

**INTERNATIONAL CONFERENCE ON FOOD & AGRICULTURE
ADVANCED TECHNOLOGY FOR SUSTAINABLE DEVELOPMENT (FAATSD 2022)
AND METAGENOMICS AND FERMENTED FOOD SYMPOSIUM**

ABSTRACT BOOK

Venue: Industrial University of Ho Chi Minh city

Date: November 24th to 27th, 2022

Jointly organized by:

Asian Food Safety and Security Association,
Asia-Pacific Institute of Food Professionals,
Industrial University of Ho Chi Minh City,
and Ecotech Village (Techfest Vietnam).

ISSN: 2306-2150



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PREFACE

The Asian Food Safety and Security Association (AFSA) is a voluntary, non-profit organization established in 2010. The 5th annual general meeting of the Bangladesh-Japan Association for Science and Technology (BJAST) in Dhaka in 2010 decided to launch the Asian Food Safety and Security Association (AFSA). The first annual meeting of AFSA was held at Osaka Prefecture University, Japan, on September 15-17, 2012. The 2nd annual meeting of AFSA was held in Bien Hoa City (Near Ho Chi Minh City), Vietnam, on August 15-17, 2014. The 3rd annual meeting of AFSA was held in Bhubaneswar, India, on 15-17 September 2016; The 4th AFSA conference was held at Siem Reap, Cambodia, on 13-15 August 2018; The 5th conference was supposed to be held at Chulalongkorn University, Bangkok, Thailand on 16-18 September 2020, However, due to Covid-19 pandemic all the activities of AFSA was suspended till today.

The main objective of AFSA is as follows:

- To forge effective cooperation among the member states in climate change, food safety, and food security.
- To disseminate research findings and future research in food safety and security.
- To help in building the Asian Food Safety and Security Network.
- To help educational institutions by supplying equipment, books, materials, ideas, etc.
- To exchange views and ideas by organizing seminars, symposia, conferences, and meetings.
- To help secure funds for students to attend seminars, conferences, and training programs.
- To launch a Food Safety and Food Security Journal focusing on current trends and needs in Asia.



Md Latiful Bari, Ph.D.
General Secretary

Message from the President of AFSA



Takashi UEMURA, DVM, Ph.D.
Professor Emeritus, Osaka Metropolitan University,
Osaka, Japan

It is my great pleasure and honor to extend my gratitude for the grand opening of the International Conferences on Food & Agriculture Advanced Technology for Sustainable Development (FAATSD 2022) in the presence of many distinguished guests. This conference is jointly organized by The Asian Food Safety and Security Association (AFSA), the Industrial University of Ho Chi Minh City (IUH), the Asia-Pacific Institute of Food Professionals (APIFP), and EcoTech Village belongs to Techfest Vietnam, the Ministry of Science and Technology.

We began our adventure in Dhaka, Bangladesh, in 2010 and continually held the conference every two years across Asian countries. This series of conferences was started by the passions of some scientists in Asia who realize the value of collaborative work and open communication of ideas and information and feel that Food & Agriculture science, bioscience, and biotechnology increase the quality of life and welfare of people around the world. Private and public institutions/organizations, including Lincoln University USA, Osaka Prefecture University Japan, University of Dhaka Bangladesh, Dong Nai University in Vietnam, KIIT University Bhubaneshwar, India, Royal College of Agriculture, Cambodia hosted the conferences, the subsequent conferences to be held at Chulalongkorn University, Bangkok, Thailand in coming days once the pandemic is over. Since we have such conferences, there is an opportunity for interaction between academics and businesses, regulatory authorities, students and scientists, non-profit organizations, international organizations, local entrepreneurs, and industries. I sincerely thank and express my sincere gratitude to the hosts and supporters of FAATSD2022.

I hope that through this conference, scientists from various Asian nations can exchange new ideas, share knowledge about ongoing research and current problems, and develop collaborative research, & practical cooperation, student exchange programs, etc., to improve the quality of life in Asian countries.

I hope to provide as many young scholars with the opportunity to attend the international symposium. Our never-ending quest for improved QOL and the welfare of humans through bioscience and biotechnology calls for a constant flow of new, creative knowledge.

Thank you all very much

A handwritten signature in dark ink, appearing to read 'Takashi UEMURA'.

Takashi UEMURA, DVM, Ph.D

ABOUT APIFP

Asia-Pacific Institute of Food Professionals (APIFP) – A professional network in the region

APIFP is a non-profit professional organization developed to provide a platform for food professionals in the Asia-Pacific region to address regional food supply challenges. The Asia-Pacific region faces diverse food-related challenges, including food security, food safety, poor quality of healthy foods, and an overall shortage in its food supply. There is a strong need to develop and closer regional collaborations and cooperation arrangements. APIFP has been established to connect regional food professionals to benefit the public and the local food sector through education, research, training, and regular engagement. APIFP has successfully developed collaborations and organized scientific and technical activities, workshops, symposiums, and conferences in the region, particularly in China, Malaysia, Singapore, Thailand, Pakistan, India, Iran, New Zealand, and Vietnam

Assoc. Prof. Malik Hussain

ABOUT IUH

The Industrial University of Ho Chi Minh City (IUH) is a public higher education institution in Vietnam. IUH is approved for implying an autonomy mechanism by the Vietnam government. IUH is a leading industrial university advancing knowledge and applied research in supporting the economic development, industrial transformation, and smartization of Vietnam and the region.

IUH provides quality education and applied research to prepare students and graduates for life and the future of work. It supports and contributes to developing start-ups, businesses, and industries in complementing Vietnam's economic efforts by harnessing its resources, strengths, research, and innovation. It engages the ASEAN region in education, research, and service to advance Vietnam's economic development and growth.

IUH's educational philosophy aims to nurture its students and graduates with CARE (Compassionate Leader, Avid Lifelong Learner, Rational Thinker; Enterprising Innovator) attributes and to prepare them for life and the future world of work. It educates students and graduates in applying and advancing knowledge through hands-on experience, active and experiential learning, and applied research to meet the needs of stakeholders and society. The IUH community lives in transforming minds and enriching the lives and businesses of students, graduates, and stakeholders by serving the community and contributing to the betterment of society.

Building advanced management, meeting the condition to provide high-quality human resources for society, creating practical values and effectiveness from technology transfer activities and international cooperation. IUH has 1,423 staff members, including 1,200 teaching lecturers. Besides, the University invites hundreds of visiting lecturers from universities, research institutes, academies, and scientific and technical staff working in production and business establishments to diversify the teaching resources. Many lecturers participate in scientific research at school, ministry, city, and national levels. In recent years, the school has gathered a team of young scientific and technical staff with professional qualifications and good pedagogical ability. With enthusiastic and passionate members, the team is a potential resource to develop and improve the University's training quality.

ABOUT ECOTECH VILLAGE (TECHFEST VIETNAM)

EcoTech Village belongs to Techfest Vietnam, Ministry of Science and Technology. Ecotech Village has the following mission:

- Create an environment to exchange, exchange, learn, share and help each other;
- Applying scientific research results to practical business;
- Support for community development and education on environmental protection;
- Support and incubate the spirit of entrepreneurship, transform new environmentally friendly technologies, and actively contribute to improving the community.

The goal of EcoTech Village

- Connecting research units, start-ups, manufacturing and trading companies in the field of nature-oriented technology towards new environmentally friendly technologies;
- Exchange, share and support start-ups in the area of activities of the Village;
- Support members in finding investors to offer capital solutions;
- Support on legal issues, business models, marketing activities, financial management, and technology transfer;
- Support the development of the market for members of the Village;
- Organizing start-up competitions for students related to the field of activity of the Village;
- Incubating, encouraging product development initiatives, and supporting the community;
- Organize seminars to introduce and discuss technology, products, and other related issues

**INTERNATIONAL CONFERENCES ON FOOD & AGRICULTURE
ADVANCED TECHNOLOGY FOR SUSTAINABLE DEVELOPMENT
(FAATSD 2022)**

The 24 - 27th November 2022

24th November 2022

Workshop: Metagenomics – Meeting room: E3.2

07:30 – 08:00	Registration
08:00 – 08:05	Welcome Address by Vice Rector of IUH (Assoc. Dr. Dam Sao Mai)
08:05 - 08:15	Address by Prof. Takashi Uemura, Osaka Prefecture University, Osaka, Japan
08:15 – 08:50	Keynote Speaker 1 Francesca De Filippis <i>Department of Agricultural Sciences, University of Naples Federico II, Italy</i> “Exploiting the microbiome of traditional fermented foods to improve food quality and human health”
08:50 – 09:20	Keynote Speaker 2 Tran Thi Mai Anh <i>Institute of Biotechnology and Food technology, Industrial University of Ho Chi Minh city</i> “Cocoa fermentation and its application in beverage production”
09:20 - 09:40	Keynote Speaker 3 (online) Le Van Diep <i>Cyber School, Vinh University.</i> “Biochemical profiling of Liquor Fermentation Starter”
09:40 - 09:50	Teabreak
09:50 – 10:40	Talkshow MC: Tran Thi Ngoc Invited guests: Francesca, Dam Sao Mai, VinaOrganics Co.Ltd., Kochu Company Co.Ltd.
10:40 – 11:00	Q&A
11:00 – 13:00	Lunch

Talk show: Italian culture and cuisine – Meeting room: A7

14:00 – 16:00	1. Italian culinary - one of the most influent origins of modern Western culinary 2. Culture of Italian Coffee and Espresso 3. And others
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Welcome dinner: 18:00 – 20:00

Address: Luxury Restaurant, No 171 Nguyen Thai Son Street, Go Vap District, Ho Chi Minh City

25th November 2022

ICATSD2022 symposiums

08:00 – 18:00	Registration
09:00 – 12:00	ICATSD2022 symposiums
12:00 – 13:30	Lunch
13:30 – 18:00	ICATSD2022 symposiums

Gala Dinner: 18:00 – 21:30

Address: Luxury Restaurant, No 171 Nguyen Thai Son Street, Go Vap District, Ho Chi Minh City

26th November 2022

FAATSD2022 conferences

Meeting Room E4: 07:30 – 12:30

07:30 - 08:30	Registration and opening ceremony
08:30 - 08:40	Welcome Address by Vice Rector of IUH (Assoc. Dr. Dam Sao Mai)
08:40 - 08:50	Address by Prof. Takashi Uemura, Osaka Prefecture University, Osaka, Japan
08:50 - 09:00	Symposium Chairman Address (Prof. Latiful Bari)

Chairman: Assoc. Prof. Dam Sao Mai; Prof. Latiful Bari	
09:00 - 09:30	Keynote Speaker 1 Dr. Nobuyuki Kijima <i>Institute of Food Research, National Agriculture and Food Research Organization (NARO), Tsukuba, Japan</i> “Rational use of antibiotics as agricultural chemicals to ensure food security”
09:30 – 10:00	Keynote Speaker 2 Dr. Md Tofazzal Islam <i>Institute of Biotechnology and Genetic Engineering (IBGE), Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur, Bangladesh</i> “The development of point-of-care detection of destructive wheat blast fungus using CRISPR-Cas technology”
10:00 – 10:30	Keynote Speaker 3 Prof. Venkatesh Meda <i>Department of Chemical and Biological Engineering, University of Saskatchewan, Canada</i> “Investigation of Lentil Seed Behavior under Microwave and Microwave-Infrared Thermal Treatments and Their Impact on Modifying the Physicochemical and Functional Properties”
10:30 – 10:45	Group photo
10:45 – 11:00	Teabreak
Chairman: Prof. Ryohei Kada; Dr. Venkatesh Meda	
11:00 – 11:30	Keynote Speaker 4 Dr. Ramesh C. Ray <i>Center for Food Biology & Environment Studies, Bhubaneswar, Orissa, INDIA</i> “Fruit and vegetable loss and waste and value-addition: Global scenario”
11:30 – 12:00	Keynote Speaker 5 (Online) Assoc. Prof. Malik Altaf Hussain <i>School of Science, Western Sydney University, Hawkesbury Campus, Richmond, NSW, Australia</i> “Emerging plant-based food products and public health risks”

12:00 – 12:15	Keynote Speaker 6 FoodMap “Boosting supply chain of agriculture - How can win in this battle by technology”
12:15 – 12:30	Keynote Speaker 7 Jonathan Choi - 8 Corners “The health of the blood is the key to a healthy body & mind”
12:30 – 13:30	Lunch (V15)

Parallel Sections

Meeting Room E4: 13:30 – 17:30

Section 1 Chairman: Prof. Dinh Thang Tran; Prof. Yong Ill Lee	
13:30 – 13:50	Keynote Speaker 1 Prof. Ryohei Kada <i>Research Institute for Humanity and Nature, Kyoto, Japan</i> “Sustainable Resource Management for Food Security in Rural Asia”
13:50 – 14:10	Keynote Speaker 2 Dr. Nguyen Ba Thanh <i>Institute of Biotechnology and Food technology, Industrial University of Ho Chi Minh city</i> “Vietnam coffee industry: The opportunities and challenges to build a better future”
14:10 – 14:25	Oral presentation 1 Vincenzo Valentino <i>Department of Agricultural Sciences, University of Naples Federico II, Italy</i> “Minimally processed vegetables facilities host potentially spoilage and pathogenic bacteria”
14:25 – 14:45	Q&A
14:45 – 15:15	Teabreak
Section 2 Chairman: Dr. Muhammad Manjurul Karim; Assoc. Prof. Nguyen Thi Minh Nguyet	

15:15 – 15:30	Oral presentation 2 Dr. Tong Thi Minh Thu <i>Center for Health and the Environment, The Saigon International University, Ho Chi Minh City</i> “A synthesis of ammonium phlox-Ru(II) complex and its application to catalytic asymmetric inter- and intramolecular cyclopropanation reactions”
15:30 – 15:45	Oral presentation 3 Huynh Thi Bich Nguyen <i>Faculty of Commerce and Tourism, Industrial University of Ho Chi Minh City</i> “Research on the impact of marketing-mix factors on brand awareness and brand image – the case of true milk in HCM”
15:45 – 16:00	Oral presentation 4 Syed M Istiak <i>Deep Sea Fishers Ltd and ASAP Healthy Food Ltd. Dhaka, Bangladesh</i> “Study to develop sashimi meat from the cuttlefish (<i>Sepia officinalis</i>) and evaluate its quality as ready to eat products”
16:00 – 16:15	Oral presentation 5 Dr. S. M. Rafiquzzaman <i>Department of Fisheries Biology and Aquatic Environment, Bangabandhu Sheikh Mujibur Rahman Agricultural University</i> “Optimization of Replacement of Fishmeal by Fermented Soybean Meal on Growth Performance and Hematology of Nile Tilapia (<i>Oreochromis niloticus</i>)”
16:15 – 16:30	Q&A
16:30 – 17:30	Poster section

Meeting Room E3.2: 13:30 – 17:30

Section 3 Chairman: Assoc. Prof. Tran Nguyen Minh An; Dr. Nobuyuki Kijima	
13:30 – 13:50	Keynote Speaker 1 Dr. Yasuhiro Inatsu <i>Food Research Institute, National Agriculture and Food Research Organization, 2-1-12, Kannondai, Tsukuba, Ibaraki, Japan</i> “Importance of the bacterial quality of irrigation water - Choice of the source and quantitative analysis of <i>E. coli</i>”

13:50 – 14:10	Keynote Speaker 2 Dr. S. M. Maruf Kabir <i>PRAN-RFL Group. 105 Pragati Sarani, Middle Badda, Dhaka-1212, Bangladesh</i> “A proper industrial packaged food could be used to prevent the food borne illness/disease”
14:10 – 14:30	Keynote Speaker 3 Prof. Muhammad Manjurul Karim <i>Department of Microbiology, University of Dhaka, Dhaka 1000, Bangladesh</i> “Potentiality of using salt-tolerant plant-growth-promoting rhizobacteria as biofertilizer for climate-smart agriculture in the coastal areas”
14:30 – 14:45	Q&A
14:45 – 15:15	Teabreak
Section 4 Chairman: Dr.Yasuhiro Inatsu; Dr. S. M. Maruf Kabir	
15:15 – 15:30	Oral presentation 1 Dr. Md. Tariqul Islam <i>Department of Fisheries, University of Rajshahi, Rajshahi-6205, Bangladesh</i> “Effects of delayed icing on the histamine contamination in Hilsa shad (<i>Tenualosa ilisha</i>)”
15:30 – 15:45	Oral presentation 2 Dr. Abdullah-Al Mamun <i>Department of Fisheries and Marine Science, Noakhali Science and Technology University, Noakhali, Bangladesh</i> “Nourishing adolescent female with ready to use fish powder (RUFPs) in Bangladesh”
15:45 – 16:00	Oral presentation 3 Prof. Luthfunesa Bari <i>Department of Food Technology and Nutritional Science, Faculty of Life Science, Mawlana Bhashani Science and Technology University, Tangail-1902, Bangladesh</i> “Determination of ciprofloxacin, tetracycline, and oxytetracycline residues in raw, frozen and boiled poultry sample by RP-HPLC-UV with solid phase extraction system”
16:00 – 16:15	Oral presentation 4 Tran Phuong Dinh

	<i>Faculty of Commerce and Tourism, Industrial University of Ho Chi Minh City</i> “Research on the factors affecting the flower experience to the intention to buy fresh food of fresh food in Vietnam”
16:15 – 16:30	Q&A
16:30 – 17:30	Poster section

Closing Ceremony - Meeting Room E4

17:30 – 18:30	Closing Ceremony • Best Oral presentation award • Best Poster presentation award • Best Innovation Concepts Award • Thank you speech Address by University Official • Thank you speech Address by Chairman
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27th November 2022

Technical tour: 06:00 - 16:30

06:00	Depart from Industrial University of Ho Chi Minh City (IUH) - 12 Nguyen Van Bao St. Go Vap District, Ho Chi Minh city
07:00	A quick breakfast at Mekong Long Thanh Rest or Tran Long Rest
08:30	Visit the Industrial Shrimp farm
11:30	Visit Đảo Khỉ (Monkey Island)
12:45	Lunch
15:00	Visit the nipa palm (<i>Nypa fruticans</i>) farm and factory (Dừa nước ông Sáu – Vietnipa)
16:30	Return to Industrial University of Ho Chi Minh City (IUH)

RATIONAL USE OF ANTIBIOTICS AS AGRICULTURAL CHEMICALS TO ENSURE FOOD SECURITY

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ABSTRACT

The Discovery of antibiotics has contributed significantly to human life, especially in medical treatment or agricultural production. Sir Alexander Fleming discovered a unique aseptic substance, penicillin, in 1928. From the 1940s to 1950s, several substances that act as a disinfectant to other microbes were found in microbes or their culture base and called "antibiotics". Streptomycin, the silver bullet to tuberculosis, and oxytetracycline, a broad-spectrum drug, were also discovered in this era.

In 1954, USDA reported diversifying medical-use antibiotics to crop production as a pesticide. Streptomycin and oxytetracycline are common in vegetable or fruit production as agricultural chemicals. Modern crop yields would not be possible to obtain without antimicrobial pesticides. However, widespread use, not only in the medical sector but also in animal husbandry, aquaculture, or agriculture, may be partly responsible for the crisis of antimicrobial resistance (AMR). World Health Organization warned global problem of AMR, and World Health Assembly adopted a "Global Action Plan on AMR" in 2015. So, it needs to understand the actual situation of AMR in the agricultural environment.

We have been looking at AMR in agricultural specimens, irrigation water, soil, and vegetables since 2017. Our observation based on culture-dependent methods at 37°C indicated that resistant bacteria to penicillin, streptomycin, and oxytetracycline are widely distributed in the agricultural environment, such as soil or irrigation water, even without the application of antimicrobial pesticides. On the contrary, under a legally managed procedure, the population level of resistant bacteria to oxytetracycline in the edible part of lettuce cultivated with oxytetracycline application was below the detection limit. So far, various antibiotics have been developed from the metabolite of common environmental microbes. The natural environment can be considered a space where the producer of antibiotics and the resister of antibiotics coexist. However, avoiding fresh produce by AMR contamination might be possible with the appropriate use of antimicrobial pesticides.

Keywords: Antibiotics, agricultural chemicals, food security,

DEVELOPMENT OF A POINT-OF-CARE METHOD FOR THE DETECTION OF DESTRUCTIVE WHEAT BLAST FUNGUS USING CRISPR-CAS TECHNOLOGY

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ABSTRACT

Wheat blast is a destructive fungal disease caused by a filamentous fungus *Magnaporthe oryzae* *Triticum* (MoT), which poses a severe threat to food security in some South American countries, Bangladesh and Zambia. In 2016, the first epidemic outbreak of wheat blast devastated 15,000 hectares of wheat in Bangladesh, with yield losses of up to 100%. In a rapid response, next-generation sequencing, open data sharing, and available science approaches were used and determine the genetic identity and origin of wheat blasts in Bangladesh as a lineage of South American *M. oryzae*. A point-of-care diagnostic method is needed to stop the spread of MoT to new wheat-growing areas and efficiently manage wheat blasts. To achieve this goal, genomes of *M. oryzae* isolates from rice and wheat were sequenced, and two unique DNA fragments, MoT-6098 and MoT-6099, were discovered in the genome of MoT. A polymerase chain reaction (PCR) method was developed and validated based on these DNA fragments. Then a loop-mediated isothermal amplification technique for detecting MoT was created, where no PCR machine is required. To upgrade these methods, guide RNAs were designed, and the Cas12a enzyme was used to target the DNA sequences of MoT-6098 and MoT-6099. The activated Cas12a exhibited indiscriminate single-stranded deoxyribonuclease activity. Using this CRISPR-Cas12a technology, a new cost-effective, and rapid method was developed for detecting MoT in infected wheat seeds and plants. This method was further improved as a field-deployable lateral flow assay, Bio-SCAN, as a susceptible tool for precisely detecting MoT in less than 1 hour. Deployment of this rapid and point-of-care method in plant quarantine offices offers an opportunity to restrict the spread of MoT fungus to new wheat-growing areas/countries. Farmers can also use this method for precise detection of MoT in infected plants, seed lots, and alternate hosts, as well as monitoring and surveillance of wheat blast disease in the practical field.

Keywords: wheat blast, CRISPR-based lateral flow assay, detection method,

FRUIT AND VEGETABLE LOSS AND WASTE AND VALUE-ADDITION: GLOBAL SCENARIO

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ABSTRACT

Vegetables and fruits contain many phytochemicals, vitamins, and minerals, dietary fibers that are good for human health. However, at a global scale, a substantial amount (25-50%) of fruits and vegetables is lost from farm to fork, together called post-harvest losses. These losses represent both food security and environmental issue and therefore counteract any effort to build sustainable food systems since they deprive populations of a considerable amount of healthy food and represent a massive waste of resources. The leading causes of fruits and vegetables food loss and waste and value addition into bioproducts (i.e., bio-absorbents, compost/vermicompost, livestock feeds, single-cell proteins, enzymes, etc.) and platform chemicals (i.e., organic acids, biofuels) are discussed.

Keywords: Vegetables and fruits, waste, Value addition, and global scenario

POTENTIALITY OF USING SALT-TOLERANT PLANT-GROWTH-PROMOTING RHIZOBACTERIA AS BIOFERTILIZER FOR CLIMATE-SMART AGRICULTURE IN THE COASTAL AREAS

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ABSTRACT

The salinity level in the coastal ecosystem and agricultural lands is increasing gradually due to the sea-level rise, one of the many effects of climate change. Consequently, a substantial reduction in crop yields is experienced in some South Asian countries threatening their food security. To bring the salinity-affected lands under agriculture, applying salt-tolerant, plant-growth-promoting rhizobacteria (PGPR) as biofertilizer as an alternate technology to genetically-modified crops could improve salt resistance in plants, thereby augmenting plant growth and production. Here, we isolated 53 PGPR from saline and non-saline areas in Bangladesh, where electrical conductivity was measured as >7.45 and <1.80 dS/m, respectively. Bacteria isolated from saline areas grew up to 2.60 mol/L salt concentration, contrary to the isolates collected from non-saline regions that did not survive beyond 854 mmol/L. Among the salt-tolerant isolates, *Bacillus aryabhattai*, *Achromobacter denitrificans*, and *Ochrobactrum intermedium*, identified by comparing respective sequences of 16S rRNA using the NCBI GenBank, exhibited a higher amount of atmospheric nitrogen fixation, phosphate solubilization, and indoleacetic acid production at 200 mmol/L salt stress. While in soil, rice growth under non-saline conditions was comparable between *B. aryabhattai* MS3-fertilized and control pots, the scenario was statistically significant when challenged with 200 mmol/L salts, 42.60%, and 8% survival were recorded, respectively. Biochemical analyses revealed that *B. aryabhattai* MS3 supported the plants under salinity by increasing the availability of nutrients (Fe, P), accelerating the levels of IAA and chlorophyll content, enhancing proline accumulation, and decreasing malondialdehyde formation. Further, rice growth was favored by enhanced expression of at least four salt-responsive plant genes: *BZ8*, *SOS1*, *GIG*, and *NHX1*. Fertilizing rice with osmoprotectant-producing PGPR could be a climate-change-adaptation framework to build climate-smart agriculture for the coastal ecosystem.

Keywords: plant-growth-promoting rhizobacteria (PGPR), salt-tolerant plant, Biofertilizer, Coastal area, Bangladesh

SUSTAINABLE RESOURCE MANAGEMENT FOR FOOD SECURITY IN RURAL ASIA

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ABSTRACT

Intensifying human activities such as deforestation, increased human settlement, and intensive agricultural activities, accompanied by high economic development, have often caused severe environmental risks such as flooding, soil erosion, and water pollution in many Southeast Asian countries. Additionally, these ecological concerns have significantly impacted the quantity and quality of agricultural and marine goods, which are crucial for food security and public health. Such food risks result in an inadequate food supply and poor-quality and contaminated food, which significantly contribute to public health risks. We have identified various negative impacts of poor resource management on expanding disaster risks and declining soil and water based on our collaborative, long-term, watershed-based empirical research conducted in Sekampung River watersheds, Lampung Province, in Indonesia's resource capacity. Furthermore, such negative impacts adversely affect farm and fishery households' income and livelihood. That is why social empowerment is crucially important, which could lead to protection against natural disaster risks.

Recently, the concept of "Green Infrastructure" (GI, in short) has been paid greater attention, mainly because sustainable resource management with good agricultural and forestry practices would provide essential ecosystem services to local people and the regional economy. GI would provide sustainable fishery, aquaculture, forestry, and agricultural resources (and biomass energy outputs). GI could also provide invaluable functions to protect or reduce natural disaster risks (such as flooding, tsunami, soil erosion, or drought). That could also be the basis of beautiful landscapes and scenery, suitable for eco-tourism, a communication network platform among local people and communities. We will also discuss the so-called Ecosystem-based Disaster Risk Reduction (Eco-DRR), defined as the sustainable management, conservation, and restoration of ecosystems, to reduce disaster risk and achieve sustainable and resilient development. Well-managed ecosystems, such as wetlands, forests, and coastal systems, would act as natural infrastructure, reducing physical exposure to many hazards and increasing the socio-economic resilience of people and communities.

Keywords: Natural Disaster Risk, Sustainable Resource Management, Community-based watershed management, Green Infrastructure, Payment for Ecosystem Services,

FUTURE NANOTECHNOLOGY FOR SUSTAINABLE FOOD AND AGRICULTURE

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ABSTRACT

Nanotechnology has tremendous promise for benefits both inside and outside of food products. For decades, nanotechnology has been used in agriculture to improve food production while maintaining or improving nutritional content and quality, boosting food output globally and safety. Recently, one of the most crucial areas of nanotechnology application is food and agricultural production. Applications of nanotechnology in agriculture include (1) nanoformulations of agrochemicals for applying pesticides and fertilizers to improve crops, (2) the use of nanosensors in crop protection for identifying diseases and agrochemical residues, and (3) nanodevices fabrications. While applications of nanotechnology in the food sector can provide more robust flavors and colors, increase barrier characteristics, and increase safety by detecting microorganisms in packaging. Nanoparticles are employed in food processing to improve food stability and preserve food color. Silicate nanoparticles can limit moisture loss and oxygen flow in packaging containers. This guarantees that the food stays fresh for a more extended period.

The main concerns surrounding current agricultural research based on nanotechnology that may boost agricultural production and food security in the future have been emphasized in this keynote address. In contrast to typical fertilizers, nutrients applied alone or in combination are bonded to nano-dimensional adsorbents, which release nutrients very gradually. This strategy reduces nutrient loss into groundwater while also improving nutrient use efficiency. Numerous nanoparticle formulations, including nano-sized insecticides, herbicides, fungicides, fertilizers, and sensors, have been studied to manage plant health and enhance the soil. A thorough understanding of the interactions between plants and nanomaterials opens new possibilities for enhancing farming practices through higher disease resistance, crop output, and nutrient uptake.

Keywords: Nanotechnology, food and agricultural production, food safety and security.

IMPORTANCE OF THE BACTERIAL QUALITY OF IRRIGATION WATER - CHOICE OF THE SOURCE AND QUANTITATIVE ANALYSIS OF *E. COLI*

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ABSTRACT

The occurrence of foodborne diseases caused by pathogenic bacteria such as Enterohaemorrhagic *Escherichia coli* (EHEC) or *Salmonella* is one of the significant issues for public health. Contamination of fecal pathogenic bacteria on raw vegetables may occur during their growth or harvesting process on farms using unclean (contaminated) irrigation water. From this viewpoint, members of AFSA in Cambodia, Laos, and Vietnam have conducted international collaborative work in FY2013-2014. At that time, fecal coliforms were isolated from 51 % (186) of collected 366 samples, and 77 % of them (144) were *Escherichia coli* (*E. coli*). The ratio of *E. coli* contamination of the water samples from canals, rivers, and streams was significantly higher than that of the ones from wells, tanks, and other "safer" water (Odds rate: 4.9 [2.2-10.6], $P < 0.01$). After that, we conducted another study in Vietnam in 2014-2015. At that time, 120 (60 %) of the 200 collected samples from field animal-invaded areas were *E. coli* positive. In Japan, the Ministry of Agriculture, Forestry, and Fisheries (MAFF) surveyed irrigation water from 2007 to 2008. At that time, 4.4 % (21 in 478), 20 % (99 in 499), and 15 % (100 in 683) of collected samples used for green onion, tomato, and cucumber harvesting, respectively, were detected with *E. coli*. After that, MAFF conducted similar surveillance from 2014 to 2016. At that time, 9.1 % (7 in 77), 0.6 % (2 in 361), 1.2% (3 in 243), and 0 % (0 in 35) of collected samples used for lettuce, cucumber, tomato, and Chinese cabbage harvesting, respectively, were detected with *E. coli*. MAFF published "Guideline on Hygiene Management of Vegetables from Cultivation to Shipping", a guideline on Good Agricultural Practices (GAP) for fresh vegetables in 2011. The revised approach published in 2021 shows a reference value (100 CFU/100 mL) of *E. coli* to distinguish whether the irrigation water is suitable for using vegetables that primarily can be eaten raw (harvested parts) within a week before harvest or not. Now we are developing and validating the quantitative method of *E. coli* used to help with management at the production stage.

Keywords: foodborne diseases, irrigation water quality, pathogenic bacteria and vegetables

A PROPER INDUSTRIAL PACKAGED FOOD COULD BE USED TO PREVENT THE FOODBORNE ILLNESS/DISEASE

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ABSTRACT

This study is concerned with industrial healthy processed foods. It describes in the paper the biological activities of foods as their enzyme action, microbial action, and oxidation state, which are rolled to affect processed food products. And is also pointed out in the paper about the quality maintaining steps of raw material.

Hygiene and sanitation, which has been taken an essential precondition for food manufacturing, is discussed in the paper mentioning CIP (Cleaning In Place) of the machine, fogging for space sanitizing by approved chemical SU-319 and personal hygiene by maintaining cap, mask, apron, and footwear, ensuring the hygienic status by testing swab in the laboratory which is also expressed in the paper. Those foods are pointed out here, generally healthy and safe for human beings, which are made through some conditional ways to prevent the food-borne disease from taking such foods. These ways can be classified as the nature of foods. Food means safe and wholesome for humans. The paper is also described to take a step to making foods at the stage of raw materials source, recipe setting, food-making process, machinery selection, method adoption, infrastructure, monitoring system, hygiene, and system, pasteurizing system, sterilizing, thermal shot, filling or packaging in aseptic condition using high barrier packaged material condition. Here is also pointed out that four steps are used to prevent a food-borne illness: a. Cleaning: Wash hands and surfaces often b. Separate: Don't cross-contamination c. Cook: Cook to proper temp. d. Chill: Refrigerate promptly. The paper touches on the microbial effect on foods with six types and states some microorganisms caused by food-borne diseases. Here also noted the health benefit of some dehydrated food products with their origin of fruits, such as raisins of grapes, mango bars of ripe mango, and tomato sauce of ripe tomato, which described the components and mechanisms of effect in the human body.

Keywords: Industrial packaging, foodborne pathogens, prevention, and products safety

EMERGING PLANT-BASED FOOD PRODUCTS AND PUBLIC HEALTH RISKS

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ABSTRACT

Global food supply has been embracing new and innovative plant-based alternatives for milk and meat products for the last few years. Among many drivers of the tremendous market growth, the key driver is an increased demand for an alternative to animal-based products for several reasons, such as sustainability, animal welfare, and dietary concerns. Many milk substitutes are available, including soy, almond, coconut, oat, and rice, which have been marketed for a considerable time. The global food market's demand for plant-based food products is rapidly growing. According to some economic reports, veganism and the plant-based industry have become the 3rd fastest growing vegan sector globally, with an estimated value of \$125 million. However, the emergence and growth of plant-based food products also created new public health, food safety, and regulatory challenges. Such challenges include uncertainty about the nutritional properties, unknown long-term health effects, public health risks, and the lack of comprehensive regulations for these products. This presentation will explore some food safety risks associated with plant-based food products.

Keywords: Plant-based food, public health, food safety, innovation

EFFECTS OF DELAYED ICING ON THE HISTAMINE CONTAMINATION IN HILSA SHAD (*Tenualosa ilisha*)

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ABSTRACT

Histamine poisoning is a significant concern for many people eating the hilsa shad (*Tenualosa ilisha*), the king of fish, for its delicious taste and unique flavors. The study aimed to know the effects of delayed icing on histamine production and histamine-producing bacteria (HPBs) after catching hilsa. For this purpose, fish were collected just after seeing onboard in Patharghata, Bangladesh, and added ice at three hours intervals (0h, 3h, 6h, 9h, 12h, and 15h) and kept separately in iceboxes and brought to the laboratory to determine the histamine content and HPB count on the 2nd, 5th and 8th day during ice storage. The initial histamine content on the 2nd day was 13.1 mg/100g in the sample of immediate icing (0h) and then gradually increased with delaying of icing. However, no significant ($p > 0.05$) differences were observed among samples of icing at 0h, 3h, and 6h. On the 5th and 8th day, a more or less similar trend in histamine content was observed. The histamine content was less than 50 mg/100g, regarded as a "hazard action level" during the entire storage period in samples of icing on and before 6h. In addition, the HPB count steadily increased with the delaying of icing in almost the whole storage period. However, HPBs were not significantly influenced ($p > 0.05$) by the storage period. Among 62 selected isolates, 16 isolates showed positive results on Niven's medium, which were further confirmed presumptively by biochemical tests as follows: *Shigella* spp. (5 strain), *Pseudomonas aeruginosa* (3), *Citrobacter freundii* (2), *Hafnia alvei* (1), *Edwardsiella tarda* (1), *E. coli* (1), *Enterobacter cloacae* (1), *Acinetobacter baumannii* (1), and *Lactobacillus* spp. (1). All those isolates were confirmed as histamine producers producing 32.37 - 66.38 mg/100g histamine. To sum up, histamine production and spoilage could be kept within acceptable limits by icing hilsa within six hours of catching, irrespective of the storage period, which will ensure the supply of hilsa for all sorts of consumers.

Keywords: Hilsa fish, histamine, icing, preservation

RESEARCH ON THE IMPACT OF MARKETING-MIX FACTORS ON BRAND AWARENESS AND BRAND IMAGE – THE CASE OF TRUE MILK IN HCM.

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ABSTRACT

The study aimed to investigate the variables influencing consumer brand awareness and brand image of fresh milk products made by TRUE MILK. They used expert-conducted preliminary qualitative research and a formal linear structural model for quantitative analysis (PLS-SEM). Distribution intensity and promotion are the two aspects that have been found to impact the awareness of the TH milk brand. The distribution intensity and brand image both affect the perception of the TH milk brand. Brand image is unaffected by price. The "Intensity of distribution" element significantly influences customers' brand awareness and perception of the TH milk brand. Nearly 40.7% and 57.6% of the variation in brand awareness and brand image are explained by independent factors. The study then makes some managerial recommendations to improve the brand image and awareness of TH True milk.

Keywords. Brand image, awareness, advertising, distribution intensity, promotion, store image, and price deals.

STUDY TO DEVELOP SASHIMI MEAT FROM THE CUTTLEFISH (*SEPIA OFFICINALIS*) AND EVALUATE ITS QUALITY AS READY-TO-EAT PRODUCTS

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ABSTRACT

The cuttlefish belong to the Cephalopoda class. Humans started consuming Cephalopods 4000 years ago. In 2021, Japan imported about 64,649 Mt of frozen Cuttlefish as one of the principal consumers. Cuttlefish meat is a good source of protein, EPA, and DHA. Sashimi is a raw ready-to-eat product. Usually, cuttlefish are eaten as Sashimi, cooked, deep-fried, boiled, etc. Sashimi production requires higher standards and HACCP protocols. Cuttlefish is a by-catch product in Bangladesh. In 2020-21, Bangladesh exported 942 MT of cuttlefish, earning USD 2.4 million. The study objective was to develop Sashimi meat from cuttlefish (*Sepia officinalis*) and evaluate its quality as a ready-to-eat product. The sashimi grade cuttlefish production method and HACCP plan were evaluated and approved by the FIQC, Chottogram. The processing steps were air defrosting, grading, washing, pre-processing, processing, and export grading, which are 8/12, 12/20, 21/30, 31/40, 41/60, 61/81, 81 up counts per kg, panning, quick frozen, metal detection, packing and storage. Drawn five random samples and conducted sensory evaluation by the panel of 5 members using the Tory Sensory Scale and microbiological tests. About 20.04 MT Onboard frozen (-20°C) 50 gm to 300 gm size whole cuttlefish were used. Processed and produced 10.03 MT of final products, of which 4.56 MT was head parts, and 5.71MT was Sashimi meat. Total yield was 50.62%, meat 55.40%, head 44.60 %, grade 41/60 was 37%, and by-products were 49.38%, respectively. *Vibrio*, *E. coli*, and *Salmonella* were absent in the samples, and the APC count was 6.6×10^4 , which is less than the recommended critical limit of Japan (APC count $< 10^5$ cfu/g). Sensory evaluation results were 7.78, which is good quality. According to the regulations of Japan and Bangladesh, test results confirmed that the meat was Sashimi grade Ready to Eat. The export price was USD 7.16/kg, 178% higher than the total cuttlefish price of 2.58/kg.

Keywords: Cuttlefish, Sashimi meat, raw-ready-to-eat, processing, quick frozen, HACCP, Sensory, microbiological, better revenue.

OPTIMIZATION OF REPLACEMENT OF FISHMEAL BY FERMENTED SOYBEAN MEAL ON GROWTH PERFORMANCE AND HEMATOLOGY OF NILE TILAPIA (*Oreochromis niloticus*)

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ABSTRACT

Developing high-quality fish feed at a lower price is crucial to commercial fish culture success. Searching for an alternative fish meal as a protein source is essential to reduce the feed cost. Therefore, this study was conducted to optimize the replacement of fish meal (FM) with fermented soybean meal (FSM) for *O. niloticus*. A total of 12 tanks of 500 L water capacity were used for rearing fish, and the stocking density was 50 fish per tank. Four iso-nitrogenous (37%) diets were prepared by replacing FM protein with FSM protein at a rate of 0% (T₀), 30% (T₁), 40% (T₂), and 50% (T₃). The fish were fed twice daily at 9 am and 4 pm near satiation. Fish were sampled at every weekly interval. Water quality parameters (temperature, pH, dissolved oxygen, ammonia) were within the suitable range of *O. niloticus* culture. At the end of 10 week rearing period, it was observed that the highest weight gain (3.08 ± 0.06 g), % weight gain (402.84 %), and specific growth rate (2.69 ± 0.06 %^{day}⁻¹) in 50% replacement (T₃) treatment. The survival rate was not affected by the replacement level and was found to be 97% in all the treatments. Hematological parameters of fish, including hemoglobin (Hb), white blood cell (WBC), red blood cell (RBC), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC), were found to be better in T₂ (40%), and T₃ (50%) treatments. However, a sign of anemia and imbalanced nutrition was observed at 30% (T₁) replacement levels. Based on the results obtained from the present study, it can be concluded that a 40% and 50% replacement of FM protein with FSM protein in the diet of *O. niloticus* can be used as an ideal alternative protein source without compromising growth, body composition, and hematological status.

Keywords: *Oreochromis niloticus*, fermented soybean meal (FSM), fish meal(FM), growth performance, feed utilization, immunity.

NOURISHING ADOLESCENT FEMALE WITH READY-TO-USE FISH POWDER (RUFPS) IN BANGLADESH

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ABSTRACT

Five generally available, cost-effective, and nutrient-dense fish species (pointed tail anchovy (*Coilia dussumieri*), fringe scale sardine (*Sardinella fimbriata*), Indian River Shad (Chapila, *Gudusia chapra*), Ganges River Sprat (Kachki, *Corica soborna*) and Ticto Barb (Tit Punti, *Puntius ticto*)) were used to develop the fish powder; each was selected using a food security index has three fundamental pillars: availability, affordability, and nutritional utilization. Three distinct sub-types of powder, including whole fish powder, gutted fish powder, and fish muscle powder, were generated in the current study. Thirteen different types of powder were developed from five other fish species, with the Ganges river spat only being utilized for whole fish powder. The nutritional value was examined, including macronutrients (protein, lipid, ash, moisture, and energy), fatty acid profile, amino acids, and micronutrients. Data analysis showed that entire fish powder from small-sized fish species, as opposed to other types of powder from the same species, provides 2-3 times more nutrients. A randomized controlled trial (RCT) was then carried out utilizing whole fish powder of Indian River shad in six different communities, with half as the control group and the other half as the intervention group.

Additionally, the adolescent female's anthropometric measurements and biomarkers, a 24-hour recall method, an examination of food frequency and consumer preferences, and a female autonomy questionnaire were obtained at the baseline and end line of the study. Among the biomarkers (Fe, Ca, vitamin A, vitamin B₁₂, ferritin, and CRP (C-reactive protein)), B₁₂ demonstrated a more significant impact than others. Furthermore, the 16-week intervention showed a significant positive effect on the adolescent girls' energy and nutrient intake and fruitful nutritional outcomes. Finally, our findings stated that safe and nutritionally sound ready-to-use fish products/powder could tackle the burden of malnutrition for vulnerable populations in Bangladesh and wider afield.

Keywords: Adolescent female, Ready-to-use fish powder, nourishing, malnutrition

MINIMALLY PROCESSED VEGETABLE FACILITIES HOST POTENTIALLY SPOILAGE AND PATHOGENIC BACTERIA

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ABSTRACT

Although part of a healthy lifestyle, consuming minimally processed vegetables is not free of risks due to potential pathogens. In addition, spoilage or pathogenic microbes might adhere to and form biofilms on industrial surfaces. Therefore, this study aimed to characterize the resident microbiome in the environment of three facilities producing minimally processed vegetables.

Facilities were visited after the routine cleaning and disinfection procedures. Thirty-two samples were collected, including vegetables at process start and end points and swabs (equipment, tools, operators' hands, walls, and floors). Whole metagenome sequencing was carried out. Then, we profiled the metagenomes' taxonomy, predicted genes, and reconstructed Metagenome-Assembled Genomes.

Potential spoilage members of the genus *Pseudomonas* were part of the core microbiome, showing high abundances on surfaces. Moreover, we attempted to estimate the contribution of textures and ingredients on the microbiome composition of the final product, highlighting that food contact surfaces contribute significantly besides ingredients.

In addition, a wide range of antibiotic resistance genes was observed, which were widespread on food contact surfaces and assigned to genera *Pseudomonas*, *Bacillus*, and *Acinetobacter*.

Finally, we reconstructed genomes of the human pathogen *Bacillus cereus* on food contact surfaces.

Our results show that a diverse antibiotic-resistant/pathogenic bacterial potential endures on sanitized surfaces.

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DETERMINATION OF CIPROFLOXACIN, TETRACYCLINE, AND OXYTETRACYCLINE RESIDUES IN RAW, FROZEN, AND BOILED BROILER CHICKEN BY RP-HPLC-UV WITH SOLID PHASE EXTRACTION SYSTEM

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ABSTRACT

The determination of ciprofloxacin (CIP), tetracycline (TC), and oxytetracycline (OTC) in broiler chicken at raw, frozen, and boiled stages by high-performance liquid chromatography (HPLC) was the aim of this study. The TC and OTC were extracted with oxalic acid (0.01M) and acetonitrile-methanol (1:1; v/v), and the CIP was extracted with metaphosphoric acid (3%) and acetonitrile (1:10, v/v) using solid phase extraction (SPE) system. The chromatographic elution was achieved on a C18 column (5 μ m, 250 $\times$ 4.6 mm) using mobile phase as 2% acetic acid and 95% acetonitrile (83:17; v/v) for CIP; methanol, acetonitrile, and acidified water with 0.01M oxalic acid (5:18:77; v/v/v) for TC and OTC. The detection was done with a UV detector at 280 nm at 8.6 $\pm$ 0.4 minutes for CIP and 355 nm at 8.7 $\pm$ 0.4 minutes for TC, and 6.7 $\pm$ 0.4 minutes for OTC. The chromatographic method was validated in terms of specificity, linearity, detection limit, quantification, accuracy, precision, and stability. Among 252 samples of three stages, about 65.25% contained CIP, 26.6% TC, and 9.9% contained OTC. Approximately 10.71% muscle, 12.66% liver, and 15.38% skin samples exceeded the maximum residual limit (MRL) for CIP, according to EU, but no model exceeded the maximum residual limits for TC and OTC. The mean concentration of tetracycline and oxytetracycline residue in raw muscle, liver, and skin samples was reduced to 4.7-84% after three days of storage at 4°C and 80-100% after boiling at 100°C for 30 minutes. Again, the change of CIP residue in raw muscle, liver, and skin was 0-8.3% in the frozen stage and 0-20.82% in the boiled stage. Our findings indicated that TC and OTC residues in chicken were reduced more than CIP in the boiled stage. CIP in broiler chickens above MRL can lead to adverse health effects and antibiotic resistance.

Keywords: Antibiotics, Boiled Boiler Chicken, HPLC, maximum residual limit (MRL)

RESEARCH ON THE FACTORS AFFECTING THE FLOW EXPERIENCE OF THE INTENTION TO BUY FRESH FOOD OF FRESH FOOD IN VIETNAM

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ABSTRACT

Since the Covid 19 epidemic, shopping for fresh food online are an upward trend. This study was conducted to determine and measure the factors influencing the flow experience on the intention to buy fresh food from Vietnamese consumers. The PLS-SEM approach was applied in this study, analyzing and gathering information from Vietnamese customers purchasing fresh food online. The research result demonstrates a correlation between buying intention of goods and concentration, advertising value, website/app quality, informativeness, interest, perceived risk, and flow experience. In particular, the flow experience and the advertising value have the most decisive impact on consumers' online purchase intention. From the research results, the team proposes solutions to enhance the advertising value and flow experience to stimulate customers' purchasing intention.

Keywords. Fresh food, Vietnamese consumers, purchase intention, flow experience.

A SYNTHESIS OF AMMONIUM PHEOX-RU(II) COMPLEX AND ITS APPLICATION TO CATALYTIC ASYMMETRIC INTER- AND INTRAMOLECULAR CYCLOPROPANATION REACTIONS

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ABSTRACT

This study reports a strategy for synthesizing ammonium pheox-Ru(II) catalyst and its application to catalytic asymmetric cyclopropanations. The catalyst was prepared in two stages: Initially, chlorobenzyl oxazoline derivative (Pheox) **5** was synthesized from commercially available acid chloride and optically active amino alcohol in three steps in high yield (98%). Next, the chlorobenzyl group **5** was stable during the complexation reaction with ruthenium to form pheox-Ru(II) complex **6** (98%). The ammonium pheox-Ru(II) catalyst **8** was then synthesized from the functionalized pheox-Ru(II) complex to afford the desired catalyst in 42% yield in two steps. The molecular structure of the catalyst was identified by ¹H NMR, ¹³C NMR, IR, and elemental analysis. The catalytic activity and enantioselectivity of ammonium pheox-Ru(II) catalyst **8** were evaluated in both asymmetric inter- and intramolecular cyclopropanation reactions. The results showed that ammonium pheox-Ru(II) catalytic asymmetric intermolecular cyclopropanation of terminal olefins and ethyl diazoacetate gave the corresponding cyclopropane products in 92-98% yields and *trans/cis* ratios of 90:10 to 96:4 with enantioselectivity (>98%, *trans* product). The intramolecular cyclopropanation of *trans*-cinnamyl diazoacetates gave the corresponding cyclopropane ring fused lactones with high yields (95-99%) and enantioselective (82-100%).

Keywords: Asymmetric synthesis, alkene, cyclopropanation, enantioselectivity, phase transfer catalyst.

EVALUATION OF LASER BACKSCATTERING IMAGING AS A NON-DESTRUCTIVE METHOD FOR DETECTING THE ADULTERATION OF COCONUT DRINK

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ABSTRACT

In recent years, coconut drinks have become popular products of Vietnam in the world beverage market. Food and drink adulteration has gained interest due to its adverse effects on quality in terms of nutritional value and safety. The main goal of this work was to evaluate the applicability of the non-destructive laser backscattering imaging (LBI) technique in assessing the adulteration of coconut drinks with water at different dilution levels. Six low-power laser modules emitting at 532, 635, 780, 808, 850, and 1064 nm wavelengths have been used. The LBI profile was extracted from 12-bit raw images and described with the peak widths at three selected intensity levels (D75%, D50%, D25%) and their ratios; the illuminated areas at the desired intensity level of 50% (A50%), the ring of 25-75% and their ratio. Laser backscattering imaging is a promising non-invasive technique for the quality control of coconut drinks. LBI signal parameters responded sensitively ($p < 0.001$) to the adulteration of coconut drinks. The illuminated area at the intensity of 50% obtained the highest sensitivity to the drink's dilution at the wavelength of 635 nm, 780 nm, and 808 nm. In contrast, the measured parameters at the wavelength of 532 nm showed no sensitive response. Linear discriminant analysis successfully distinguished diluted samples and detected 5% (v/v) adulteration.

Keywords: Food and drink adulteration, laser backscattering, linear discriminant analysis

EXPLOITING THE MICROBIOME OF TRADITIONAL FERMENTED FOODS TO IMPROVE FOOD QUALITY AND HUMAN HEALTH

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ABSTRACT

Many traditional fermentation technologies have been industrialized in modern times, using selected microbial starters to standardize the process and the fermented food properties. However, this leads to the global diffusion of a few microbial strains and a considerable decrease in microbial diversity in fermented foods. The project FOODMICROHERITAGE aims to characterize the microbiome of typical Italian fermented foods by using shotgun metagenome sequencing, to preserve and depict the microbial diversity of these traditional products. More than 200 Italian cheeses were collected from producers, including fresh, medium- and long-ripened cheeses. Metagenomics sequencing was carried out. The microbiome of traditional cheese is a new source of beneficial microbes, harboring genes related to probiotic activities. We also identified microbial genes involved in the production of the typical sensorial properties of each cheese, highlighting the presence of different LAB strains in each product. Microbial profiles of each food type are unique and can be used to track cheese origin and production according to traditional practices.

Acknowledgments: This work was funded by a grant from the Italian Ministry of Foreign Affairs and International Cooperation to the project FOODMICROHERITAGE–Quality and authenticity protection of artisanal fermented foods through the characterization and conservation of their microbial and genetic heritage.

MICROBIOLOGICAL QUALITY AND ANTIBIOGRAM ASSESSMENT OF MICROORGANISMS ISOLATED FROM FRESH SALAD VEGETABLE SAMPLES SOLD IN DHAKA CITY MARKETS

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ABSTRACT

Contamination of vegetables by multidrug-resistant pathogens is of global concern. This study evaluated the microbiological quality and antibiotic resistance pattern of *Escherichia coli* and *Salmonella spp* isolated from fresh salad vegetables (tomato, carrot, cucumber, coriander, and lettuce leaves) sold in Dhaka city markets. Irrespective of the fresh vegetables analyzed, a higher aerobic bacterial count (5.45-7.31 log₁₀ CFU/g) and total coliform count (4.28-6.06 log₁₀ CFU/g) was observed compared to the standard limit in all the samples. In addition, 83.3% and 66.7% of vegetable samples, irrespective of vegetable type, were contaminated with *E. coli* (1.52-4.81 log₁₀ CFU/g) and *Salmonella spp* (1.16-1.42 log₁₀ CFU/g), respectively. Coriander leaves were found to be highly contaminated compared to other vegetables. A total of 492 *E.coli* isolates and 180 *Salmonella*spp isolates were obtained from 108 (tomato, cucumber, and carrot) and 90 (lettuce, coriander leaves, and green chili) samples collected from the wholesale, chain, and retail markets of Dhaka city. Overall, an average of 85.66% of vegetables were contaminated with *E.coli*, and 46.5% of samples were infected with *Salmonella spp.*, irrespective of the shop types. *E. coli* isolated from cucumber showed the highest resistance to 10 different antibiotics, followed by tomato to 9 antibiotics, carrot to 8, coriander to 6, and lettuce to 5 different antibiotics. On the other hand, *Salmonella spp* isolated from tomato showed the highest resistance to 8 different antibiotics, lettuce and coriander to 7, and carrot to 6 different antibiotics. Multiple antibiotic indexes ranged from 0.27 to 0.55 for the *Escherichia coli* isolates and from 0.33 to 0.44 for *Salmonella* isolates. This study revealed that fresh salad vegetables sold in Dhaka city markets are contaminated with antibiotic-resistant *E. coli* and *Salmonella spp*.

Keywords: Microbiological quality; antibiotic resistance; *Escherichia coli*; *Salmonella*; and fresh salad vegetables;

ASSESSMENT OF FECAL CONTAMINATION IN MULTIPLE WATER SAMPLES ASSOCIATED WITH DIARRHEA IN URBAN COMMUNITIES OF DHAKA CITY

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ABSTRACT

Rapid urbanization and poor hygiene knowledge among city dwellers have led to a growing sanitation crisis in urban areas of Bangladesh and potential exposure to fecal contamination in the urban water systems due to inadequate sanitation and poor fecal sludge management. In addition, faulty septic tank construction has led to groundwater contamination, and withdrawing this contaminated underground water for household use contributes to fecal contamination. This study was carried out from April to June 2022 to assess the fecal indicator bacteria and *Vibrio* spp in point-of-use water, including glass water, bath water, kitchen water, and holding tank water in the households of Dhaka city dwellers. In addition to collecting and analyzing drinking water, field notes and a semi-structured questionnaire were used to survey randomly selected households. The bacteriological analysis includes total aerobic bacteria, *Enterococcus* spp., and *Vibrio* spp., carried out according to the standard bacteriological analytical methods. The study revealed that 30% of glass water, 25% of kitchen water, 75% of storage tank water, and 45% of bath water were contaminated with *E. coli* and fecal coliform bacteria, i.e., *Enterobacter faecalis*. Although no *Vibrio* species were detected in the glass water, *Vibrio cholerae* was found in bath and storage tank water. Bangladesh standard did not allow any coliform (0 CFU/100ml) or fecal coliform (0 CFU/100ml) in drinking water. However, 40% of the glass water sample was contaminated with *E. coli*, and 100% was infected with fecal coliform. *Escherichia coli* in drinking water is a public health concern and may contribute to diarrheal diseases. The findings suggest that recontamination and post-treatment contamination at the point of drinking play a significant role in household water contamination. The water holding tank should be cleaned periodically, and intermittent investigation needs to ensure a safe water supply.

Keywords: Potable water, *E. coli*, *Vibrio cholerae*, water reservoir, fecal contamination, indicator bacteria, low-income urban area, and Dhaka city.

MICROBIOLOGICAL QUALITY OF FRESH SALAD VEGETABLES AND USE OF NON-CHLORINE SANITIZERS IN IMPROVING THE SAFETY AND QUALITY OF SALAD VEGETABLES

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ABSTRACT

Post-harvest handling, poor processing practices, non-sanitized water wash, poor or no packaging and transportation system, and poor personal hygiene practices are the contributory factors of pathogens contamination in fresh produces, which is a public health concern. Thus, to reduce foodborne pathogens, cleaning and sanitation operation have become standard post-harvest practices to ensure the quality and safety of fresh vegetables. This study was undertaken to evaluate the magnitude of microbial contaminants and the presence of pathogens in fresh salad vegetables (Lettuce, cucumber, and carrot) and wash these vegetables with different sanitizers to improve the safety and quality of salad vegetables. The study results showed that irrespective of market location higher number of total aerobic bacteria (APC) ranging from 4.20-4.80 log CFU/g; total coliform count (TCC) ranging from 3.00-3.30 log CFU/g; and total yeast and mold count ranging from 4.28-4.48 log CFU/g were recorded in lettuce, cucumber and carrot samples. In addition, the presence of fecal coliform called *Enterobacter cloacae* ranging from 3.00-4.00 log CFU/g was recorded in all these samples. *E. coli* was detected at the initial plate in some samples but needed enrichment to detect *E. coli* in other samples. Although presumptive *Salmonella* spp. was found in the BSA plate in the initial study, after API confirmation, it was found that all the presumptive *Salmonella* spp. was *Enterobacter cloacae*. On the other hand, washing these vegetables with distilled water reduced only 0.5 logs CFU/g of APC, TCC, yeast, and mold count but could not eliminate *Enterobacter cloacae* & *E. coli*. However, washing these vegetables with peracetic acid (PAA) or 0.01% calcinated calcium (CCa), complete elimination of *Enterobacter cloacae* & *E. coli* and an additional 1.0 log CFU/g reduction of APC, TCC, and yeast and mold counts were recorded. Therefore, the study results demonstrated that using non-chlorine sanitizer is better in controlling microbial contaminants and pathogens in fresh vegetables than in water wash.

Keywords: Fresh salad vegetables, Non-chlorine sanitizers, safety, and quality,

ANALYSIS OF SALT, SUGAR, AND FAT IN FAST FOOD ITEMS COLLECTED FROM DHAKA CITY

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ABSTRACT

Ready-to-eat fast food has become popular in our daily diets due to its taste, easy availability, and affordable price. Available literature mentions that these foods contain a high level of salt, sugar, and fat (SSF) which act as risk factors for many diseases. To date, there is a lack of scientific data on salt, sugar, and fat (SSF) content in different fast food items in our country. The study aims to measure the salt, sugar, and fat content in popular fast food items like Samuca, Singara, Puri, Cake (Plain and pastry/layered), and Parata collected from different categories of the shop in Dhaka city. This study was conducted from January to June 2022, and 113 samples of Singara, Samucha, Parata, puri, and cake (Plain & pastry/layered) were purchased from the shops of Dhaka city. The samples were analyzed in National Food Safety Laboratory (NFSL) by validated methods. The average weight (gm), salt, sugar, and fat content (g per 100g) of these food items varied according to the shop categories, and the difference in fat content of plain and pastry cake is statistically significant($p<0.005$). The higher salt content was found in Singara (1.27-2.39%), whereas pastry cakes were found to be rich in fat (20.31-37.92%) and sugar (15.61-20.71%) content. The present study made a baseline report on the SSF content of collected food items. It concluded that there was a marked variation in salt, sugar, and fat content in these food items between the two categories of shops. An appropriate program on reducing salt, sugar, and fat should be implemented to reduce health risks associated with excess intake of these ingredients present in food items.

Keywords: Fast food items, salt, sugar and fat, health risk.

RESEARCH ON RELATIONSHIP QUALITY AMONG PARTNERS IN SUPPLY CHAIN: A CASE STUDY OF SUPERMARKET AND CONSUMER IN THE CONTEXT OF THE 4TH WAVE OF COVID-19 IN HO CHI MINH CITY

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ABSTRACT

This paper examines factors that affect the quality of relationships among partners in supply chains, specifically, the relationship between retailers and consumers in the 4th wave of the Covid-19 pandemic in Ho Chi Minh City. A case study of supermarket chains was investigated in the context of social distancing, considering three factors, Loyalty Program Quality (LPQ), Personal Interaction Quality (PIQ), and Switching Barrier (SB). The researcher uses the structural Equation Modelling method (SEM) to analyze data collected from 330 consumers who regularly shop at supermarkets at least twice a month. The result shows that the three factors significantly affect the relationship quality through a multidirectional scale measured by trust and emotional commitment/calculative commitment.

Keywords. Relationship quality, loyalty program quality, personal interaction quality, switching barrier, customer loyalty.

FACTORS AFFECTING STUDENTS' REPURCHASE TO BUY FOOD ON SHOPEE

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ABSTRACT

During the intense outbreak of the COVID-19 pandemic, online shopping has had a significant impact on consumers. Consumers are starting to turn to online shopping more than traditional shopping. Consumers tend to focus on essential items, including food. Therefore, the study was developed to determine which factors influence the students' food purchases on the e-shop (Shopee). This study uses both quantitative and qualitative research methods. The online survey and the results collected from 300 survey participants were entered into SmartPLS software to check the reliability of the Cronbach's Alpha scale, analyze the discriminant value between the variables by Fornell-Lacker and analyze the data SEM linear product. The final results show that satisfaction, trust, usefulness, ease of use, and convenience, are factors that directly affect students' repurchase to buy food on the e-shop (Shopee). Research results will recommend businesses and individuals selling online to develop effective sales strategies.

Keywords: intention, repurchase intention, the e-shop (Shopee), and satisfaction

FACTORS AFFECTING THE INTENTION OF CUSTOMERS TO USE AN ONLINE FOOD DELIVERY APPLICATION IN HO CHI MINH CITY

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ABSTRACT

Ordering food via mobile applications has been and is no stranger to people living in Ho Chi Minh City. The study aims to uncover the factors influencing the intention to use an online food delivery app in Ho Chi Minh City. The survey subjects were Ho Chi Minh City customers who intend to use an online food delivery application. Group discussions carry out qualitative research. From the group discussion results, adjust the scale one last time to give a formal questionnaire. After a preliminary investigation, the quantitative analysis uses a minor partial squared PLS method with SmartPLS software to test research models and hypotheses. The study results show that the impact of reliability and social influence affects the intention of customers to use online food delivery applications in Ho Chi Minh City.

Keywords: Fast Food, Online Delivery, Reliability, Technology Risk, Usage Behavior

DEVELOPMENT OF LOW-COST HYGIENE DETECTION KITS FOR COMMUNITY USE

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ABSTRACT

Clean food handling and processing equipment is a prerequisite for good hygiene, but the effectiveness of cleaning must also be monitored and recorded. To be hygienic, food contact worktops, cookware, utensils, and other equipment must be free from any contamination and invisible residue that food leaves behind, providing opportunities for microbial growth. This study developed a kit based on the protein error principle to detect protein left behind after inadequate cleaning. In addition, hygiene evaluation of a food catering premises and its utensils (table surfaces, serving dishes, glass plates, bowls, cooking utensils, knives, cutting board, etc.) were evaluated and compared with the hygiene detection kit, plate count agar methods, and visual observation by the site foreman or workers. A total of 161 samples were tested; the coincidence rate of the result was 95.65%, showing that the results of the hygiene detection kit method were similar to microbial contamination. Only 4.0% of the sample containing low-level microbial contamination (<1.0 CFU/100 cm²) gave false-negative results. Thus, the study results demonstrated a high relationship between protein-based detection methods and microbial contamination in actual food catering premises and hence could be applicable to evaluate the cleanliness level of any food contact surfaces because this method is inexpensive, rapid, and user-friendly.

Keywords: Protein detection, Protein error, Microbial contamination, hygiene detection

FACTORS AFFECTING PURCHASE INTENTION FOR FOOD PRODUCTS OF GEN Z IN VIETNAM

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ABSTRACT

E-commerce is a trend among businesses globally. E-commerce brings efficiency not only to companies but also convenience to customers. Since the COVID-19 respiratory disease epidemic has impacted everything globally, new trends directly affect e-commerce strategies—especially suppliers of fashion, travel, accessories, food, etc. One social media that is attracting a large number of young people around the world is Tik Tok. With the way of transmitting content through short videos, TikTok has differentiated and attracted customers compared to other social media platforms. According to statistics from the ranking of the most used platforms worldwide, TikTok ranks 7th after Facebook, Youtube, WhatsApp, Messenger, WeChat, and Instagram applications. Currently, TikTok has more than 800 million users worldwide. Recognizing the conditions to attract customers from this platform, Tiktok's parent company Bytedance has launched the Tik Tok Shop feature to keep up with the trends and needs of users. So this study focuses on identifying factors such as the development of Tiktok, product value, usefulness, risks, and payment methods that impact the intention of Vietnamese youth to buy food on TikTok Shop today. This study is a combination of qualitative and quantitative methods. The survey was conducted with 300 samples; participants are people aged 16 and over who have used the internet for shopping online in Vietnam. After collecting feedback samples, the data will be analyzed using SMART PLS 4.0 software.

Keywords: The development of TikTok; Product value; Usefulness; Risk; Payment methods; Intent to buy food online.

THE CUSTOMER'S TRUST FACTOR AFFECTS BUYING BEHAVIOR ON E-COMMERCE WEBSITES IN HO CHI MINH CITY: FOOD PRODUCTS

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ABSTRACT

The internet and the digital economy are driven by information technology, which has also developed worldwide. Many new technologies help businesses promote and enhance product images through websites. Therefore, attracting consumers to change from traditional methods to online shopping. Therefore, many food businesses participate in online shopping. How customers access the site into users will depend on many different factors. Knowing the reasons, the authors chose the following influencing factors: awareness of usefulness, perception of risk, understanding of ease of use, social influence, customer trust, perception of enjoyment, and how the expected effect affects the behavior of buying food on e-commerce websites. Qualitative research and quantitative research are the two methods used in this study. The survey subjects were customers of HCMC, with 369 people. After obtaining the feedback, data will be analyzed using SPSS software. The study shows that the trust factor has the most significant impact on food-buying behavior on e-commerce websites. From the research results, the proposal implies appropriate governance for food businesses after the Covid-19 pandemic.

Keywords: Consumers trust, food-buying behavior, e-commerce, websites, Vietnam

THE CHANGE IN E-COMMERCE AFTER THE COVID-19 PANDEMIC AFFECTS THE INTENTION TO BUY FOOD IN VIETNAM

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ABSTRACT

Consumer health consciousness is raised. E-commerce has gradually become a field of significant influence for businesses and customers in the era of globalization. In particular, after the Covid-19 pandemic, e-commerce is essential in supplying products to the market, stimulating economic demand, and helping consumers access goods without worrying about infection. At the same time, consumers have formed the habit of buying essential goods and spending at the appropriate level, specifically, the food industry in Vietnam: vegetables, fish meat. Therefore, the authors conducted a study focusing on critical factors: trust, customer behavior, marketing strategy, digital platform, risk, and e-commerce change to determine which factors have the most substantial impact on consumers' food intentions. The study was conducted using quantitative and qualitative research methods, with 310 participants in the online survey. The results collected by the group were included in the theSmartPLS panel to test the reliability of Cronbach's Alpha scale, then performed a Discovery Factor Analysis (EFA) and further analysis of the SEM linear structure model. The results show that trust, customer behavior, digital platforms, and e-commerce changes positively affect consumers' purchase intent in the food industry. Besides, factors such as risk and marketing strategy also affect more or less consumer buying intent. The Covid-19 pandemic has passed, both a difficulty and an opportunity for businesses and individuals to do business effectively on the e-commerce platform.

Keywords: Intent to buy, food, Vietnam, change, e-commerce, Covid-19, and consumers.

CUSTOMER'S BEHAVIOR OF USING SHOPEEPAY E-WALLET AFTER THE COVID-19 PANDEMIC: FOOD INDUSTRY

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ABSTRACT

The COVID-19 pandemic raged, significantly affecting human social life. Food became scarce and challenging to buy during social distancing. In addition to being able to buy directly, some regions are limited in the amount of food they buy. Moreover, the implementation of the social distancing directive also has a significant impact on purchasing behavior. Especially in the field of e-commerce, namely Shopee, many people use this application more and more. Therefore, the payment method through ShopeePay e-wallet is also gradually used by Shopee users to pay when buying goods in general and food in particular. In this study, the team analyzed 314 surveys, then analyzed the influence of factors through SmartPLS software. User behavior is measured and evaluated through the following factors: trust, perceived usefulness, awareness of security, perceived ease of use, price-saving orientation, and social impact on ShopeePay users after the COVID-19 pandemic. The results of this research paper will provide a more theoretical basis for further studies to refer to and supplement to improve.

Keywords: Perceived usefulness; Perceived security; Perceived ease of use; price saving orientation; Usage behavior; Food industry; ShopeePay e-wallet

ASSOCIATION OF VITAMIN A AND ZINC WITH THE DEVELOPMENT OF DIABETIC RETINOPATHY

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ABSTRACT

Diabetic retinopathy (DR) is a common microvascular disorder in people with diabetes mellitus (DM). It is characterized by various lesions within the retina and is the leading cause of blindness in adults. Hyperglycemia promotes the formation of reactive oxygen species (ROS) and increased concentrations locally and throughout the body, even exceeding antioxidant capacity, a condition known as oxidative stress affecting retinal integrity. Antioxidants and trace elements are responsible for scavenging reactive oxygen species and, as a result, reducing oxidative damage. This study evaluated vitamin A and zinc levels in diabetic patients with and without diabetic retinopathy. A cross-sectional study was done in BIRDEM general hospital and the Center for Advanced Research in Sciences (CARS), the University of Dhaka, from January 2021 to December 2021. Study parameters fasting blood glucose (FBG), HbA_{1c}, Vitamin A, and zinc were estimated in all study subjects by standard laboratory methods. According to the inclusion criteria, one hundred subjects aged 30 to 75 were included. They were divided into two groups, 50 patients with diabetic retinopathy and 50 without diabetic retinopathy. After taking informed written consent from the study subjects, a structured questionnaire was filled up for each subject to collect data, including personal identification, Demographic history, Drug history, and history of other systemic diseases.

Collected data were checked, edited, and processed with the help of SPSS (20). Continuous data were analyzed by parametric test (Independent student t-test, Chi-square test) and Pearson's correlation test. The study showed that vitamin A was significantly lower in group I (8.95 ± 8.12) than in group II (22.39 ± 11.56). Zinc level was also decreased in cases of diabetic retinopathy (1.17 ± 0.31) than without diabetic retinopathy patients (1.43 ± 3.60). Vitamin A had a significant negative correlation between FBG and HbA_{1c}. However, zinc did not show a significant correlation with FBG and HbA_{1c}. This study also found a significant positive correlation between vitamin A with Zinc. Therefore, the study results revealed that vitamin A and Zinc were significantly lowered in patients with diabetic retinopathy than in patients without diabetic retinopathy.

Keywords: Vitamin A, Zinc, Diabetic retinopathy, and fasting blood glucose.

ASSESSMENT AND COMPARISON OF NUTRITIONAL STATUS AMONG 2-5 YEARS CHILDREN AND THEIR MOTHERS IN AN URBAN AND RURAL AREA OF BANGLADESH

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ABSTRACT

A cross-sectional comparative study was conducted to observe the nutritional status of children aged from two to 5 years and their mothers in rural and urban Bangladesh. The study was conducted on 400 children and their 400 mothers, dividing 200 in rural and 200 in urban areas. The objectives of the study were to assess the socio-economic profile, to observe the dietary pattern, and to identify the clinical status with anemia, Vit A deficiency (Night blindness, Bitotspot), Vit B deficiency (Chilosis, Glossitis angular stomatitis), scabies, dental caries, otitis media, Upper respiratory tract Infection (URTI), Urinary Tract Infection (UTI), Enlargement of the thyroid gland. The other objectives were to assess the biochemical parameters of children and their mothers in terms of hemoglobin in the blood, albumin, and sugar in the urine. Para cytological presence of *Ascaris Lumbricoids* (AL), *Ancylostoma duodenale* (AD), and *Trichuris Trichura* (TT). The knowledge of the mothers of children in terms of health and educational and nutritional aspects was also evaluated. Special attention was given to observing the immunization and anthropometric status. The socio-economic profile and dietary pattern had positive effects on nutritional status. Fifteen percent of urban areas and 11.0% of mothers in rural areas had completed the secondary school certificate examination. About 99% and 97.0% of children and mothers were anemic in rural and urban areas. The average calorie intake of the mother was 1538.52 kcal in the urban area and 1546.22 in the rural area. According to Body Mass Index (BMI), 4.0% and 17.0% of mothers were malnourished in urban and rural areas. In both urban and rural areas, 24.0% were suffering from glucosuria. In Urban and rural regions total of 99.0% of children had taken vitamin 'A' capsules. In urban and rural areas, 96.5%, 97.5%, 98.5%, and 56.5% had completed BCG, DPT, Polio, and measles, respectively. Using Z-score for both urban and rural areas, 34.0% (WAZ-2.99 to -2.0 SD) children were moderately underweight, 11.0% (HAZ-2.99 to -2.00 SD) were somewhat stunted, and 24.0% (WHZ -2.99 to -2.00 SD) were rather wasted.

Keywords: Nutritional status, Children 2-5 years, Urban & Rural area, Mother, Bangladesh

EVALUATION OF VITAMIN D₃ AND VITAMIN K₂ STATUS OF BANGLADESHI POSTMENOPAUSAL WOMEN: A CROSS-SECTIONAL STUDY

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ABSTRACT

Post-menopause is the name given to the period after a woman has not bled for an entire year. During this stage, postmenopausal women are at increased risk for various health anomalies, such as osteoporosis, diabetes, vision, dental, and heart disease. The purpose of the study was to assess the vitamin D₃ and vitamin K₂ [menaquinone-4 (MK-4)] status of postmenopausal Bangladeshi women in Dhaka city. This cross-sectional analytical study was done in Retired Government Employees Hospital, Dhanmondi, Dhaka, in 2019. For this study, 55 postmenopausal women aged below 60 years were selected. The level of serum vitamin D₃ [25(OH) D] and vitamin K₂ [menaquinone-4 (MK-4)] were determined by the high-performance liquid chromatography (HPLC) method. Binary logistic regression was used for model fitness and its significance. The age of postmenopausal women was 55.80 ± 3.55 years (mean $\pm$ SD). Their body mass index (BMI) and waist-hip ratio (WHR) was 26.03 ± 2.66 kg/m² and 0.93 ± 0.05 cm, respectively (mean $\pm$ SD). Serum levels of vitamin D₃ [25(OH) D] and menaquinone-4 (MK-4) from postmenopausal women were 14.80 ± 6.36 ng/mL and 0.38 ± 0.21 ng/mL, respectively (mean $\pm$ SD). In this study, the regression model was 74% fit, and diabetes, cardiovascular disease (CVD), dental problems, vision problems, and hearing problems were significant. However, serum vitamin D₃ and serum vitamin K₂ were non-significant at the 5% significance level. In this study, a high incidence of insufficient serum vitamin D₃ [25(OH) D] level and sufficient serum vitamin K₂ (MK-4) level were found among postmenopausal women with pre-obese and high waist-hip ratio (WHR).

Keywords: Vitamin D₃; Vitamin K₂; Postmenopause; Women; Bangladesh.

CURRENT STATUS AND ISSUES OF HALAL FOOD PRODUCTS FOR DISASTER PREPAREDNESS

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ABSTRACT

Earthquakes have hit Japan, and torrential rains have in recent years, and local governments have been operating evacuation centers on a case-by-case basis. At evacuation centers, the provincial government temporarily distributes food and water stockpiled. However, the evacuation centers are not designed for people who require special care (CHECTP = Children, H = Handicapped people, E = Elderly people), E = Elderly people, C = Chronically ill (e.g., dialysis patients), T = Tourist (e.g., foreigners who cannot communicate in English). In addition, it has been pointed out that foreigners have limited access to information during a disaster. Since the Great East Japan Earthquake in 2011, many "disaster food" products have been developed that can be eaten without fire during disasters. Since the Great East Japan Earthquake in 2011, many foods have been developed as "disaster food" that can be eaten without fire in times of disaster, and based on the CHECTP concept, allergen-free and halal foods such as alpha rice and canned bread are now available. Halal foods currently available on the internet include staple foods such as rice, alphanumeric rice with wakame seaweed and mushrooms, ethnic-style alphanumeric rice such as nasi goreng and biryani, retort porridge, and rice cookies.

On the other hand, there were a few main dishes whose main nutritional component was protein or vegetables, and most of the disaster food was carbohydrate-based. Therefore, users must look at food labels to find vegetarian and allergy-friendly foods other than Halal. In Japan, there are 42 national universities (including some private universities) where many international students from Muslim countries are enrolled, and their student co-op cafeterias always serve Halal food. Among them, a national state University Co-op introduced a kitchen car exclusively for Halal food in March 2021. The vehicle regularly rounds four campuses, serving Halal food such as kebabs and fried chicken. The vehicle is expected to be used in times of disaster, and it is hoped that other universities will support the project. To serve Halal meals in the cafeteria, the ingredients and utensils must be specially designed. Still, it is believed that the kitchen car is helping Muslim students to trust and Japanese students to understand other cultures.

Keywords; Disaster; People in need of care; CHECTP; Halal food and Kitchen car

ASSESSMENT OF HYGIENE AND FOOD HANDLING PRACTICES OF CHEAP, CROWDED RESTAURANTS IN DHAKA CITY

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ABSTRACT

In developing countries, customers are at risk for enteric diseases due to poor hygiene standards and restaurant food handling. This study evaluates the food handling and sanitary standards of a few busy, inexpensive eateries in Bangladesh's Dhaka metropolis. 93 swabs, cloth, and tissue samples were collected from different, dynamic, affordable Dhaka restaurants. Microbial analysis of nine categories of models, including restaurant table surfaces, table mopping cloths, servers' hands, tissue paper, serving plates, glassware, spoons, and salad cutting surfaces, as well as take-out packets, was done to determine the total aerobic bacterial count, total coliform count, total fecal coliform count, *E. coli*, *Salmonella* spp, and the total yeast and mold count. The average total aerobic count in the waiter's hand swab was 3.5×10^4 CFU/ml, the total coliform count was 1.2×10^3 CFU/ml, the total fecal coliform was 5.2×10^2 CFU/ml, and the total yeast and mold count was recorded as 3.0×10^4 CFU/ml. *Klebsiella pneumoniae* from hand and spoon swabs, *Acinetobacter baumannii* from table surface swab, *Enterobacter cloacae* from spoon swab, *Citrobacter freundii* from hand swab, *Serratia liquefaciens* from tissue sample were isolated. Fifteen antibiotic disks were used against each identified pathogenic microorganism. The result revealed that all the pathogenic organisms were resistant to at least six antibiotics, i.e., erythromycin (10 µg), ampicillin (10 µg), bacitracin (10 µg), amoxicillin (10 µg), vancomycin (30 µg), and oxacillin (1 µg). The research findings enforce that regular monitoring and hygiene training initiatives are necessary to improve the sanitation and food handling conditions of these restaurants in Dhaka since the identified bacteria can cause UTIs, meningitis, blood infections, and respiratory tract infections.

Keywords: Hygiene and sanitation culture, pathogens, antibiotic resistance, public health.

THE IMPACT OF ATTITUDES AND PERSONAL CHARACTERISTICS ON VEGETARIAN FOOD CONSUMPTION BEHAVIOR INTENTIONS

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ABSTRACT

Vegetarian foods have had evidence of positive health effects, which are plant-based and provide essential nutrients and a lower percentage of fat than animal-derived foods. Animal foods are recommended to replace plant-based supplies but should be approached in terms of awareness among vegetarian food consumers. The fundamental theories of customer behavior have guided individual attitudes and characteristics that influence behavioral intentions for vegetarian food consumption. This study will apply planned behavior theory to examine associations in plant-based food consumption behavior, which will help people better understand the perception and health protection of plant-based or vegetarian food choices in life. This study was designed according to the model of testing hypotheses, conducting an online survey of 350 consumers on the social networking platform Zalo Vietnam. The study results are analyzed according to the model of linear structural equations. The study results show that perceived public attitudes have a direct positive effect on vegetarian intentions. Emotional awareness factors, health awareness, nutrition awareness, and environmental awareness indirectly positively influence vegetarian preferences. Research findings and health-protecting dietary needs impact green, organically sourced, and innovative food needs that can be applied to the prevention of many nutrition-related diseases. According to global trends, this result contributes to people's choices about safe, organically sourced foods. This is one of the studies that focus on the impact of human eating trends and behaviors through the perception of community and individual attitudes to the intention to choose consumption according to organic food trends.

Keywords: Vegetarianism, trends, cuisine, health, green consumption

EFFECT OF MOISTURE ABSORBER AND MODIFIED ATMOSPHERE ON QUALITY OF PACKAGED SWEET CHERRY

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ABSTRACT

This work aimed to investigate the effect of moisture absorber and perforation packaging on cherries during storage. Cherries were packed in 1 or 3 perforations packaging with FruitPad30 (30 % fructose), FruitPad90 (90 % fructose), or without FruitPad. All samples were stored at 10 ± 0.5 °C for 9 d and an additional 2 d for shelf-life at ambient temperature. There was no significant difference between FruitPad30 and FruitPad90 in headspace gas concentration, visual evaluation, and decay. One perforation on packages resulted in more depletion of O₂ during shelf-life compared to three perforations. It was observed that perforation packaging could maintain the quality of sweet cherries during storage compared to control. In addition, the visual appearance of packed samples was also better than the control.

Keywords: moisture absorber, perforation, packaging, fructose, storage

SIMULTANEOUS ESTIMATION OF MULTIPLE ANTIBIOTIC RESIDUES FROM CHICKEN SAMPLES USING HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC)

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ABSTRACT

This study was designed to quantify the residual concentrations of some antibiotics such as oxytetracycline (tetracycline), ciprofloxacin (quinolones group), enrofloxacin (quinolones group), and levofloxacin (quinolones group) in broiler production systems. For the quantification of antibiotic residues (ARs), a rapid, simple and accurate method has been developed and validated for the identification and quantification of oxytetracycline, ciprofloxacin, and a rapid, simple and precise method enrofloxacin and levofloxacin residues in chicken muscles and livers by using reverse-phase high-performance liquid chromatography (RP-HPLC). The proposed method showed good linearity with the determination of coefficient $r^2=0.999$ for each antibiotic and $r^2=1.0$ for ciprofloxacin in the range of 1.25 – 15.00 $\mu\text{g/mL}$ with high sensitivity with a detection limit (LOD) of 25 ppb, 34 ppb, 27 ppb, and 29 ppb and quantitation limit (LOQ) of 83 ppb, 110 ppb, 89 ppb and 96 ppb for levofloxacin, oxytetracycline, enrofloxacin, and ciprofloxacin, respectively. A total of 20 chickens (muscle and liver) were examined using high-performance liquid chromatography (HPLC). The study revealed that oxytetracycline and levofloxacin were detected in 100% of chicken samples, whereas ciprofloxacin and enrofloxacin were ultimately not seen in all the chicken samples. Oxytetracycline residues were above the Maximum Residue Limit (MRL) of 55% in chicken muscle and 75% in the liver. Levofloxacin was detected below the Maximum Residue Limit (MRL) of 85% in muscle and 75% in the liver in chicken samples. This study revealed that chicken samples contain antibiotic residues. The method was successfully applied to the simultaneous quantitation of multiple antibiotic residues in pharmaceutical formulations or other sectors for routine analysis.

Keywords: high-performance liquid chromatography (HPLC), simultaneous quantitation, antibiotics, routine analysis, and chicken.

ISOLATION OF NEXT-GENERATION PROBIOTIC STRAINS FROM THE HUMAN GUT: CHOICE OF THE BEST-PERFORMING MEDIA

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ABSTRACT

Probiotics currently available on the market generally belong to a narrow range of microbial species. However, recent studies about the importance of gut microbial commensals on human health highlighted that the gut microbiome is a new reservoir of potentially beneficial microbes. For this reason, academic and industrial research is focused on identifying and testing novel microbial strains of gut origin for developing next-generation probiotics (NGPs). Next-generation probiotics are microbial taxa that conform to the traditional definition of probiotics but do not have a history of use for health promotion. One of the main issues in NGP isolation and culturing is identifying the best growth medium. The main issue of this research was the selection of a suitable culture medium that allowed the anaerobe's growth.

For this reason, we tested nine culture media with different formulations in terms of vitamins, minerals, and fatty acids to study the culturable fraction of the gut microbiome. We collected microbial cells grown on two medium plates and analyzed them by 16S rRNA sequencing of the V3-V4 regions. In addition, we sequenced amplicons obtained from the original fecal samples to identify differences among the media and which of them gives a more reliable picture of the gut microbiome. Moreover, 202 bacterial strains were isolated from all samples and identified.

Results highlighted that none of the media used gave the same result. In particular, four culture media with the most significant number of anaerobes species have been selected.

Keywords: next-generation probiotics (NGPs), Human gut microbiome, Probiotics

PRO-TECHNOLOGICAL ACTIVITIES OF LACTIC ACID BACTERIA TO BE USED IN THE DAIRY INDUSTRY

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ABSTRACT

The consumption of fermented foods is associated with numerous health benefits, and more and more efforts are directed toward selecting novel starter cultures for industrial use. Therefore, this study aimed to isolate and choose new strains of lactic acid bacteria from traditional Italian dairy products with strong technological properties to improve the sensorial and nutritional profiles of dairy products. The following technical properties were evaluated for each isolated strain: acidifying activity, proteolytic activity, aromatic activity, and exopolysaccharide production. From the results obtained, the best strains were combined into two starter cultures, S1 and S2, which differed by only one strain. The selected strains belonged to *Lactobacillus delbrueckii* group, *L. casei* group, and *Streptococcus thermophilus*. In addition, a sensory analysis was carried out to evaluate the organoleptic traits of both fermented milks. Partially skimmed UHT milk was used to make the fermented milk. A shelf-life study showed that starting from a concentration of 10^8 - 10^9 CFU/ml per strain, after 15 days, there was a decrease in the microbial loads of about ten folds. These studies can be advantageous for the dairy industry, which can benefit from carefully isolated and characterized strains to obtain various innovative and healthy products. In conclusion, it can be said that artisanal cheeses are a valuable, as yet unexplored source of microorganisms beneficial for the dairy industry.

Keywords: Lactic acid Bacteria, Dairy industry, shelf life, and health benefit.

PAPAIN HYDROLYSATE OF RICE BRAN AND SOYBEAN FLOUR PROMOTES ALCOHOL FERMENTATION

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ABSTRACT

This study demonstrated that when rice bran or soybean flour is used as a fermentation accelerator, pre-hydrolysis with papain promotes alcoholic fermentation. The alcohol fermentation-promoting effect was proportional to the free amino acid concentration due to papain digestion. It was shown that hydrolysate of rice bran and soy flour at 2% concentration induced 13% alcohol production. These effects were more significant than adding magnesium and phosphoric acid. Since rice bran has the same effect as soybean flour, effective use of rice bran is expected.

Keywords: Rice bran, soybean flour, papain.

SPOILAGE DYNAMICS AND BIOGENIC AMINE PRODUCTION DURING STORAGE OF FISH FILLETS ARE AFFECTED BY PACKAGING AND TEMPERATURE

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ABSTRACT

Fresh fish is a highly perishable product and is easily spoiled by microbiological activity and the chemical oxidation of lipids. However, microbial spoilage is the main factor linked with the rapid fish sensorial degradation due to the action of specific spoilage organisms (SSOs) that can dominate and produce metabolites that directly affect the sensory properties of the product. Proteins are hydrolyzed into peptides and amino acids by microbial proteases, leading to changes in the physicochemical properties of fish flesh, and amino acids released by protein degradation can be converted into α -keto acids, sulfides, ammonia, trimethylamine, and various kinds of biogenic amines. Fresh anchovies were stored at three temperatures (0, 4, 10°C), under three different packaging conditions (aerobic, AIR; vacuum, VP; modified atmosphere, MAP) and analyzed at different time points (up to 10 days for aerobic and 16 days for MAP and VP). At each sampling point, shotgun metagenomics was carried out to understand the functional potential of the microbial community in the fish fillet, identifying the presence of spoilage-associated activities or genes related to pathogenesis. In chilled fish stored under aerobic conditions, the spoilage microbiota contains genera that can grow faster aerobically at low temperatures, such as *Psychrobacter*, *Vibrio*, and *Shewanella*. At the same time, in VP and MAP, *Photobacterium* and *Brochothrix thermosphacta* usually dominate. These species can produce distinct spoilage compounds that include biogenic amines (BA), created due to the decarboxylation of their respective free precursor amino acids through the action of substrate-specific microbial decarboxylases, whose activity is enhanced at higher temperatures (4-10°C).

Keywords: Biogenic amines, fish fillets, spoilage dynamics, packaging, and temperature

COMMUNITY-BASED APPROACH FOR ORGANIC VEGETABLE PRODUCTION AND DIGITAL TRACEABILITY FOR CONSUMERS' TRUST

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ABSTRACT

The demand for organic produces has been skyrocketing among the mindful consumers of developed and developing countries worldwide. However, the main challenges of organic production in the small holding countries are fragmented land, social recognition, inadequate technological ventures and affordability, weak market linkage with consumers, etc. The community-based approach has been initiated for organic vegetable production in Bangladesh with a model developed by Bangladesh Agricultural Research Institute (BARI) that comprises modern and traditional practices. The activities were performed in two regions of Bangladesh, namely, Barishal and Rangpur. The soil was amended with enriched cattle compost, a microbial consortium of indigenous microbes. To prevent the vegetable crops from pests, barrier crops, pest exclusion net (PEN) technology was applied. The homemade microbial consortium fertilized the established crops, and yellow, blue, and pheromone traps and biopesticides were applied. Twelve vegetables were grown using locally popular OP techniques, digital technology was applied to build the consumer's trust, and land GPS values were recorded and submitted to *GreenEU* for satellite mapping. Images of different crop stages were captured and posted on the verified *Facebook* of BOAN regularly, and finally, the PGS certification logo was put in a Barcode form. All the vegetables yielded significantly higher than the national average and varied from location to location. Disease and pest infestation were negligible, and negligible amounts of heavy metal contamination were found in the products. Proximate analysis showed the highest amount of nutrients than the conventional produces. However, the main threat was the marketing of the products; the cucumber price was meager, i.e., Tk. 4.00 per kg, in the case of brinjal, bitter gourd, and leafy vegetables, farmers sell the produce higher than the conventional ones. Digital traceability created a new opportunity for consumer trust. The community-based approach found effective results in the social transformation of organic farming.

Keywords: The community-based approach, Organic Farming, Social transformation

COST-EFFECTIVE FORMULATION OF BIO-FERTILIZER USING AGRICULTURAL RESIDUES AS CARRIERS AND DETERMINATION OF SHELF-LIFE OF BIO-FERTILIZER INOCULANTS

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ABSTRACT

Recently inorganic chemical-based fertilizers have been used for soil management strategies, which can cause environmental threats. In agriculture, bio-fertilizer is very important in increasing the productivity and sustainability of soil and cost-effective inputs for farmers. The present study aimed to cost-effectively formulate bio-fertilizer using rice husk ash and soil as carriers, *Rhizobium* sp., *Azotobacter* sp., and *Trichoderma* sp. bio-inoculants. The antibiotic sensitivity of the microorganisms *Rhizobium* sp. and *Azotobacter* sp. were introduced against 26 antibiotics. The total viable count of microorganisms in formulated bio-fertilizer was 8.0×10^7 CFU/gm. After one month, the total viable count of microorganisms of the formulated bio-fertilizer was increased to 2.2×10^8 CFU/gm. After one year, the total viable count of microorganisms of the formulated bio-fertilizer was increased to 2.2×10^9 CFU/gm.

The evaluation of the bio-fertilizer on plant growth was also carried out on a small scale where significant growth of plants was observed in soil containing bio-fertilizer. The bio-fertilizer increased the growth of potato and sponge gourd plants compared with the control. A significant increase in seed germination, plant growth, leaves growth, biomass yield, and nutrient uptake was found in the study. The formulated bio-fertilizers were stored at room temperature for one year. Rice husk ash supported the growth and survival of *Rhizobium* sp., *Azotobacter* sp., and *Trichoderma* spp.; bioinoculants are under room temperature because of their nutrient retention capacity, adsorptive capability and high content of silica. In the experiment, rice husk ash combined with soil can be used as a carrier for bio-fertilizers formulation with *Rhizobium* sp., *Azotobacter* sp., and *Trichoderma* spp., bioinoculants.

Keywords: Bio-fertilizer, Rice husk ash, Microorganisms, Shelf life, Soil fertility, Plant Growth.

GENETIC DIVERSITY OF EGGPLANT TO MITIGATE THE FOOD SECURITY AND SUSTAINABLE DEVELOPMENT IN BANGLADESH

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ABSTRACT

The study was conducted at the experimental field of the Olericulture Division, Horticulture Research Centre (HRC), Bangladesh Agricultural Research Institute (BARI), Gazipur, during 2021-22 to assess the extent of genetic diversity among 23 eggplant germplasm. The collected 23 germplasm originating from Plant Genetic Resources Center (PGRC), BARI, was subjected to cluster analysis. The germplasm was constellated into five distinct groups, with a range of 2 germplasm in cluster II to 7 germplasm in cluster V. In all cases; the inter-cluster distance was more significant than the intra-cluster distance. The intra-cluster length was maximum in cluster V (1.574) and minimum in cluster II (0.673). Regarding inter-cluster space, cluster III showed the maximum genetic distance with cluster V (18.525), followed by the genetic distance from cluster III and IV (13.184), cluster II and cluster III (12.289), and cluster I and cluster III (10.267). Considering the group distance and inter-genotypic crosses between the members of clusters III and V, clusters III and IV and clusters II and III would exhibit high heterosis and be likely to produce new recombinants with desired traits. However, in the case of the cluster means values and yield contributing performance, cluster I, cluster II, cluster III, and cluster V performed well. Therefore, inbreds belonging to clusters I, II, III, and V will be given higher priority for crossing in future eggplant hybridization programs and will ensure good-quality eggplant hybrids. Thus this study will contribute to mitigating Bangladesh's food security and sustainable development.

Keywords: Genetic diversity, food security, sustainable development, eggplant (*Solanum melongena* L.), Bangladesh.

IN SILICO* IDENTIFICATION OF *DE NOVO* AND CONSERVED MICRORNAS IN THE GENOME OF THE MODEL MOSS *PHYSCOMITRELLA PATENS

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ABSTRACT

The bryophyte moss *Physcomitrella patens* fill a significant evolutionary gap between higher plants and green algae. The moss *Physcomitrella patens* have evolved over the past three decades from an unknown bryophyte to a model organism. Excellent resistance to abiotic stressors such as salt, drought, and hypotonicity is exhibited by *Physcomitrella patens*. This moss was quickly chosen for genome sequencing because of its phylogenetic placement as a member of the sister lineage to vascular plants. MiRNAs can target any gene of interest for functional gene research. A significant group of short RNAs (sRNAs) called microRNAs controls stress and growth in flowering plants. The cloning of miRNAs from the model moss *Physcomitrella patens* has attracted the attention of various researchers in recent years. Identification of numerous miRNAs, both novel and conserved, has presented a unique chance to deepen our understanding of the role of miRNAs in the evolution of land plants. By binding to reverse complementary regions and producing cleavage or translational inhibition of the target RNA, miRNAs create precursor RNAs with the specific hairpin structure that regulates the expression of relevant target genes. Here, we summarize our current understanding of moss' miRNAs and propose techniques for examining how they operate in *Physcomitrella patens*. Expressed Sequence Tags (ESTs) based homology searches between 383,068 non-redundant ESTs from the *Physcomitrella patens*' genome and 3514 known miRNAs from flowering plants were permitted, which resulted in the prediction of 5 possible miRNA candidates from five different miRNA families. The putative miRNAs comprised 22 nucleotides with (A + U) content in their pre-miRNAs ranging from 39% to 60% and MFEI values between -0.52 and -0.95. The study used a detailed computational methodology to find and characterize the preserved miRNAs in the *Physcomitrella patens*' genome, including genetic analysis of particular gene targets.

Keywords: *Physcomitrella patens*, conserved miRNAs, EST, abiotic stress, hypotonicity

CLUSTER ANALYSIS ON RISK PERCEPTION IN TOURISM AFTER THE COVID – 19 EPIDEMICS

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ABSTRACT

Tourism risk awareness is the objective assessment of tourists of the negative consequences or negative impacts that may occur during tourism. The Covid pandemic has impacted almost every area, from personal behavior to organizational activity. In the post-Covid-19 period, travelers have different cognitive aspects of disease risk, and visitors' theories of perception and behavior are extended from the view of planned behavior. This study was designed to assess the perception of tourists in tourist areas about the problem of risk perception during tourism. The study focused on categorizing groups of tourists assessing risk perceptions, and finding differences between groups. The analysis results were divided into three groups; group 1 accounted for 32.18%, group 2 accounted for 16.56%, and group 3 accounted for 51.25%. Travelers concerned about risk awareness are ranked in descending order, such as safety and hygiene risk awareness, health risk awareness, time risk awareness, and emergency response support channel concerns. The key findings suggest that key elements of safety and hygiene awareness, health risk, and time risk awareness concern tourists and future travel intentions.

Keywords: Risk, tourist, risk perception, cluster, behavior

FACTORS INFLUENCING THE PURCHASE INTENTION OF VEGETARIAN FOODS: THE CASE STUDY OF VIETNAMESE CONSUMERS

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ABSTRACT

This study analyzes the factors influencing the purchase intention of vegetarian food. The Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB) were used in conjunction with adjustment. The sample size includes 300 vegetarian consumers in Viet Nam. The research method includes Cronbach's Alpha reliability analysis and Exploratory Factor Analysis (EFA) using the SPSS 20.0 program. From the results, the authors suggest a series of repercussions to help vegan restaurant owners develop an understanding of consumer demand for vegetarian food in Viet Nam to plan a sustainability strategy, keep existing customers and promote consumers' purchase intentions for vegetarian food in Viet Nam.

Keywords: Vegetarian Food, Vegetarianism, Purchase Intention, Purchase Intention, Viet Nam.

SYNTHESIS SEQUESTERING AGENT FROM CHITOSAN AND EDTA BY ACETYLATION AND ITS APPLICATION TO DYEING

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ABSTRACT

This study prepared EDTA-linked chitosan (EC) by N-acylation of Chitosan and ethylenediaminetetraacetic monoanhydride (EDTAM) under aqueous acidic to slightly primary conditions. FT- IR confirmed the product's structure, EDTA-linked chitosan (EC). The EC provided properties like a solid sequestering agent. EC was soluble in acidic regions and precipitated in the essential areas. Applying the prepared EC for removing metal ions in the natural water such as Ca^{2+} and Mg^{2+} but not adsorb dye in dyeing. We evaluated the ability to remove Ca^{2+} and Mg^{2+} ions and the dye adsorption capacity of EC in a river water sample. The result showed that its absorbent dye was the lowest and completely removed metal ions in water under pH=5.

Keywords: sequestering agent; chelating agent; chitosan; EDTA

BIOLOGICAL ACTIVITIES OF THYMINE EXTRACTED FROM ETHYL ACETATE EXTRACT OF *Cordyceps neovolkiana* DL0004 ISOLATED IN VIETNAM

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ABSTRACT

Cordyceps is a genus of entomopathogenic fungi, some of which have been used in traditional medicine for centuries. Recently, *Cordyceps neovolkiana* DL0004, a member of *Cordyceps* genus widely found in the Southern region of Vietnam, was isolated in Langbiang mountain, Vietnam, but its bioactivity is still unknown. In this study, we investigated the anti-inflammatory and protective effects of the ethyl acetate extract and thymine, the nucleotide isolated from the extract, against DNA damage and protein oxidation. The results showed that both the extract and thymine exhibited anti-inflammatory effects via inhibition of NO production ($IC_{50} = 24.00 \pm 1.07$ and 19.66 ± 0.69 $\mu\text{g/ml}$, respectively) as well as regulation of NF- κB pathway through p50 and p65 expression. Furthermore, the extract and thymine also prevented DNA damage ($> 80\%$) from oxidative stress at 50 $\mu\text{g/ml}$ concentrations and 10 $\mu\text{g/ml}$, respectively. Of note, thymine and the extract could inhibit membrane protein oxidation with $IC_{50} = 4.89$ and $IC_{50} = 8.119$ ppm, respectively. These findings suggest thymine and ethyl acetate extract from *C. neovolkiana* DL0004 as potential candidates for treating inflammation and oxidative stress disorders.

Keywords: *Cordyceps neovolkiana* DL0004, ethyl acetate extract, NO production, oxidation of membrane protein, thymine extracted.

INVESTIGATION OF ANTIOXIANT ACTIVITY OF EXTRACTS FROM *Isaria cicadae* F0004 IN VIETNAM

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ABSTRACT

Isaria cicadae (*I.cicadae*) is a parasitic fungus on cicadas, considered a folk medicine in traditional medicine. In this research, we investigated and compared the antioxidant activity of some extracts from biomass and fruit bodies of *Isaria cicadae* F0004 isolated in Vietnam. The results showed that the ethyl acetate fraction extract of *I.cicadae* biomass exhibited the best antioxidant activity in *in vitro* with IC₅₀ values are 159.73 ± 7.33 µg/mL (DPPH assay) and 379.25 ± 7.33 µg/mL (ABTS assay), respectively. Meanwhile, the ethyl acetate fraction extract of *I.cicadae* fruit bodies showed good antioxidant activity both *in vitro* and on RAW 264.7 cells, with $\Delta OD_{400\mu g/mL} = 0.422 \pm 0.014$ (reducing power), IC₅₀ values are 90.8 ± 2.36 µg/mL (xanthine oxidase inhibition), 68.631 ± 0.632 µg/mL (protein protection), 19.042 ± 1.072 µg/mL (lipid membrane protection) and protected $98.116 \pm 0.079\%$ DNA molecules at 100 µg/mL, respectively. Therefore, the ethyl acetate fraction extract contains many secondary metabolites with antioxidant activity and is the potential for antioxidant studies in animal models and clinical.

Keywords: antioxidant, biomass, fruit bodies, *Isaria cicadae*, *in vitro*, RAW 264.7 cells

RESEARCH ON FOOD RESOURCES TO DEVELOP CULINARY CULTURE TOURISM IN TRI TON DISTRICT – AN GIANG PROVINCE

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ABSTRACT

Culinary, in a general sense, is about the needs of people to eat. The culinary values in each locality and region are part of the national cultural identities. The cuisine reflects the characteristics of the lifestyle, beliefs as well as customs of that region.

Vietnamese cuisine can be divided into three regions: North - Central – South. Each part has differences in geography, soil, water, natural features, customs, and traditions, creating differences in culinary culture, such as various dishes and tastes. This is a treasure of Vietnam's tourism resources combined with the culinary cultures of 54 ethnic groups, 64 provinces, and cities.

The cuisine in the Southwest of Vietnam mainly uses natural ingredients according to the region and season. In particular, An Giang's culinary culture is considered the typical cuisine of the Mekong Delta. The land and people here have given birth to unique culinary and cultural values, the cross-cultural products of the Kinh (Viet), Hoa (Chinese), Cham, and Khmer people. The combination of all four ethnic groups has given birth to An Giang province's cultural values that are diverse, rich, and unique.

Following the current tourism trends, An Giang province focuses on exploiting culinary culture and developing in parallel with local tourism. An Giang province has many potentials and strengths in tourism, but these resources have yet to be fully exploited, not meeting the needs of tourists. This study was conducted to analyze the strengths and advantages of preserving and promoting the traditional values of Tri Ton District – An Giang Province, as well as exploit the powers to build and develop culinary culture tourism in this region. The obtained results serve as a basis for proposing, commenting, and building start-up ideas for local people and businesses in Tri Ton District, An Giang Province, to find solutions to develop culinary culture tourism.

Keywords: Cuisine, culinary tourism, proposals, ideas, development of culinary culture tourism.

THE RAW 264.7 CELL MEMBRANES AND DNA PROTECTION OF THE EXTRACTS FROM *Isaria tenuipes* VHI-2 BIOMASS ISOLATED IN VIETNAM

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ABSTRACT

In previous studies, we cultured the fungus *Isaria tenuipes* VHI-2 isolated in the mountains of Liangbiang, Lam Dong province (Vietnam), and collected their biomass to investigate in vitro antioxidant capacity. Accordingly, the ethyl acetate extract had the highest antioxidant activity among the tested extracts. The target of this study was to evaluate and compare the ability to protect DNA and protein and lipid membranes of RAW 264.7 cells of extracts from *Isaria tenuipes* VHI-2 biomass. These results show that ethyl acetate extract can protect cell membranes from damage by oxidizing agents better than ethanol extract, with $IC_{50} = 83.112 \pm 5,137 \mu\text{g/mL}$ (membrane protein protection survey); $IC_{50} = 40.179 \pm 0.837 \mu\text{g/mL}$ (protection of cell lipid membranes) and protected $97,454 \pm 0.308 \%$ DNA of RAW 264.7 cells at a concentration of $100 \mu\text{g/mL}$. From the obtained results, the ethyl acetate fractional extract from *Isaria tenuipes* VHI-2 biomass is an extract containing secondary compounds that can protect DNA and cell membrane damage from oxidizing agents and be a potential extract for separation for antioxidant studies in animal and human clinical models.

Keywords: *Isaria tenuipes*, biomass, protein-membrane, lipid membranes, DNA, RAW 264.7 cells.

APPLICATION AND SYNTHESIS STUDIES OF BIOCHAR FROM AGRICULTURAL WASTE

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ABSTRACT

In this work, agricultural waste was calcined without oxygen at 450 °C for 40 minutes to synthesize biochar, denoted as BCC. BCC was then characterized by surface morphology and structure by analytical methods such as scanning electron microscopy (SEM), X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), and Brunauer-Emmett-Teller (BET). Based on the surface analysis results, BCC was applied (1) as an adsorbent to adsorb the methylene blue (MB) color in wastewater, (2) as a catalyst for biodiesel synthesis production, and soon as (3) the organic fertilizer to fertilize for plants. The results of applied research of BCC showed that MB color adsorbent was obtained with the optimal adsorption capacity of 11.70 mg MB/g BCC at 16 minutes, the resulted application as a catalyst for biodiesel synthesis production calculated with the reaction efficiency as 72.50 %, and the resulted application as organic fertilizer tested on broccoli plant showed the plants grew better than, respectively. BCC's application results demonstrate the potential of recycling agricultural wastes to synthesize products having development value for Vietnam's Industry and Agriculture sector.

Keywords: biochar, organic fertilizer, adsorbent, catalyst

SYNTHESIS, IN *VITRO* ANTIBACTERIAL, ANTICANCER, AND *INSILICO* DOCKING MODEL OF 2H-CHROMEN-2-ONE DERIVATIVES

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ABSTRACT

The chromen-2-one derivative compounds have the most significant biological activities, such as antibacterial, fungal, anticancer, antidiabetic, anti-inflammatory, and antioxidant. Due to the interest in this group, in this article, we have continuously invested some synthesis compounds via bromination reaction by NBS reagent, tested in *vitro* anti-bacteria, anticancer, and performed in *silico* docking based on the chromen-2-one group. 6-(3,7-dimethylocta-2,6-dien-1-yl)-7-hydroxy-2H-chromen-2-one (**1**), a new compound has conducted the bromination reaction by NBS and yielded 8-bromo-6-(3,7-dimethylocta-2,6-dien-1-yl)-7-hydroxy-2H-chromen-2-one (**2**). The novel synthetic compound, 3-bromo-7-(diethylamino)-4-methyl-2H-chromen-2-one (**3**) has obtained a high yield from the compound from 7-(diethylamino)-4-methyl-2H-chromen-2-one via NBS. The compound (**1-3**) have been characterized by the FT-IR, ¹H, ¹³C-NMR, DEPT, two-dimensional spectroscopy, COSY(H,C), COSY(H,H), HMBC, HSQC, and HR-MS (ESI) spectra. They have been tested for antibacterial activity and anticancer against lung, breast, and liver human cancer cell lines. The test results in *vitro* indicate the compound (**2**) has inhibited strongly against *Staphylococcus aureus* and *Bacillus cereus* bacteria at a concentration of 13.20 ± 0.97 μ M and equivalent to the inhibition of the standard drug, Gentamicin by disk dispersion method and exposed the potential inhibition against breast cancer cells, MCF-7 with a value of IC₅₀ of 50.37 ± 3.70 μ M based on MTT assay. In the *silico* docking model, the most conformation ligand (**2**) has docked well to a target protein of a crystal structure of the *Staphylococcus aureus* bacteria (code:5M19: PDB) with the values of the free Gibbs energy value, $\Delta G^\circ = -7.55$ kcal.mol⁻¹ and an inhibition constant, K_i of 2.94 μ M, and *Bacillus cereus* (code: 5O6Y: PDB) with the values of ΔG° of -9.41 kcal.mol⁻¹ and K_i of 0.128 μ M. The most ligand conformation (**2**) has calculated the docking to a receptor of the target protein of the breast cancer cell and showed the potential interaction results in *silico*. Entry (**3**) predicted high inhibition against α -glucosidase enzyme in the docking model with ΔG° of -7.11 kcal.mol⁻¹ and K_i of -6.17 kcal.mol⁻¹.

Keywords: Chromen-2-one, NBS, antibacteria, anticancer, α -glucosidase enzyme, in *silico* docking model

IN *SILICO* MOLECULAR DOCKING MODEL: ANTICANCER, ANTI-SARCOVIRUS-19, GLUCOSIDASE ENZYME INHIBITOR, AND ADMET PROPERTIES OF 1,3-THIAZOLE DERIVATIVES

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ABSTRACT

The 1,3-thiazole heterocyclic compounds showed the most biological activities as anticancer, antimicrobial activities, antiviral, anticonvulsant, antioxidant, and glucosidase enzyme inhibition, eventually applied in the clinic. In our former article, the analog 1,3-thiazole compounds synthesis showed high cytotoxicity against human breast, lung, and colon cancer cell lines. As their high cytotoxicity properties *in vitro*, we continuously performed *in silico* molecular docking models such as anticancer, anti-Sarcorvid-19, and glucosidase enzyme inhibition activities of entries 3a-3j. In *in silico* docking, entries **3d-3g** were selected to perform the molecular docking model. The calculation results indicated that **3d** is the best candidate among the synthesized chemicals according to its potent inhibition against cancer cell lines via the enzyme inhibition mechanism, topoisomerase I (top I), **1T8I:PDB**. For antiviral in *in silico*, all entries 3a-3j were calculated for their docking characteristics, and entry **3f** strongly inhibited the crystal structure of COVID-19 main protease, **6LU7**. With α -glucosidase enzyme **4J5T** for anti-diabetic activity in *in silico*, compound **3g** inhibited well from this enzyme among entries 3a-3j. The calculation of redocking models for anticancer, antiviral, and antidiabetic models obtained docking poses, which anchored to the same cavities of the enzyme, respectively, and got the reasonable values of RMSD by pyMOL software. Protein-ligand (position no.81) was observed to have the highest (negative) binding energy against Human DNA Topoisomerase (PDB: 1T8I) and was subjected to molecular dynamics (MD) simulation assessment. A 100 ns MD simulation was also undertaken to optimize the interaction, forecast complex flexibility, and assess the stability of the protein-ligand (3g) complex, which was found to be stable.

Keywords: 1,3-thiazole, in *in silico* molecular docking model, anticancer, Coronavirus, α -glucosidase enzyme

VEGETABLE CONSUMPTION IN VIETNAM

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ABSTRACT

A variety of vegetable parts can refer to vegetables. Vietnamese meals always include a lot of veggies, herbs, and distinctive sauces. Our nation has two main growing seasons for vegetables: spring-summer and autumn-winter. With an average growth rate of 5% per year, Vietnam's vegetable production climbed from 15 million tons in 2015 to over 18 million tons in 2018, and about 2.5 million tons of veggies will be produced in the first quarter of 2022. In contrast to the average income level, agricultural production earnings still do not create a comfortable living. Over the past five years, Vietnamese farmers spent between 500 and 700 million USD annually to purchase pesticides from more than 40 nations, with 70% of those imports coming from China. In large cities like Hanoi and Ho Chi Minh City, households typically spend 8–9% of their monthly food budget on fruits and 12–13% on vegetables. Over 90% of the money spent on vegetables is spent at traditional markets, where the fruit is purchased, with 47-52% of that money; the remaining 58-67% is spent on vegetables at official stores. According to a survey, 80% of respondents welcome purchasing from supermarkets since they think the food is cleaner while labeling the high-quality Vietnamese logo brand, ISO, and VietGAP certifications. According to the Institute of Nutrition Vietnam, ripe fruit and vegetables should be consumed at 240–320g/day and 480–560g/day. However, more than 55% of Vietnamese people continue to consume a lack of veggies, but excess meat and alcohol lead to many diseases.

Keywords: vegetable consumption, vegetable, Vietnam,

EFFECTS OF MODIFIED STARCH ON THE TECHNICAL PROPERTIES OF CHITOSAN - STARCH FILM

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ABSTRACT

This study investigates the effect of modified starch on the technical properties of chitosan (CH) – modified starch (MS) film. Three types of MS were used for the survey, including E1412, E1414, and E1420. The 2%, 4%, 6%, and 8% (w/v) of each type of MS mixed with CH 2% are 2:8, 3:7, 4:6, and 5:5 (v/v). Towards the application of films in fruit preservation, the technical properties of the films were determined, including water vapor transmission rate, tensile strength, percentage elongation, elastic modulus, and opacity value.

The research results showed that the concentration and percentage of MS and the type of MS had a statistically significant influence on the properties of the film. For all three types of TBBT, movies from a mixture of CH 2% - MS 4% with a ratio of 5-5 performed better at other concentrations at the investigated properties. The water vapor transmission capacity of the films CH - E1412, CH - E1420, and CH - E1414 at the above concentrations and ratios have determined values of 29,792, respectively; 27,758 and 26,801 (g/h.m²). In terms of mechanical strength, which is evaluated through tensile strength, elongation, and elastic modulus, the best expression is shown in CH - E1412 film (values are 77,681 (MPa), 1.468%, 5436.08, respectively); then by film CH – E1414 (values are 69,544 (MPa), 1.382% and 5025.44, respectively); CH -, E1420 film showed the lowest strength with the corresponding values of 55,092 (MPa), 1,217%, 4547,521. In addition, the survey results on optical properties showed that, with three types of TBBT E1412, E1414, and E1420, The optical transmittance of CH film combined with MS gradually decreased, and correspondingly, the opacity increased. Conclusion The film created from the combination of chitosan with modified starch E1412 4% mixing ratio 5:5 (v/v) showed the most outstanding properties of the three types.

Keywords: Chitosan film, modified starch, water vapor transmission, tensile strength, elongation, elastic modulus, E1412, E1414, E1420.

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