamp drying could replace traditional sun-drying, and alkaline pretreatment has potential for improving the hardness of Gelidium jelly.

Keywords: *Gelidium amansii, Halogen lamp drying, Short-wave infrared lamp drying, Alkaline pretreatment, Texture, Color*

Sec.4-Poster-11

SURVEY ON FOOD SAFETY FACTORS RELATED TO PACIFIC OYSTER (Crassostrea gigas Thunberg, 1793) RAW MATERIALS CULTIVATED IN FARMING AREAS, NORTHERN KHANH HOA, VIETNAM

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ABSTRACT

Oysters have become a strongly developed aquaculture product used for food in Vietnam in recent times. Due to their filter-feeding nature, they have a high potential to accumulate safety hazards from the environment. Therefore, monitoring and controlling hazards related to heavy metals, marine biotoxins, and pathogenic microorganisms at farming areas is crucial. Two Pacific oyster farming areas in Ninh Hoa and Van Ninh, Khanh Hoa, which provide a significant portion of oyster raw materials for the surrounding region, have been sampled to assess food safety risks. Monitoring results from March 2022 to February 2024 show that the levels of pathogenic microorganisms (Escherichia coli, Salmonella, Coliform, and Norovirus), heavy metals (Pb, Cd, and Hg), and marine biological toxins (lipophilic toxins and PSP) in the both areas did not exceed the allowable limits set by the Vietnam Ministry of Agriculture and Rural Development and the EU. The average values of both Cd and Pb in the dry season were higher than in the rainy season, however, the detected residue of Cd was always higher than Pb during the rainy season. For Hg, it was only detected at very low levels in the dry season and almost not detected in the rainy season in both Ninh Hoa and Van Ninh areas. Additionally, the survey showed that the incidence of Coliform was higher in the rainy months (from September to December) compared to the dry months (from January to August) but remained below the level that could pose a safety hazard. Raw oysters harvested in Ninh Hoa and Van Ninh contain high levels of Zn and Se, especially those from Ninh Hoa harvested in the dry season. The research results indicate that the Pacific oyster farming areas in Ninh Hoa and Van Ninh, Khanh Hoa, are well-managed, meeting the requirements for food use.

Keywords: *Pacific oyster, heavy metal, marine biotoxins, microbiological indicator, food safety.*

Sec.5-Poster-01

FARMER'S DECISION TO PARTICIPATE IN AQUACULTURE COOPERATIVES AND FARMING CLUSTERS IN VIETNAM: A STUDY OF SMALL-SCALE SHRIMP FARMING

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ABSTRACT

Promotion of collective economic organizations such as cooperative (Co.) or farming cluster (FC) in aquaculture is to uplift farmers by providing better input services while linking output market. Therefore, this paper is empirically investigating the factors that influence small-scale shrimp farmers to participate in the Co./FC and their intensity of participation in Soc Trang province, Vietnam by surveying 254 shrimp farming households. By using Binary logistic model approach, the findings found that farmers with higher education level, longer farming experience, larger farming area, higher farm-gate selling price, closer to the Co./FC site, having access to the credit resource and attending more training course are more likely to participate in the Co./FC. The study also implies several policies to expand the collective economic forms, therefore, upgrade the small-scale shrimp farming industry.

Keywords: Binary logistic model, cooperatives, farming clusters, Litopaenus Vannamei, participation, shrimp farming.

Sec.5-Poster-02

APPLICATION OF THE IPA MODEL IN ASSESSING THE QUALITY OF PUBLIC TRANSPORT SERVICES FOR INTERNATIONAL TOURISTS – A CASE STUDY IN NHA TRANG

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ABSTRACT

Buses are a popular form of public transportation for international tourists exploring tourist destinations. This mode of transport not only offers sightseeing opportunities but also contributes to environmental protection. However, the quality of bus services in Vietnam, particularly in Nha Trang, does not fully meet the expectations of international tourists. This study aims to identify and assess the factors affecting the quality of bus services in Nha Trang. Data were collected from 250 international tourists using bus services through a convenience sampling method. By applying Importance-Performance Analysis (IPA), the results were presented in tabular form to identify the strengths and weaknesses of the service quality factors. The findings suggest that businesses need to focus more on improving service capacity to enhance overall service quality.

Keywords: Bus, IPA, public transportation, service quality

Sec.5-Poster-03

EVALUATING POLLUTION SOURCES AND POLLUTANT COMPOSITE INDICATORS OF MAJOR PORTS IN TAIWAN: A DOUBLE HDEA METHOD WITH POLLUTION SOURCE DATA AGGREGATION

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ABSTRACT

Ports are vital to global trade but are significant sources of environmental pollution due to maritime traffic and industrial activities. Taiwan's major ports, including Kaohsiung, Keelung, and Taichung, face increasing scrutiny for their environmental impacts. This study introduces an innovative framework to evaluate pollution sources and develop composite pollutant indicators using a Double Hierarchical Data Envelopment Analysis (Double HDEA) method. The proposed methodology aggregates pollution source data across multiple levels, integrating gaseous pollutants (NOx, VOCs, CO, SOx), particulate matter (PM10, PM2.5, DPM), and greenhouse gases (CO2, CH4, N2O) to assess environmental efficiency comprehensively.

Key pollution sources such as ocean-going vessels, in-port operational vessels, cargo handling equipment, and heavy-duty vehicles are evaluated for their contributions to overall pollution. The hierarchical structure of Double HDEA ensures a detailed assessment at both source and port levels, enabling the identification of inefficiencies in pollution management. Expected outcomes include composite indicators that provide a holistic view of port pollution, environmental efficiency evaluations for each port, and actionable policy recommendations. This study not only addresses gaps in port pollution research but also supports Taiwan's commitment to sustainable development by promoting cleaner and more efficient port operations.

Sec.5-Poster-04

CHARACTERIZATION OF BIOACTIVE PEPTIDES WITH ANTIOXIDANT AND ANTIHYPERTENSIVE ACTIVITIES FROM FOUR SPECIES OF UNDERUTILIZED MARINE BIVALVES

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ABSTRACT

Marine bivalves are protein rich edible seafood and the high protein quality in these bivalves could indicate their potential as precursors for bioactive peptides. A proper hydrolysis technique at suitable and optimum conditions plays an important role in liberating the biofunctional activities of these peptides. This study evaluated the protein profile as well as the antioxidant and antihypertensive properties of four species of underutilized marine bivalves namely *Placuna placenta, Placuna ephippium, Scapharca inaequivalvis,* and *Marcia hiantina* using hot and cold aqueous extraction. Generally, cold water extracts gave higher total soluble protein yield as compared to samples under hot water, with the highest total soluble protein found in the cold water extract of *P. placenta* at 21.37%. Low molecular weight proteins (<10.5-14 kDa) were found also in the cold water extracts of *M. hiantina* and S. *inaequivalvis* as revealed by sodium dodecyl sulfate–polyacrylamide gel electrophoresis (SDS-PAGE). Moreover, cold water extract of *M. hiantina* demonstrated highest DPPH (2,2-diphenyl-l-picrylhydrazyl) radical scavenging activity and ferric-ion reducing capacity (76.24% and 1.58 mol Trolox equiv/mL sample, respectively), while cold water extract of *P. ephippium* exhibited the highest ABTS (2,2′-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid) radical scavenging activity (93.67%). For the antihypertensive activity, hot water extract of *P. placenta* demonstrated the highest ACE (angiotensin-I converting enzyme) inhibitory activity at 91%. These results suggest that the four bivalve species might possess bioactive peptides eliciting antioxidant and antihypertensive activities. It also confirmed the potential of using aqueous extraction to liberate the peptides, which is a cost-effective method in lieu of the high cost of chemical and enzymatic hydrolysis. Further investigations intending to purify these active compound(s) should be considered to clarify their chemical nature.

Keywords: *marine bivalves, aqueous extraction, low molecular weight peptides, antioxidant, antihypertensive*

Sec.5-Poster-05

SOLAR POWER PREDICTION ON CRUISE SHIP WITH LONG SHORT-TERM MEMORY MODEL

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ABSTRACT

The integration of solar power on the rooftop of cruise ships plays a crucial role in reducing CO_2 emissions, supporting the global transition toward sustainable maritime operations. This research proposes a novel approach for predicting solar power output on cruise ships using a Long Short-Term Memory (LSTM) model. Unlike traditional models, the LSTM effectively captures long-term dependencies and dynamic patterns within multivariate time series data. The input features for the LSTM model include solar power data alongside key weather parameters. By incorporating these multi-factor inputs, the model achieves more accurate and robust predictions of solar power output. Experimental evaluations demonstrate the superiority of the LSTM technique compared to a simple Recurrent Neural Network (RNN), demonstrating higher predictive accuracy and better generalization performance. The LSTM achieves significant enhancements across all evaluated metrics, with improvements ranging from 60% to over 83% in all evaluating benchmarks. The proposed approach provides cruise ship operators with a reliable prediction framework for optimizing energy usage and reducing reliance on fossil fuels. This research offers significant implications for the design of intelligent energy management systems on green cruise ships, promoting energy efficiency and sustainable development in maritime transportation.

Keywords: *Deep learning machine, Climate change, Cruise ship, Long short-term memory, Solar power prediction*

Sec.5-Poster-06

STUDY OF FACTORS INFLUENCING AND OPTIMIZING CONDITIONS OF THE PRODUCTION OF WATER-BASED ACRYLIC PAINTS AND THEIR PROPERTIES

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ABSTRACT

In this study, we initially focused on investigating univariate factors such as the content of film-forming substances, paste, corrosion inhibitor additives, and stirring speed on the properties of water-based acrylic paint. Increasing the content of film-forming substances and paste reduced drying time, and increased the mechanical properties of the film, causing it to reach highest values at a 60/40 ratio. A corrosion inhibitor additive at 1% content was most effective in protecting metal surfaces. High stirring speed increased smoothness and hardness but reduced coverage and impact resistance when exceeded 1600 rpm. Moreover, we optimized the conditions for manufacturing water-based acrylic paint using the Box-Behnken design model with the response surface methodology. The target functions for the optimization process were viscosity, drying time, impact resistance, and abrasion. Parameters including resin content, corrosion inhibitor additive content, and stirring speed were selected to optimize the technological factors for manufacturing water-based acrylic paint. Under optimal conditions (level 2), the predicted values of the target functions for the water-based acrylic paint were viscosity of 18.65, drying time of 34.125, impact resistance of 83.25, and abrasion resistance of 130.399. The experimental values of these target functions produced under optimal conditions were 19, 35, 80, and 128, respectively. These values were close to the predicted values, demonstrating the agreement between theory and experiment.

Keywords: *Water-based acrylic paint, TiO_2 paste, optimization, response surface methodology (RSM), Box-Behnken*.

Sec.5-Poster-07

TENSILE BEHAVIOR OF ASYMMETRIC SPECIMENS FABRICATED FROM DISSIMILAR LAP JOINTS

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ABSTRACT

Dissimilar lap joints between AA6061 aluminum alloy and SUS316 stainless steel were fabricated using friction stir welding (FSW). Tensile specimens were machined perpendicular to the weld line to study the effects of asymmetric geometry and material properties on tensile behavior. The investigation focused on the role of the bonded area, interface morphology, and the size and orientation of kissing bonds. A combination of experimental and simulation approaches was employed to clarify these effects. Results indicated that the orientation of the kissing bond plays a critical role in determining joint strength. To enhance joint efficiency, it is essential to optimize material flow during welding, which governs the orientation of the kissing bond.

Sec.6-Poster-01

DECADAL SHIFTS AND SEASONAL DYNAMICS IN SEA SURFACE TEMPERATURE: UNRAVELING THE WARMING TRENDS AND ECOLOGICAL IMPACTS IN THE KUROSHIO AND EASTERN TAIWAN WATERS (1870-2022)

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ABSTRACT

Global climate change has led to significant environmental shifts, including rising sea surface temperatures (SSTs), which pose challenges to marine ecosystems. This study examines long-term SST variations in the Kuroshio Current region and adjacent eastern Taiwan waters from 1870 to 2022, utilizing the Hadley Centre's "Global Ocean Surface Temperature" dataset (HadISST1). The analysis reveals a pronounced warming trend influenced by seasonal dynamics. February consistently recorded the lowest SSTs (22.9°C), while July exhibited the highest (29.0°C). Annual mean SST extremes were observed in 1998 (26.9°C) and 1918 (24.4°C). The decadal analysis categorizes SST changes into distinct phases: cooling from 1870 to 1910 (-0.90°C), warming from 1911 to 1945 (1.17°C), moderate warming from 1946 to 1977 (0.19°C), accelerated warming from 1978 to 1998 (1.36°C), slight cooling from 1999 to 2010 (-0.11°C), and resumed warming from 2011 to 2022 (0.81°C). By integrating in situ observations and satellite-derived data, the study underscores the role of anthropogenic climate change in amplifying SST anomalies. Key findings reveal a pronounced warming in the region, with distinct seasonal and interannual variability. Furthermore, the warming trends are particularly intensified along the Kuroshio Extension, raising concerns about potential shifts in marine ecosystems and fisheries dependent on these thermal corridors. These findings are critical for informing regional climate adaptation strategies and sustainable management of marine resources in the dynamic and ecologically vital waters east of Taiwan. These findings highlight the variability and trends linked to both natural climate cycles and anthropogenic influences. The results provide critical insights into the thermal dynamics of the Kuroshio region, an area pivotal for marine biodiversity and regional climate regulation. Understanding these trends is essential for predicting ecosystem responses, managing fisheries, and mitigating climate impacts.

Keywords: *Sea surface temperature (SST), Warming trend, Kuroshio Current, Long-term variations, Climate change impacts, Eastern Taiwan waters*

Sec.6-Poster-02

EXPLORING FACTORS INFLUENCING THE WILLINGNESS TO PAY FOR GREEN TOURISM PRODUCTS IN VIETNAM

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ABSTRACT

Purpose – This study seeks to explore the influence of healthy involvement and the consideration of future consequences on attitudes toward environmental protection and the willingness to pay for green tourism. It also investigates the moderating role of future consequences consideration in the relationship between attitude and willingness to pay for green tourism. Based on the results, the authors provide recommendations to increase the willingness to pay for green tourism in the future.

Design/methodology/approach – This study involved a sample of 558 tourists, including 300 tourists from Nha Trang City and 258 tourists from Da Nang City, Vietnam. The SmartPLS software was utilized to evaluate the measurement model and analyze the structural model using structural equation modeling.

Findings – The results emphasize the importance of healthy involvement and the consideration of future consequences in influencing attitudes toward environmental protection and the willingness to pay for green tourism. Furthermore, the study confirms that the consideration of future consequences moderates these relationships.

Research limitations/implications – The research model combines the roles of healthy involvement and the consideration of future consequences to assess their impact on attitudes toward environmental protection and the willingness to pay for green tourism. In addition, attitude is explored as a mediator between healthy involvement, consideration of future consequences, and willingness to pay for green tourism, while the consideration of future consequences is examined as a moderator influencing attitudes and willingness to pay. Based on these findings, the paper offers recommendations to increase the willingness to pay for green tourism in the near future.

Originality/value – This study explores the roles of healthy involvement and the consideration of future consequences in positively influencing attitudes toward environmental protection and the willingness to pay for green tourism. Notably, it is the first to investigate the moderating effect of the consideration of future consequences on the relationship between attitude and willingness to pay for green tourism.

Keywords: *Consideration of future consequence; willingness to pay; green tourism*

Sec.6-Poster-03

HOME COUNTRY BIAS IN DOMESTIC DESTINATION CHOICE: THE CASE OF MILLENNIALS IN VIETNAM

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ABSTRACT

In the era of globalisation, the consumption of local products emerges as a key factor in advancing sustainability worldwide, bolstering regional economies, and preserving cultural identities. However, little research has been done on this topic in the context of tourism. This study identifies sociopsychological and economic factors that contribute to this home country bias. Building on social identity theory, this paper shows that home country bias is in part driven by a need for self enhancement. This influence is stronger for consumers who identify more strongly with their own country, and is complementary to the effect of tourism ethnocentrism, which provides an economic motivation for home country bias. This study develops a conceptual model that assesses the relative influence of tourism ethnocentrism, national identity on attitude and domestic destination choice in a non-Wester, Vietnamese context and targeting Millennials. Born between 1980 and 1999, the generation commonly referred to as Millennials (or Gen Y) has emerged as a particularly fascinating consumer cohort within this demographic for a variety of reasons. Despite the distinctiveness of this cohort, little is known about how their national identity—a crucial component of self-concept— influence their choices in tourism. We believe that this conceptual model has the potential to enhance our understanding of destination marketing theory and practice, contribute a more comprehensive understanding of the role of tourism ethnocentrism and national identity toward tourism consumer behavior. We then outline research propositions emanating from the conceptual model and directions for future research on tourism destination choice.

Keyword: *Millennials; Generation Y; destination choice; social identity theory; national identity; ethnocentrism*

Sec.6-Poster-04

THE IMPACT OF THE BIODIVERSITY BEYOND NATIONAL JURISDICTION (BBNJ) AGREEMENT ON OCEAN ECONOMY

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ABSTRACT

The Biodiversity Beyond National Jurisdiction (BBNJ) Agreement, adopted under the United Nations, marks a significant step in the governance of the high seas and aims to address the conservation and sustainable use of marine biodiversity in areas outside national jurisdictions. This article explores the potential impact of BBNJ on the global ocean economy, which encompasses various sectors such as fisheries, shipping, marine resource extraction, and tourism. The primary objectives of this study are to assess the potential economic benefits and challenges associated with the implementation of BBNJ, as well as to examine the agreement's influence on different ocean economy sectors. Specifically, the article aims to explore how the conservation measures mandated by BBNJ could reshape the utilization and management of marine resources in the high seas. Using a mixed-methods approach, the research combines qualitative analysis of the BBNJ framework and its provisions with quantitative data from global ocean economy sectors. This includes an analysis of existing literature, economic models, and case studies from marine industries affected by conservation regulations. Results suggest that BBNJ could drive long-term economic benefits by promoting sustainable practices that preserve marine ecosystems, thereby ensuring the continued availability of marine resources. However, it also presents significant challenges, particularly in industries reliant on resource extraction, such as fishing and deep-sea mining. These sectors may face stricter regulations and operational restrictions that could increase costs and reduce profits in the short term. In conclusion, while BBNJ holds promise for a more sustainable and equitable ocean economy, its success will depend on effective implementation, international cooperation, and balancing environmental and economic interests. The study provides policy recommendations to maximize the benefits of BBNJ while mitigating its economic risks.

Keywords: *BBNJ Agreement, Sustainable use, Marine biodiversity, Ocean economy.*