

iAsT - 2018

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1st INDO-ASEAN Conference on

Innovative Approaches in Applied Sciences and Technologies

JUNE 13-17, 2018



Venue : P-100, Phuong Vy Building, Nong Lam University, Ho Chi Minh City - Vietnam

Chief Editors

Shailendra S. Gaurav, India

Nguyen Bao Quoc, Vietnam



Souvenir and Conference Book

Conference Link :

<http://hba.edu.vn/iast2018/index.php/Act/home>



iAsT-2018

MAJOR ORGANISERS



Scientific & Educational Research Society
Meerut U.P., India



Nong Lam University
Ho Chi Minh City

IN COLLABORATIONS WITH



Dept. of Biotechnology
Ch. Charan Singh University
Meerut (U.P.) India



Department of Biochemistry & Physiology
Dept. Immunology & Defense Mechanism
SIPUAAT, Meerut (U.P.) India



CSIR-Institute of Genomics &
Integrative Biology,
New Delhi, India



Dept. of Science & Technology
HCMC, Vietnam



Jawaharlar Nehru
Krishi Vishwavidyalaya
Jabalpur, M.P., India

Previous Conferences Organised by SERS, India



1st International Conf. on
Inn. Approaches in Applied Sci. & Tech.
VENUE : Kasetsart University, Bangkok, Thailand
Feb 1-5, 2016



2nd International Conf. on
Inn. Approaches in Applied Sci. & Tech.
VENUE : NEC, Nanyang Technological University, SINGAPORE 639673
June 19-23, 2017

In Association with :



D.K. Education & Charitable Trust
Bidar, Karnataka, India



Scientific and Applied Research Center
Meerut (U.P.) India



Journal of Scientific and
Applied Research
Meerut (U.P.) India

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Editors

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Jointly-organized by :



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Meerut 25004 India



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Vietnam

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Editors

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1st INDO-ASEAN Conference on Innovative Approaches in Applied Sciences and Technologies

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Welcome Letter from the Organizing Committee

Ho Chi Minh City, June 13-17, 2018

Dear Guests and Participants:

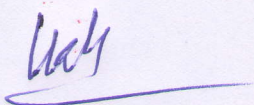
Welcome to the 1st INDO-ASEAN Conference on Innovative Approaches in Applied Sciences and Technologies jointly organized by Nong Lam University, Ho Chi Minh City and Scientific Educational Research Society (SERS), India in collaboration with Department of Seed Science & Technology and Department of Horticulture, Ch. Charan Singh University Campus, Meerut and Scientific & Applied Research Center, Meerut at Nong Lam University, Ho Chi Minh City, Vietnam.

This conference is organized on the purpose of providing a platform for both Vietnamese and Indian scientists to meet and share their innovative research work in the many fields ranging from agricultural sciences to environmental and natural resources management; from basic scientific research in physics, chemistry, and mathematics to applied engineering and technology; from education to socio-economics development. Through this wide-spread coverage of the conference themes, we believe that the conference will be fruitfully and highly benefit to the participant's scientific development. Last but not least, the conference also aims to strengthen collaboration among scientists and research institutions of the two countries, India and Vietnam.

Difficult problems always need innovative solutions to address. With that in mind, we do hope that, through this conference, we will get a chance to share our innovative approaches to deal with difficult scientific problems, to share our research results to each other, and to build up closer relationship among us for a stronger collaboration in the future.

Lastly, we would like to welcome all of you to the conference, and wish you all to have a productive, fruitful, and joyful time in Ho Chi Minh City.

Sincerely yours,



Prof., Dr. Nguyen Hay

President

Nong Lam University, Ho Chi Minh City, VietNam.



सी.एस.आई.आर..जीनोमिकी और समवेत जीवविज्ञान संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्, भारत सरकार)
दिल्ली विश्वविद्यालय परिसर, माल रोड, दिल्ली-110007 भारत

CSIR-Institute of Genomics & Integrative Biology

(COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH, GOVT. OF INDIA)
DELHI UNIVERSITY CAMPUS, MALL ROAD, DELHI-110007, INDIA



Dear Colleagues and Participants;

It gives me great pleasure to welcome you at Nong Lam University, Ho Chi Minh City of Vietnam to participate in **“1st INDO-ASEAN Conference on Innovative Approaches in Applied Science and Technologies” (iCiAsT)** at the Ho Chi Minh City of Vietnam from 13-17th, June, 2018. This conference was jointly organized by the Nong Lam University and SERC society of India along with various Research Institutes and Universities from India and ASEAN countries.

The theme of the Conference is innovative approaches in applied sciences are transforming our collective understanding the role of Agro-biotechnology and the way to we need to tackle the current problems. Over the last five years, advances in microbiology, genomics, metabolomics, transcriptomics and gene editing have opened a new avenues for commercial and societal exploitation of microbes and genes in different areas. The internet and advances in Information technology have reduced the world to a family size. It is empowering individuals and organizations with the ability to instantly exchange the ideas and knowledge, and also opens a way to work together with different backgrounds. This conference is aimed to provide a common platform for young students, teachers scientists, farmers, industries and government to exchange their research ideas and expectations. I would like to thanks each of speaker, delegates and guests sharing their experiences during the scientific session of the conference.

As the iCiAsT-2018 family, we look forward to see you on at Ho Chi Minh City of Vietnam, as we hope that this conference will provide you with a broader perspective and help you become more confident, knowledgeable and self aware individuals. I hope that our hard work will exceed your expectations and will give you memorable experience that you will remember for a life time.

Dr. Hemant K. Gautam
Sr. Principal Scientist and Professor

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MESSAGE

It gives me immense pleasure that 1st INDO-ASEAN Conference on **"Innovative Approaches in Applied Sciences and Technologies (iAsT- 2018)** will be organized by Scientific, Educational Research Society (SERS), Meerut and Nong Lam University, Ho Chi Minh City Vietnam - in collaboration with Deptt. of Biotechnology, CCS University, Meerut (U.P.) India & CSIR-Institute of Genomics & Integrative Biology, New Delhi, India, **during 13-17, June 2018 at P-100, Phuong Vy Building, Nong Lam University, Ho Chi Minh City - Vietnam.**

The focal theme of the programme entitled **"Innovative Approaches in Applied Sciences and Technologies"** is very relevant and timely in the context of the important being given by all the Government at global scenario. In future, the realization of full potential and complete change in global trade scenario due to adoption of innovative technology and commercialization of the produce would be highly important.

I hope and believe that issues pertaining to various aspect of technological innovation and their dissemination to the end users will be deliberated and discussed by the delegates at length during the conference in order to come out with certain adoptable cost effective location specific need base recommendation for the benefit of mankind at global level, particularly for those living edge of the society.

I welcome the bringing out the souvenir and extend my greetings and wishes to the Indian and Vietnamies organizers for successful organization of the conference iAsT-2018.

(P.M.SALIMATH)

Vice-Chancellor

UAS, Raichur

Vice-Chancellor
University of Agricultural Science
Raichur-584104

Scientific Educational Research Society

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Regd. No. : 38/2014-15

MESSAGE

Dear Delegates, Faculty, and Affiliates!

On behalf of the organizing committee iAsT-2018, it is our honor to welcome you to the 1st INDO-ASEAN Conference on **"Innovative Approaches in Applied Sciences and Technologies (iAsT-2018)"** that is jointly been organized by Scientific Educational Research Society (SERS), Meerut and Nong Lam University, Ho Chi Minh City Vietnam during 13-17, June 2018 at **P-100, Phuong Vy Building, Nong Lam University, Ho Chi Minh City - Vietnam.**

iAsT-2018 has brought together hundreds of scientists and academicians from about four countries (India, Australia, Thailand & Japan) to make this event global and historic. The scientific session will not only address the issues related to different area of science & agriculture but delegates may also get a platform to exchange their views on economic, political, and social issues—be they regional or global, historic or unprecedented—but also seek to craft solutions.

We hope, iAsT-2018 will create a long lasting bond with our Singapore counterparts and we will be always ready to extend our wishes and support in all kind of scientific and social initiatives.

The goal of this conference is to promote scientific and social awareness, develop mutual cross-cultural understanding, to educate students about differing perspectives, and to give delegates the tools to advocate for their positions in reasoned debate.

Thanks to the great effort and enthusiasm of our Vietnamese colleagues, special thanks to Dr. Nguyen Bao Quoc, for his continued support.

We are very confident that your time at Vietnam during iAsT-2018 will be entertaining and educational.

Organizing Team, iAsT-2018

ORGANIZING CHAIRMAN



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ABOUT THE CONFERENCE

The **iAsT-2018** will be organised jointly by Scientific Educational Research Society(SERS), Meerut, India and Nong Lam University, Ho Chi Minh City, Vietnam in collaboration with Dept. of Seed Science & Technology and Dept. of Horticulture, Ch. Charan Singh University Campus, Meerut and Scientific & Applied Research Center, Meerut at Nong Lam University, Ho Chi Minh City, Vietnam during 13-17 June 2018.

iAsT-2018 aims to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and research results about all aspects of Science, Agriculture, Environment Science and Natural Resource Management and allied sciences. It also provides the premier interdisciplinary forum for researchers, practitioners and educators to present and discuss the most recent innovations, trends, and concerns, practical challenges encountered and the solutions.

Nong Lam University, Ho Chi Minh City, Vietnam: Located at Thu Duc District, Ho Chi Minh City, Nong Lam University (formerly the University of Agriculture and Forestry) of Ho Chi Minh City was founded in 1955. Its 118-ha main campus is 16-km to the north of HCMC downtown. It is now being transformed into a comprehensive university with a broad range of educational programs.

NLU is organized into 12 faculties with 69 departments and 2 university-attached independent departments as follows:

Faculty of Agronomy, Faculty of Animal Science and Veterinary Medicine, Faculty of Fisheries, Faculty of Forestry, Faculty of Food Science and Technology, Faculty of Economics, Faculty of Engineering and Technology, Faculty of Environmental and Natural Resource, Faculty of Basic Sciences, Faculty of Land and Real Estate Administration, Faculty of Information Technology, Faculty of Foreign Languages and Technology Education, Department of Biotechnology and Department of Chemical Engineering.

Nong Lam University has also established several centers and institutes to research and transfer technology to its respective partners within the areas. The University is offering educational programs leading to the obtainment of Diploma, Bachelors, Masters and Doctoral degrees. The total student enrollment in 2010 were about 14,000.

Educational curricula at the University are inter-disciplinary in nature, aiming to provide a rich and diverse knowledge base for students. The university academic year divided into three semesters.

NLU has built good relationship with the many universities, research institutes from Australia, Belgium, France, Hungary such as Godollo University of Agricultural Sciences, Institute for Small Animal Research (KATKI, Godollo) and Research Institute for Fisheries Aquaculture and Irrigation, Japan, Korea, Malaysia, Neitherland, Taiwan, Thailand, United State, etc. and international and non-government organizations such as AIT, ACIAR, AUPELF-UREF, Bread for the World, CIRAD, FAO, Ford Foundation, IDRC, IFS, HELVETAS, IRRI, SEARCA, SAREC, SIDA, , Rockefeller Foundation, World Fish Center, etc.

Scientific & Educational Research Society (SERS) is an autonomous research and educational organization registered under the Societies Registration Act XXI of 1960 in Meerut, India bearing registration no. 38/2014-15. SERS is mainly engaged in promotion of basic, applied and agricultural sciences to participate in nation building program. Society is also engaged

in the area of conservation of nature and protection of environment. SERS is organising workshop, training programme, symposia on different burning and challenging issues. Society is also planning to publish science journals, magazine and news letters. Society recognises excellent workers by confirming them SERS awards.

Chaudhary Charan Singh University, Meerut (UP) India (formerly, Meerut University) established in 1965, is one of the premier educational institutions in India encompassing a vast, beautiful and pollution-free campus spread over 222 acres of land. The teaching department belonging to faculty of Science, Agriculture & Humanities are offering Post graduate degrees (MA/M.Sc., M.Phil and PhD) in More than 900 college (Govt./ Self financed/ Aided) are affiliated to this university.

Journal of Agricultural Science & Technology (ISSN 1859-1523): The official publication of Nong Lam University, is publishes six issues yearly (four issues in Vietnamese and two issues in English) JAST invites original articles from different fields of agriculture, science, technology and humanities in the form of the research paper, review and short communication. Correspondence relating to the journal should be addressed to Prof. Dr. Nguyen Hay, President/Chief Editor, Nong Lam University, Linh Trung ward, Thu Duc district, Ho Chi Minh City, Vietnam. Email : ng.hay@hcmuaf.edu.vn. Submission should be done online Via : <http://www.journal.hcmuaf.edu.vn>. All accepted research papers for the conference will be published in this journal.

CSIR- Institute of Genomics and Integrative Biology (CSIR-IGIB) is a scientific research institute of Council of Scientific and Industrial Research (CSIR) devoted primarily to biological research of national importance in the areas of genomics, molecular medicine, bioinformatics, proteomics and environmental biotechnology.

Jawaharlal Nehru Krishi Vishwa Vidyalaya (JNKVV), Jabalpur came into existence On October 2, 1964 and was inaugurated by the then Union Minister for Information and Broadcasting Smt. Indira Gandhi. At present, the University holds an area of about 1544 ha of land. JNKVV encompasses five Colleges of Agriculture one College of Agricultural Engineering four Zonal Agricultural Research Stations (ZARS) four Regional Agricultural Research Stations four Agricultural Research Stations (ARS) and twenty Krishi Vigyan Kendras (KVKs).

Sardar Vallabh Bhai Patel University of Agriculture and Technology, Meerut (U.P.) India was established on 2nd October 2000. The U.P Government has given the responsibility of all around development of the agriculture and rural community in its four divisions i.e Saharanpur, Meerut, Moradabad and Bareilly which consists of 15 districts i.e Saharanpur, Muzaffargarh, Meerut, Gautam Buddha Nagar, Ghaziabad, Bulandshahr, Baghpat, Bijnor, Jyotiba Phule Nagar, Moradabad, Rampur, Bareilly, Pilibhit, Baduan and Shahjahanpur. The state of U.P has 09 agro-climatic zones in which 03 falls under the Jurisdiction of this University.

THEMES OF THE CONFERENCE

(A) Agriculture, plant and animal sciences

1. Crop improvement: conventional to molecular approaches
2. Crop protection: Traditional Vs Modern Technologies.
3. IPR and utilization of Plant Genetic Resources.
4. Hi-tech Horticulture .
5. Integrated Farming system research.
6. Bio-fortification: A tool to fight against hunger and malnutrition.
7. New agronomy.
8. Rural sociology, behavioral psychology and agri. extension: Role in development of agriculture industry.
9. Global initiatives for sustainable soil health management.
10. Innovations in animal health and animal husbandry.
11. Prospects of veterinary sciences in global challenging era.
12. Home science, Food processing value addition and post harvest technology.
13. Food technology.
14. Herbal and Traditional medicine.
15. Aqua farming/aqua cultures and its future prospect.
16. Forestry science.
17. Legal Issue of Bio-diversity Protection.

(B) Climate change, global warming and natural resource management

1. Environmental protection systems: traditional, legal and molecular approaches.
2. Global warming and impact on Agriculture.
3. Bio-diversity : Terrestrial and marine.
4. Marine biology.
5. Weather forecast.
6. Natural resource conservation and management.
7. Role of community in natural resource management.
8. Environment and ecology: conservation and protection system.
9. Biotic and abiotic stress management.
10. Policy issues related to natural resource management.
11. Green economy: concept and significance.
12. Legal Issue of water sharing and protection.

(C) Life and Biomedical Sciences

1. Cell and molecular biology.
2. Biotechnology: genomics, proteomics, transcriptomics and bioinformatics
3. Molecular microbiology: from basics to applications.
4. Secondary metabolite biosynthesis and metabolism.
5. Signaling pathways in living systems.
6. Mycoscience.
7. Pharmacy and pharmaceuticals sciences.
8. Reproductive biology of living systems.
9. Experimental and clinical oncology.
10. Parasitic pathogens, virus and infectious diseases.
11. Healthy aging and wellness.
12. Antibiotic resistance.
13. Molecular diagnostics and therapeutics.
14. Innovative approaches in bio-nanotechnology.

(D) Physical, Chemical & Mathematical Sciences

1. Synthetic organic and bio-organic chemistry.
2. Structural organic and inorganic chemistry.
3. Polymer and materials synthesis and characterization.
4. The chemistry and physics of electronic and photonic materials.
5. Theoretical and computational chemical physics.
6. Solid-state chemistry, X-Ray crystallography, Functional materials.
7. Chemistry of surfaces and interfaces, Fullerene and carbon nanotube chemistry.
8. Thin film, Nuclear and Astrophysics.
9. Spectroscopic, Atmospheric and Material Science.
10. Application of Laser in different fields of Physical Sciences.
11. Probability and Stochastics, Group theory, Topology, Mathematical

Visualization, Geometrical theory.

12. Mathematical modelling in biological and medical systems; pattern formation.
13. Multi-level Modeling (applied to healthcare racial disparities), Predictive Modeling.
14. Lie groups, Automorphic forms, Representation theory, Number theory, Conformal Techniques in Probability.
15. Functional Analysis, Harmonic Analysis, Complex Functional Theory.
16. Algebraic Number Theory, Algebraic Geometry, Cryptography and Coding Theory.
17. Actuarial Science, Quantitative Risk Mngmt, Applied Stochastic Processes.
18. Image Formation and Processing, Algebraic Groups.

(E) Engineering and technology

1. Microelectronics, Microprocessors and VLSI, signal processing, imaging and communication.
2. Structural engineering and design; environmental geotechnology, geotechnical engineering and materials; water resources, supply and hydrology, hydraulics and rivers, concrete materials, environmental engineering.
3. Networks, computer vision, computer forensic, data encryption, cloud computing and security issues in cloud computing, image processing, information theory, acoustics, speech and signal processing
4. MEMS and microse, photonics and optoelectronics, semiconductor materials and technology.

(F) Social Sciences & Humanities

1. Tourism policy the path of community development
2. Education status in developing country
3. Women empowerment
4. Globalization and economy
5. Language & Literature
6. Economic Growth and WTO
7. Social change
8. History: Ancient to modern.

(G) Library and information science

1. Next generation libraries: issues and challenges
2. User's study
3. IPR & its Implications in digital library environment
4. Cloud computing and its applications
5. Applications of Plagiarism
6. Application of information technology
7. E-resources in library
8. Biblio metric Study
9. Knowledge based eta vs. artificial intelligence
10. Information Literacy
11. Use of Information & Communication Technology

CALL FOR PAPERS

The abstracts containing max. 250 words or full length paper containing max. 1000 words, for oral and poster presentation, are to be submitted to :-

E-mail: iAsT2018conference@hcmuaf.edu.vn before May 10th 2018, in camera ready form, using MS Word, Times New Roman, Font Size 11, Line Spacing 1.0 black colour. The Title of the paper should be in Font Size 12, bold and centred, followed by names of authors marked with asterisk for paper presenter/Communicating author.

DEADLINES

Abstract Submission

- | | |
|---|--------------|
| - Full paper abstract (should be 4-5 pages) | May 10, 2018 |
| - Abstract/full paper acceptance | May 15, 2018 |
| - Registration | May 20, 2018 |

1st INDO-ASEAN Conference on Innovative Approaches in Applied Sciences and Technologies

JUNE 13-17th 2018

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TABLE OF CONTENTS

THEME A: AGRICULTURE, PLANT AND ANIMAL SCIENCES

A-1. UNRAVELING THE MOLECULAR MODE OF ACTION OF RESTORER-OF-FERTILITY-LIKE PROTEINS IN PLANT MITOCHONDRIA	3
A-2. CHARACTERIZATION OF BBM GENES CONTROLLING SOMATIC EMBRYOGENESIS IN OIL PALM (Elaeis guineensis Jacq.) TISSUE CULTURE	3
A-3. STANDARDIZATION OF HOLDING SOLUTION AFFECTING THE ENZYME ACTIVITY IN PETALS OF TUBEROSE SPIKES	4
A-4. THE INITIAL RESEARCH ON CREATING POLYMER MEMBRANE WITH PHOSPHATE SOLUBILIZING BACTERIA TO PRODUCE A MIXTURE OF SLOW RELEASE FERTILIZER AND MICROORGANISMS	4
A-5. DEVELOPMENT OF AN ECO-FRIENDLY APPROACH TO IMPROVE NITROGEN CONTENT IN OKRA	5
A-6. EFFECT OF BIOCHAR APPLICATION ON GROWTH AND YIELD OF SOYBEAN GROWING IN GREY SOIL UNDER GREENHOUSE CONDITIONS	5
A-7. CHARACTERIZATION OF PEROXIDASE ENZYME FROM THREE HEVEA brasiliensis CLONES	5
A-8. INFLUENCE OF MONOCHROMATIC LED ILLUMINATION REGIMES TO REGENERATION OF DENDROBIUM MINI	6
A-9. INFLUENCE OF LED ILLUMINATION REGIMES ON REGENERATION WILD RICE (ORYZA RUFIPOGON L.)	6
A-10. A SURVEY OF VARIETY AND FERTILIZER USE IN RICE AT FARMER'S FIELD IN LONG AN PROVINCE	7
A-11. QTL ANALYSIS FOR FLOWERING TIME USING BACKCROSS POPULATION BETWEEN ORYZA SATIVA IR 36 AND O. RUFIPOGON	7
A-12. DEVELOPMENT OF SILK MOTH ON DIFFERENT VARIETIES OF MULBERRY LEAVES	7
A-13. INVESTIGATING THE EFFICIENCIES OF SOME TECHNICAL METHODS APPLIED IN EARLY GRAFTING RUBBER TREE (HEVEA brasiliensis Muell. L. Agr.) PROCEDURE	8
A-14. INTERACTION EFFECT OF GENOTYPES AND TIME OF SOWING ON CROP PRODUCTIVITY AND LEAF REDDENING IN BT COTTON	8
A-15. SSR MINING, CHARACTERIZATION AND ANNOTATION OF DE NOVO ASSEMBLED TRANSCRIPTS OF GARLIC	9
A-16. MOLECULAR MARKERS FOR IDENTIFYING FEMALE (F) LOCUS IN CUCUMIS SATIVUS	9
A-17. RESPONSE OF BIO-ENHANCERS ON GROWTH AND YIELD OF COLE CROPS	10
A-18. IDENTIFICATION OF COLLETOTRICHUM SPECIES CAUSING ANTHRACNOSE DISEASE ON CHILI (CAPSICUM ANNUUM L.)	10
A-19. FIRST REPORT ON ARBUSCULAR MYCORRHIZA IN THE BLACK PEPPER ROOTS	11
A-20. EVALUATION OF THE POTENTIAL CONTROL OF ROOT-KNOT NEMATODE ON BLACK PEPPER OF SESAME PLANTS, INTERCROPPING SYSTEM	11
A-21. STUDY OF TRANSMISSION OF YELLOW LEAF VIRUS TO INSURE THE FOOD SECURITY OF SUGARCANE CROP	11
A-22. RESPONSE OF SOYBEAN GENOTYPES TO ROOT-KNOT NEMATODE MELOIDOGYNE INCOGNITA IN SOUTHERN VIETNAM	12
A-23. ROLE OF POTATO EMITTED VOLATILE CUES IN ENHANCEMENT OF FORAGING BEHAVIOUR OF CHRYSOPERLA ZASTROWISILLEMI	12
A-24. HOSTS OF ALTERNARIA PASSIFLORAE CAUSING BROWN SPOT OF PASSION FRUIT (PASSIFLORA EDULIS)	13

A-25. STUDY ON PINK ROT DISEASE ON EGGPLANT (<i>SOLANUM MELONGENA</i> L.)	13
A-26. ISOLATION AND CHARACTERIZATION OF A CANKER DISEASE CAUSING PATHOGEN FROM LIME TREE AND EVALUATION OF ITS ACTIVITIES AGAINST OF <i>STEMEUPHORBIA TIRUCALLI</i> EXTRACT	13
A-27. EFFECTS OF FLOWER NUTRITIONAL RESOURCES ON THE LONGEVITY OF <i>COTESIA VESTALIS</i> (HYMENOPTERA : BRACONIDAE), A SOLITARY PARASITOID OF <i>PLUTELLA XYLOSTELLA</i>	14
A-28. DNA BARCODING APPLIED TO THE IDENTIFICATION OF PARASITIDS ON VEGETABLE FIELD IN SUBURBS OF HO CHI MINH CITY	14
A-29. EFFECT OF HEIGHT OF SPRAY AND OPERATING PRESSURE ON SWATH WIDTH AND DISCHARGE RATE OF A DRONE MOUNTED SPRAYER	15
A-30. FIRST REPORT OF <i>PHYTOPYTHIUM HELICOIDES</i> INFECTING CASSAVA AND EFFECTING OF <i>TRICHODERMA</i> STRAINS TO CONTROL THIS DISEASE IN VIET NAM	15
A-31. STUDY ON THE PATHOGEN CAUSING BASAL ROT AND ROT ROOT OF <i>CHRYSANTHEMUM</i> IN DA LAT CITY, VIETNAM	16
A-32. RESISTANCE TO IMIDACLOPRID, FENOBUCARB, AND PROFENOFOS ON BROWN PLANT HOPPER (<i>NILAPARVATA LUGENS</i> STAL.) IN TIEN GIANG, AN GIANG AND CAN THO PROVINCES	16
A-33. GENETIC DIVERSITY IN MARIGOLD GENOTYPES	16
A-34. ETHYLENE DEPENDENT AND INDEPENDENT FRUIT RIPENING IN HORTICULTURAL CROPS	17
A-35. EFFECT OF FOLIAR SPRAY OF MICRO-NUTRIENTS ON YIELD AND YIELD ATTRIBUTING CHARACTER OF AONLA (<i>EMBLICA OFFICINALIS</i> GAERTN.) CV. NA-6	17
A-36. STUDIES ON INTEGRATED NUTRIENT MANAGEMENT IN BER (<i>ZIZYPHUS MAURITIANA</i> LAMK.) CV. BANARASI KARAKA	18
A-37. IDENTIFICATION AND GROUPING OF LINSEED (<i>LINUMUSITA TISSIMUM</i> L.) GENOTYPES THROUGH CHEMICAL AND BIOCHEMICAL TESTS	18
A-38. TOXIC EFFECT OF HEAVY METALS ON SHOOT, ROOT LENGTH, DRY WEIGHT, NODULATION AND DRY NODULE WEIGHT, NITROGEN CONTENT, CHLOROPHYLL, LEGHAEMOGLOBIN, SEED YIELD AND GRAIN PROTEIN CONTENT OF PIGEON PEA	19
A-39. PLANT GROWTH, NODULATION, CHLOROPHYLL AND LEGHAEMOGLOBIN CONTENT OF CHICKPEA INFLUENCED BY CHROMIUM REDUCING STRAINS <i>BACILLUS</i> BC5 AND <i>MESORHIZOBIUM</i> RC3 IN CHROMIUM RELATED SOILS	19
A-40. FLAVONOIDS ACT AS SIGNALING MOLECULES IN THE INFLORESCENCE OF SUN- FLOWER (<i>HELIANTHUS ANNUUS</i>)	20
A-41. SURPLUS INCOME BY INTRODUCING RAINWATER HARVESTING IN PROTECTED CULTIVATION	20
A-42. DEVELOPMENT OF PRODUCTION, POSTHARVEST AND TRANSPORTATION TECHNOLOGIES FOR PROMOTION OF EXPORTING JAPANESE FRESH FRUITS TO EAST ASIA AND SOUTHEAST ASIA COUNTRIES	21
A-43. FACTORS AFFECTING FARMERS' ADOPTION OF AGRICULTURE 4.0 TECHNOLOGIES IN VIETNAM	21
A-44. PROTECTIVE CLOTHING FOR PESTICIDE HANDLERS	22
A-45. SOCIO-ECONOMIC PROFILE OF THE HIGH YIELDING VARIETIES GROWERS IN DISTRICT SULTANPUR U.P., INDIA	22
A-46. CONSTRAINTS FACED BY FARMERS ABOUT SCIENTIFIC CROP CULTIVATION OF PIGEON PEA	22
A-47. IMPORTANCE OF EXTENSION APPROACHES TO MAKE A SUCCESSFUL EXTENSION PROGRAMME	23
A-48. CORRELATION COEFFICIENT BETWEEN DIFFERENT INDEPENDENT VARIABLES AND KNOWLEDGE EXTENT OF GREEN GRAM CROP	23
A-49. CONSTRAINT ANALYSIS OF UTILIZATION OF SCIENTIFIC PRACTICES IN CHICKPEA CULTIVATION	24

A-50. ECONOMIC ANALYSIS OF FIG (FICUS CARICA LINN.) CULTIVATION IN NORTH EASTERN-KARNATAKA, INDIA	24
A-51. INTEGRATED FARMING SYSTEM : A HOLISTIC WAY FOR DOUBLING THE FARMERS INCOME	25
A-52. SUSTAINABLE NUTRIENT MANAGEMENT APPROACH FOR MAXIMIZING PRODUCTIVITY AND PROFITABILITY OF MAIZE-CHICKPEA CROPPING SYSTEM IN VERTISOL OF UPPER KRISHNA PROJECT (UKP) COMMAND AREA	25
A-53. SALT AND ION ACCUMULATION IN SESU VIUMPORTULACASTRUM UNDER SALT STRESS	26
A-54. COMPOSTING OF SEWAGE SLUDGE WITH A SIMPLE AERATION METHOD AND ITS UTILIZATION AS A SOIL FERTILIZER	26
A-55. EXTRACTION OF LEAD : AN ENVIRONMENTAL APPROACH FOR SOIL HEALTH IMPROVEMENT	27
A-56. STCR DOSE OF SOLUBLE FERTILIZERS ENHANCES THE NUTRIENT UPTAKE, YIELD AND SOIL PROPERTIES IN HYBRID MAIZE	27
A-57. INITIAL STUDY ON ARTIFICIAL INSEMINATION FOR LOCAL BUFFALOES WITH FROZEN SEMEN OF MURRAH BUFFALO IN TAY NINH PROVINCE	28
A-58. EFFECTS OF ENZYME TREATED SOYBEAN MEAL ON PERFORMANCE AND GUT MORPHOLOGY OF COLOR FEATHER CHICKENS	28
A-59. COMBINNING MODERN TECHNOLOGIES TO REVOLUTIONIZE THE DAIRY INDUSTRY	29
A-60. EFFECTS OF DIETARY SUPPLEMENTATION OF β -MANNANASE ON PERFORMANCE AND EGG QUALITY IN LAYING HENS	29
A-61. EFFECT OF SACCHAROMYCES CEREVISIAE ON IMPACT OF AFLATOXIN ON DUCK LIVER AND KIDNEY	29
A-62. EXPLORING FARMERS KNOWLEDGE ON LIVESTOCK'S CONSTRAINTS PRIORITIZATION, ANIMAL DISEASES RANKING AND DIFFERENTIAL DIAGNOSTIC USING	30
A-63. HEAVY METAL INDUCES ALTERATION IN THE LIVER CHOLESTEROL LEVEL OF ALBINO RAT (RATTUS NORVEGICUS)	30
A-64. EFFECTS OF FEEDING TIME AFTER PLACEMENT AND SEX ON GROWTH PERFORMANCE AND FLOCK UNIFORMITY OF LUONG PHUONG BROILERS	31
A-65. IDENTIFICATION OF IGF-1 GENE POLYMORPHISM IN CROSSBRED DAIRY CATTLE IN HO CHI MINH CITY	31
A-66. MINIMUM INHIBITORY CONCENTRATION (MIC) DETERMINATION OF FIVE CRUDE HERBAL EXTRACTS AGAINST ESCHERICHIA COLI, SALMONELLA TYPHIMURIUM AND STAPHYLOCOCCUS AUREUS	32
A-67. DIAGNOSIS AND TREATMENT OF ENDO-ECTOPARASITES IN DOGS AND CATS AT VETERINARY HOSPITAL NONG LAM UNIVERSITY	32
A-68. DIAGNOSIS OF MAREK'S DISEASE AT VETERINARY HOSPITAL IN NONG LAM UNIVERSITY	33
A-69. OVERVIEW OF INFECTIOUS DISEASES OF LIVESTOCK IN VIETNAM FROM 2012-2017	33
A-70. EVALUATION OF THERAPEUTIC REGIMEN FOR MANAGEMENT OF EXOCRINE PANCREATIC INSUFFICIENCY IN DOGS	33
A-71. FACTORS AFFECTING BETACYANIN STABILITY IN JUICE OF LD5 RED-FLESHED DRAGON FRUIT (HYLOCEREUS POLYRHIZUS)	34
A-72. OPTIONS FOR PROCESSING AND UTILIZATION OF PROCESSED FOOD PRODUCTS FROM SHEEP IN NINH THUAN PROVINCE, VIET NAM	34
A-73. CHEMICAL COMPOSITION AND FACTORS AFFECTING THE FERMENTATION OF ELAEOCARPUS HYGROPHILUS KURZ	35
A-74. A STUDY ON PROCESSING CONDITIONS OF FERMENTED ACEROLA JUICE	35
A-75. CHANGES IN THE QUALITY OF POSTHARVEST 'SANH' ORANGE FRUIT (CITRUS NOBILIS VAR. TYPICA) USING DIFFERENT TYPES OF COATING MATERIALS DURING STORAGE	36
A-76. PROCESSING OF DEHYDRATED MANGO (MANGIFERA INDICA L.) APPLYING OSMO-DEHYDRATION AND SOLAR DRYING	36

A-77. ISOLATION AND SELECTION OF YEAST STRAIN FOR FERMENTATION OF JUICE FROM RED-FLESH DRAGON FRUIT (HYLOCEREUS POLYRHIZUS)	36
A-78. INVESTIGATION OF PRODUCING POWDER FROM RED DRAGON FRUIT JUICE BY SPRAY- DRYING	37
A-79. INVESTIGATION OF PRODUCING FERMENTED DRINK FROM THE MUCILAGE JUICE OF COCOA (THEOBROMA CACAO L.) BEANS PROCESSING	37
A-80. FACTORS AFFECTED ON THE DISCOLORATION OF DEEP FRIED EGGPLANT	37
A-81. PINE APPLE LEAF FIBRE : EXTRACTION AND VALUE ADDITION	38
A-82. IMPORTANCE OF LACTOBACILLI IN FOOD INDUSTRY	38
A-83. HEALTH AND ENVIRONMENTAL ADVANTAGES OF ORGANIC FOOD	39
A-84. MEDICO-NUTRITIONAL FACTS OF LEMONGRASS (CYMBOPOGON CITRATES) : A REVIEW	39
A-85. MORPHO-ANATOMICAL STUDY OF HOMOEOPATHIC PLANT DRUG HYGROPHILLA SPINOSA T. ANDERSON	40
A-86. EFFICIENCY OF DIETARY β -GLUCAN SUPPLEMENTATION ON GROWTH PERFORMANCE, FEED AND NUTRITION UTILISATION IN POMPAO FISH (TRACHINOTUS OVATUS) (LINNAEUS, 1758)	40
A-87. ISOLATION AND SELECTION OF BACTERIA METABOLIZING AMMONIA FROM LOBSTER FARMING AREA IN VINH XUAN DAI, PHU YEN	41
A-88. GELATION OF BARRAMUNDI (LATES CALCARIFER) MINCED MUSCLE AS AFFECTED BY PRESSURE AND THERMAL TREATMENTS AT LOW SALT CONCENTRATION	41
A-89. SHRIMP DISEASE PREVENTION AND RECENT INNOVATIONS IN PRODUCTION SYSTEM—A PRACTICAL GUIDE IN VIETNAM	42
A-90. IMPROVING SUSTAINABILITY FOR THE MARBLE EEL (ANGUILLA MARMORATA) FARMING THROUGH RECIRCULATION TECHNOLOGY	42
A-91. BACTERIAL DISEASES OF FRESHWATER FISHES AND THEIR ECO FRIENDLY MANAGEMENT	43
A-92. ULTRASOUND-ASSISTED EXTRACTION OF POLYPHENOLS FROM POMELO PEEL	43
A-93. VARIATION IN SEED YIELD AND FATTY ACID COMPOSITION OF SUNFLOWER (HELIANTHUS ANNUUS L.) GERMPLASM ACCESSIONS TO DIFFERENT SEASONS	44
A-94. PLANT VARIETY PROTECTION & FARMERS RIGHT ACT 2001: INDIAN SYSTEM OF PROTECTION OF FARMERS RIGHT	44
A-95. EFFICACY OF THREE INDIGENOUS ENTOMOPATHOGENIC NEMATODES FROM GHAZIABAD AND MEERUT, INDIA AGAINST THE LARVAE OF GALLERIA MELLONELLA	45
A-96. INFLUENCE OF NANO-INVIGORATION ON SEED QUALITY PARAMETERS	45
A-97. EVALUATION OF ORGANIC AND INORGANIC SOURCES OF NUTRIENTS ON YIELD IN RICE (ORYZA SATIVA)—WHEAT (TRITICUM AESTIVUM) CROPPING SYSTEM ON FARMER'S FIELD.	46

THEME B

CLIMATE CHANGE, GLOBAL WARMING AND

NATURAL RESOURCE MANAGEMENT

B-1. INTEGRATING SWAT AND HEC-RAS MODELS FOR FLOOD FORECASTING IN VU GIA- THU BON RIVER BASIN, VIETNAM	49
B-2. SPATIAL AND TEMPORAL TREND ANALYSIS OF ANNUAL AND SEASONAL RAINFALL TIME SERIES IN HO CHI MINH CITY	49
B-3. ANALYZING SPATIAL AND TEMPORAL VARIATION OF WATER BALANCE COMPONENTS IN LA VI CATCHMENT, BINH DINH PROVINCE, VIETNAM	49
B-4. ECOLOGICAL PLANNING FOR THE CONSERVATION AND DEVELOPMENT OF PINEAPPLE (ANANAS COMOSUS) IN TAN PHUOC DISTRICT, TIEN GIANG PROVINCE	50
B-5. RESOURCE GOVERNANCE IN UPLAND AREA OF CENTRAL VIETNAM SINCE DOI MOI – MARKET INTRODUCTION, CROSS-BORDER TRADING AND ETHNIC MINORITY PEOPLE	50
B-6. SOCIO-ECONOMIC IMPACTS AT HOUSEHOLD LEVEL FROM PAYMENT FOR FOREST ENVIRONMENTAL SERVICES PROGRAM – A CASE STUDY IN DA NHIM COMMUNE, CENTRAL HIGHLAND, VIETNAM	51
B-7. FLOOD – ADAPTED URBAN MODEL BASED ON INDIGENOUS LANDSCAPE IN CAN THO CITY OF VIETNAM	51
B-8. THE USE OF WATER SPINACH (IPOMOEA AQUATICA) IN DOMESTIC WASTEWATER TREATMENT	52
B-9. THE POLLUTION STATUS OF RIVER RAMGANGA, BAREILLY : A CASE STUDY	52
B-10. HEAVY METAL CONTAMINATED VEGETABLES: HARMFUL FOR HUMAN HEALTH	53
B-11. THE PROBLEM OF ARSENIC ACCUMULATION IN RICE: SUSTAINABLE AND FEASIBLE SOLUTIONS	53
B-12. FISHERIES ENVIRONMENTAL MANAGEMENT AT TIDE SLUICE FOR NHIEU LOC - THI NGHE CANAL OF HO CHI MINH CITY	53
B-13. EVALUATION OF THE PERFORMANCE OF LUMILITE COMBINED WITH ACTIVATED SLUDGE IN DOMESTIC WASTEWATER TREATMENT	54
B-14. SUSTAINABLE ADAPTATION TO CLIMATE CHANGE IN SOC TRANG COASTAL ZONE- HAU ESTUARY-MEKONG DELTA BASE ON ITS ECOSYSTEM SERVICES	54
B-15. RISK ASSESSMENT AND RISK MANAGEMENT IN DOMESTIC WATER SUPPLY SYSTEM IN PLEIKU CITY—GIA LAI PROVINCE	55
B-16. ISOLATION AND IDENTIFICATION OF THERMOPHILIC BACTERIA FROM HOT SPRINGS IN THE SOUTH OF VIETNAM	55
B-17. ASSESSING SITUATION OF GROUNDWATER EXPLOITATION AND PROPOSING THE MANAGEMENT SOLUTION IN PLEIKU CITY, GIA LAI PROVINCE	55
B-18. CONCENTRATIONS OF HEAVY METALS IN WATER FROM THE SOUTHERN COAST OF VIETNAM	56
B-19. ASSESSING ECOLOGICAL CHANGES IN THE RIVER BASIN OF DA DANG RIVER, LAM DONG PROVINCE USING GIS	56
B-20. ASSESSMENT OF NATURAL AND SOCIO-ECONOMIC CONDITIONS OF ETHNIC MINORITY COMMUNITIES WITHIN LANG BIANG BIOSPHERE RESERVE	57
B-21. APPLYING ASP.NET, OPENLAYERS AND GEOSERVER FOR MANAGING LAND INFORMATION IN WARD 1, GO VAP DISTRICT, HO CHI MINH CITY	57
B-22. APPLICATION OF GIS TECHNOLOGY FOR BUILDING MAP OF SALINE INTRUSION IN CAN GIUOC DISTRICT, LONG AN PROVINCE	57

B-23. INCLUDING MANGROVES IN THE REDD + AGENDA TO IMPROVE LIVELIHOODS OF COMMUNITIES FOR CONSERVATION	58
B-24. ROLE OF GREEN CHEMISTRY IN CONTROLLING ENVIRONMENTAL POLLUTION AND CHEMICAL HAZARDS	58
B-25. ALKALI HYDROLYSIS AND FERMENTATION OF PROSOPIS JULIFLORA FOR LIGNOCELLULOSIC ETHANOL PRODUCTION	59
B-26. BUILDING TOOLS TO CONVERT DATABASE STRUCTURE FOR COMPLETING THE CADASTRAL DATABASE OF DISTRICT 6, HO CHI MINH CITY	59
B-27. ASSESSMENT OF SOIL MOISTURE ADEQUACY FOR RAINFED CROPS UNDER SEMI-ARID AGRO-CLIMATIC CONDITIONS : A CASE STUDY	60
B-28. SITUATION AND SOLUTION TO COMPLETE THE IMPLEMENTATION MECHANISM OF LAND FINANCIAL POLICIES AT DIST.9, HO CHI MINH CITY	60

THEME C

LIFE AND BIOMEDICAL SCIENCES

C-1. NEW SHIITAKE L. PLATINEDODES AND L. LATERITIA IN SOUTH VIETNAM - TROPICAL SPECIATIONS OF LENTINULAEDODES - REVISED AND CULTIVATED DATA	63
C-2. THE SIMILARITY AND DIFFERENCE IN KARYOTYPE OF F1- HYBRIDS OF MALE GAUR (BOS GAURUS GAURUS) WITH DOMESTIC CATTLE (BOSTAURUS INDICUS) IN SOUTH VIETNAM FROM GAYALS (BOS GAURUS FRONTALIS) IN SOUTH CHINA	63
C-3. CURRENT STATUS OF HUMPHREYA ENDERTII (GANODERRMATACEAE) FOUND IN CAT TIEN AND PHUOC BINH NATIONAL PARKS IN SOUTH VIETNAM	64
C-4. GENETIC DIVERSITY OF BALANTIDIUM COLICAUSED DIARRHEA IN WEANED PIGS SAMPLED FROM PIG-FARMS	64
C-5. COMPARING IMMUNOLOGICAL EFFICACY OF INFECTIOUS BURSAL DISEASE M.B STRAIN VACCINE WITH COMMERCIAL VACCINES	65
C-6. SUCCESSFUL BIOSYNTHESIS OF SILVER AND GOLD NANOPARTICLES FROM CRINUM LATIFOLIUM L.LEAVES'S EXTRACT WITH FULL ANTIBACTERIAL PROPERTIES	65
C-7. OPTIMIZE PROTOCOL TO PRODUCE ANTIGEN MASS OF INACTIVATED ACTINOBACILLUS PLEUROPNEUMONIA IN LABORATORY CONDITION	66
C-8. DEVELOPMENT OF MULTI PLEX PCR TEST TO DIFFERENTIATE HAEMOPHILUS PARASUISSEER OVAR 4 AND SEROVAR 5/12 FROM HPS SPP. IN SWINE	66
C-9. DIFFERENTIATION OF CLOSTRIDIUM PERFRINGENS TYPE A AND C IN PIGS USING MULTIPLEX PCR	66
C-10. NOVEL SYNTHESIS AND CHARACTERIZATION OF ANTIBACTERIAL ACTIVITY OF SILVER NANOPARTICLES AND GOLD NANOPARTICLES SYNTHESIZED FROM ARCTIUM LAPPA LINROOT'S EXTRACTS	67
C-11. CHARACTERIZATION OF CONE SNAIL VENOM BY LC MALDITOF MS	67
C-12. NEUROANATOMY OF PELLUCIDHAPTOR KRITSKYIA FROM GOLD FISH CARASSIUS AURATUS, NILSSON, FROM MEERUT (U. P.), INDIA	68
C-13. NOVEL PROTEINS, CAROTENOIDS AND OMEGA 3 FATTY ACIDS FROM THE AUSTRALIAN AQUATIC PLANTS AND MICROBIAL SPECIES	68
C-14. MI-SP5 GENE SILENCING REDUCES SIGNIFICANTLY REPRODUCTION OF MELOIDOGYNE INCOGNITA IN RICE (ORYZA SATIVA)	68
C-15. A METABOLICALLY RESPONSIVE FEEDING STRATEGY FOR ENHANCED BACTERIAL CELLULOSE PRODUCTION IN FED-BATCH SHAKING CULTURES	69
C-16. COLLECTION, IDENTIFICATION AND CULTIVATION THREE SPECIES OF GENUS MACROCYBE PEGLER AND LOGDE FOR COMMERCIAL PRODUCTION IN CAT TIEN NATIONAL PARK, SOUTH VIET NAM	69
C-17. SURVEY OF FERMENTATION CONDITION FOR CANDIDA BOMBICOLA ACTT22214 FROM MOLASSES AND SOYA OIL TO SOPHOROLIPID PRODUCTION	70
C-18. CHARACTERIZATION OF ACNE MICROBIOME AND EVALUATE THE EFFICACY OF BIOLOGICALLY SYNTHESIZED SILVER NANOPARTICLES OF FARSETIA HAMILTONII EXTRACT AGAINST PROPIONIBACTERIUM ACNES	70
C-19. POTENCY OF BIOSYNTHESIZED GOLD NANOPARTICLES AGAINST MDR PATHOGENS AND CANCER	71
C-20. MECHANISM AND PROBIOTIC EFFECTS OF PIGMENTED BACILLUS AQUIMARIS SH6 ON WHITE-LEG SHRIMP (LITOPANAEUS VANNAMEI)	71
C-21. ANTIFUNGAL ACTIVITY AND CYTOCHROME P450 GENE ANALYSIS OF ENDOPHYTIC ACTINOMYCETES FROM HALOPHYTES	72
C-22. INVESTIGATION OF THE MICROBIOLOGICAL PERFORMANCE OF CACAO FERMENTATION	72

C-23. NEUROANATOMY OF DACTYLOGYRUS SP., A MONOGENEAN GILL PARASITE OF THE AQUARIUM GOLD FISH CARASSIUS AURATUS	73
C-24. BIOCHEMICAL ASSAY OF HIGH VALUE PIGMENTS OF DIFFERENT SPIRULINA SPECIES CULTURED IN FIBRE GLASS CHAMBER	73
C-25. GREEN SYNTHESIS AND EVALUATION OF THE ANTIMICROBIAL ACTIVITY OF SILVER NANO PARTICLES SYNTHESIZED FROM STEREOSPERMUM BINHCHAUENSIS V.S. DANG'S EXTRACTS	73
C-25. DEVELOPMENT OF CORDYCEPS MILITARIS UNDER DIFFERENT MONOCHROMATIC LIGHTS	74
C-26. ISOLATION AND SELECTION OF SOME BACTERIAL SPECIES CAPABLE OF TREATING NITROGEN COMPOUNDS IN THE WHITE SHRIMP (LITOPENAEUS VANNAMEI) CULTURE MODEL BY BIOFLOC TECHNOLOGY	74
C-27. INVESTIGATION OF PROBIOTIC PROPERTIES OF YEAST ISOLATED FROM FRUIT AT CUC PHUONG NATIONAL PARK	75
C-28. THE EFFECTS OF EXTRACTION METHODS ON THE FUNCTIONAL PROPERTIES OF FLAX- SEED PROTEIN ISOLATE	75
C-29. SCREENING AND OPTIMUM INCUBATING CONDITIONS BY LACTOBACILLUS APPLIED FOR GAMMA-AMINOBUTYRIC ACID RICH TEA FERMENTATION	76
C-30. ENHANCE THE QUALITY OF CORDYCEPSMILITARIS BY SELENIUM SUPPLEMENTING INTO CULTURE MEDIUM	76
C-31. GENERATION GENE TOXIC OF BACILLUS THURINGIENSIS VAR. KURSTAKI BY PCR AND SDS-PAGE METHOD	77
C-32. PREPARATION AND ANTIFUNGAL ACTIVITY OF NANOCHITOSAN LOADING METAL IONS AGAINST RED BREAD MOLD (NEUROSPORA SPP.) ON MUSHROOMS	77
C-33. EXAMINATION OF RICE BLAST FUNGUS AVIRULENT GENES, AVR-PIK AND AVR-PI9 IN THAILAND RICE BLAST ISOLATES	77
C-34. THE ROLE OF MICRORNA 144 IN OSTEOARTHRITIS	78
C-35. IMPACT OF INTERVENTION ON NUTRITIONAL STATUS, MENTAL HEALTH, SLEEP QUAL-ITY AND PERCEIVED STRESS AMONG RURAL ELDERLY	78
C-36. ASSESSMENT OF SILVER MYCONANOPESTICIDE AGAINST WHITE GRUBS AND EVALUA- TION OF ANTIMICROBIAL EFFICACY	79
C-37. BIOSYNTHESIS OF SILVERNANOPARTICLES AND EVALUATION OF ITS EFFICACY AGAINST FUSARIUM DISEASE IN PEA PLANT	79
C-38. EVALUATION OF SILVER AND ZINC MYCOGENIC-FUNGICIDES AGAINST EARLY BLIGHT AND LATE BLIGHT	80
C-39. SYNTHESIS AND EVALUATION OF EFFICACY OF SILVER MYCONANOPARTICLES AS A POTENTIAL PEST CONTROL AGENT AGAINST WHITE GRUB	80
C-40. HEALTHY AGING AND WELLNESS	81
C-41. DEFAULT PARAGRAPH FONT;HYPERLINK;FOOTER CHAR;PRIMARY STUDY ON THE BACTERIAL STRAIN UL48ISOLATED FROM CHAO IN HUE PROVINCE, VIETNAM	81
C-42. EMPOWERMENT LEVEL AMONGST THE ADOLESCENT GIRLS IN AGRA DISTRICT	81
C-43. EXTENSION STRATEGY FOR ENHANCING PULSES PRODUCTION AND NUTRITIONAL SECURITY IN INDIA	82

THEME D

PHYSICAL, CHEMICAL AND MATHEMATICAL SCIENCES

D-1. CHEMICAL CHARACTERIZATION AND EVALUATION OF ANTIBACTERIAL POTENTIAL OF ESSENTIAL OIL OF CURCUMA CAESIA	85
D-2. EFFECT OF THAWING METHODS ON ANTIOXIDANT CAPACITY OF FROZEN STRAW- BERRY (FRAGARIA ANANASSA) AND MULBERRY (MORUS NIGRA)	85
D-3. PHYSICO-CHEMICAL CHARACTERIZATION OF BLACK SOLDIER FLY LARVAE (HERMETIA ILLUCENS LINNAEUS) OIL	85
D-4. OPTIMIZATION OF MICROCAPSULES OF W/O/W DOUBLE EMULSIONS OF DRUMSTICK (MORINGA OLEIFERA) LEAVES EXTRACT LOADED IN MALTODEXTRIN MATRIX BY SPRAY DRYING	86
D-5. WATER HYACINTH (EICHORNIA CRASSIPES) AS AN EFFECTIVE BIOSORBENT FOR SORPTION OF PHENOL	86
D-6. IMPORTANCE OF HIGH PERFORMANCE THIN LAYER CHROMATOGRAPHY AND UV SPECTROSCOPY IN ANALYSIS OF HOMOEOPATHIC DRUG DATURA FEROX	86
D-8. INFLUENCES OF METAL DOPING ON ELECTRONIC AND MAGNETIC PROPERTIES OF MOS ₂ MONOLAYER	87
D-9. ACTIVITY CONCENTRATIONS OF NATURAL AND ARTIFICIAL RADIONUCLIDES IN VEGETABLES AT THE AGRICULTURAL AREA OF HOC MON DISTRICT, HO CHI MINH CITY, VIETNAM AND THEIR RADIOLOGICAL IMPACTS ON HUMAN	87
D-10. THERMOSOLUTAL INSTABILITY OF AN INCOMPRESSIBLE VISCOUS FLUID PERMEATED WITH MAGNETIC FIELD IN AN ANISOTROPIC POROUS MEDIUM	88
D-11. TUNING ELECTRONIC STRUCTURES AND OPTICAL PROPERTIES OF MoS ₂ MONOLAYER BY HALOGEN AND POLYMER DOPING	88

THEME E

ENGINEERING & TECHNOLOGY

E-1. AN EXPERIMENTAL STUDY ON DRYING OF PEPPERCORNS IN FLUIDIZED-BED DRIER	91
E-2. A STUDY ON TILLAGE MACHINE FOR WATERMELONS LAND PREPARATION-CASE IN TIEN GIANG PROVINCE, VIET NAM	91
E-3. INVESTIGATING EFFECT OF CHANGING BASE LENGTH TO MOTION COMFORT ON COACH IS MADE AND ASSEMBLY AT VIETNAM	91
E-4. A COMPARATIVE STUDY OF EVOLUTIONARY AND GENETIC ALGORITHMS IN COURSE TIMETABLING	92
E-4. BUILDING A SYSTEM FOR SIMULATING THE YIELD OF AGRICULTURAL CROPS BASED ON INFERENCE AND LEARNING BAYESIAN NETWORKS	92
E-5. EXPERIMENTAL STUDY TO VERIFY THE EFFECT OF PARAMETERS ON SURFACE ROUGHNESS WITH 9XC HARDENED STEEL AFTER LASER ASSISTED TURNING	92
E-6. ASIAN AGRICULTURE 4.0	93
E-7. A STUDY ON DESIGN AND MANUFACTURE THE COFFEE FRUITS PICKING MACHINE	93
E-8. A CASE STUDY OF DESIGN OF LOW-COST RICE COLOR SORTER MACHINE	94
E-8. DETERMINING THE EFFECTIVE METHOD FOR ONE-SUN-DRIED SQUID DRYING	94
E-9. AUTOMATIC CONTROL OF BIRD'S NEST DRYER PROCESS	94
E-10. FIELD PERFORMANCE EVALUATION OF A STUBBLE CUTTING MACHINE COUPLED WITH A WINDROW GATHERING SYSTEM	95
E-11. EMERGING TRENDS IN RESEARCH OF BIOLOGICALLY ACTIVE MOLECULES : A FUTURE ANALYTICAL APPROACHES TO INVESTIGATE AND CONTROL VARIOUS DISEASES	95
E-12. BERBERINE INDUCES TOXICITY IN HELA CELLS THROUGH PERTURBATION OF MICROTUBULE POLYMERIZATION BY BINDING TO TUBULIN AT A UNIQUE SITE	96
E-13. CHARACTERIZATION OF ACNE MICROBIOME AND EVALUATE THE EFFICACY OF BIOLOGICALLY SYNTHESIZED SILVER NANOPARTICLES OF FARSETIA HAMILTONII EXTRACT AGAINST PROPIONI BACTERIUM ACNES	96

THEME F

SOCIAL SCIENCES AND HUMANITIES

F-1. FACTORS AFFECTING CONSUMERS' CHOICE OF BIO-FUEL: THE CASE OF E5 IN HO CHI MINH CITY, VIETNAM	99
F-2. AGRICULTURAL SUSTAINABILITY ASSESSMENT : APPLICATIONS TO VEGETABLE PRODUCTION IN AN GIANG PROVINCE, VIETNAM	99
F-3. RICE VALUE CHAIN STUDY IN TRA VINH PROVINCE, VIETNAM	99
F-4. GOVERNANCE PATTERNS OF PIG VALUE CHAINS IN THONG NHAT DISTRICT, DONG NAI PROVINCE	100
F-5. MAPPING OUT SOCIO-ECONOMIC DRIVERS OF ANTIMICROBIAL USAGE IN POULTRY FARMS IN VIETNAM : A COMBINED PARTICIPATORY EPIDEMIOLOGY AND Q-METHODOLOGY APPROACH	100
F-6. PRICE RISK PERCEPTIONS AND MANAGEMENT STRATEGIES IN VIETNAMESE PANGASIU PRODUCTION	101
F-7. THE IMPACT OF POVERTY REDUCTION POLICIES TO INCOME INEQUALITY FOR ETHNIC MINORITY GROUP : THE CASE STUDIES IN DUC TRONG DISTRICT, LAM DONG PROVINCE	101
F-8. CARNAP'S CONTRIBUTIONS TO THE DEVELOPMENT OF SEMANTICS	101
F-9. STRESS AND STRESS MANAGEMENT AMONG SINGLE PARENT FAMILIES	102
F-10. ASSESSMENT OF SUSTAINABLE TOURISM DEVELOPMENT IN CU CHI DISTRICT, HO CHI MINH CITY	102
F-11. BREAST FEEDING PRACTICE : EFFECT ON COGNITIVE DEVELOPMENT AND INFANT MORBIDITY	102
F-12. AN ANALYSIS OF FACTORS AFFECTING KEY COMPETENCIES OF COLLEGIATE STUDENTS IN HO CHI MINH CITY	103
F-13. NUTRITIONAL AND HEALTH STATUS OF SIDI MOTHERS OF KARNATAKA	103
F-14. ACADEMIC PROBLEMS OF DYSLIXIC CHILDREN AND PARENTS AWARENESS AND KNOWLEDGE ON DYSLIXIA-AN ASSESSMENT STUDY	104
F-15. EMPOWERMENT LEVEL AMONGST THE ADOLESCENT GIRLS IN AGRA DISTRICT	104

THEME G

LIBRARY AND INFORMATION SCIENCE

G-1. APPLIED ROUGH SET TOPROCESSING DATA THE ADVISOR SUPPORT SYSTEM	107
G-2. USING STATISTICAL METHOD IN THE ADVISOR SUPPORT SYSTEM TO ANALYZE AND FORECASTING PROFESSIONAL CAPACITY OF LEARNER	107
G-3. BUILDING A QTI QUESTION BANK AND ASSESMENT DELIVERY TOOL	107

Theme A

Agriculture, Plant and Animal Sciences

A-1. UNRAVELING THE MOLECULAR MODE OF ACTION OF RESTORER-OF-FERTILITY-LIKE PROTEINS IN PLANT MITOCHONDRIA

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Abstract

The interaction between restorer of fertility (RF) genes and cytoplasmic male sterility (CMS)-causing genes has important applications in hybrid seed production. However, the exact mechanism of how RF proteins block expression of CMS-proteins remains unknown. It is also unclear whether RFs cleave their RNA targets by themselves or by interacting with other proteins with endonucleolytic activity. Bioinformatic analysis of restorer-of-fertility-like (RFL) proteins revealed the presence of a C-terminal domain in their sequence. In this study, the molecular function of the C-terminal domain of the Arabidopsis thaliana RESTORER-OF-FERTILITY-LIKE 6 (RFL6) protein also known as RNA PROCESSING FACTOR 2 (RPF2) was analyzed. Fragments encoding the RFL6 protein with and without the C-terminal domain as well as RFL6 fused with the C-terminal domain of the RFL40 protein from wheat Triticum timopheevii were generated and introduced into the rfl6 mutant by Agrobacterium tumefaciens-mediated transformation. Positive transformants obtained by screens on growth medium supplemented with hygromycin B were confirmed by DNA extraction and genotyping with sequence-specific primers. Northern blots and 5'RACE assays were developed to study the processing of the cox3 transcript in the complemented rfl6 lines. The results show that the C-terminal domain of RFL6 is vital for maturation of the 5' UTR of the cox3 transcript in Arabidopsis mitochondria. Moreover, domain swaps between RFL6 and the RFL40 protein from wheat did not restore the function of RFL6, as the cox3 transcript remained unprocessed. This research brings new insights into the molecular mode of action of RFL proteins in plant mitochondria and expands our understanding of mechanisms underlying CMS and fertility restoration in plants.

Keywords: C-terminal domain, restorer-of-fertility-like protein, CMS

A-2. CHARACTERIZATION OF BBM GENES CONTROLLING SOMATIC EMBRYOGENESIS IN OIL PALM (*Elaeis guineensis* Jacq.) TISSUE CULTURE

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Abstract

Oil palm (*Elaeis guineensis* Jacq.) originated from the Arecaceae family and is the economically important edible oil in the world. It is a cross pollinating plant that cause genetic variation in seed propagation, so tissue culture is the best method to produce the true-to-type seedling of oil palm. Oil palm tissue culture usually takes approximately 1 year starting from explant to callus and from callus to embryo. We are interested in the gene that control the oil palm somatic embryogenesis during tissue culture process. According to research on Arabidopsis thaliana, found that BABY BOOM (BBM) is transcription factor and is preferentially expressed in developing embryos and seeds. In this study, oil palm was cultured on N6 medium supplemented with 2,4-D to induce callus for 2-3 months. BBM genes were isolated from callus, globular, torpedo, cotyledon and plantlet, and determined the expression level by using real-time PCR. The result suggested that BBM gene may be involved in controlling somatic embryogenesis in oil palm tissue culture. The BBM characterization will help to understand and leads to the shortening the time of tissue culture in oil palm.

Key words: oil palm, BABYBOOM genes, *Elaeis guineensis*, tissue culture, somatic, embryogenesis.

A-3. STANDARDIZATION OF HOLDING SOLUTION AFFECTING THE ENZYME ACTIVITY IN PETALS OF TUBEROSE SPIKES

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Abstract

Tuberose (*Polianthes tuberosa* L.), a member of family Amaryllidaceae, was originated in Mexico and is grown on the large scale in Asia. It is an important cut flower crop from aesthetic as well as commercial point of view. Tuberose has the unique place among the flowering plants and is easy to cultivate. The experiment was carried out with different floral preservatives viz., sucrose, cobalt chloride, GA3 to find out their efficacy on the POD and CAT enzyme activity on petals during vase life period of cut tuberose (*Polianthes tuberosa* L.) flower spikes in cv. "Single" and cv. "Double". There were 4 treatments T1 (Tap Water). The tuberose spikes were treated with the desired concentration of related holding solution treatments each replication-wise before storage. Among the floral preservatives tried the CAT activity was observed to be the minimum in 4% sucrose treatment (T2) whereas, the maximum in 25 ppm cobalt chloride treatment (T3). GA3 100ppm and 25ppm cobalt chloride (T4) treated spikes recorded the highest POD activity whereas, 4% sucrose treatment recorded the lowest POD activity in the cut flower spikes. Lower activity of peroxide and catalase at senescence were associated with a longer vase life.

Keywords: Floral preservatives, POD, CAT, vase life, quality.

A-4. THE INITIAL RESEARCH ON CREATING POLYMER MEMBRANE WITH PHOSPHATE SOLUBILIZING BACTERIA TO PRODUCE A MIXTURE OF SLOW RELEASE FERTILIZER AND MICROORGANISMS

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Abstract

The capability of slow-release nutrient combined with microbial activities in a fertilizer product will result in an increase of fertilizer's efficiency, and limit the impact of the chemical hazard of fertilizer on the environment. The aim of the research was to determine the optimal parameters for immobilization of phosphate solubilizing bacteria of adequate size, mechanical properties of polyvinyl alcohol (PVA), and chitosan membranes whether or not they contained bacterial immobilized particles for the purpose of producing slow-release fertilizer. The result showed that the combination of 1% sodium alginate concentration, alginate molecular weight of 100 kDa, and 1% calcium chloride concentration was the optimal parameters for the preparation of microbial calcium alginate immobilized. The activity of phosphate solubilizing bacteria *Burkholderia* *sp.* *atlantica* immobilized in micro calcium alginate particles, in PVA membrane, and in chitosan membrane after 72 hours was about 84.2%, 82.2%, and 52.3%, respectively in comparison with free bacteria. Mechanical properties of PVA membrane with and without bacterial immobilized particles with modulus, elongation, and toughness of 0.122 GPa, 115.1%, 17.65 MPa and 0.022 GPa, 220.8%, 18.70 MPa, respectively. Mechanical properties of chitosan membrane with and without bacterial immobilized particles with modulus, elongation, and toughness of 0.6 GPa, 7.6%, 0.66 MPa and 0.842 GPa, 32.4%, 3.52 MPa, respectively.

Keywords: Chitosan, bacterial immobilization, slow release fertilizer, polyvinyl alcohol.



A-5. DEVELOPMENT OF AN ECO-FRIENDLY APPROACH TO IMPROVE NITROGEN CONTENT IN OKRA

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Abstract

A simple randomized pot experiment was conducted at G. F. College, Shahjahanpur during January to March-2011. Efficacy of various doses of nitrogen in combination with Azotobacter was studied on the nitrogen content of okra leaves. Two controls were set, one without nitrogen and Azotobacter and another without nitrogen with Azotobacter to compare the effect of Azotobacter alone and in combination with various nitrogen doses. The nitrogen was estimated in dry leaves at 15, 30 and 45 days after germination (DAG) stages.

All the treatments of nitrogen and Azotobacter seed inoculation gave significantly higher nitrogen contents in the leaves of okra. The maximum nitrogen content was reported in okra leaves receiving N22.5 + Azotobacter. The minimum nitrogen content was reported in control (N0+B0) where no nitrogen and Azotobacter was applied. Therefore, it can be recommended that use of lower doses of nitrogen and Azotobacter seed inoculation improved the nitrogen content of leaves in okra plants which will enhanced the final yield of the crop. On the other hand, a large amount of nitrogen fertilizer is also saved thereby, decreasing the cost of production of crop.

Keywords: Azotobacter, nitrogen, okra, fertilizer, plant

A-6. EFFECT OF BIOCHAR APPLICATION ON GROWTH AND YIELD OF SOYBEAN GROWING IN GREY SOIL UNDER GREENHOUSE CONDITIONS

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Abstract

Biochar application to low fertility agricultural soils has the potential to improve crop production through nutrient and water retention. Biochar has also been reported to improve soil physical properties (i.e., water holding capacity, bulk density) chemical (pH, nutrient availability), and biological properties (microbial diversity and activity). However, the benefits vary depending on application rates and soil conditions. This study was to evaluate the effect of biochar application rates on growth and yield of soybean growing in the pots of grey soil under greenhouse conditions. Four rates (0.5%, 1%, 2% and 4% by weight) of biochar (produced at 600°C from rice husk) were amended to 5 kg pot of grey soil and the controls without biochar. The experiment was designed as RCDB with three replicates. Each experimental plot unit was presented 10 pots, each pot containing three soybean plants. Results of experiment show that application of biochar for soybean in grey soil has increased growth and yield compared to control without biochar, especially at high rates, 2% and 4%. Plant height, leaf number, leaf area and biomass of soybean were greater in biochar application treatments. In term of plant development, biochar also has promoted flowering time of soybean plants.

Keywords : Biochar, soybean, grey soil, growth and yield

A-7. CHARACTERIZATION OF PEROXIDASE ENZYME FROM THREE HEVEA BRASILIENSIS CLONES

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Abstract

The objective of the study was to evaluate and characterized peroxidase collected from three Hevea brasiliensis clones. The

latex was collected from 10-year-old trees belonging to three clones Rim600, Riv4, Pb235. Peroxidase was isolated through various steps using solvents including ethanol, acetone and $(\text{NH}_4)_2\text{SO}_4$. The activity of peroxidase was determined through measurement of quinoneimine formed at the wavelength of 510nm after the isolated fraction was supplemented with H_2O_2 . Protein content was determined with Lowry method. The enzyme activity was estimated at pH ranged from 5.7 to 8.0 and temperature ranged from 25 to 75°C. The results indicated that optimal pH for peroxidase activity from the rubber tree latex was at 6.0 and the activity reduced 50% at pH 7.0 after 30 minutes. The optimal temperature for peroxidase activity from the latex was at 40°C and the activity reduced 50% at 55°C after 30 minutes. The enzyme activity was highest in the latex collected from clone Pb235. Based on electrophoresis result, it is also indicated that molecular weight of the enzyme was 50 kDal. The specific activity of the enzyme was 3.96 UI/mg.

Keywords: Peroxidase enzyme, Heveabrsiliensis, rubber, clones

A-8. INFLUENCE OF MONOCHROMATIC LED ILLUMINATION REGIMES TO REGENERATION OF DENDROBIUM MINI

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Abstract

The purpose of this study was to determine the ratio and optimum light intensity from the monochromatic LEDs during protocol development and regeneration of *Dendrobium mini*. Experiments were arranged in the two-factor with completely randomized design. The in vitro samples were illuminated with red monochromatic LED (wavelength 660 nm), blue monochromatic LED (wavelength 460 nm) at ratios of 100% Red LED/0% Blue LED; 75% Red LED/25% Blue LED or 50% Red LED/50% Blue LED. Variation of light intensity ranged from 200, 400, 600 and 800 luxes. The control was illuminated with fluorescence lamps. The results indicated that shoot multiplication rate was highest at lighting regime of 75% red LED combined with 25% blue LED at the intensity of 800 luxes. While the ratio of 100% red LED at 800 luxes was the best regime for leaf size development. Leaf number and leaf chlorophyll content were highest when the plants were illuminated under lighting regime of 50% red LED combined with 50% blue LED at 400 luxes. Root number and root length were also highest when the plants were illuminated under lighting regime of 50% red LED combined with 50% blue LED at 400 luxes.

Keywords : Dendrobium mini, light emitting diodes, light intensity, regeneration, tissue culture

A-9. INFLUENCE OF LED ILLUMINATION REGIMES ON REGENERATION WILD RICE (ORYZARUFIPOGON L.)

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Abstract

The aim of this study was to evaluate morphogenesis and the regeneration responses of wild rice (*Oryzarufipogon L.*) under different LED illumination conditions. The experiments included three illumination regimes of monochromatic LED lighting (100% red LED [1]; 50% red LED:50% blue LED [2]; 75% red LED:25% blue LED [3]) and at four intensities (200, 400, 600, 800 luxes). The experiments were conducted with three replications. The temperature was controlled at 24 degrees throughout the experiments. The results indicated that the ratio of 100% red LED at the intensity of 800 luxes was the best for callus formation. While 75% red LED combined with 25% blue LED at the same intensity was best for shoot induction from these calluses. 100% red LED illumination at the intensity of 400 luxes was the best for root induction and development. It was suggested that the lighting regime with specific monochromatic light ratio and intensity could improve regeneration efficiency of the wild rice.

Keywords : Oryzarufipogo L., light emitting diodes, morphogenesis, shoot regeneration, conservation.

A-10. A SURVEY OF VARIETY AND FERTILIZER USE IN RICE AT FARMER'S FIELD IN LONG AN PROVINCE

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Abstract

Long An province is a high yield and quality rice production region due to using a diversity of rice varieties along with the fertilizers used during the growing period. A survey was conducted during the dry seasons of 2017 to collect the information from the farmers regarding input use of fertilizers and yield of rice varieties. A total of 197 farmers from three districts of Chau Thanh, Tan Tru and Can Duoc representing the most important areas of rice production in Long An province were directly interviewed on their management practices. It was noticed that farmers were mainly growing many rice varieties belong to a short-day rice variety group (90-110 days). RVT, Nang Hoa 9 and IR6425 were most popular. The amount of seed for direct seedling was in the range of 150-160 kg.ha⁻¹. Regarding fertilizer application, the majority of farmers (>90%) did not applied organic fertilizers and those who did only applied it at an average rate of 101.7 – 214.3 kg.ha⁻¹. Most farmers applied the rates of N, P₂O₅ and K₂O higher than recommended rate in the rice production.

Keywords: rice varieties, fertilizer, farmer, Long An province

A-11. QTL ANALYSIS FOR FLOWERING TIME USING BACKCROSS POPULATION BETWEEN ORYZASATIVAIR36 AND O. RUFIPOGON

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Abstract

Recently, climate change are causing serious loss to agricultural production in Vietnam and worldwide. Decreased rice yield due to climate change is needed to consider and solve as soon as possible. Prolonged high temperature at flowering time induced spikelet sterility of rice has been proved in number of studies. Some rice production areas, rice yield were damaged almost entirely. Therefore, study on early flowering time trait of rice to escape high temperature period of the day is the new strategy of this study. To evaluate this useful trait, the wild rice *Oryzarufipogon*W630 and *Oryzasativa*IR36 were used as materials of the study. As for SOT, two parameters of SOTb (beginning time when the first spikelet opens) and SOTm (median time when 50% of the spikelets open) were recorded. One QTL located on chromosome 8 in the regions of RM44–RM223 was detected for SOTb and another one QTL located on chromosomes 5 in the regions of RM13–RM574 was detected for SOTm, respectively. In addition, the additive effect of single wild alleles at these alleles was 0.27h and 0.23h. The results indicate that the homozygous wild alleles at these loci have potential to promote earlier flowering.

Keywords: Early flowering time, high temperatures, *Oryzasativa* IR36, *Oryzarufipogon*

A-12. DEVELOPMENT OF SILK MOTH ON DIFFERENT VARIETIES OF MULBERRY LEAVES

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Abstract

To identify the food preference of silk moth (*Bombyx mori* Linnaeus), the leaves of five mulberry varieties belonging to AR-2, BR-2, K-2, S-1 and S-146 were provided as food to newly hatched silk worms in different rearing jars under similar laboratory conditions (25±1°C, 65±5 % and 12:12 L:D). The observations revealed a significant ($p < 0.01$, $df = 4, 24$) variations in

different developmental stages of silk worm with respect to change food and the shortest incubation (7.90 ± 0.123 days), shortest larval (3.10 ± 0.078 , 2.30 ± 0.127 , 3.20 ± 0.114 , 3.60 ± 0.123 and 6.20 ± 0.130 days on Ist, IInd, IIIRD, IVth and Vth instar, respectively), shortest pupal (4.80 ± 0.071 and 8.00 ± 0.114 days with respect to pre-pupal and pupal) period and longest adult (8.20 ± 0.071 and 9.80 ± 0.071 days on male and female, respectively) development was observed on S-146 variety of mulberry compare to AR-2, BR-2, K-2 and S-1. Similarly, the overall development showed preference in accordance to S-146 (48.10 ± 0.327 days) followed by K-2 (51.66 ± 0.346 days), AR-2 (53.00 ± 0.200 days), BR-2 (55.00 ± 0.212 days) and minimum to S-1 (55.10 ± 0.300 days), respectively. The highest preference to mulberry variety of S-146 was noticed due to the smooth texture of leaves compare to other varieties.

Keywords: *biology, silk worm, mulberry, food preference*

A-13. INVESTIGATE THE EFFICIENCIES OF SOME TECHNICAL METHODS APPLIED IN EARLY GRAFTING RUBBER TREE (*HEVEA BRASILIENSIS* MUEL L. AGR.) PROCEDURE

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Abstract

The study was carried out to (1) determine the appropriate rootstock age, type of grafting and shading intensity for early grafting rubber tree procedure; 2) identify the suitable size of sleeves and fertilizer dosages for grafted rubber seedlings which were produced by early grafting method. Splice grafting and using 5 week-old rootstocks was the most appropriate for early grafting procedure. Shading net that reduced 50% light intensity was the most appropriate net for shading in early grafting procedure. Used 16 x 33 cm polybag and applied 11,4 g DAP + 6,8 g Urea + 4,1 g KCl/seedling/6 months, the early grafted rubber tree seedlings grew well and produced high output rate (94,3%) and reduced seedling production cost (8,032 dong/seedling). When planted on the plantation, the two-whorl early-grafted rubber tree seedlings of four different rubber clones (RRIV1, RRIV5, PB255 and PB260) showed the similar growth as the traditional seedlings.

Keywords: *early graft, rubber tree, seedling, rootstock age, grafting type*

A-14. INTERACTION EFFECT OF GENOTYPES AND TIME OF SOWING ON CROP PRODUCTIVITY AND LEAF REDDENING IN BT COTTON

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Abstract

Field experiments were conducted at College of Agriculture Farm, Raichur, India during 2014-15 and 2015-16 to study the interaction between cultivars (Bindas, Bunny-Bt, ATM and Brent) and planting time (II fortnight of June, and I and II First fortnights of July and August) on the performance of the Bt cotton. Significantly higher number of monopodials (1.9, 2.8, 2.8 and 2.86, respectively), sympodials (12.5, 24.4, 28.5 and 31.9, respectively), maximum number of nodes on main stem (13.8, 30.6, 32.9 and 35.3, respectively), leaf area per plant (20.6, 95.1, 112.2 and 78.1 dm² plant⁻¹, respectively), leaf area index (0.38, 1.76, 2.08 and 1.45, respectively) at 45, 90 and 135 DAS and at final picking, higher DM in leaves, stem and reproductive parts (49.9, 84.7 and 87.3, 75.0, 112.2 and 123.5, and 106.7, 121.6 and 128.1 g plant⁻¹ in leaves stem and reproductive parts, respectively at 90 and 135 DAS and at final picking, respectively), seed cotton yield (4173 kg ha⁻¹), harvest index (0.40), and benefit: cost ratio (5.22) were registered with early sowing during June II fortnight particularly with cv. Bindas compared to delayed sowings with same or different cultivars.

Keywords: *Bt cotton, growth and yield attributes, B:C ratio*

A-15. SSR MINING, CHARACTERIZATION AND ANNOTATION OF DE-NOVO ASSEMBLED TRANSCRIPTS OF GARLIC

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Abstract

Since ancient era garlic has been a valued part of Indian cuisine and also possesses major medicinal properties. Availability of Illumina reads of garlic provided us a platform to explore depth knowledge of transcriptomic content by performing de-novo assembly for garlic paired end reads (SRA Id: SRR5889574 downloaded from NCBI) and to identify and characterize Simple sequence repeats (SSRs) in these generated transcriptomic expressed sequence tags (EST). SSR markers tend to be highly polymorphic and also exhibit high reproducibility potential. The search for SSR loci in 43794 ETs revealed total number of 1835 SSRs. 951 tri-nucleotide repeats were found to be dominant followed by 801 di-nucleotides, 68 tetra-nucleotides, 4 penta-nucleotides and 11 hexa-nucleotides. Among all di-nucleotides TA(186) repeat was highly frequent followed by AT(175), AC(91) and TG(101). Whereas TTC(58) repeat was observed as most prominent followed by GAA (54). On the other hand only one tetra nucleotide repeat TATG (11) was frequently occurring in putative transcripts. Considering sequence complementarity AT/AT(361) repeat was found to be highly frequent followed by AG/GT(287) and AAG/CTT(285). Presence of penta and hexa-nucleotide were not remarkable in these ESTs. Furthermore annotation of ESTs (65) containing most frequent di and tri-nucleotide repeats was carried out by performing Blast Search using Blast2GO suite. Maximum Number of repeat containing ETs were observed to be associated with catalytic activity (15, 50%) followed by binding activity (13, 43 %; specifically metal ion binding activity), transporter activity (1, 3%) and molecular function regulation (1, 3%). Among all the biological processes majorly ETs (14, 38%) were reported to take part in metabolic process followed by cellular process (9, 24%), response to stimulus (2, 5%) and signaling (1, 3%). These ETs/contigs based markers could be very crucial resource for gene discovery and mapping and biodiversity analysis.

Keywords: SSR, EST, Transcripts, Contigs, Garlic.

A-16. MOLECULAR MARKERS FOR IDENTIFYING FEMALE (F) LOCUS IN CUCUMIS SATIVUS

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Abstract

Cucumber is a typical monoecious having separate male and female flowers on the same plant. Its sex expression is mainly determined by three major genes: F/f, M/m and A/a. The use of gynoeceous lines as maternal parents ensure high productivity. Thus, gynoeceous lines play an important role in cucumber hybrid breeding. In this study, we aimed to develop molecular markers linked to Female locus to distinguish homozygous and heterozygous gynoeceous lines. A 1-kb genomic sequence of ACS1G genes (from 1103 to 1875) of 3 gynoeceous and 2 monoecious lines was sequenced for identifying polymorphism. Potential marker based polymorphisms (Cs-BCAT) was then screened across 15 pure lines including 3 gynoeceous, 3 subgynoeceous, 9 monoecious in Vietnam by PCR. In line with this, other Female locus linked In/Del markers Cs-Female1, Cs-Female4, ACS1G and SSR markers: SSR18956, SSR13251, UW020605 were also used as addition markers for improving the accuracy of the reaction. Sequencing of the gynoeceous and monoecious lines found the presence of 56 bp deletions in gynoeceous lines and SNPs at the position e.g 1319 (G/C), 1385 (A/C), 1405 (C/T), 1482(C/G), 1519(T/G), 1622 (G/A) of the ACS1G gene. Screening of 15 pure lines indicated that two In/Del markers (Cs-BCAT, Cs-Female1) and one SSR marker (SSR13251) have the same correlation, correctly identified the gynoeceous compared to other markers. From that, the markers suggested that apply to the selection protocol for testing the level between marker and locus F.

Keywords: Molecular marker, Cucumis sativus, gynoeceous lines, cucumber

A-17. SPONSE OF BIO-ENHANCERS ON GROWTH AND YIELD OF COLE CROPS

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Abstract

Bio-enhancers are fermented preparation obtained by active fermentation of plants and animal residues over specific duration. Bio-enhancers play an important role in organic vegetable production. Panchgavya, Jivamrita and Vermiwash are some of the important Bio-enhancers used as the treatments in these investigations on three cole crops viz. Cauliflower (*Brassica oleracea* L. var. botrytis), Cabbage (*Brassica oleracea* L. var. capitata) and Broccoli (*Brassica oleracea* L. var. Italica). Investigations were statistically analysed in Simple Randomised Block Design (RBD) and replicated thrice. Different combinations of these Bio-enhancers viz. Panchagavya (4%), Jivamrita (20%), Vermiwash (1:5 times dilution), Panchgavya (4%)+Jivamrita (20%), Panchagavya (4%) + Vermiwash (1:5 times dilution), Jivamrita (20%)+Vermiwash (1:5 times dilution) and RDF (120:80:80::N:P2O5:K2O) with control were applied as treatments. Observations were recorded on various attributes of growth and yield and analysed. The results obtained on different parameters of growth and yield for cabbage, cauliflower and broccoli show that that treatment with RDF (N: P: K:: 120:80:80) respond with higher values in all the traits observed but very close values were obtained from the plots treated with Panchagavya (4%) + Vermiwash (1:5 times dilution) in all attributes. The treatment (4% Panchagavya+ 1:5 times dilution of Vermiwash) came out as the best combination for growth and yield characters of cauliflower, cabbage and broccoli for commercial production because organically produced vegetables fetch higher price in the market therefore, even if the yield is slightly low with organic inputs, it can be recommended for the commercial production of cole crops in account of human health, soil health, environmental health and quality product instead of quantity.

Keywords: Bio-enhancers, Organic, Cabbage, Cauliflower, Broccoli

A-18. IDENTIFICATION OF COLLEOTRICHUM SPECIES CAUSING ANTHRANOSE DISEASE ON CHILI (*CAPSICUM ANNUUM* L.)

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Abstract

Anthrnose disease found on leaves, stems, fruits, and flowers of chili caused serious yield loss in Viet Nam. Objective of this study was to identify the Colletotrichum species collected on chili grown in DongThap, Lam Dong provinces and Ho Chi Minh city, based on morphological characteristics and sequence of ITS, TUB2, ACT, GS and GPDH genes. Isolates of Colletotrichum were shown to belong to the Colletotrichum gloeosporioides, Colletotrichum siamense, Colletotrichum queenslandicum, Colletotrichum truncatum and Colletotrichum acutatum. This is the first reported association of C. queenslandicum and C. siamense with chili anthracnose in Viet Nam. Cross (leaves and fruits) inoculation tests indicated that most isolates were attacked on the leaves and fruits but there were a few on the stems of chili. The results were suggesting that pathogenicity of Colletotrichum isolates should be evaluated on fruit, leaf, and stem, and that resistance of chili varieties to Colletotrichum should be tested on stem together with on leaf and fruit.

Keywords : Anthracnose, colletotrichum, rDNA-ITS, actin

A-19. FIRST REPORT ON ARBUSCULAR MYCORRHIZA IN THE BLACK PEPPER ROOTS

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Abstract

Arbuscular mycorrhiza (AM) plays a role for nutrient converting from soil into plant. In this study, we, a first, surveyed the present of AM in blackpepper roots in order to develop an organic system for blackpepper in Viet Nam. Results indicated that there were Glomus, Acaulospora, Gigaspora and Scutellospora observed in 50 soil and root samples collected from blackpepper rhizosphere. That was confirmed by nested-PCR with primers LSU0599/ LSU0061 and LSURK4f/ LSURK7r. Interestingly, Acaulospora was widespread in roots of blackpeppers and Glomus was also recorded. Further studies should be done on AM species identification and establishing an organic ecosystem for blackpeppers.

Keywords: Arbuscular mycorrhiza, blackpepper, root, ecosystem, Vietnam

A-20. EVALUATION OF THE POTENTIAL CONTROL OF ROOT-KNOT NEMATODE ON BLACKPEPPER OF SESAME PLANTS, INTERCROPPING SYSTEM

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Abstract

In this study, Sesame was conducted as an intercropping plant with blackpepper trees for evaluation of the control on parasitic nematodes in blackpepper root. In the nethouse condition, sesame showed a potential control the population of root knot nematode and reducing the number of galls or egg masses in blackpepper roots, after 60 days treated. In the field experiment, sesame could reduce the population density of parasitic nematode in soil but could not effected on population density of nematodes in blackpepper roots and also on that of saprophytic nematode. Results suggested that sesame could be used as a plant for clean up the soil affected with parasitic nematodes, particular in blackpepper field.

Keywords: root-knot nematode, blackpepper, sesame

A-21. STUDY OF TRANSMISSION OF YELLOW LEAF VIRUS TO INSURE THE FOOD SECURITY OF SUGARCANE CROP

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Abstract

Sugarcane yellow leaf virus (ScYLV) is distributed worldwide and has been shown to be the cause of the disease sugarcane yellow leaf syndrome (YLS). This study was an investigation of the transmission and spread of ScYLV in Uttar Pradesh. Several aphids are known to transmit the virus, but investigation of infestation and transmission efficiency showed *Melanaphis sacchari* to be the only vector important for field spread of the disease. The initial multiplication of ScYLV in a virus-free plant occurred exclusively in very young sink tissues. When a single leaf was inoculated on a plant, that leaf and all older leaves remained virus-free, based on tissue-blot immunoassay, whereas meristems and all subsequently formed new leaves became infected. Therefore, only after those leaves which had already developed before inoculation had been shed, did the complete plant contain ScYLV. Spread of the viral infection to neighboring plants in the plantation fields via aphids was relatively slow and in the range of a few meters per year. No indication of long-distance transfer could be seen. This indicates that it may be possible to produce and use virus-free seed cane for planting of high-yielding but YLS-susceptible cultivars.

Keywords : Luteoviridae, *Melanaphis sacchari* , *Saccharum officinarum* , ScYLV, yellow leaf syndrome

A-22. RESPONSE OF SOYBEAN GENOTYPES TO ROOT-KNOT NEMATODE MELOIDOGYNE INCOGNITA IN SOUTHERN VIETNAM

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Abstract

The root-knot nematode, *Meloidogyne incognita* (Kofoid et White) Chitwood is an pernicious pathogen of plants worldwide. In Vietnam, scientific information of root-knot nematode on soybean is limited. In this circumstance, the purpose of study was to evaluate the response of soybean genotypes to this soil-borne pathogen. Root-knot nematode isolates were collected from soybean fields at different geographic areas in Southern Vietnam. Intraspecific morphology and virulence variability of these isolates were determined on susceptible Nam Vang soybean variety. Thus, twelve soybean genotypes (*Glycine max* Merrill) were evaluated for the tolerance to a virulent isolate of root-knot nematode (PN-03) under net house conditions. Inoculation of 1000 J2s per plant did not effect the growth of the twelve soybean genotypes after 8 weeks inoculating. Among the soybean genotypes tested, DT08 showed the moderate level of resistance while others genotypes ranked in the range of susceptible or moderately susceptible levels. The results suggest that DT08 genotype could be used to soybean breeding program to develop new cultivars that are resistant to the nematode.

Keywords: *Meloidogyne incognita*, soybean, Vietnam, tolerance.

A-23. ROLE OF POTATO EMITTED VOLATILE CUES IN ENHANCEMENT OF FORAGING BEHAVIOUR OF *CHRYSPERLA ZASTROWISILLEMI*

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Abstract

In recent years practice of novel approaches of Integrated Pest Management (IPM) became popularized due to its ecofriendly mode. Major tool of IPM is utilization of volatile cues that are responsible for behavioural manipulation of natural enemies like *Chrysoperla zastrowisillemi*, a prominent predator for sucking pests. Thus, present study focuses on collection, identification of volatile cues from Potato crop varieties and response assessment towards predator. It also includes identification and selection of attractant signaling molecules for *C. zastrowi*. For this, volatile cues were collected from three potato varieties (Kufri Bahar, Kufri Surya, Kufri Chipsona-1). Gas Chromatography-Mass Spectrometry (GC-MS) did chemical identification. To assess the orientation response of predator various concentrations of targeted volatile cues were tested through Y-tube bioassay. Result indicated that predator elicited maximum response towards volatile cues emitted from Kufri Surya at 50,000-mg/L concentrations in vegetative phase (2.40 ± 0.58). GC-MS profile of Kufri Surya in vegetative stage indicated presence of Tetradecane, Heptadecane, 2-methyltetracosane, Pentacosane, Triacontane and Tetracontane. Study revealed that to reduce the intensity of sucking pests, *C. zastrowi* should be released in early stage of vegetative phase of crop with desire quantity of formulation. Effective formulation may be prepared from 50,000-mg/L concentration of crude extract of Kufri Surya or by combining pure form of Tetradecane, Heptadecane, 2-methyltetracosane, Pentacosane, Triacontane and Tetracontane. Utilization of these attractant volatile cues-based formulations will be an efficient, cost-effective and eco-friendly approach for management of sucking pest.

Keywords: Allelochemicals, predators, potato, pest, gas chromatography- mass spectrometry

A-24. HOSTS OF ALTERNARIA PASSIFLORAE CAUSING BROWN SPOT OF PASSION FRUIT (*PASSIFLORA EDULIS*)

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Abstract

A host spectrum of *Alternaria passiflorae* causes a brown spot disease on *Passiflora edulis* f. *edulis* was evaluated in this study. In laboratory condition, the study on pathogenicity of *Alternaria passiflorae* on leaves of ten plant species in both injured by pin pricking and unpricked methods showed that *Alternaria passiflorae* (isolate LD4T-3.10) infected on leaves of longan (*Dimocarpus longan*), durian (*Durio zibethinus*) and rubber (*Hevea brasiliensis*) causing different disease lesions from 3 to 10 days after inoculation. In the net house, pathogenicity test was conducted on ten different cultivars with a spraying of spore suspension at 107 spores per milliliter. Result showed that *Alternaria passiflorae* (isolate LD4T-3.10) caused the disease symptoms on mustard green (*Brassica juncea*), sweet potato (*Ipomoea batatas*), pumpkin (*Cucurbita maxima*), tomato (*Solanum lycopersicum*) and chilli (*Capsicum annuum*) from 3 to 7 days after inoculation. It was suggested that *Alternaria passiflorae* was not only a pathogen on passion fruit but also on other crops.

Keywords: *Alternaria passiflorae*, *Passiflora edulis*, brown spot, passion fruit

A-25. STUDY ON PINK ROT DISEASE ON EGGPLANT (*SOLANUM MELONGENA* L.)

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Abstract

Trichothecium roseum was found to be present on fruit causing Pink rot. This fungus was found in a particular period of the year i.e. in the months of March and August only in Bareilly region. The biannual attendance of *Trichothecium roseum* has increased the curiosity to know much information regarding its tendency to encounter to eggplant. Therefore this mysterious fungus was selected to study. Unique geographical situation and agro climatic conditions of Bareilly region make the pathological study of the eggplant more relevant and significant. Alternating two-celled, clavate conidia held at their bases are typical characteristics of *Trichothecium roseum*. Mancozeb was taken into an account to control the test fungus. Mancozeb is grayish yellow powder, insoluble in most organic solvents. It is used to protect many fruits, vegetables, and field crops against a wide spectrum of fungal diseases. The addition of zinc chloride to a suspension of maneb yields mancozeb, superior to maneb. Four concentrations viz. 0.5%, 1%, 1.5% and 2% were used. For each set of experiment a control containing only PDA medium was used. In the present study, in vitro study was carried out to evaluate the efficacy of Mancozeb against *Trichothecium*. Mancozeb at 2% concentration proved its superiority over any other treatment. The radial growth of *Trichothecium roseum* was significantly reduced in all the treatments compared to the control, however its efficacy at all other concentrations during the investigation was also found to be significantly effective.

Keywords: *Solanum nigrum*, *Trichothecium roseum*, eggplant, Brinjal, Mancozeb, Bareilly

A-26. ISOLATION AND CHARACTERIZATION OF A CANKER DISEASE CAUSING PATHOGEN FROM LIME TREE AND EVALUATION OF ITS ACTIVITIES AGAINST OF *STEMEUPHORBIA TIRUCALLI* EXTRACT

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Abstract

The lime tree canker diseased samples were isolated and confirmed to identify the bacterium by biochemical characteristic viz. Gram staining, Starch hydrolysis, Tween 80 hydrolysis, Gelatin Liquefaction, KOH test, Kovacs' Oxidase and Fluorescent Pigmentation test. The results indicate that *Xanthomonas axonopodis* was disease-causing bacteria. Aqueous, ethanol, methanol and ethyl acetate extracts from the stem of *Euphorbia tirucalli* were used to evaluate antibacterial activity against bacteria *Xanthomonas axonopodis* via the agar well diffusion method. The results showed that methanol stem extract showed highest antibacterial activity with zone of inhibition 21 ± 1.25 mm after 24h incubation. The Minimal Inhibitory Concentration for the methanol extract was 8mg/mL for all of the bacteria. The results of the study were the basis for the application of plant extracts to manage the disease citrus canker and other crops with similar pathogens, *Xanthomonas axonopodis* in the future.

Keywords: *Euphorbia tirucalli*, canker disease, antibacterial activity, methanol extract.

A-27. EFFECTS OF FLOWER NUTRITIONAL RESOURCES ON THE LONGEVITY OF *COTESIA VESTALIS* (HYMENOPTERA : BRACONIDAE), A SOLITARY PARASITOID OF *PLUTELLA XYLOSTELLA*

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Abstract

In Viet Nam, *Cotesia vestalis* is a native species and has been demonstrated its applicability as the natural enemy to control *Plutella xylostella*. For successful biological control program, parasitoids require food resources such as nectar, pollen to optimize their life histories in the field after released. In this study, we investigated the effects of two flowering plants, yellow cosmos (*Cosmos sulphureus*), and *Zinnia elegans* on the longevity of adult *C. vestalis*. The experiments were conducted with 4 treatments, 5 replications at 28°C, 60-70% R.H, and 16L:8D condition, including 30% honey, *Zinnia elegans*, *Cosmos bipinnatus* and water to examine the effect of flower nutritional resources on the longevity of *Cotesia vestalis*. For mated parasitoids, the results showed that there were significantly different among the treatments. At 30% honey solution treatment, male parasitoid lived for 6.2 days and 6.6 days for the female, respectively. Yellow cosmos (*Cosmos sulphureus*) provided pollen and nectar that parasitoid longevity was 4.6 days for male and 5.8 days for female parasitoid, respectively. Similarly, for unmated parasitoid, male parasitoid lived for 6.4 days and 7.0 days for the female in 30% honey solution treatment, which were significantly different among the treatments ($P < 0.05$). In addition, male parasitoid longevity was 4.8 days and 4.6 days for the female in yellow cosmos treatment. The result indicated that food resources from flowers can benefit to parasitoid in the field.

Keywords: *Cotesia vestalis*, longevity, yellow cosmos (*Cosmos sulphureus*), *Zinnia elegans*

A-28. DNA BARCODING APPLIED TO THE IDENTIFICATION OF PARASITOIDS ON VEGETABLE FIELD IN SUBURBS OF HO CHI MINH CITY

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Abstract

Exploiting the role of natural enemies to create an ecological balance is an important measure of IPM practices to limit the use of pesticides. The research was carried out in some vegetable fields in suburbs of Ho Chi Minh City. Result indicated that there

was 6 species of insect pests in 5 orders. In addition, species confirmation was performed based on molecular barcoding of the cytochrome oxidase subunit I (COI) gene (so-called DNA barcode region) of parasitoid wasps and morphological observation indicated that the specimens collected in Viet Nam belonged to many genera including *Apanteles*, *Cotesia*, *Microplitis*, *Schoenlandella*, *Neochrysochris*, *Telenomus*, *Phaeditoma* and *Binodoxys*. Moreover, some of them were identified to species level, e.g., *Apantelestaragamae*, *Cotesisvestalis*, *Binodoxyscommunis* and *Diglyphusisaea*.

Keywords: *Apantelestaragamae*, *Cotesisvestalis*, *DNA barcode*, *parasitoid*

A-29. EFFECT OF HEIGHT OF SPRAY AND OPERATING PRESSURE ON SWATH WIDTH AND DISCHARGE RATE OF A DRONE MOUNTED SPRAYER

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Abstract

The conventional method of spraying results in the excessive application of chemicals and are difficult in the orchard, paddy, dense crop field which leads to environmental pollution and less uniformity which further leads to more production cost and also associated with health hazards to the operator. The drones attached with the spray tanks which can store the pesticide and spray over the crop are more feasible alternatives. These drones fly at a proper height, helping the pesticide penetrate perfectly into the fields. This way the effect of the pesticide is also highly effective as the chemical could now reach on the plant parts where it is not possible in case of manual spraying. A drone mounted sprayer has been developed and tested under laboratory conditions at the different height of spray and operating pressure. The performance evaluation of developed drone mounted sprayer was conducted with the operational parameters of five different height of spray (500, 750, 1000, 1250 and 1500 mm) and three operating pressure (1.37, 1.78 and 1.90 kg cm⁻²). It was observed that the swath width increased by increasing the height of spray from 500 to 1500 mm and operating pressure range from 1.37 to 1.92 kg cm⁻². The discharge rate increased by increasing the operating pressure from 1.37 kg cm⁻² to 1.92 kg cm⁻². However, the height of spray did not influence the discharge rate during the laboratory trials.

Keywords: *environmental pollution, drone, hazards, mounted sprayer, pressure*

A-30. FIRST REPORT OF PHYTOPYTHIUM HELICOIDES INFECTING CASSAVA AND EFFECTING OF TRICHODERMA STRAINS TO CONTROL THIS DISEASE IN VIET NAM

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Abstract

In recent years, cassava (*Manihot esculenta* Crantz) production can be severely affected by cassava rot root disease in Tay Ninh province. This disease affected to plant growth, reduced 15% - 20% harvest yield. With the habitat using chemical fertilizers and growing to specialize plant in poorly drained soils lead to the disease accumulating in soil from year to year, and caused severe damage when the weather is suitable for disease development. Disease samples were isolated and compared with morphological identification. *Phytophthium helicoides* was confirmed the main factor causing rot root disease on cassava. This was originally from the soil, and can cause on various plants. To control this disease, eight strains of *Trichoderma* sp. with specific names were tested to inhibit rot root disease caused by *P. helicoides*. The results showed that seven strains of *Trichoderma* with the high antagonistic ability to *P. helicoides* and inhibition efficiency was at least 59%. To our knowledge, this is the first report of cassava rot root disease caused by *Phytophthium helicoides* in Vietnam.

Keywords: *Manihot esculenta* Crantz, *cassava rot root disease*, *Phytophthium helicoides*, *biological control*.

A-31. STUDY ON THE PATHOGEN CAUSING BASAL ROT AND ROT ROOT OF CHRYSANTHEMUM IN DA LAT CITY, VIETNAM

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Abstract

In recent years, stem rot and rot root diseases significantly damaged on both seedling and flower period of Chrysanthemum plants at Da Lat city, Lam Dong province. The results of morphological identification and comparing sequence the rDNA internal transcribed spacer (ITS) 1 and 2 regions with that of known isolates and found that *Fusarium oxysporum* and *Fusarium solani* were the main factors causing stem rot and rot root disease of Chrysanthemum. *F. oxysporum* caused stem rot and wilt symptom, while *F. solani* caused basal rot and rot root symptom. The optimum condition growth for both fungus *F. oxysporum* and *F. solani* was grown in PDA media, at 25°C - 30°C, 12 light: 12 night, and pH 7 – 8. This is the first report of this disease in Da Lat, Lam Dong, Vietnam.

Keywords: *Fusarium oxysporum*, *Fusarium solani*, Chrysanthemum rot root disease, stem rot disease, wilt symptom.

A-32. RESISTANCE TO IMIDACLOPRID, FENOBUCARB, AND PROFENOFOS ON BROWN PLANT HOPPER (*NILAPARVATALUGENS* STAL.) IN TIEN GIANG, AN GIANG AND CAN THO PROVINCES

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Abstract

The study was conducted to evaluate the insecticide resistance of BPH to three active ingredients of imidacloprid, fenobucarb, and profenofos collected in 3 provinces in Mekong Delta. Resistance indices to imidacloprid on BPH were 172,9 – 177,1 (Tien Giang), 96,8 – 140,1 (An Giang) and 96,8 – 140,0 (Can Tho); to fenobucarb were 99,2 – 113,1 (Tien Giang), 87,0 – 120,0 (An Giang) and 105,8 – 124,8 (Can Tho); and to profenofos: 13,8 – 15,4 (Tien Giang), 16,8 – 19,0 (An Giang) and 23,5 – 28,7 (Can Tho). The pesticide resistance population from An Giang province was chosen for further investigation of the reversion of pesticide susceptibility after withdrawal of insecticide for a series of consecutive generations using insecticide-free laboratory. The results showed that at the 8th generation, LD50 value of imidacloprid sharply decreased and there was no significant difference in LD50 compared with the susceptible strain. Interestingly, the LD50 of imidacloprid reduced 39,98 times from 21,87 µg/g to 0,5 µg/g after 12 generations in insecticide-free conditions, the resistant index in the 12th generation reached to 5,4 ($R_i < 10$).

Keywords: Brown plant hopper, pesticide resistance, imidacloprid, fenobucarb, profenofos

A-33. GENETIC DIVERSITY IN MARIGOLD GENOTYPES

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Abstract

Marigold, a member of the family Asteraceae or Compositae, is a potential commercial flower crop that is gaining popularity on account of its easy culture, wide adaptability, and increasing demand in the subcontinent. It is popular among flower growers because of wide spectrum of attractive colours, shape, size and good keeping quality. They are extensively used for making garlands, beautification and other purpose i.e., pigment and oil extraction and therapeutic uses. Loose flowers are in great demand for garland making as well as in religious and social functions. Globular shaped flowers with long stalks are

used for cut flower purposes. Thirty genotypes of marigold were evaluated during two winter seasons of 2016-17 and 2017-18 in a randomized block design (RBD) with three replications, to assess the genetic diversity and variability. The mean sums of squares were highly significant for all the characters studied, indicating the presence of variability. The genotypes were grouped into six clusters based on Mahalanobis D² statistics using Tocher's method. The clustering pattern of genotypes revealed that the genetic diversity was independent of the geographical diversity. Among the six clusters, cluster-II was largest with 12 genotypes, followed by cluster-IV (11), cluster-V (3), cluster-I (2) and clusters-III and VI with one genotype each. The maximum inter-cluster distance was observed between clusters-V and VI (D²=13.94), closely followed by clusters-I and VI (12.73) and clusters-IV and VI (12.36). The intra-cluster distance was highest in cluster-V (4.88) and minimum in cluster-I (2.80). Depending upon the mean value, the genotypes like Hisar Jaffri-2, MGH-09-271 and MGH-09-276 can be used as parents in hybridization programme for higher flower yield. As these genotypes have better means for yield and yield contributing characters and are placed in different clusters showing great genetic diversity.

Keywords: Genotype, variability, cluster, hybridization, inter-cluster

A-34. ETHYLENE DEPENDENT AND INDEPENDENT FRUIT RIPENING IN HORTICULTURAL CROPS

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Abstract

Understanding of fruit physiology is crucial for development of technology to minimize postharvest loss in both quality and quantity. Fruit have been classically categorized as either climacteric or non-climacteric, depending on their regulation of ethylene biosynthesis. In higher plants, various stress such as water stress, drought, wounding and chilling temperature have been known to induce ethylene biosynthesis. A potent inhibitor of ethylene perception, 1-methylcyclopropene (1-MCP) has been developed and used for control of ethylene related deterioration. In persimmon, *Diospyros kaki* Thunb., we found that water loss induced stress ethylene, resulting in rapid fruit softening and deterioration. In addition to application of 1-MCP, we developed practical technology to extend shelf life through suppression of water loss by polyethylene bag or water proof carton box. Kiwifruit, *Actinidia chinensis* Planch., which belong to climacteric fruit, has been known to be extremely sensitive to ethylene. Treatment of propylene, ethylene analogue, immediately induced rapid fruit ripening while pre-treatment with 1-MCP inhibited response to propylene, indicating ethylene dependent ripening. On the other hand, during long-term storage, fruit softening and decrease of acidity were accelerated at low-temperature (15-5°C) without detectable ethylene production, compared with fruit at room temperature. Repeated 1-MCP treatments failed to suppress the fruit ripening facilitated in low-temperature storage. Expression profiling by RNAseq and qPCR revealed that pattern of ripening associated genes in propylene treated fruit was distinct from that in fruit at low temperature. Several ripening associated gene were stimulated by low temperature exposure but not by propylene treatment at all. These observations indicate that low-temperature modulates the ripening of kiwifruit in an ethylene independent manner, suggesting that kiwifruit ripening is inducible by either ethylene or low temperature signals. In addition, the low-temperature modulated ripening is likely to be involved in on-vine ripening in kiwifruit.

Keywords: ethylene, fruit ripening, 1-MCP, stress, low temperature storage

A-35. EFFECT OF FOLIAR SPRAY OF MICRO-NUTRIENTS ON YIELD AND YIELD ATTRIBUTING CHARACTER OF AONLA (*EMBLICA OFFICINALIS* GAERTN.) CV. NA-6

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Abstract

Aonla (*Embllica officinalis* Gaertn.) belongs to the family Euphorbiaceae and sub family Phyllathoidae, is one of the important minor fruit crops of India. It is indigenous to tropical south-east Asia, particularly in central and southern part of India. The foliar application of micro and macro nutrients have immense important role in improving physical characters as well as

productivity of fruits. An experiment was conducted at Main Experiment Station, Horticulture, N.D. University of Agriculture and Technology, Kumarganj-Faizabad 224 229, during the year 2014-15 to ascertain the influence of foliar application of micro-nutrient on different characters of aonla. The seven treatments as T₁-ZnSO₄ (0.5%), T₂-CuSO₄ (0.4%), T₃-MnSO₄ (0.5%), T₄-ZnSO₄ (0.5%) + CuSO₄ (0.4%), T₅-CuSO₄ (0.4%) + MnSO₄ (0.5%), T₆-ZnSO₄ (0.5%) + MnSO₄ (0.5%) and T₇-Cotrol (Water spray) were replicated three times by using one plant as a plant unit. The recorded data of different characters were statistically analyzed by using simple Randomized Block Design (R.B.D.), where significantly maximum yield and yield attributing characters in respect to fruit retention (26.53%) per cent, fruit length (4.17 cm), fruit width (4.46 cm), fruit weight (42.38g), pulp : stone ratio (21.59:1) and fruit yield (73.03kg/tree) while minimum fruit drop (73.47%) per cent were recorded by the foliar spray of ZnSO₄ (0.5%) + CuSO₄ (0.4%) whereas treatment comprise control (water spray) shows minimum results than all other treatments. So it can be concluded that the foliar application of ZnSO₄ (0.5%) + CuSO₄ (0.4%) was judged better for yield and yield attributing characters of aonla.

Keywords: Foliar spray, micro-nutrients, *Emblca officinalis Gaertn*, fruit crop

A-36. STUDIES ON INTEGRATED NUTRIENT MANAGEMENT IN BER (*ZIZYPHUS MAURITIANA* LAMK.) CV. BANARASI KARAKA

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Abstract

The present investigation entitled “Studies on integrated nutrient management in ber (*Zizyphus mauritiana* Lamk.) cv. Banarasi Karaka” was carried out during the year 2016-17 at Main Experiment Station, N.D. University of Agriculture & Technology, Kumarganj, Faizabad (U.P.). The experiment comprises three replications with seven treatments having Randomized Block Design (R.B.D.) viz. T₁ (Control), T₂ (100% RDF through NPK), T₃ (100% FYM), T₄ (50% FYM + 50% RDF through NPK), T₅ (50% FYM + 50% PSB + Azotobacter), T₆ (75% FYM + 25% RDF through NPK), T₇ (75% FYM + 25% RDF through NPK + 25% (PSB + Azotobacter). Under experiment, the maximum yield and quality of ber fruits was studied and it was found that highest superior results in favour of Plant height (m), Trunk girth (cm), Plant spread (m), fruit retention (%), Fruit size (cm), Fruit weight (g), Yield (kg/plant), Yield (q/ha), Total Soluble Solids (°Brix), Titrable acidity (%), Ascorbic acid (mg/100g pulp), Reducing sugars (%), Non-reducing sugar (%) and Total sugars (%) content of ber fruit were noted with the application of T₇ (75% FYM + 25% RDF through NPK + 25% (PSB + Azotobacter) followed by application of 50% RDF through FYM + 50% RDF through NPK.

Keywords: Integrated nutrient management, *Zizyphus mauritiana* Lamk, fruit, Banarasi Karaka

A-37. IDENTIFICATION AND GROUPING OF LINSEED (*LINUMUSITATISSIMUM* L.) GENOTYPES THROUGH CHEMICAL AND BIOCHEMICAL TESTS

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Abstract

Characterization of varieties got greater importance with the implementation of Protection of Plant Varieties and Farmers' Rights Act, 2001. Grouping the varieties of minor oilseed crop like linseed based on seed and seedling response to various chemicals and biochemical tests viz., Electrical conductivity, Dehydrogenase activity and α-amylase activity needs to be attended. Hence the study was taken up at University of Agricultural Sciences, Raichur to identify safflower varieties with various chemical tests. Ten genotypes of linseed were subjected to chemical tests using NaOH, KOH, GA₃ and 2, 4-D. The seeds were soaked in NaOH (5%) and KOH (5%) solution for overnight and the solution was decanted. Based on the colour of the solution, genotypes were grouped as light brown (T-397), medium brown (Indraalsi, NL-115, Padmini, Suyog, Parvati, Ruchi, Shikha and RLV-6) and light golden yellow (S-36) in sodium hydroxide test and light brown (Parvati, Shikha and RLV-6), medium brown (S-36, T-397 and Suyog), dark brown (NL-115 and Ruchi) and light golden yellow (Padmini and Indraalsi) in KOH test. The germination papers soaked in 25 ppm GA₃ and 5 ppm 2, 4-D were used to test the seedlings

response of these genotypes. Based on the response to GA₃, the genotypes grouped as showing very low response (NL-115, Ruchi and RLV-6), low response (Indraalsi, S-36, T-397, Suyog, Parvati and Shikha) and moderate response (Padmini). Based on response to 2, 4-D the genotypes were grouped as highly susceptible (Indraalsi and Padmini) and susceptible (NL-115, S-36, T-397, Suyog, Parvati, Ruchi, Shikha and RLV-6). Among the genotypes Suyog recorded low EC (280 iSm-1), Ruchi had higher Dehydrogenase enzyme activity (0.450) and Parvati had higher α -amylase activity (10.80 mm).

Keywords: Characterization, linseed, chemical tests, biochemical tests, groups

A-38. TOXIC EFFECT OF HEAVY METALS ON SHOOT, ROOT LENGTH, DRY WEIGHT, NODULATION AND DRY NODULE WEIGHT, NITROGEN CONTENT, CHLOROPHYLL, LEGHAEMOGLOBIN, SEED YIELD AND GRAIN PROTEIN CONTENT OF PIGEON PEA

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Abstract

Cajanuscajan L. (Pigeon pea) is a multiuse legume crop in the world, especially in Indian subcontinent. Due to its multiple use, pigeon pea is widely grown as inter crop in semi arid regions. Pigeon pea originated in India, as evidenced by the presence of its several wild relatives, the large diversity of the crop gene pool, ample linguistic and a few archaeological remnants. The effect of heavy metal on pigeon pea crop on shoot root length and dry weight, nodulation and dry nodule weight, on nitrogen content and chlorophyll, leghaemoglobin, seed yield and grain protein content grown in unsterilized pot soil was variable and metal concentration dependent. Among all the single metal treatments cadmium was found to be the most phytotoxic and significantly. Chromium was found to be least phytotoxic and significantly among all the single metal treatments and increased the plant growth at all the three concentration as compared to other treatments. Zinc, nickel, lead and all combination of metals also effect on shoot root length and dry weight, nodulation and dry nodule weight, on nitrogen content and chlorophyll, leghaemoglobin, seed yield and grain protein content as compare to control.

Keywords: *Cajanuscajan*, nitrogen content, heavy metal

A-39. PLANT GROWTH, NODULATION, CHLOROPHYLL AND LEGHAEMOGLOBIN CONTENT OF CHICKPEA INFLUENCED BY CHROMIUM REDUCING STRAINS BACILLUS BC5 AND MESORHIZOBIUM RC3 IN CHROMIUM RELATED SOILS

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Abstract

In this experiment chromium-reducing and plant growth promoting strains *Bacillus* BC5 and *Mesorhizobium* RC3 were used to assess its bioremediation potential in pot house conditions using chickpea as a test legume crop. The chickpea plants grew poorly when the soil was amended with Cr. Among the three concentration of Cr (VI), Cr (VI) at 60.52mg/kg soil had the largest toxic effects and significantly ($P=0.05$ and 0.01) without BC5, decreased root length 66.49%, shoot length 47.15%, nodule numbers 77.15% and nodule dry weight 45.83%, at 90 days, root length 55.91%, shoot length 45.83%, and without RC3 decreased root length 66.49%, shoot length 47.15%, nodule numbers 77.15% and nodule dry weight 45.83%, at 90 days, root length 55.91%, shoot length 45.82%, at 135 days as compared to the control. In comparison when, BC5 and RC3 were

also added, BC5 increased the root length, 10.87%, shoot length 12.38%, nodule numbers 6.64%, nodule dry weight 13.77% at 90 days respectively, root length 7.18%, shoot length 9.22% respectively, and Mesorhizobium strain RC3 was also added, it increased the root length, 10.87%, shoot length 12.38%, nodule numbers 6.64%, nodule dry weight 13.77% at 90 days respectively, root length 7.18%, shoot length 9.22% respectively at 135 days as compared to control. The inoculant strain reduced the Cr uptake by plant organs. In conclusion, the strains BC5 and RC3 showed a potential for Cr (VI) reduction, produced plant growth-promoting substances under Cr stress and enhanced the growth and yield of chickpea, both in Cr stress and Cr free conditions. Due to the multifarious activity, the strains BC5 and RC3 could therefore, be utilized for growth promotion as well as for the bioremediation of Cr polluted soil. Chlorophyll and leghaemoglobin content measured decreased consistently with increasing concentrations of chromium without the inoculation of strains BC5 and RC3. Chromium at 60.52mg/kg was the most toxic and decreased the chlorophyll and leghaemoglobin by 11.83, 67.30% as compared to control. In comparison, the bioinoculant showed a maximum increase in the chlorophyll and leghaemoglobin content of 6.83% and 9.47%, respectively, at 60.52mgCr/kg soil compared to control.

Keywords : Plant growth, nodulation, chlorophyll, leghaemoglobin, chickpea

A-40. FLAVONOIDS ACT AS SIGNALING MOLECULES IN THE INFLORESCENCE OF SUNFLOWER (*HELIANTHUS ANNUUS*)

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Abstract

Sunflower (*Helianthus annuus*), member of asteraceae family is an important oilseed crop. Flavonoids have an important role in the reproductive biology of Sunflower. The present investigation on the reproductive parts of sunflower reveal that they have diverse metabolic functions, and, also protect the plant against various biotic and abiotic stress. Flavonoids act as antioxidants and have a developmental role in stigma, pollen, ray florets and the disc florets. Among the various reproductive parts, flavonoids are maximal in pollen, where they show a role in combating heat stress, biotic stress against pathogens and pollinators, pollen recognition, pollen hydration and generate signals for the growth of pollen tube towards the ovary.

Keywords: Inflorescence, stigma, pollen, stress, reactive oxygen species

A-41. SURPLUS INCOME BY INTRODUCING RAINWATER HARVESTING IN PROTECTED CULTIVATION

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Abstract

Keeping in mind the socio-economic conditions of farmers, land holdings and natural resources, an experiment was conducted at experimental field of SHUATS, Allahabad during 2016-2017, to study vegetable production in protected conditions in the poly house using drip irrigation system. Polyhouse structure of size 20m x 5m x 3m was selected for cultivation of hybrid Capsicum (var. Tanvi) and tomato variety Rakshita, from March to October. A total of 360 plants were grown in the polyhouse with spacing of 50cm x 50cm. 20,000litre capacity polytank was constructed (5.1m x 5m x 1.5m) in the upper side of polyhouse structure so that sufficient head due to gravity can be available for drip irrigation system. By filter and plastic pipes the harvested rain water from the nearby buildings (effective roof area 120m²) was collected in the poly tanks. For irrigation, drip system (dripper discharge 2.5litres/hr) was installed to this polyhouse. During March to October 74 irrigations were needed. To maintain the uniformity, drip system was operated half an hour a day. It was observed that May–June required maximum of 15 irrigations. Maximum water requirement of crops was recorded 18,750 litres each month in May and June. To grow capsicum and tomato from March to October, total quantity of irrigation water required was 92,500 litres and this quantity of water can be harvested from a single roof area 120m² in the similar rainfall area. From the 100m² polyhouse, the total yield of Capsicum and Tomato was recorded as 1050kg and 1250kg respectively, which gave total returns as ₹45,000(

Capsicum @ ?25 kg and tomato@ ?15 kg). Whereas , total income obtained from the traditional method under open field conditions from the same area (100m²) were only ?2500. By adopting the proposed techniques over the traditional method,the farmers can obtain significantly higher income (18 times higher than traditional method).For irrigation of capsicum and tomato in 100m² area with the same rainfall pattern,the poly-tank of 20,000 litre along with drip irrigation system is sufficient. This technology is being adopted by a large number of farmers who are benefitted with net profit of ?10,000-12,000 per year in off-season through 40-50 m² small size polyhouse with irrigation from the harvested rain water.

Keywords: drip system, polytanks, polyhouse,rain water harvesting

A-42. DEVELOPMENT OF PRODUCTION, POSYHARVEST AND TRANSPORTATION TECHNOLOGIES FOR PROMOTION OF EXPORTING JAPANESE FRESH FRUITS TO EAST ASIA AND SOUTHEAST ASIA COUNTRIES

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Abstract

In order to promote the export of Japanese fresh fruits including peach, grape, strawberry, satsuma mandarin and persimmon, development of production techniques that matches requirements of markets in importing countries and establishment of postharvest and transportation techniques to maintain freshness during long transportation periods and prolonged storage- and shelf-lives are attempted. Collaborative exportation activities by five prefectures with the supports of institutes expertizing the transportation research are also programmed, in which transportations with sea containers and land transportation through Asian highways are conducted in order to reduce the transportation costs compared with air transportation. Transportation environments such as temperature, humidity, vibrations and shocks are monitored during transportation. Factors related to fruit qualities and sensor tests by buyers at importing countries and by specialist from production areas are conducted. This research is supported by the Project of the NARO Bio-oriented Technology Research Advancement Institution (the Special Scheme Project on Regional Developing Strategy).

Keywords:postharvest, fruit, trasnportation, export

A-43. FACTORS AFFECTING FARMERS' ADOPTION OF AGRICULTURE 4.0 TECHNOLOGIES IN VIETNAM

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Abstract

Over the past three decades of agricultural renovation since 1989, Vietnam has made great strides in boosting agricultural development. Its agricultural production value, added values, product volume, and exports have grown significantly. However, the growth model was mainly extensive manner, natural resources intensive-driven; Growth of this sector tends to slowly down due to spontaneous and small-scale production model, weak technological application in agro-forestry-fisheries, the stagnation of expansion of arable lands, scarcity of water resources, advancing environmental degradation, negative impacts of climate change, competition between food crops and bio-energy crops in the use of limited natural resources, rapid urbanization and a declining agricultural labor force. In order to achieve improved and sustainable agricultural production and productivity growth largely depends on the advancement of agricultural research and its effective applications in farmer's fields through the transfer of technology and innovation. In this context, agriculture 4.0 technologies will play a new strategic role for agriculture growth; maintain the quality of the environment and other sustainable development aspects. Drawing conclusions from a survey data, this study analyzes the factors explaining adoption behavior of agriculture 4.0 technologies among farmers in Vietnam based on the Rural Technology Acceptance Model (RUTAM) and binary logistic model. The result of this study will provide the scientific foundation for a set of policy implications.

Keywords: Agriculture 4.0, farmers' adoption, hi-tech agriculture, RUTAM, technology adoption.

A-44. PROTECTIVE CLOTHING FOR PESTICIDE HANDLERS

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Abstract

Agriculture plays a vital role in India's economy. There are numerous problems faced by the workers of agricultural activities, particularly during application of pesticides. Pesticide application is one of the major hazardous farm activity which leads to numerous health problems. Pesticides include insecticides, bird repellent, fungicides, herbicides, rodenticides, miticides and acaricides. Pesticides are linked to various chronic diseases like cancers, infertility, kidney failure, reproductive problems and nervous disorders. To reduce the risk of pesticide poisoning, functional clothing were designed and developed for the pesticide applicators and assessed for suitability, comfortability, functionality and acceptability of developed functional clothing. The designed functional clothing kit for pesticide applicators was found to be highly suitable, comfortable, functional and acceptable by maximum number of respondents as protective clothing does not have any adverse effect on work efficiency.

Keywords: Pesticide application, comfortability, acceptability, protective clothing, water vapour permeability

A-45. SOCIO-ECONOMIC PROFILE OF THE HIGH YIELDING VARIETIES GROWERS IN DISTRICT SULTANPUR U.P., INDIA

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Abstract

The study was conducted in Sultanpur, district of Uttar Pradesh selected purposively. Ours is an agricultural country and the main source of economic condition of country is still farming. Two third population of country depends on agro-based professions. The geographical area of India covers 2.4% of the world but 17.5% of world population lives here. A total number of 120 farmers were selected through proportionate random sampling from one sample villages. The respondents were contacted personally for data collection. The maximum numbers of respondents were found that total 28.68% males and females fall under the age group of 15-30. Nearly 62.50% families are still enjoying joint family system. Mostly 66.66% people of general category and 20.53% people of scheduled category live in the selected village. Most of the farmers (30.14%) are educated up to high school standard. Nearly 60% farmers chief occupation is farming while 40% of them are engaged in agriculture related professions. 30% farmer families of the selected village have arable land less than 1.2 acre. Thus, the number of farmers having less arable land is greater.

Keywords: socio-economic profile, awareness, communication technology

A-46. CONSTRAINTS FACED BY FARMERS ABOUT SCIENTIFIC CROP CULTIVATION OF PIGEON PEA

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Abstract

The study was conducted in Karwi block of Chitrakoot district (UP) selected purposively, because block area has more popular for area and production of pigeon pea as criteria. A total number of hundreds pigeon pea growers were selected through random sampling from five selected villages panchayats on the basis of twenty respondents from each selected

villages panchayats. The structured schedule was developed keeping in the view of objectives and variables under study. The respondents were contacted personally for data collection. Out of 12 common problems the maximum number of the respondents 95% with adopt a rank of first were agreed with the statements that “Plant protection measures” is the common problem, followed by “Low price for produce.” 92% at ranks second, “Lack of knowledge about high yielding varieties” 89% at rank third, “High labour cost” 79% at rank fourth, “Lack of post-harvest management” 78% at rank fifth, “Lack of proper information” 76% at ranks sixth, “High transportation cost” 71% at rank seventh, “High cost of chemical fertilizers” 66% at rank eighth, “Lack of knowledge about pest” 65% at ranks ninth, “High cost of hybrid seeds” 47% at the ranks tenth, “Lack of skilled labour.” 35% at the ranks eleventh, and “Lack of storage facilities.” 30% at the ranks twelfth, respectively.

Keywords: Constraints, knowledge and sampling, awareness, scientific cultivation etc.

A-47. IMPORTANCE OF EXTENSION APPROACHES TO MAKE A SUCCESSFUL EXTENSION PROGRAMME

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Abstract

Growth in the agricultural sector stimulates higher rates of growth in the economy through forward linkage activities such as processing and transportation, and backward linkages like the provision of services to the sector, with further growth spurred as a result of spending incomes earned from all these productive activities. In general, though, problems in extension approaches were due to a combination of a lack of relevant technology, failure by research and extension to understand and involve clientele in problem definition and solving, lack of incentives for extension agents, and weak linkages among extension, research, and farmers. Moreover, extension and research approaches must be tailored for solving the problems of a unique target group effectively. An approach may become the best one if rural producers use and apply the provided knowledge, technology and services and if the standard of living subsequently improves. Agricultural extension approaches being used by extension staffs of the various providers are the T&V, FFSs, participatory and the commodity based. Different programs have diverse goals and thus differing strengths and weaknesses.

Keywords: Extension approaches, linkage, knowledge, technology etc.

A-48. CORRELATION COEFFICIENT BETWEEN DIFFERENT INDEPENDENT VARIABLES AND KNOWLEDGE EXTENT OF GREEN GRAM CROP

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Abstract

This study was conducted in Malwan block of Fatehpur district (U.P.) by conducting personal interview with 100 respondents that were selected through random sampling technique from 5 sample villages on the basis of majority of green gram (summer season) growers. There were the majority of the respondents 67% were found in middle categories (38-52) of age group, like this 96 % literate, 38% general caste, 56% joint family, 49% medium family size (7-10 members), 43% medium farmers land holding size (2-4ha.), 75% agriculture occupation, 70% annual income (83001-220000), 64% mixed house of housing pattern, 57% social participation (participation one organization), 83% medium scores (32-47) of overall material possession, 39% medium level of scientific orientation, 31% low level of economic motivation and 30% medium levels of risk orientation respectively. The overall knowledge index was calculated to be 70.61%. Out of 15 variables studied, the variables

i.e. adoption extent of annual income, social participation and extension contact were found highly significant and positively correlated with knowledge extent.

Keywords: Socio-economic profile, knowledge and adoption, awareness, communication technology etc.

A-49. CONSTRAINT ANALYSIS OF UTILIZATION OF SCIENTIFIC PRACTICES IN CHICKPEA CULTIVATION

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Abstract

This study was conducted in Bahuablock of Fatehpur district (U.P.) selected purposively. A total number of 100 beneficiaries were selected through proportionate sampling five sample villages on the basis of majority of beneficiaries. The structured schedule was developed keeping in view the objectives & variables under study. The respondents were contacted personally for data collection. Thus, it may be concluded that major constraints of the respondents “Lack of the proper guidance for getting the scientific practices in chickpea cultivation” followed by “High cost of chemical fertilizers”, “Lack of Education” “Lack of knowledge about high yielding varieties” and “Lack of proper information” respectively.

Keywords : Chickpea, constraints, utilization, Scientific Practices, etc.

A-50. ECONOMIC ANALYSIS OF FIG (*FICUS CARICA* LINN.) CULTIVATION IN NORTH EASTERN-KARNATAKA, INDIA

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Abstract

The paper presents the costs and returns, economic and financial feasibility of fig cultivation in North Eastern region of Karnataka, India. Data collected from 60 fig cultivators by adopting multistage sampling design were analysed using tabular analysis, economic and financial feasibility measures like Net Present Value (NPV), Internal Rate of Return (IRR), Benefit Cost (BC) ratio and Pay Back Period (PBP). The results revealed that, per acre total establishment cost was 1,23,626.73 of which, 55,607.30 (44.98 %) were variable cost and 68,019.40 (55.02%) were fixed cost. Further, the analysis of investment in fig orchard suggests that, the investment made in fig cultivation in the study area was economically viable with BCR greater than unity (3.01), positive positive (749986.40) and IIR higher than prevailing rate of interest (12.00 %). The payback period was also desirable considering the total economic life of fig orchard. There is higher initial investment in fig orchards, therefore there is a need to provide financial assistance through enhanced scale of finance to the fig cultivators by institutional agencies to enhance the income of the farmers.

Keywords : Financial feasibility, NPV, BCR, PBP, internal rate of return (IRR)

A-51. INTEGRATED FARMING SYSTEM : A HOLISTIC WAY FOR DOUBLING THE FARMERS INCOME

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Abstract

In India, nearly 100 million ha of land is under rainfed cultivation and therefore, rainfed agriculture will continue to play an important role in the Indian economy. Development and adoption of integrated farming system in rainfed areas will help in productivity enhancement, employment, income generation and nutritional security both for human and livestock. The different components of the system have complementarities with waste products of one component becoming source of food and energy for other components. Results on integration of different components with crop depending upon suitability and preferences were found encouraging, and to enhance the productivity, economic returns, generating employment for farm families and maintaining soil health of the farm, the crop + livestock + horticulture combination could be adopted in the rainfed areas of Hyderabad-Karnataka than cultivating the crop alone on the same piece of land under irrigated condition. Maximum income of 25,60,000 was gained in a system where crop+Horticulture+poultry+sheep+piggery + vermicompost components were added as compared to 36000 in crop+livestock model. The employment generated was 626 days against 165 days in alone crop model. Highest cost-benefit ratio of 5.46 was achieved when piggery component was added in IFS. Addition of organic residues in the form of animal and plant wastes could also help in improving the soil-health and thereby productivity over a longer period of time with lesser environmental hazards. The livelihoods of small and marginal farmers could be improved by their adoption of IFS technologies on a larger scale, as they provide scope to employ more labor year-round. Mere integration of all components in a harmonious way will definitely pave a way for doubling the farmers income

Keywords: IFS, doubling income, dry land, rainfed.

A-52. SUSTAINABLE NUTRIENT MANAGEMENT APPROACH FOR MAXIMIZING PRODUCTIVITY AND PROFITABILITY OF MAIZE-CHICKPEA CROPPING SYSTEM IN VERTISOL OF UPPER KRISHNA PROJECT (UKP) COMMAND AREA

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Abstract

Field experiments were conducted during kharif and rabi seasons of 2013-14 and 2014-15 at ARS, Raddewadagi, Kalaburagi district, UAS, Raichur to study the "Sustainable nutrient management approach for maximizing productivity and profitability of maize-chickpea cropping system in Vertisol of Upper Krishna Project (UKP) command area". Application of nutrients through SSNM approach for targeted yield of 8.0 t ha⁻¹ of maize grain and its residual effect on chickpea was registered significantly higher growth, yield attributes, yield, quality parameters and total uptake of nutrients favorably and was on par with application of nutrients through STCR approach for targeted yield of 8.0 t ha⁻¹. Application of nutrients through SSNM approach for targeted yield of 8.0 t ha⁻¹ for maize and its residual effect on chickpea was registered significantly higher grain and seed yield (7.74 t ha⁻¹ and 29.90 q ha⁻¹, respectively) over farmers practice, RDF and STL method. Available N, P₂O₅, K₂O, S, Zn and Fe (301.05, 62.93, 439.38, 22.03 kg ha⁻¹, 0.52 and 2.43 g kg⁻¹, respectively) were noticed significantly higher with 125% SSNM approach for targeted yield of 8.0 t ha⁻¹ and it was on par with 125% SSNM approach for targeted yield of 7.0 t ha⁻¹ or SSNM or STCR approach for targeted yield of 7.0 or 8.0 t ha⁻¹ in maize-chickpea sequence. However, there was no definite trend observed with recovery, agronomic and physiological efficiency of nitrogen, phosphorus and potassium by maize-chickpea sequence. The maximum net gain of N, P₂O₅, and K₂O (60.35, -11.67 & 76.10 kg ha⁻¹ and 33.00, 28.00 & 45.00 kg ha⁻¹, respectively) were noticed with 125% SSNM approach for targeted yield of 8.0 t ha⁻¹ and minimum net loss (-80.20, -27.49 & -42.40 kg ha⁻¹ and 15.00, 10.00 & 15.00 kg ha⁻¹, respectively) over absolute control during two years of cropping, respectively. The higher maize-equivalent yield, sustainability yield index, gross returns, net returns and BC ratio (19,083 kg ha⁻¹, 0.83, 2,53,985 ha⁻¹, 2,04,279 ha⁻¹ and 5.11, respectively) were recorded with SSNM approach for targeted yield

of 8.0 t ha⁻¹ followed by STCR approach for targeted yield of 8.0 t ha⁻¹ (18,751 kg ha⁻¹, 0.80, 2,49,360 ha⁻¹, 1,99,828 ha⁻¹ and 5.03, respectively) as compared to other treatments. The application of nutrients through SSNM approach for targeted yield of 8.0 t ha⁻¹ produced higher grain yield and sustainability yield index (8.62 and 0.80, respectively) as compared other nutrient management approaches. Hence it was concluded that applications of nutrients based on the soil test results in SSNM approaches under field situation is more useful and profitable due to maximizing productivity and profitability as compared to other approaches.

Keywords: Targeted yield, productivity, sustainability yield index, nutrient uptake, soil fertility and economics.

A-53. SALT AND ION ACCUMULATION IN *SESUVIUM PORTULACA STRUM* UNDER SALT STRESS

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Abstract

The objectives of the study were to determine *Sesuvium portulacastrum*'s the adaptability and improvement the salinity of the soil. The results showed that *Sesuvium portulacastrum* was able to regulate its ions to help it grow well under conditions of high salinity by increasing the absorption of K⁺, Ca²⁺ and reducing absorption of Mg²⁺. Under salt stress conditions (NaCl = 200mM), after six months, *Sesuvium portulacastrum* still grows well and reduces 36 percent Cl⁻ and 34 percent Na⁺ in the soil. In the parts of the tree, the leaves are the most likely to accumulate Na⁺, Cl⁻. On this basis, the study proposed using *Sesuvium portulacastrum* to improve the salinity of the soil, produce biological products such as biological salts, animal feeds, and preservatives.

Keywords: Sesuvium portulacastrum, salt stress, ion accumulation, salinity

A-54. COMPOSTING OF SEWAGE SLUDGE WITH A SIMPLE AERATION METHOD AND ITS UTILIZATION AS A SOIL FERTILIZER

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Abstract

The objective of this study was to examine the feasibility of sewage sludge composting using a simple aeration method. Two consecutive composting trials (run A and run B) using Japanese sludge and woodchips (1:1, v/v) were conducted in cubic boxes (0.45×0.45×0.45 m³) made by plywood at Okayama University. Air was forced up through small holes perforated on two open-ended parallel PVC pipes (ø 16mm, 0.25m apart) laid at the base. The results show that compost temperatures were rapidly increased to the peak points of 47.4°C (run A) and 74.8°C (run B) within the first 2-3 days and varied depending on each composting run and vertical locations. The changes in physicochemical properties with particular attention to inorganic nitrogen (NH₄-N, NO₃-N) and free amino acid nitrogen (FAA-N) indicated that the biodegradation took place by different mineralization pathways during the composting process. The degradation of organic matter into amino acids followed by ammonification was predominant in run B, whereas the nitrification was greater in run A. A pot experiment using the two finished composts and their raw materials was carried out to study their effectiveness as fertilizer to *Komatsuna* (*Brassica rapa* var. *perviridis*). The total plant biomass produced by the composts was similar to chemical fertilizer. The lowering proportions of FAA-N/T-N, NH₄-N/NO₃-N, and C/N ratios in the composts compared to those in raw materials was found to correlate with the increase in plant biomass.

Keywords: Amino acid; biodegradation; composting; nitrogen; sewage sludge

A-55. EXTRACTION OF LEAD : AN ENVIRONMENTAL APPROACH FOR SOIL HEALTH IMPROVEMENT

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Abstract

Phytoextraction involves specific plant species which can absorb and hyperaccumulate metal contaminants and/or excess nutrients in harvestable root and shoot tissue, from the growth substrate(soil).The objective of present investigation is to examine the accumulation potential of lead in marigold. The experiment was carried out with two varieties of marigold i.e. Pusa narangi and Ritu raj. The seeds of marigold of two varieties were presoaked in distilled water and were sown in the field without any treatment as control. After 20 days, the plantlets of marigold of both varieties were transplanted into the pots, supplied with different doses of Pb (50,100 and 200 mg/kg of soil) at 10,15,25 and 30 days. The growth parameters were recorded at 25 and 45 days. The result of the present investigation clearly indicate that different concentration of Pb(50,100 and 200 mg/kg of soil) did not adversely affect the growth parameters of marigold in both varieties in terms of plant height, fresh and dry weight, chlorophyll, Carotenoid, carbohydrate, nitrogen and protein contents but some insignificant reduction were noticed in these parameters as compared to control, proline content insignificantly increased under the influence of different concentration of Pb at 25 days. At 45 days too, a insignificant reduction was noticed in these parameters and also the proline content was insignificantly increased as compared to 25 days old plants. The accumulation of Pb was found to be more in shoot than in the root. We have noticed that among both the varieties, Pusa narangi was found to be more resistant to metal toxicity and the accumulation potential of Pb was found to be more than in variety Ritu raj. So the marigold can be considered as a potential economic crop for phytoremediation of Pb contaminated sites.

Keywords: Marigold; Phytoextraction; Lead; Accumulation.

A-56. STCR DOSE OF SOLUBLE FERTILIZERS ENHANCES THE NUTRIENT UPTAKE, YIELD AND SOIL PROPERTIES IN HYBRID MAIZE

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Abstract

A field experiment was conducted during Kharif 2014 at Zonal Agricultural Research Station, University of Agricultural Sciences, Bengaluru to study the influence of different approaches and different forms of fertilizers on nutrient uptake, yield and soil properties in hybrid maize. The experiment was laid out in randomized block design comprising of ten treatments replicated thrice. The results revealed that Significantly higher total uptake of macro, secondary and micronutrients by maize crop was recorded in 100 per cent soil test crop response (STCR) dose applied through soluble fertilizer (SF) with three splits and three sprays. Similarly, higher grain(98.22 q ha⁻¹) and stover (130.96 q ha⁻¹) yield was recorded in 100 per cent STCR dose applied through SF at three splits and three sprays of 19: 19: 19 @ 1% concentration compared to recommended dose of fertilizer (RDF) through conventional fertilizer (CF). Similar results were recorded higher in post-harvest nutrient status of soil for macro, secondary and micronutrients. The present study evidently concluded that soluble fertilizer application based on STCR targeted yield approach with three splits at basal, 30 and 50 DAS along with three sprays of 19:19:19 at 20, 40 and 60 DAS was helpful for getting higher nutrient uptake and higher post-harvest nutrient status of soil by maize crop, This increased higher nutrient uptake and higher post-harvest nutrient status of soil might be due to its easy solubility and uniform distribution of nutrients in root zone leading to availability of sufficient available nutrients for uptake by the crop through soluble fertilizers. Split application of soluble fertilizers for three times along with three sprays of 19:19:19 at three stages helps in better translocation and uptake of these nutrients without fixation or any leaching losses.

Keywords: STCR, RDF, soluble fertilizers, normal fertilizers.

A-57. INITIAL STUDY ON ARTIFICIAL INSEMINATION FOR LOCAL BUFFALOES WITH FROZEN SEMEN OF MURRAH BUFFALO IN TAY NINH PROVINCE

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Abstract

The aims of this study were to evaluate the efficiency of artificial insemination (AI) for local buffaloes by which natural or hormonal induced estrus with the imported frozen semen of Murrah buffalo from India. A total of 35 buffalo cows with natural estrus were inseminated, the conception rate at the first AI was 31.4% and after two times AI was 44.4%. Induced estrus by hormonal treatment was conducted in 63 cows by two therapies. The first one was treatment of CIDR for 7 days combined with one dose of PGF2 at the time of removal CIDR, one dose of GnRH were injected at the day of CIDR insertion (D0) and the second dose at 48 h after CIDR removal, then fixed time AI was applied at 15 h post the second GnRH treatment. The later one was a treatment of PGP2a at 11 days apart, one dose of GnRH was injected at the day of the first PGF2a injection (D0) and the second dose at 48 h after the second time PGF2 treatment. The time for AI was the same as the first therapy. The conception rate at the first time AI of therapy I and II were 26.6 and 24%, respectively, and total conception rate after two times AI were 42.2 and 40.0%, respectively. Taken together we concluded that the conception rate was still low, more studies are required to improve the conception rate.

Keywords: Buffaloes, fixed time artificial insemination, fertility, conception rate

A-58. EFFECTS OF ENZYME TREATED SOYBEAN MEAL ON PERFORMANCE AND GUT MORPHOLOGY OF COLOR FEATHER CHICKENS

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Abstract

A trial was conducted at experimental farm of Nong Lam University, Hochiminh City, Vietnam; to evaluate the effects of enzyme treated soybean meal (HPA) in diets of color feather chickens on growth performance and gut development. Five hundred one day old color feather chicks were randomly assigned into one of the five diets: the control diets (CON) contained without fish meal either HPA; the HPA2.5, HPA5, HPA7.5 diets contained 2.5%, 5.0% and 7.5% of HPA, respectively and without fish meal; the FM5 diet contained 5% fish meal and without HPA. Each treatment included 10 replicates and each replicate (cage) contained 10 chickens. The average live weight at the end of the trial for CON, HPA2.5, HPA5, HPA7.5 and FM5 were 1667, 1655, 1730, 1686 and 1641 g/bird, respectively. The mean daily feed intake for the CON, HPA2.5, HPA5, HPA7.5 and FM5 were 62.1, 60.0, 61.4, 60.2 and 60.2 g/bird/day, respectively, with average feed conversion ratios of 2.29, 2.23, 2.18, 2.19 and 2.27 kg of feed per kg of gain, respectively. However, no significant differences were seen for live weight, FI, FCR among treatments. The highest of intestinal villus height (1345.2 and 1975.5 μ m) of color chickens was seen in HPA5 treatment in both periods. There were not significant differences in villus height and crypt depth among treatments in both periods. However, significant differences were seen for the ratios of the intestinal villus height/crypt depth between treatments in both periods.

Keywords: Color feather chickens, enzyme treated soybean meal, performance, gut morphology.

A-59. COMBINING MODERN TECHNOLOGIES TO REVOLUTIONIZE THE DAIRY INDUSTRY

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Abstract

Technology is revolutionizing the dairy industry, resulting in radical outcomes in genetics, real-time cow comfort, animal health and milk quality monitoring, reducing labour requirement and automating milking and cow management. We can now take a DNA sample from a calf and predict its lifetime production, health and breeding potential. Real-time monitoring of milk, animal images and weight at milking time now gives us information on cow condition, stage of the oestrous cycle, early lameness and mastitis conditions, milk quality and milk components. Real-time internal and external sensors now also allow us to record body temperature, rumination, time standing/lying, health, and oestrous detection and monitor cow comfort. Robotic milkers milk cows without the need for people involvement, and computer system allow all the information to be collated in real-time, and monitored remotely, at the individual cow and herd level.

Keywords: Dairy, real-time monitoring, cow comfort, cow health, milk components

A-60. EFFECTS OF DIETARY SUPPLEMENTATION OF α -MANNANASE ON PERFORMANCE AND EGG QUALITY IN LAYING HENS

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Abstract

The objective of the experiment was to evaluate effects of dietary supplementation of α -mannanase (Hemicell®) on productive performance and egg quality in laying hens from 20 to 35 weeks of age. A total of 375 Isa Brown hens (1615.9 ± 76.2 g/bird) were randomly assigned to 5 treatments in a completely randomized design. The 5 dietary treatments were (1) basal diet with a high energy level of 2800 kcal ME/kg of feed and no α -mannanase supplementation (HE, Control), (2) HE + 32 units of α -mannanase/g of feed (3) HE + 64 units of α -mannanase/g of feed, (4) a basal diet with a low energy level of 2700 kcal ME/kg of feed (LE) + 32 units of α -mannanase/g of feed, and (5) LE + 64 units of α -mannanase/g of feed. Each treatment was replicated with 25 cages of 3 hens each. Addition of α -mannanase to the HE diets did not affect the egg production of birds compared with that of birds fed the control ($P > 0.05$). The egg production of birds fed LE diets supplemented with α -mannanase did not differ from that of birds fed the control and birds fed HE diets supplemented with α -mannanase. Differences in egg weight, daily feed intake, feed conversion ratio, egg quality and survival rate were not significant among the treatments ($P > 0.05$). Generally, the addition of α -mannanase to LE diets did not reduce the reproductive performance and egg quality of layers as compared with the control.

Keywords: α -mannanase, egg quality, Isa Brown, laying hens, performance.

A-61. EFFECT OF SACCHAROMYCES CEREVISIAE ON IMPACT OF AFLATOXIN ON DUCK LIVER AND KIDNEY

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Abstract

Sacharomyces cerevisiae isolates was obtained from baker's yeast, soil, fruit and identified with PCR. Twenty seven isolates of S. cerevisiae were screened for capacity of inhibition of aflatoxin producing Aspergillus flavus on coconut extract agar

media (CEA). The results showed that the method co-culture of *S. cerevisiae* isolates and aflatoxin producing *Aspergillus flavus* on CEA medium could be used for screening the strains having the antagonism ability with aflatoxin producing *A. flavus*. Testing in vivo with the ducks at one day of age by feeding contaminated feed with 300 ppb aflatoxin mixed with 108 cells of *S. cerevisiae*/kg demonstrated a reduction significative of impact of aflatoxin on the duck liver and kidneys.

Keywords: *Saccharomyces cerevisiae*, aflatoxin, inhibition

A-62. EXPLORING FARMERS KNOWLEDGE ON LIVESTOCK'S CONSTRAINTS PRIORITIZATION, ANIMAL DISEASES RANKING AND DIFFERENTIAL DIAGNOSTIC USING PARTICIPATORY APPROACH

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Abstract

A participatory epidemiological (PE) study was conducted with 53 groups of dairy, beef and pig farmers in 8 districts of Long An and TayNinh province, Vietnam. Participatory tools such as semi structure interview, pair wise ranking, disease symptoms matrix scoring (DSMS) and disease impact matrix scoring (DIMS) were used to evaluate livestock's concerns, diseases's severity, disease's impact and farmers' competence in differential diagnosis. Animal diseases were perceived as the most important constraint in animal production. Participants from dairy cattle farms considered FMD, hemorrhagic septicemia (HS), mastitis, inflammation of hooves, blood parasites and digestive diseases as the six most important diseases, in decreasing order of importance. For beef cattle farmers, the four most important mentioned diseases were HS, FMD, ruminant tympani and diarrhea. For pig farmers Porcine Reproductive and Respiratory Syndrome, infection with *Escherichia coli*, Salmonellosis, FMD and pneumonia were the five most important diseases. The perceived importance of diseases was different for each farm type and differed from government veterinarians, responses. Throughout DSMS, farmers showed their abilities in differential diagnosis of important diseases based on their clinical symptoms and recognized several clinical signs related to diseases with high agreement between groups. DIMS highlighted the perceived weight attributed to different effects of diseases on farmer's welfare. Capital loss and profit loss were the highest impacts for all farm types. Local knowledge of disease is substantial and might have a positive effect on the control of the different diseases present in farmers' herds.

Keywords: *participatory epidemiology, farmers knowledge, foot-and-mouth disease, Vietnam*

A-63. HEAVY METAL INDUCES ALTERATION IN THE LIVER CHOLESTEROL LEVEL OF ALBINO RAT (*RATTUS NORVEGICUS*)

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Abstract

The experiment portrayed the effect of the lead and zinc on the liver cholesterol of albino rat (*Rattus norvegicus*). Rats were divided into four groups of 10 rats each. Group A were fed with natural diet. Group B were fed with lead acetate, group C were fed with zinc acetate and group D were fed with lead acetate + zinc acetate in the ratio of 1:4 combination up to 60 days. The data indicated a declined pattern of liver cholesterol in lead (Pb) exposed rats while a highly trend was noticed in the zinc (Zn) treated rats. The present study demonstrates declined level of cholesterol in the liver of rats treated with lead and zinc. This

may be attributed to the ability of lead to alter the cellular structure while zinc reduces the concentration of cholesterol. Zinc could have direct effect on the liver cholesterol biosynthesis.

Keywords: Heavy metal, liver, cholesterol, albino rat.

A-64. EFFECTS OF FEEDING TIME AFTER PLACEMENT AND SEX ON GROWTH PERFORMANCE AND FLOCK UNIFORMITY OF LUONG PHUONG BROILERS

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Abstract

The objective of the experiment was to evaluate effects of feeding time after placement and sex on growth performance and flock uniformity of Luong Phuong broilers from 1 to 56 days of age. A total of 480 day-old broiler chicks of Luong Phuong breed (39.60 ± 1.68 g/bird) were randomly assigned to 6 treatments in a 2 x 3 factorial arrangement (Sex: male and female; Feeding time after placement: 0, 4 and 8 hrs) in a completely randomized design. Each treatment was replicated with 8 cages of 10 birds each. The birds were housed in cages with wire spaced at 1 cm apart in an open-sided house. Each cage measured 80 cm length x 70 cm width x 40 cm height. The birds were fed in a 3-phase feeding program: phase 1 (1-21 d old), phase 2 (22-42 d old) and phase 3 (43-56 d old). Diets were in powder form and contained no antibiotics. The experimental results showed that male birds had a greater average body weight than female birds at 28 and 56 days of age ($P < 0.05$). At 56 days of age, the average body weight of male birds (1506.2 g/bird) was greater ($P < 0.001$) than that of female birds (1285.1 g/bird). Male birds consumed more feed and had greater average daily gain than female birds during 1-28, 29-56 and 1-56 days of age ($P < 0.01$). Feeding time and interaction of feeding time x sex did not affect the average body weight, average daily feed intake, average daily gain and feed conversion ratio of birds during 1-28, 29-56 and 1-56 days of age ($P > 0.05$). Similarly, there were no main or interaction effects on flock uniformity and survival rate of birds ($P > 0.05$). Briefly, delayed feeding up to 8 hrs after placement does not affect the growth performance of broilers. In addition, if sex-split feeding is applied, diets for male and female birds should be reformulated to meet their respective nutritional requirements for optimal performance as male birds grow much faster than female birds.

Keywords: feeding time, flock uniformity, growth performance, Luong Phuong breed, sex

A-65. IDENTIFICATION OF IGF-1 GENE POLYMORPHISM IN CROSSBRED DAIRY CATTLE IN HO CHI MINH CITY

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Abstract

Insulin-like growth factor I (IGF-I) have been showed to play an important role in milk and reproductive traits in dairy cows. The aim of this study was to identify the polymorphism of IGF-1 gene by PCR-RFLP. A total of 60 crossbred dairy cows were genotype for SnaBI restriction site. The result indicated that the allele frequencies for A and B were 0.567 and 0.433. Three genotypes were observed and the genotype frequencies were 0.23; 0.67; 0.10 for AA; AB and BB, respectively. Additionally, the PIC (Polymorphic Information Content) and He (Expected heterozygosity) value were 0.371 and 0.419, respectively. In order to understand the effect of IGF-1 gene polymorphism on milk and reproductive of crossbred dairy cows, further study is required.

Keywords: Crossbred dairy cows, IGF-1, PCR-RFLP, PIC, He.

A-66. MINIMUM INHIBITORY CONCENTRATION (MIC) DETERMINATION OF FIVE CRUDE HERBAL EXTRACTS AGAINST *ESCHERICHIA COLI*, *SALMONELLA TYPHIMURIUM* AND *STAPHYLOCOCCUS AUREUS*

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Abstract

The objective of the study was to determine the minimum inhibitory concentration (MIC) of crude extract of *Camellia sinensis* (tea), *Psidium guajava* (guava), *Eclipta prostrata* L. (false daisy), *Pseuderanthemum palatiferum* and *Azadirachta indica* (neem) against *E. coli*, *S. typhimurium* and *S. aureus*. 250g of the material was mixed with 750 ml of distilled water, steam-boiled in 3 hours, filtered and concentrated by using rotary evaporator at 90°C. Crude extracts were kept in the sterile bottle at 2- 4°C. Colistin, amoxicillin and enrofloxacin were used as control antibiotic. The range of crude extract tested were from 16mg/ml to 0.0156 mg/ml. All assays were performed in triplicates as the instruction of CLSI. The results showed that MIC (mg/ml) of *Camellia sinensis* against *E. coli* ATCC 25923, *S. Typhimurium* and *S. aureus* ATCC 25923 were 8-16; 8-16 and 0.5, respectively. The figures for *Psidium guajava* were 16; 16 and 0.125-0.25, respectively. MIC (mg/ml) of *Eclipta prostrata* L. against *E. coli*, *S. Typhimurium* and *S. aureus* were 16; 16 and 1-2, respectively. The figures for *Pseuderanthemum palatiferum* were 8, 4-8 and 2-4, respectively. The antibacterial property of the crude extracts was equal to MIC (mcg/ml) of colistin, amoxicillin, enrofloxacin against *E. coli* at 0.16; 2.5 and 0.01, against *S. Typhimurium* at 0.16; 1.25 and 0.01 and against *S. aureus* at 0.04, 5 and 0.31. *Azadirachta indica* did not show antibacterial characteristic at the concentration of 16mg/ml. The data indicated that the crude aqueous extract of four plants were effective against bacteria tested.

Keywords: herbal extract, MIC, E. coli, S. Typhimurium

A-67. DIAGNOSIS AND TREATMENT OF ENDO-ECTOPARASITES IN DOGS AND CATS AT VETERINARY HOSPITAL NONG LAM UNIVERSITY

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Abstract

Parasitic diseases of companion animals comprised rapidly spreading illnesses that were caused by a wide range of internal parasites, external parasites and protozoa. The study was conducted to determine the diagnosis and treatment of endo-ectoparasites in dogs and cats at Veterinary Hospital, Nong Lam University from June to November 2017. There were sixty samples, which included thirty samples from dogs and thirty samples from cats, all of them have been undergone general examination, blood test, fecal and ectoparasitic examination. 80% (24/30) in dogs and 70% (21/30) in cats were found to harbor one or more parasite species. Blood samples were tested by SNAP with 46.67% (14/30) were positive for the presence of parasitic forms in dogs. In this study the difference prevalence of endo-ectoparasites was analyzed in relation to age, sex and neuter. The total prevalence in pet dogs was 40.0% (12/30) positive with internal parasites that could be detected via the flotation, sedimentation and Baermann-Wetzel methods. *Ancylostoma* spp. 30.0% in dogs and 50% in cats was the most prevalent parasites encountered as compared to the other types of internal parasites. Besides that, the results showed the high incidence of the external parasites was 76.7% (23/30) in dogs and in cats 26.7% (8/30). After two weeks of treatment, rechecking within positive animals about fecal samples and external parasites for the efficacy and the positive percentage decreased sharply from 80% to 23.3% in dogs and 70% to 26.7% in cats.

Keywords : Endo-ectoparasites, internal and external parasites, prevalence of parasites, effective treatment.

A-68. DIAGNOSIS OF MAREK'S DISEASE AT VETERINARY HOSPITAL IN NONG LAM UNIVERSITY

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Abstract

Poultry production is critical to the economy and food security of many developing countries. However, the spread of poultry diseases is a serious and continuing threat. One of the most important chicken diseases is Marek's disease. Marek's disease virus is known as agent causes lymphomatous and immunosuppressed in chickens that affect seriously chicken health and lose a huge economic for chicken producers. Thus, the case study was conducted to support in diagnosis of Marek's disease based on specific pathology and laboratory test. The study was performed at Veterinary Hospital of Nong Lam University in Ho Chi Minh City for three months from 1/8/2017 to 1/11/2017. Total 39 cases were necropsied and recorded in detail to complete a survey including 13 suspected diseases based on farm history, morbidity, mortality, clinical signs and epidemiological condition associated with gross lesions. Whilst, 6 cases were suspected Marek's disease and one of them was a typical Marek's disease case in broilers flock over 3 months old with 40% of morbidity but low mortality. The gross lesions showed that visceral lymphomas in multiple organs were observed. The samples from these chickens were taken in order to conduct laboratory test as PCR and histopathology for determining the pathogen agent. This case was confirmed Marek disease by these laboratory tests.

Keywords: Chicken, Marek disease, laboratory test

A-69. OVERVIEW OF INFECTIOUS DISEASES OF LIVESTOCK IN VIETNAM FROM 2012-2017

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Abstract

This report gives a snapshot of infectious diseases in animals (pigs, poultry, cattle) in Vietnam from 2012-2017 to provide information on current prevalent diseases for animal health workers. Information for this was collected from different sources. Firstly, a systematic review was performed on all papers in the national veterinary journal. Results from these papers were categorized and summarized to understand the most concern and prevalence of some pathogens. Then, annual reports from national department of animal health were also used to summarize by years. The outputs of this report reveal important diseases in animals, prevalence during the mentioned period of time. With this information, the animal health worker can find useful to have better disease prevention strategies.

Keywords: livestock, infectious diseases, Vietnam

A-70. EVALUATION OF THERAPEUTIC REGIMEN FOR MANAGEMENT OF EXOCRINE PANCREATIC INSUFFICIENCY IN DOGS

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Abstract

A total of fifteen dogs initially tested positive on faecal and haematological examination for exocrine pancreatic insufficiency in primary screening were divided into three groups, namely G1, G2 and G3 comprising of 5 animals in each group irrespective of their sex, breed and age. Another group i.e., G0 comprising of 5 apparently healthy dogs served as negative control during the study period. The dogs in-group G1 were treated with tablet Sorbezyme, G2 group of dogs were treated with Pancreatin whereas dogs in group G3 were treated with Chymerol Fort. The drugs were given @ 1 tab per 20 kg body weight.

In addition to the specific drugs, common ancillary and supportive treatment was also given including administration of fluids, antibacterial, H2 receptor antagonists, fat-soluble vitamins and dietary modifications (low fat diet). Serum lipase and canine pancreatic lipase (cPL) were also estimated on 0th, 15th, 30th and 45th day of the study period. A significant decrease in the serum lipase and canine pancreatic lipase was observed in all the three groups in comparison with the healthy group. However, maximum decrease in the serum lipase and canine pancreatic lipase was observed in group treated with 1, 00,000 armour units of enzyme activity supplied by a purified concentration which has a specific trypsin and chymotrypsin activity in the ratio of approximately six to one showed better results followed by 15,000 units of USP amylase activity, 4,000 USP of lipase activity and 15,000 USP units of protease activity.

Keywords: exocrine pancreatic insufficiency, pancreatin, sorbezyme, chymerol forte, serum lipase.

A-71. FACTORS AFFECTING BETACYANIN STABILITY IN JUICE OF LD5 RED-FLESHED DRAGON FRUIT (*HYLOCEREUSPOLYRHIZUS*)

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Abstract

In Binh Thuan province (Vietnam), the red-fleshed dragon fruit (*Hylocereuspolyrhizus*), concretely LD5 variety majorly grows and contains a large amount of betacyanin, a natural colorant that potentially applied to many products in the food industry. In this study, the processing factors possibly influencing the betacyanin stability in the red-fleshed dragon fruit juice were in turn investigated. The heating treatment included 2 factors: temperature (65, 75 and 85°C) and heating time (10, 20 and 30 minutes); while the pH values ranged between 3.0 to 7.0 and the ascorbic acid addition varied in concentrations (0.1, 0.2, 0.3, 0.4 and 0.5% w/w). The processed fruit juice was stored in different packaging materials (plastic and glass) with and without light exposure for 5 weeks to monitor the retained betacyanin. The results showed that the betacyanin was remained with the highest proportion at 0.3% ascorbic acid addition, pH 4.0 and heat treatment at 65°C for 10 minutes. In storage without light exposure, both plastic and glass packaging materials kept efficiently betacyanin in fruit juice. However, the glass material represented better efficiency in the betacyanin remaining than the plastic material did.

Keywords: betacyanin, BinhThuan dragon fruit, LD5 variety, fruit juice, colorant stability

A-72. OPTIONS FOR PROCESSING AND UTILIZATION OF PROCESSED FOOD PRODUCTS FROM SHEEP IN NINH THUAN PROVINCE, VIET NAM

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Abstract

In NinhThuan Province, Viet Nam, sheep is currently raised for leather and meat purposes. The red meat is mainly used at household level and its by-products are discarded. It is desirable to develop several processed food products from the red meat and the by-products could be processed into high value products. This research determined weight distribution of slaughtered sheep and its chemical composition. The results indicated that the highest weight of sheep carcass was red meat (36%), the weight of by-products (40%) including bone, head, blood, viscera and organs, which are often discarded or underutilized, was relatively high. Protein content of the blood, the meat, stomach and liver was found to be high, approximately 23, 18, 17 and 14%, respectively. This research also reports two production processes of different processed products (smoked and dried sheep meats). A potential processing scheme for by-products is proposed to helpfacilitate greater use of sheep. Therefore, identifying means of utilizing of these components is necessary to reduce the environmental problem of waste and to enhance the economic value of the sheep.

Keywords : sheep, by-products, smoked meat, dried meat

A-73. CHEMICAL COMPOSITION AND FACTORS AFFECTING THE FERMENTATION OF ELAEOCARPUSHYGROPHILUSKURZ

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Abstract

Lactic fermentation plays an important role in the production of many fermented meat and vegetables. The current study was conducted to investigate the conditions that influenced the lactic acid fermentation of *ElaeocarpushygrophilusKurz*, a type of popular traditional fermented vegetables in Vietnam, especially in the Mekong Delta region. The purpose of the study was to determine the quality of fermented products and to analyze factors affecting the quality of the fermented products as well: raw material pre-treatment, and salt and sugar concentration of the fermenting solutions. In addition, the chemical compositions of *ElaeocarpushygrophilusKurz* fruit were also analyzed. The chemical compositions of the fruit were 41.8% acid, 0.2% fat, 0.87% polyphenol and 0.72% protein. The changes of lactic acid content (%), LAB populations (CFU/ml), and pH of fermented solution after 5, 10, 15, and 20 fermentation days, and color and texture of the fermented products were observed. The lactic acid content ranged from 0.67-1.23%, and was 0.85% after 20 days of fermentation. pH of fermented solution was reduced from 2.96 to 2.53, while LAB populations were in the range of 105-2.106 CFU/ml. The sensory quality was found to be most acceptable under the fermentation condition at $28 \pm 2^\circ\text{C}$ for ten days in solution containing salt 7% and sugar 3%. The research originally enables an extensive application of *ElaeocarpushygrophilusKurz* fruits after harvesting in small and medium-scale production.

Keywords: *lacticfermentation, fermentation condition, ElaeocarpushygrophilusKurz, and chemical compositions*

A-74. A STUDY ON PROCESSING CONDITIONS OF FERMENTED ACEROLA JUICE

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Abstract

This study aimed to determine the key processing steps of fermented acerola juice, including acerola variety, maturity, enzyme addition, sugar concentration and fermentation conditions. One and two-factor experiments were randomly designed to determine the most suitable processing variables based on the investigated parameters, including the content of vitamin C, sensory quality and physicochemical properties of the resultant juice. A storage study of the fermented juice was also investigated for up to six months. For selection of acerola variety, physicochemical properties (Brix, titrated acidity, pH, Brix and vitamin C) and sensory quality of the three different varieties, namely sweet (*Malpighia punicifolia* L.), sour (*Malpighia glabra* L.) and Brazil (*Malpighia emarginata* D.C) acerola fruits, were examined. The results indicated that the highest content of vitamin C in Brazil variety (1567.9 mg/100g) was found, followed by sour (882.9 mg/100g) and sweet (630.4 mg/100g) ones. However, according to sensory evaluation results, the fermented acerola had the highest overall score, indicating to be suitable for processing. The different maturity stages of this variety were also determined and confirmed that high sensory score and high content of vitamin C in the fermented juice were obtained at 100% maturity. Furthermore, different pectinase additions of 0.05, 0.1 and 0.15% (w/w) were investigated to enhance clarity of the juice. The most suitable enzyme addition of 0.15% was found to be effective. Afterward, the sugar concentrations (20, 22, 24%, w/w) and additions of *Saccharomyces cerevisia* (0.1, 0.15 and 0.2%, w/w) of the initial juice before fermentation were also studied. The two-factor experiments at fermentation temperatures (15 and 20°C) and times (24, 48 and 72 hours) were carried out. The results showed that the good quality of the resultant juice fermented at 15°C for 48 hours was achieved when the sugar concentration of 22% and *Saccharomyces cerevisia* addition of 0.1% were used. Finally, the good quality of the fermented juice product, in terms of physicochemical, sensory and microbiological properties, was still maintained for up to 6 months.

Keywords: *Acerola juice, vitamin C, Pectinase, Saccharomyces cerevisia*

A-75. CHANGES IN THE QUALITY OF POSTHARVEST ‘SANH’ ORANGE FRUIT (*CITRUS NOBILIS* VAR. TYPICA) USING DIFFERENT TYPES OF COATING MATERIALS DURING STORAGE

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Abstract

Postharvest orange fruit coating is an effective method to replace natural waxes which lost during washing and handling. The coatings can reduce water loss and impart gloss to the fruit. In this study, the oranges were stored at room temperature ($30\pm 2^{\circ}\text{C}$) with five coating materials: PE bags, PP bags, PVC film, preservatives Citra Shine and 1% chitosan and the control were used. Some typically nutritional value and weight loss were determined during storage time. Research results show that PVC coated ‘Sanh’ oranges could be prolonged their shelf life up to 25 days with low damage ratios (7.10%, lower than other bags) which were good appearance in green peel color. Acid ascorbic content was maintained at a high level (12.32 mg/100 g) and relatively low weight loss (13.91%). Moreover, pH value (3.77) and Brix (9.70) were not change significantly during storage time.

Keywords: Coating, quality, ‘Sanh’ orange, storage, time

A-76. PROCESSING OF DEHYDRATED MANGO (*MANGIFERA INDICA* L.) APPLYING OSMO-DEHYDRATION AND SOLAR DRYING

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Abstract

Processing of dried mango product is to diversify food products and improve value added for mango. Utilizing solar energy with simple device to dry the material will help to save production costs, however, be difficult to control product quality. In this research, mango (*Mangifera indica* L.) was combinedly dried by a simple solar energy collector and hot air dryer. Product quality was optimized through the control of fresh material, immersion time and addition amount of 55% HFCS to soaking solution, solar drying time, and drying temperature in hot air dryer. Results showed that the ripening of mango was suitable for processing when the skin color values with $L^* \sim 69.99$, $a^* \sim 2.98$, $b^* \sim 49.04$, acid content was $\sim 0.8\%$ and total soluble solid of $\sim 12.23\%$. Soaking time in 18 hours with addition of 10% HFCS 55% gave the product good sensory value. To reach final moisture content of $17 \pm 1\%$, after 5 hours of sun drying, mango slices was continuously dried with hot air of 60°C .

Keywords: mango, dehydrated, solar drying, hot air drying.

A-77. ISOLATION AND SELECTION OF YEAST STRAIN FOR FERMENTATION OF JUICE FROM RED-FLESH DRAGON FRUIT (*HYLOCEREUS POLYRHIZUS*)

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Abstract

The research was carried out with the aim to find out the yeast strain optimum for fermentation of red dragon fruit juice with its specific flavor. Based on colony and cell morphologies, 20 yeast strains were isolated identified from red-flesh dragon fruit (*Hylocereus polyrhizus*) juice. Based on the behaviors of yeast growth, change of total soluble solid, pH and sensorial values of fermented dragon fruit juice, 2 strains including *Saccharomyces cerevisiae* CBS1644 and *Pichia kudriazevii* CBS5590 were found optimum for the fermentation. The results showed that the combination between *Saccharomyces cerevisiae* CBS1644 and *Pichia kudriazevii* CBS5590 at ratio of 4:6 (v/v) with density of 10^7 cfu/ml for each strain, when being added with an amount of 5% (v/v) into juice, gave the drink a tasty flavor. In addition, the isolates possessed the same alcoholic fermentative activity as the commercial yeast RV100.

Keywords: red flesh dragon fruit, yeast strain, fermentation, isolation.

A-78. INVESTIGATION OF PRODUCING POWDER FROM RED DRAGON FRUIT JUICE BY SPRAY-DRYING

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Abstract

Dragon fruit is a popular fruit in the subtropical and tropical regions. Beside nutritional values, red dragon fruit has beautiful color due to the presence of betacyanin pigment. However, betacyanin is easily to be affected by many factors such as temperature, pH, light and oxygen. Deterioration of betacyanin is accelerated with the presence of water. Spray drying is a method produces powder from a liquid or slurry quickly. Applying this method for the production of instant red dragon fruit powder, not only betacyanin in powder can be preserved for a long time, but also a convenient and nutritional product is created for consumers. The main objective of this study was to investigate the effect of spray drying treatments applying maltodextrin concentration of 15, 20 and 25% and inlet temperature of 140, 150 and 160°C to the physicochemical properties of the powder such as moisture content, betacyanin retention, color, the solubility of process yield of powder. In addition, the effect of acid concentration in the feed, the ratio between the powder and water, between the powder and sugar on sensory values of the product served as an instant drink were also investigated. At 20% maltodextrin and 150°C inlet temperature, the powder obtained higher process yield, betacyanin retention, lower moisture content and L* value. The use of PE-aluminium packaging for storage the powder in one month showed that moisture content of the powder was insignificantly different.

Keywords: red dragon fruit powder, spray drying, maltodextrin.

A-79. INVESTIGATION OF PRODUCING FERMENTED DRINK FROM THE MUCILAGE JUICE OF COCOA (*THEOBROMA CACAO* L.) BEANS PROCESSING

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Abstract

Cocoa mucilage, a by-product from cocoa beans processing, is a nutrient-rich environment in sugars, organic acids, proteins, amino acids, vitamins and minerals, for microorganisms to grow. This study aimed to investigate the processing of fermented drink from cocoa pulp juice, including determination of chemical composition and pre-treatments of cocoa juice, isolation and comparison of fermentative efficiency between the yeast isolated from cocoa juice and commercial yeast products, and studied the optimal fermentation method between free cell fermentation and yeast immobilization. Results showed that the pre-treatments of pectin-hydrolysis and pasteurization at 75°C for 10 minutes gave the juice high purity and colorless. *Pichia kudriavzevii* CBS5590 isolated from the mucilage fermented at cell density of 106 cfu/ml, juice total soluble solid of 18 oBrix for 60 hours gave a good color and tasty product containing alcohol of 2.9% (v/v). This yeast when immobilized in sodium alginate gel prepared at density of 107 cfu/ml gave a product with 3.1% alcohol (v/v) after fermentation at room temperature for 58 hours.

Keywords: mucilage, fermented drink, pulp juice, pre-treatment, free cells, immobilized cells.

A-80. FACTORS AFFECTED ON THE DISCOLORATION OF DEEP FRIED EGGPLANT

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Abstract

Eggplant is an ordinary kind of vegetable but it could make several benefits in terms of the economy such as high productivity, short-time planting periods, making delicious dishes, etc. Additionally, eggplant also has been proved to nutritionally affect on preventing and treating some diseases. Eggplant normally is consumed in fresh ones or cooked and served at home and

restaurant; while the processed eggplant (e.i. canned, frozen, deep-fried ones) that could add value for it has been not popular. This study was carried out on deep-fried eggplant to examine the factors that caused the discoloration in storage. The treating conditions with CaCl₂, including concentrations (0, 1, 2, 3 and 4%) and soaking time (0, 5, 10, 15 and 20 minutes) were investigated in turn; the colour (L*, a* and b* values) after 48-hour cooled storage period were the indices of assessment. The results showed that the eggplant dipped into CaCl₂ solution 2% for 5 minutes had the smallest changes in L*, a* and b* values, which indicated for the lowest discoloration as compared to other treatments. Similarly, the deep-frying conditions, including temperatures (140, 160, 180 and 200°C) and time (30, 60, 120 and 180 seconds) were also consecutively studied. The results showed that both frying temperature and frying time affected on the discoloration and the optimum frying conditions were found to be 160°C for 210 seconds.

Keywords: Deep fried, eggplant, discoloration, vegetable

A-81. PINE APPLE LEAF FIBRE : EXTRATION AND VALUE ADDITION

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Abstract

Pineapple leaf fiber is one kind of vegetable fiber obtained from plants. The pineapple fiber from the leaves can be extracted in two ways, manual and mechanical methods. Recently, the fibre extraction machine “Raspador” has been developed. Thus, an effort is made to extract the Pine Apple Leaf Fibre from Raspador machine. The leaf of pine apple plants grown for fruits locally was taken for the experimental study. The results revealed that the percentage extraction of fibres from the leaf was found to be 1.56 per cent. The cellulose and hemicelluloses content was found to be 68.59 and 18.28 respectively which was on par with flax and sisal fibres. On scouring the composition of cellulose, hemicelluloses, lignin, ash and protein decreased while the moisture content increased. It is observed that the breaking load (gf) of the pine apple leaf fibre increased after scouring while the elongation (%) and Extension at maximum load (mm) decreased. However, the increase and decrease after scouring was found to be significant. The fibres after drying was utilized for the development of various products viz., tea coaster, pen stand, dining table mat, fruit bowl etc by braiding technique. The fibres were also used as hair for dolls.

Keywords: Pine Apple Leaf Fibre, raspador, breaking strength, value added products

A-82. IMPORTANCE OF LACTOBACILLI IN FOOD INDUSTRY

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Abstract

Fermentation or Anaerobic processing has been used to produce a wide range of foods and food ingredients ever since the earliest recorded food preservation by humans. Many beneficial microorganisms (molds, yeast and lactic acid bacteria) are widely used to convert raw food substrates into a plethora of fermented products. The genus *Lactobacillus* is a heterogeneous group of lactic acid bacteria (LAB) with important implications in food fermentation. It is important to acknowledge that the widespread term LAB has no official status in taxonomy and is only a general term of convenience used to describe the group of functionally and genetically related bacteria. Lactic acid bacteria are widely used in the production of fermented foods when they are used as the starter cultures. The starter cultures are defined as a preparation consisting of active or inactive microorganisms which possess desirable metabolic activity. The design of starters used in bakery industry requires prior knowledge of the biochemical characteristics and baking potential of present microflora. Performance of starters during fermentation process is usually studied by characterization of the acidification properties, such as pH value decrease, acidity increase and organic acids production. *Lactobacillus* are used for the production of yogurt, cheese, pickles, beer, wine, cider

and other fermented foods, as well as animal feeds such as silage. In recent years, much interest has been shown in the use of lactobacilli as probiotic organisms and their potential for disease prevention in humans and animals.

Keywords: *Lactobacillus, Anaerobic, Microflora, pH value, Acidity*

A-83. HEALTH AND ENVIRONMENTAL ADVANTAGES OF ORGANIC FOOD

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Abstract

Organic food consumption is one of the fastest growing segments of present era. There are many different reasons why consumers choose to buy organic food. During the last decades consumers trust in food quality and safety has drastically decreased, mainly due to several food scandals and growing ecological awareness. Consumers have started to look for safer foods, produced in environmentally friendly, authentic and local systems. Organically produced foods are believed to satisfy these demands. These can include, concern for the environment and animal welfare. Consumer may also choose to buy organic food because Organic crops contain less nitrates and pesticide residues, but more dry matter, vitamin C, phenolic compounds, essential amino acids and sugars than conventional ones. Organically produced milk contains usually more dry matter, fat, calcium, selected vitamins and beneficial conjugated linoleic acids (CLA) compared to conventional milk from high input systems. Meat from organically raised cattle, pigs and sheep was found to contain less total fats and saturated fatty acids but higher content of unsaturated fatty acids and better n-6/n-3 fatty acid ratio. In addition, with the exception of wheat, oats, and wine, organic foods typically provide greater levels of a number of important antioxidant, phytochemicals. In-vitro studies of organic fruits and vegetables consistently demonstrate that organic foods have greater antioxidant activity, these antioxidant are more potent suppressors of the mutagenic action of toxic compounds, and inhibit the proliferation of certain cancer cell lines. Clear health benefits from consuming organic dairy products have been demonstrated in regard to allergic dermatitis. Environmental Benefits of Organic food and Agriculture also has been observed over the long term. Many changes observed in the environment are long term, occurring slowly over time. Organic agriculture considers the medium- and long-term effect of agricultural interventions on the agro-ecosystem. It aims to produce food while establishing an ecological balance to prevent soil fertility or pest problems. Organic agriculture takes a proactive approach as opposed to treating problems after they emerge.

Keywords: *antioxidant, organic food, non- organic food, fatty acid*

A-84. MEDICO-NUTRITIONAL FACTS OF LEMONGRASS (*CYMBOPOGON CITRATES*) : A REVIEW

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Abstract

Lemon grass *Cymbopogon citratus* is an aromatic tropical perennial grass is native to South India and Sri Lanka, now widely cultivated in the tropical areas of America and Asia, belonging to the family Gramineae. The prefix 'lemon' owes to its typical lemon like odor, which is mainly due to the presence of citral, a cyclic monoterpene. Essential oils are widely used in flavours, fragrances, cosmetics, soaps, detergents and perfumery owing to their typical lemon and rose-like aroma. Plants are utilized as therapeutic agents since time immemorial in both organized (Ayurveda, Unani) and unorganized (folk, tribal, native) form. Plants have been identified as the potent therapeutic agent, due to the presence of nutritional (minerals and vitamins) and non-nutritional component (fibres, active phytochemicals), including the flavonoids, terpenoids, lignans, sulfides, polyphenolics, carotenoids, etc.), due to promoted as "functional food". Lemon grass has high antioxidant levels. It has been claimed *Cymbopogon citratus* possesses various pharmacological activities such as anti-amoebic, anti-bacterial, anti-diarrheal,

anti-filarial, anti-fungal and anti inflammatory properties and various other effects like anti-malarial, anti-mutagenicity, anti-mycobacterial, anti-oxidants, hypoglycemic and neurobehavioral.

Keywords: anti-oxidants, anti-mycobacterial, phytochemicals, flavonoids

A-85. MORPHO-ANATOMICAL STUDY OF HOMOEOPATHIC PLANT DRUG HYGROPHILLA SPINOSA T. ANDERSON

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Abstract

Hygrophilla auriculata (Schumach.) Heine known as Hygrophilla spinosa in homoeopathic system of medicine, belongs to the family Acanthaceae. It is native of India, which widely distributed from Himalayas regions to Nepal, Ceylon, Burma, Malaysia, and Sri Lanka. It is commonly known as Long Leaved Barleria (English); Talmakhana (Hindi). Ikshura, Ikshugandha, and Kokilasha (ayurvedic literature). Traditionally plant is useful for the treatment of urogenital tract, dropsy of chronic Bright's disease, hyperdipsia, diarrhea, dysentery, leucorrhoea, blood diseases, painful micturition, menorrhagea etc. In Homoeopathic system mother tincture prepared from whole plant their potencies are being used for curing urticaria, conjunctivitis, gastroenteritis, nausea (morning sickness), intermittent fever etc. The aim of this study was to examine the morphological and anatomical features of drug. The macroscopical, microscopical, and powdered microscopic studies were performed. The macroscopy revealed shrivelled leaves, small quadrangular pieces of stem with spines and dried root. Microscopy of whole plant showed few peculiar features like aerenchymatous cortex in the middle region of root; semi-quadrangular outline, four vascular bundles at each corner in young stem and developing fascicular vascular bundles between them; broad cortical aerenchyma in mature stem, amphistomatous leaf with anomocytic stomata, crescent-shaped meristele in leaf. Biostatistical parameters include vein islets 19- 21 per mm², palisade ratio 4- 8, stomatal index 36.68 (dorsal side) and 26.21 (ventral side). Present study can assist the diagnosis of Hygrophilla spinosa and also may be treated as pharmacognostical standards for the identification of homoeopathic drug.

Keywords : Homoeopathy, Macroscopy, Microscopy, drug

A-86. EFFICIENCY OF DIETARY -GLUCAN SUPPLEMENTATION ON GROWTH PERFORMANCE, FEED AND NUTRITION UTILISATION IN POMPAÑO FISH (*TRACHINOTUS OVATUS*) (LINNAEUS, 1758)

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Abstract

This study aims to examine the effect of dietary -glucan (0, 0.05, 0.10, 0.20 and 0.40%) on the growth performance, feed utilization, nutrition retention of pompano fish (*Trachinotus ovatus*, 7.02 g ± 0.15 (SD)). After 8-weeks of diet feeding, growth and survival rates were significantly higher in the fish fed diet with 0.05% and 0.10% -glucan compared to fish fed control diet (P = 0.01). Moreover, feed intake (FI), Feed conversion ratio (FCR) and feed conversion efficient (FCE) were significantly higher in fish fed diet added 0.05 to 0.10% -glucan (P = 0.01). However, these parameters did not significantly differ in fish fed 0.40% in compared to those index in fish fed control diet. At day 56, protein content was higher, but lipid content was lower in the flesh of fish fed diet supplemented with 0.05% to 0.10% b-glucan in comparison to fish fed control diet (P = 0.05). Furthermore, protein efficiency ratio (PER) and protein productive value (PPV) were higher in fish fed 0.05% to 0.10% -glucan. There were high correlations between growth, feed utilization and protein efficient ratio with the concentration of -glucan in the diet of pompano fish. In conclusion, -glucan supplementation is effective for improving growth, feed efficiency and nutrition utilization of the pompano fish, *T. ovatus*.

Keywords: *Trachinotus ovatus*, α -glucan, growth, nutrition utilization.

A-87. ISOLATION AND SELECTION OF BACTERIA METABOLIZING AMMONIA FROM LOBSTER FARMING AREA IN VINH XUAN DAI, PHU YEN

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Abstract

In wastewater treatment, the elimination of nitrogen compounds can be accomplished by the combination of nitrification (oxidation of ammonia to nitrate) and reduction of nitrate (reduction of nitrate to N₂O or N₂). This requires the co-ordinate or sequential action of different groups of microorganisms, especially nitrifying bacteria and nitrate-reducing bacteria. Subjects was conducted to isolate and selecting the bacteria metabolize ammonia capable of handling ammonia with 6 different experiments; include: NT 01: Additional environmental strains on S16. NT 02: Additional environmental strains on S19. NT 03: Additional environmental strains on S27. NT 04: Additional environmental strains on S43. NT 05: Additional environmental strains on S47. NTDC: no additional bacteria. Each treatment was repeated 5 times. After 5 days of the experiment, the results showed meaningful difference statistically ($P < 0.05$) in the ammonia metabolism among treatments. In particular, treatments NT 01, NT 02, NT 04 achieved the highest effective. Besides, isolated 35 strains metabolize ammonia, which has five lines (S16, S19, S27, S43, S47) is capable of handling ammonia in laboratory conditions. In addition, five strains capable of handling ammonia are identified by PCR and is searchable on BLAST has identified the strain on the *Providenciastuartii*, *Alcaligenesfaecalis*, *Massiliaaurea*, *Sphingobacteriummultivorum*, *Micrococcusluteus*.

Keywords: nitrogen, ammoniac, nitrite, nitrate, metabolize ammonia.

A-88. GELATION OF BARRAMUNDI (*LATESCALCARIFER*) MINCED MUSCLE AS AFFECTED BY PRESSURE AND THERMAL TREATMENTS AT LOW SALT CONCENTRATION

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Abstract

Barramundi minced muscle with salt 10 g/kg and 20 g/kg added is gelled by different combinations of pressurisation (300, 400 and 500 MPa at 4°C for 10 min), cooking (0.1 MPa, 90°C for 30 min) and setting (0.1 MPa, 50°C for 2 h) to improve mechanical properties of barramundi gels and reduce salt added to barramundi gels. At the low salt concentration of 10 g/kg, pressurization prior to cooking (P-C) treatment induced barramundi gels with comparable mechanical properties and water-holding capacity to those of conventional heat-induced (HI) gels with 20 g/kg added salt. At the salt concentration of 20 g/kg, pressurization prior to the setting (P-S) and P-C gels exhibited higher mechanical properties and water-holding capacity as compared to HI gels. Scanning electron microscopy images showed a smooth and dense microstructure of P-C and P-S gels whereas the microstructure of HI gels is rough and less compact. P-C treatment can reduce salt concentration added to barramundi gels to 10 g/kg. P-S and P-C treatment can result in higher mechanical and functional properties of barramundi gels at the conventional salt concentration (20 g/kg) as compared to HI gels.

Keywords: high pressure, gel properties, barramundi, scanning electron microscopy, salt.

A-89. SHRIMP DISEASE PREVENTION AND RECENT INNOVATIONS IN PRODUCTION SYSTEM—A PRACTICAL GUIDE IN VIETNAM

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Abstract

White Feces Syndrome has been an idiopathic disease causing significant economic losses for shrimp farmers in Asia. The syndrome is characterized by transformation and sloughing of microvilli of hepatopancreatic tubule epithelial leading to accumulation of aggregated, transformed microvilli (ATM) in the tubule lumens (Sriurairatana et al., 2014), white fecal materials in the gut, and the floating feces on pond water surface. Since 2017, the ShrimpVet lab has been working on transmission models for WFD with focus on bacterial etiology. Based on the initial result of these studies, several management strategies have been applied, including algal bloom control, better feed management, probiotics application, better bio-remediation strategies, and functional diets. Those studies have proven to reduce WFD both in the laboratory and grow out in pond conditions. Early Mortality Syndrome (EMS) or Acute Hepatopancreatic Necrosis Disease (AHPND) have been characterized and determined by the pathogens since 2013. Since then, the ShrimpVet lab has made several attempts in order to reduce the impact of AHPND in productions. These include better hatchery, nursery, and grow out protocols. With regards to hatchery protocols, several improved practices have been applied including PCR screening for all material (brood stock, live feed, Nauplii, and post larvae before harvest), better sanitation, better bio-remediation with focus on *Vibrio* reduction. The same sanitation, probiotics, and bio-remediation approaches have been applied in nursery and grow out practices. Several trials using “functional diets” with feed additives added in feed ingredients before extrusion showed the positive result in both disease prevention and growth performance. An overall antibiotic-free farming protocol is achievable. In practice, Vietnam has been moving a long way from a very natural based farming system with less biosecurity and antibiotics-based farming protocols to a more controlled farming method since the outbreak of EMS/AHPND in 2010 and EHP in 2014. Several new practices have been applied including: screening for diseases (EMS/AHPND, EHP, WSSV) throughout the farming cycle, better pond preparation with good probiotics bloom before stocking, plastic-lined pond farming protocol, nursery phase at the farm level, routine/daily application of bioremediation, daily shrimp pond waste removal, probiotics top-coating in feed, and functional feed. With better adaptation to new farming protocols, it appears that the shrimp farming becomes more predictable, explaining the fast increase of Vietnamese shrimp production in recent years.

Keywords: Shrimp disease, EMS/AHPND, ShrimpVet Lab, White Faces Syndrome

A-90. IMPROVING SUSTAINABILITY FOR THE MARBLE EEL (*ANGUILLA MARMORATA*) FARMING THROUGH RECIRCULATION TECHNOLOGY

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Abstract

This study was carried out from January 2015 till May 2017 in Ho Chi Minh city. These experiments aimed to develop protocol for marble eel (*Anguilla marmorata*) culture through recirculating aquaculture systems (RAS) to improve sustainability for eel farming culture. Initial body weight of stocking marble eel was 97g individual-1 and stocking density was 82 individuals m⁻³ in 4m³-concreted tank during 393 culture days. Each indoor RAS for eel culture comprised: a trickling filter, 1 bio-filter reactors (media moving bed reactor), a swirl separator and a culture tank. Functions and dimension of components of three RAS (three replicates) were designed alike. The results showed that water quality was optimum for marble eel growth. Feeding level was recorded 1-2% bwd-1 and feed conversion ratio was 2.44. Specific growth rate was 0.6 %d-1 and final body weight was 940 g individual-1. Sustainability indicators of marble eel culture in RAS showed that water use was 727.2 L kg fish-1, electricity consumed 2.1 kWh kg fish-1 and the sodium bicarbonate consumed 435.1g kg fish-1. Nitrogen (N), phosphorus (P), dry matter (DM) and COD (chemical oxygen demand) per 1 kg fish produced were 31.2g, 9.8g, 425g, 927.7g,

respectively. One kg fish produced discharged 129.4g N, 99.8g P, 1242.3g DM and 591.9g COD. The recirculation technology for marble eel culture can be applied to improve sustainability in future in Vietnam.

Keywords : marble eel, sustainability, bio-filter, aquaculture,

A-91. BACTERIAL DISEASES OF FRESHWATER FISHES AND THEIR ECO FRIENDLY MANAGEMENT

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Abstract

The immune system of aquatic vertebrates are sensitive to immune challenges by environmental stresses. Fishes are in intimate contact with their environment which contains very high concentration of disease causing pathogens like bacteria, viruses, fungi etc. Under Normal conditions the fish maintains a healthy state by defending itself against potential invaders by a complex system of non specific and specific defence mechanisms. Fishes mainly depend upon their Non Specific immune System this also acts as a first line of defence against various invading pathogens. Disease outbreaks and mortalities often result from the fish being stressed and these defense mechanisms are being compromised. Bacteria's are the main source of infection or disease in freshwater fishes. Bacterial species commonly effecting these fishes are *Aeromonas*, *vibrio*, *Edwardsiella*, *Myobacterium*, *Pasteurella*, *Staphylococcus* species, *Escherichia coli* etc. Bacterial infection decreases the immunity of fishes thus, making them more prone to diseases which can lead to heavy mortality causing great loss in Aquaculture. Use of natural Immunostimulants seems to be an alternative way of reducing disease in Aquaculture. Natural immunostimulants are gaining wider acceptance because they are- biocompatible, biodegradable and safe for the environment. To prevent loss of valuable fish species through disease caused by pathogens in Fish culture and to add to economic benefit in fish farming, Immunostimulants are widely used in farms for health management. Fish treated with immunostimulants usually show enhanced protection against various pathogens. These can be controlled to a great extent by feeding or giving vaccines of Natural immunostimulants, which are group of natural or biological substances, that enhance the non specific defence mechanisms as well as the specific immune response. Most commonly used natural immunostimulants are Garlic, Vitamin C, Curcuma longa, Beta Glucan, *Tinospora cordifolia* etc.

Keywords: Aquaculture, Bacterial disease, Natural Immunostimulants, ecofriendly approach.

A-92. ULTRASOUND-ASSISTED EXTRACTION OF POLYPHENOLS FROM POMELO PEEL

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Abstract

The pomelo (*Citrus grandis* (L.) Osbeck) peel occupied 50% of the fruit mass after juice processing. It contained a high amount of phenolic compounds, which might provide health benefits for humans. In this study, the solvent extraction method would be optimized by evaluating the effects of ethanol concentrations (0%, 20%, 40%, 60%, 80%, absolute ethanol (96%)), material and solvent ratios (g/ml) (1:10, 1:15, 1:20, 1:25, 1:30), and temperatures (room temperature, 40°C, 50°C, 60°C, 70°C) based on total polyphenolic content (TPC), naringin and antioxidant capacity (using DPPH assay) of the extracts. After that, the ultrasound was incorporated and the effect of sonication time (0.0, 2.5, 5.0, 7.5, and 10.0 minutes) on the extraction was evaluated. The optimal extraction conditions were found to be 80% for ethanol concentration, material and solvent ratio of 1:25 (g/ml) at temperature of 60°C, and sonication time of 7.5 min. In conclusion, a suitable condition for solvent extraction of polyphenols from pomelo peel was found and the results also showed that ultrasound treatment was a useful method for improvement of the extraction.

Keywords: Pomelo (Citrus grandis (L.) Osbeck) peel, polyphenols, naringin, antioxidant capacity, ultrasound-assisted extraction.

A-93. VARIATION IN SEED YIELD AND FATTY ACID COMPOSITION OF SUNFLOWER (*HELIANTHUS ANNUUS* L.) GERMPLASM ACCESIONS TO DIFFERENT SEASONS

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Abstract

In sunflower, oil content and fatty acid composition are influenced by environmental factors. Temperature has a profound effect on oleic and linoleic accumulation in sunflower seeds. To study the genetic variability and effect of environmental factors on oil content and fatty acid composition, an experiment was conducted in two different seasons using 33 sunflower accessions. Results of the experiment indicated variability in physiological, morphological, yield attributing characters including oil content and fatty acid composition due to the effect of seasons and temperature. Days to flowering significantly varied among the genotypes and between the seasons from 51 to 66 days in kharif and 54 to 65 days in rabi. Maximum leaf area was observed in kharif compared to rabi and hybrids produced broader leaves with more total dry matter (TDM). Plants grown in kharif had 36.4% more grain yield compared to plants grown in rabi. Hybrids yielded more followed by inbreds and RHA lines. Among all the genotypes higher TDM was recorded with hybrids compared to CMS lines, RHA-lines and inbreds. Results also indicated that oil content and percentage of fatty acids, especially the ratio of oleic to linoleic acids were largely affected by seasons. Oleic acid in sunflower oil was significantly affected in both the seasons and 28 accessions were high oleic types. Change in environmental factors did not have any impacts on saturated fatty acids, stearic and palmitic acid. Out of 33 genotypes, 22 genotypes recorded higher oil percentage in rabi than in kharif. Oil content was less in most of the genotypes during rabi/summer due to physiological maturity of genotypes coincided with higher temperature and bright sunshine hours. Accumulation of maximum grain oil content was found in early matured genotypes. Depending on their consistent performance, genotypes can be selected for heterosis breeding to develop good fatty acid containing hybrids combined with high seed yield.

A-94. PLANT VARIETY PROTECTION & FARMERS RIGHT ACT 2001: INDIAN SYSTEM OF PROTECTION OF FARMERS RIGHT

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Abstract

The Plant Variety Protection and Farmers Rights Act (PPVFRA), 2001, a sui Generis system, is an attempt by the Indian Government to recognize and protect the rights of both commercial plant breeders and farmers in respect of their contribution made in conserving, improving and making available plant genetic resources for development of new plant varieties and to encourage the development of new plant varieties. Protection of the plant varieties under the PPVFR Act, 2001. The Agreement on TRIPs requires WTO Members to introduce an “effective system” for the protection of plant varieties. Article 27 3 (b) of the TRIPs agreement reads :

Member countries may exclude “plants and animals other than micro-organisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes. However, Members shall provide for the protection of plant varieties either by patents or by an effective sui generis system or by any combination thereof.”, India decided to exclude patents for plants and plant varieties but exercised the sui generis option. Four types of plant varieties can be registered under PPVFR Act, 2001. -1) New varieties: A variety which is not in public domain in India earlier than one year before the date of filing; or outside India, in the case of trees or vines earlier than six years, or in any other case, earlier than four years. 2) Extant variety: A variety which is notified under Seed Act, 1966 or a variety about which there is common knowledge or a farmers’ variety or any other variety which is in public domain is considered as an Extant variety. 3) Farmers’ variety: A variety which has been traditionally cultivated and evolved by the farmers in their fields or a variety which is a wild relative or land race of a variety about which farmers possess common knowledge. 4) Essentially derived variety (EDV): An

“essentially derived variety” shall be said to be essentially derived from such initial variety when it is predominantly derived from such initial variety, or from a variety that itself is predominantly derived from such initial variety, while retaining the expression of the essential characteristics that result from the genotype or combination of genotype of such initial variety and it is clearly distinguishable from such initial variety. An EDV conforms to such initial variety that results from the genotype or combination of genotype of such initial variety. Duration of protection for a registered plant variety? Trees and vines - 18 years. Other crops - 15 years. Extant varieties - 15 years from the date of notification of that variety by the Central Government under Seed Act, 1966

Key words: Plant varieties, DUS, PPV& FRA, Farmers right

A-95. EFFICACY OF THREE INDIGENOUS ENTOMOPATHOGENIC NEMATODES FROM GHAZIABAD AND MEERUT, INDIA AGAINST THE LARVAE OF GALLERIAMELLONELLA

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Abstract

Entomopathogenic nematode of the genera *Heterorhabditis* and *Steinernema* are obligate and lethal insect parasites. In last decade they are widely used as biological control agents for pest insects of crops, therefore research in this area is directly linked to agriculture. In this study the efficacy of three entomopathogenic nematode species *Steinernema thermophilum*, *Steinernema masamkayai* and *Heterorhabditis indica* from Ghaziabad and Meerut, India was studied against the larvae of *Galleria mellonella* under the laboratory conditions. The *Galleria mellonella* were exposed to 10, 20, 40, 60, 80 and 100 infective juveniles (IJs) of each nematode species for different time periods 6, 12, 18, 24, 30, 36, 42, 48 hours and they were found to be susceptible to all the EPNs tested. At 18 hours 50% mortality was observed due to the infection with *Steinernema thermophilum* at 20 IJs/ *Galleria mellonella*. After 30 hours in *Heterorhabditis indica* and 36 hours in *Steinernema masamkayai* time exposure, 50% larval mortality was obtained at 100 IJs/ *Galleria mellonella* respectively. The *Galleria mellonella* is highly susceptible to the *Steinernema thermophilum*.

A-96. INFLUENCE OF NANO-INVIGORATION ON SEED QUALITY PARAMETERS

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Abstract

High quality seed is the basic and critical input that acts as key factor for successful agriculture. Modern agriculture with its bias for technology and precision, demands that each and every seed should readily germinate and produce a vigorous seedling ensuring higher yield. Many scientists all over the world have developed many new production techniques called “seed enhancement techniques” viz., seed invigoration, seed polymer coating, seed colouring, seed pelleting, seed fortification, seed infusion, etc., among these seed nano-invigoration is the promising one. Nanoparticles are known to exhibit unprecedented variations in their properties which are size dependent. Seed Science Research, nanotechnology offers the tools like various nanoparticles for improvement of seed germination and related physiological parameters, nanomembranes and nanopolymer coating to enhance the storability of the seeds by incorporation of pesticides, nanosensors for better management of seed infestation during storage (Chinnamuthu and Murugesu Boopathi, 2009). Nanoparticles (NPs) by virtue of their nano size (10^{-9} m) possess larger surface area resulting in increased catalytic activity and are highly reactive (Grassian, 2008). Khodakovskaya et al. (2009) reported that carbon nano tubes (CNTs) can penetrate thick seed coat and support water uptake by the seeds which could be responsible for the significantly faster germination and higher biomass production in tomato. Zheng et al. (2008) reported that utilization of nano particles on spinach for studying the germination and growth of naturally aged seeds had indicated that the nano particles treatments with proper concentration accelerated germination of aged seeds and increased its vigour. Maize seeds treated with chitosan improved germination under optimum conditions and seedling growth. The enhancement was attributed to reduced malonyl-dialdehyde content, altered membrane permeability and also increased soluble sugars and proline contents, as well as peroxidase and catalase activities (Guan et al., 2009). Azimi et al. (2014) reported that a significant increase in seed germination, germination rate, seedling fresh weight, seedling dry weight, seedling vigour index, mean

germination time and peak value of germination was found by prechilling and SiO₂ nanoparticles. He suggest that SiO₂ nanoparticles may be contributed in the metabolic or physiological activity of tall wheatgrass seed. Consequently, it has proposed that applying of nanoparticles as a presowing treatment, delivery of different growth regulator and other organic molecules could use as a new alternative potential for dormancy breaking and also for enhancement of seed quality. A trial on carryover seed of maize were conducted and found that the germination percentage and seedling vigour along with other seed quality parameters were increased up to 20%. On the basis of study it can be concluded that the seed invigoration by nanoparticle could be increased the germination percentage of carry over seed.

A-97. EVALUATION OF ORGANIC AND INORGANIC SOURCES OF NUTRIENTS ON YIELD IN RICE (*ORYZA SATIVA*)—WHEAT (*TRITICUM AESTVUM*) CROPPING SYSTEM ON FARMER'S FIELD.

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Abstract

On farm trial was conducted on farmers' fields in Bareilly district of Uttar Pradesh during Kharif and Rabi of 2000 to 2002 to study the performance of four organic manures consisting green manuring (*Sesbania aculeata*), farm yard manure, vermicompost and poultry manure in conjunction with NPK fertilizer i.e., 0-NPK, 50% NPK and 100% NPK of recommended dose (120 kg N, 60 kg P₂O₅ and 40 kg K₂O kg/ha). The experimental soil was silt loam (Mollisols). The soil pH was 7.5 with medium available N, P and high in K content. Organic soil matter was 45%. Altogether seven treatments were evaluated in Randomised Block Design. All organic manures were added during Kharif rice (Pant Dhan-4) and residual effect was studied on Rabi wheat (UP-2338). Results revealed that all the organic manures in conjunction with NPK fertilizers increased mean grain yield over control. Among fertilizer levels, 100% recommended fertilizer dose gave significantly higher grain yield over 50% NPK. During the succeeding Rabi season, the residual effect of organic manure was also significant over control. Incorporation of organic manure might have helped in improving the nutrient availability in the soil for the succeeding season on one hand and improving the soil for physical condition on the other. The studies indicate that for higher yield, use of organic manure in rice in rice-wheat cropping system is highly beneficial. The economic returns were also higher from the crop which was treated with organic manure. After 10 years impact assesment was carried out through personal visits, interview of farmers and questionnaires during 2010-11 and 2011-12. It was found from the study that practices of integrated nutrient management was continuously adopted by the farmers due to its beneficial effect on crop yield and economic returns. It is revealed that the crop yield has gone higher up to 15-20% in the same system of crop production. It might be due to long term in positive effect on soil fertility and productivity by adding organic manures rice-wheat-cropping system on farmers field.

Keywords : Organic, Nutrients, Yield, Cropping system

Theme B

Climate Change, Global Warming and Natural Resource Management

B-1. INTEGRATING SWAT AND HEC-RAS MODELS FOR FLOOD FORECASTING IN VU GIA- THU BON RIVER BASIN, VIETNAM

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Abstract

This study are the part of “Decision Support System (DSS) for Real –time Flood Warning in Vu Gia Thu Bon River Basin, Quang Nam province” project code KC.01.24/11-15 under The National Program for Key Science & Technology “Research, Application and Development of Information and Communication Technologies” – Ministry of Science and Technology, Vietnam.

The precise and reliable simulation of hydrologic and hydraulic conditions on a basin represents the important basis for efficient flood prediction and warning. In recent years, when weather conditions, natural disasters have become more unpredictable, increasingly complex, deploying a disaster warning system such as flood in the basins of Quang Nam province in general, Vu Gia - Thu Bon river basin in particularly is very essential to ensure social-economic development sustainability. In the Vu Gia - Thu Bon river basin, flooding usually occurs quickly in short duration with high magnitude in the upper and middle of basin while in relatively flat floodplains, flooding typically occurs quickly but slowly withdrawn. The paper presents an automated procedure of real-time flood forecasting by coupling SWAT hydrological model with HEC-RAS hydraulic model based on 1:10,000 scale topographic map, reservoir data, 2010 land use map at 1:25,000 scale, soil map at 1:25,000 scale and real-time meteo-hydrological data (since August 2015) of 20 weather stations, 5 hydrological stations. The results showed that all steps, including writing SWAT input files, executing SWAT model, writing HEC-RAS input files from extracting output files of SWAT model, executing HEC-RAS model, visualizing online floodplain map, were completely automated with strict constraints on accuracy and processing time.

Keywords: Flood forecasting, Flood warning system, SWAT, HEC-RAS, Vu Gia- Thu Bon river basin.

B-2. SPATIAL AND TEMPORAL TREND ANALYSIS OF ANNUAL AND SEASONAL RAINFALL TIME SERIES IN HO CHI MINH CITY

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Abstract

This study analyzed spatial and temporal patterns of rainfall time series from 14 proportionally distributed stations in Ho Chi Minh City for the period 1990–2014. Both parametric and nonparametric approaches, viz. linear regression, Mann–Kendall test and Sen’s slope estimator, were applied to detect and estimate the annual and seasonal trends after using original and notched boxplot for the preliminary interpretation. The outcomes showed high domination of positive trends in the annual and seasonal rainfall time series, but most statistically significant trends were observed in dry season. The results of trend estimation also indicated higher increasing rates of rainfall in dry season compared to rainy season, ranged approximately from 3.51 to 12.72 mm/year. It is likely to conclude that even though the total amount of annual rainfall is mainly contributed by rainfall in rainy season, the pronounced increment in dry season can be a determinant factor of possible changes in annual rainfall. Additionally, the interpolated results revealed a consistent increasing trend in the southeastern and northeastern parts of the study area, included 3 districts viz. Can Gio, Thu Duc and District 9, where annual rainfall was by far the lowest intensity compared to other regions.

Keywords: GIS, Linear regression, Mann–Kendall test, Rainfall trend, Trend detection

B-3. ANALYZING SPATIAL AND TEMPORAL VARIATION OF WATER BALANCE COMPONENTS IN LA VI CATCHMENT, BINH DINH PROVINCE, VIETNAM

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Abstract

Topography, land use, soil and climate are the main factors affecting water resources (both quantity and quality) in a basin. For purely agricultural basins, water resource assessment and management plays a very important role in the region's agricultural development. This study aimed to analyze the variation of water balance components at different spatial scales (catchment, sub-catchment, Hydrologic Response Unit) in La Vi catchment, BinhDinh province, Vietnam from 2000 to 2015 using Soil and Water Assessment Tool (SWAT) model. The results showed that actual evapotranspiration mainly depended on land use with high values (600-1,110 mm) in residential land, low values (520-600 mm) in perennial industrial crop areas. Soil moisture has been altered by soil texture with high values (131-178 mm) on Haplic Acrisols, low values (95- 130 mm) on Rhodic Acrisols. Percolation to shallow aquifer varied inversely with the impervious surface (high value in perennial industrial crop areas, low value in residential land) and directly with rainfall (e.g., in the wet year 2005, the value reached 1,461 mm while in the warm year 2001, the value fell to 94 mm). Surface flow positively correlated with both the impervious surface (high value in residential land, low value in perennial industrial crop areas) and rainfall (high value in rainy season, insignificant value in dry season). For base flow, high values occurred in perennial industrial crop areas while small values occurred in residential land with a time lag of more than one month compared to the rainy season. These findings were expected to provide a reference for water resource management and planning in La Vi catchment as well as other similar basins in Vietnam.

Keywords: Water balance component, hydrologic response unit, La Vi catchment, soil and water assessment tool.

B-4. ECOLOGICAL PLANNING FOR THE CONSERVATION AND DEVELOPMENT OF PINEAPPLE (*ANANAS COMOSUS*) IN TAN PHUOC DISTRICT, TIEN GIANG PROVINCE

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Abstract

Land assessment is a specific requirement for the land use. Land assessment results provide the information on land types and natural conditions (land map units) so that we can evaluate the suitability of the land area for agricultural and non-agricultural use. In agriculture, appropriate crops for the land area are usually designed based on the land assessment data. Ecological planning is a process of assessment, evaluation, and decision in order to help authorities design the ideal, appropriate land area and land arrangement for agricultural and non-agricultural purposes. Tan Phuoc district, Tien Giang province is a low and alluvial agricultural area of Dong Thap Muoi. In this area, the income of the locals depends majorly on agricultural activities. Pineapple (*Ananas comosus*) with its high economic value was cultivated widely in Tan Phuoc and has an important impact on the locals' income. Nevertheless, the majority of the land area currently used for pineapple in Tan Phuoc was the land area of other crops. Due to this poor land resource planning, the yield of pineapple was low, the land and environment were polluted. An adequate land assessment for Tan Phuoc is therefore highly needed so that a proper ecological planning for pineapple could be designed to improve the yield of pineapple, preserve the environment and support sustainable development in Tan Phuoc.

Keywords: Biological resource, ecological planning, land assessment, sustainable development.

B-5. RESOURCE GOVERNANCE IN UPLAND AREA OF CENTRAL VIETNAM SINCE DOI MOI – MARKET INTRODUCTION, CROSS-BORDER TRADING AND ETHNIC MINORITY PEOPLE

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Abstract

In the late 1980s, after several decades of stagnation under central planning, Vietnam economy started showing encouraging growth thanks largely to official policies stimulating the engagement of different economic sectors and devolution of agriculture land to individual households. While most of policies in the early of Doi Moi period targets urban centers and

lowland plain, later the state replicated and improvised several policies in the upland area, especially in resource governance, leading to fundamental transformation of upland area in Vietnam in general and in Central Vietnam in particular. This article presents major transformations among groups of ethnic minority in upland area of Central Vietnam resulting from the implementation of resource management policies. The author argues that during the last several decades, the state has increased the management of resource such as land and forest, leading to the gradual decline of kinship-based traditional institutions. Social and economic relations between households are no longer solemnly relying on local rules but leaning to official governance tools. In addition, the introduction of market mechanism in upland economy, especially in resource use, has affected the homogeneity of traditional social structure of ethnic minority groups. In other words, within each ethnic minority, new social groups emerge from economic relations unprecedented in their traditional society.

The author believes that research on social transformations of ethnic minority people in the upland is significant because their position is vulnerable, especially when Vietnam is becoming more integrated into global economy. During integration process, local resources are increasingly woven into international supply chains whereas local people, especially ethnic minorities, have little decision-making power in dealing with other related stakeholders regarding the sharing of economic benefits and environmental risks.

Keywords: Payment for forest environmental services, socio-economic impacts, ethnic ethnicminority, up-land area

B-6. SOCIO-ECONOMIC IMPACTS AT HOUSEHOLD LEVEL FROM PAYMENT FOR FOREST ENVIRONMENTAL SERVICES PROGRAM – A CASE STUDY IN DA NHIM COMMUNE, CENTRAL HIGHLAND, VIETNAM

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Abstract

Payment for forest environmental services (PFES) is a program implemented at national scope by Vietnamese government since 2010 aiming at ensuring environmental services providers such as individual households, communities, private sectors or state organizations who plant or protect forest are incentivized and paid for their provision of services. This study is originated from data collected during the fieldtrip to Da Nhim Commune, Lac Duong District, Lam Dong Province in the Central Highland of Vietnam. The commune, right next to Bidoup – Nui Ba National Park, is home to around 900 households, of which 80% are ethnic minority groups who traditional livelihoods were highly dependent on forest resources. The target of PFES in Da Nhim Commune is to reduce forest degradation and loss from encroachment by local people and at the time, increase livelihood stability of household who depend on forest resources. In other words, it is expected by providing a payment scheme, the local encroachers would turn into protectors of forest.

The purpose of this study is to investigate the social and economic impacts on local people who directly involving in protecting the forest. The main method is having local households answer questionnaires and semi-structure interviews. On a lighter note, the authors also examine the protection aspects of the program by interview forest protection authorities. The result has shown that there have been positive socio-economic and environmental impacts. Nonetheless, there is still concern about the long-term sustainability of the program.

Keywords: Payment for forest environmental services, socio-economic impacts, ethnic ethnicminority, central highland

B-7. FLOOD – ADAPTED URBAN MODEL BASED ON INDIGENOUS LANDSCAPE IN CAN THO CITY OF VIETNAM

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Abstract

This paper highlights the role of indigenous landscape in enhancing flood resilience of river cities. Flood management based on landscape infrastructure help the city reduce its reliance on flood control infrastructure - which has been claimed to harm riverine ecosystem services. A careful study of the territorial organization, local landscape integrated into urban development process will bring new initiatives to promote flood resilience. Through the case study of Can Tho city (CTC), Vietnam, the paper discovers the characteristics of (1) integrated structure between river network and urban infrastructure; (2) complex soil-water balance on liquid geography; and (3) the territorial organization logic of local agricultural landscape will play an

important role for CTC to build a new ecological infrastructure – flood resilient infrastructure. As a result, in landscape design, the strategies for balancing built environment and hydrological dynamics will be discussed to enhance flood resilience for the city in the context of sea water level rise. Flood resilience is considered as a plausible alternative to flood control. The ecological infrastructure helps the city to nurture its flood resilience and improves its capacity to recover after sudden floods in the future.

Keywords: Indigenous landscape, flood resilience, agricultural landscape, ecological infrastructure

B-8. THE USE OF WATER SPINACH (IPOMOEA AQUATICA) IN DOMESTIC WASTEWATER TREATMENT

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Abstract

The main objective of this study was to examine the efficacy and capacity of using hydroponic systems in municipal pollutant removal at household scale. Three pilot scaled hydroponic systems [dimension for each system: 4.5 m (L) × \varnothing 114 mm] were installed to investigate the optimal age of vegetable, planting density and retention time for household wastewater treatment, respectively. Water spinach (*Ipomoea aquatic*) planted in 27 plastic cups throughout 4.5-m-length and 114-mm-diameter uPVC pipes filled with wastewater was employed as the treating agent of pollutants. The averaged influent contained proximately 220.5 mg l⁻¹ chemical oxygen demand (COD), 76.0 mg l⁻¹ biological oxygen demand (BOD), 32.5 mg l⁻¹ suspended solids (SS), 260 mg l⁻¹ NH₄⁺-N, 5.0 mg l⁻¹ NO₃⁻-N, and 28.5 PO₄³⁻ at pH 7.3. Results showed that a designed system consisting of 10 plants of 15-day-old water spinach pre-planted in baked clay in each cup was capable of treating 30 l of domestic wastewater meeting the current municipal wastewater discharge standards in Vietnam (column B standards of QCVN 14:2008/BTNMT) after 4 days of wastewater retention time. If operated under conditions of the above parameters, the pilot-plant hydroponic system can achieve removal of 74% COD, 82% BOD, 64% SS, 89% NH₄⁺-N, 33% NO₃⁻-N and 86% PO₄³⁻. The result of this study has provided an applicable domestic wastewater treatment system eco-friendly and suitable for small and medium household areas.

Keywords: Water spinach, hydroponic system, wastewater, pollutant, treatment

B-9. THE POLLUTION STATUS OF RIVER RAMGANGA, BAREILLY : A CASE STUDY

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Abstract

River Ramganga is a major source of water to the rural population of western Uttar Pradesh, India. The main goal of the present study was to assess the impact of urban and industrial activities on the water quality of river Ramganga at the Bareilly. For this, river water samples were collected from five different sites all along the route of Ramganga main streamline and were analyzed for chemical oxygen (COD) demand and biochemical oxygen demand (BOD) levels. There were variations for BOD (2.75–6.84 mg l⁻¹?) and COD (23.90–43.60 mg l⁻¹?) levels at different sites. The BOD values noticed were almost within the permissible limits of USPH and WHO (5mg/L and 6mg/L) at most of the sampling sites. The COD values in the present study remained higher than the COD values published for most of the other Indian rivers by CPCB (1991). The values generally exceeded the tolerance limit of 5mg/L, prescribed by USPH and WHO. This is the study on itself and the interrelationship of human activities and river water quality makes the study significant and interesting to assess the pollution load discharges in catchments of Ramganga at Bareilly. Overall, the water quality of Ramganga was relatively poor with respect to its use for domestic purposes.

Keywords: River Ramganga, water quality, BOD and COD

B-10. HEAVY METAL CONTAMINATED VEGETABLES: HARMFUL FOR HUMAN HEALTH

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Abstract

India is an agricultural land and most of the farmers are depend on rain water for their crops but there is great scarcity of fresh water for irrigation purpose. Surface water get polluted directly or indirectly which causes pollution in agricultural products. This metal contaminated water uptake by vegetable plants may have adverse impact on human health as well as animals. Heavy metals like Cu, Fe, Zn, Mn and Ni are essential for growth and development if they are present in human body in small quantities but their excess concentration give harmful effect on our body. To increase the yield of agro products farmers used compost, manure, fertilizers, industrial waste and municipal effluent for irrigation purpose that ultimately absorbed by the roots and other plants part when these vegetables and crops are consumed by humans and animals they effect the digestive tract, nutritional status and their age also. These heavy metals accumulated in kidney, bones and causes various health problems especially cancer. There is a great need to maintain the concentration of heavy metals to reduce their impact on food chain because vegetables are the main source of micro and macro nutrients, vitamins, antioxidants and proteins. Tendency of plants to accumulate heavy metals not only depend upon environmental contamination but also the plant species. Leafy vegetables are more contaminated than non leafy vegetable by heavy metal because leafy vegetables have higher transpiration rate. Beside this season also affect the concentration of heavy metals. in summer season more uptake of heavy metal occurs by the plants. Acidic soil is also favorable for heavy metal accumulation. To avoid this, heavy metal contaminated sites are used for flowering or timber purpose not for vegetables.

Keywords:

B-11. THE PROBLEM OF ARSENIC ACCUMULATION IN RICE: SUSTAINABLE AND FEASIBLE SOLUTIONS

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Abstract

The problem of geogenic arsenic contamination is widespread in Gangetic plains in Indian states of Uttar Pradesh, Bihar and West Bengal. In this region, arsenic concentration of groundwater is several folds higher over the safe limit and toxic levels of arsenic have been reported in crop plants, vegetables, fruits and fish and meat products. In the affected states, rice is the main crop and staple food for humans. Rice is more efficient in arsenic accumulation in its grains than other cereal crops. The problem can be tackled either through remediation of contaminated water or through management of agronomic practices for growing safe rice. Further, there are known variations in rice genotypes in terms of arsenic accumulation in their grains. The grains of these contrasting genotypes show variations in accumulation of other mineral elements as well as in amino acid contents. Hence, genotype screening and selection and development of suitable genotype for cultivation in affected regions are promising approaches. With respect to agronomic practices, supplementation of rice crops with redox active chemical, thiourea, has been proved to be a promising approach in lab conditions. In addition, other chemical (nitrogen) and biological (microbial consortia) amendments could pave way for reducing arsenic in rice grains. Hence there lies possibility of its application in field conditions for safe rice cultivation. The presentation highlights key findings in the direction of suggested possible approaches to tackle the issue of arsenic contamination of rice.

Keywords: arsenic, genotype, nitrogen, microbial consortia, rice

B-12. FISHERIES ENVIRONMENTAL MANAGMENT AT TIDE SLUICE FOR NHIEU LOC - THI NGHE CANAL OF HO CHI MINH CITY

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Abstract

The Nhieu Loc-Thi Nghe (NL-TN) Canal runs roughly 9,319.4 meters through seven central districts in Ho Chi Minh City

(HCMC), spreading out an water surface area of 383,938.6 m² and total water volume of 1,513,618.8 m³. In 1993, HCMC launched a US\$120 million effort to resurrect such polluted canal and brought the black water canal back from the dead. Though the ecological recovery of the canal has proven hard to gauge, fish have returned to its waters. The fisheries environmental study was carried out during Jan 2015 to Dec 2015 in order to investigate: (1) the carrying capacity for fish stocked in the canal; (2) the environmental issues for fish stocked; and (3) the tidal management regimes for fisheries' environment. In this paper, the results focus on the tidal management regime based on the tide sluice operation that regulating water flows from the Saigon River. As the aims of the tide sluice is just for city flooding control, the fisheries management aspect was not considered thus there were lack of data or research concerned. This study selected the dissolved oxygen (DO) as water quality indicator for fish in which its fluctuations on times, spaces and the tide were discussed. The comparison of monthly tidal fluctuations between Saigon River and NL-TN Canal were carried out in order to suggest a suitable operation regime for the tide sluice that regulating water flows from the Saigon River. Research results provided a fisheries perspective to serve the tide sluice management for NL-TN Canal of HCM City.

Keywords: Fisheries environmental management, tide sluice, Nhieu Loc - Thi Nghe canal.

B-13. EVALUATION OF THE PERFORMANCE OF LUMILITE COMBINED WITH ACTIVATED SLUDGE IN DOMESTIC WASTEWATER TREATMENT

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Abstract

Activated sludge has been widely employed in wastewater treatment. However, it is not always effective, especially in the nitrogen removal process. The combinations of activated sludge and different types of zeolite have been potentially showed to be alternative solutions yet applied in Vietnam. In this study, an experimental aerated pilot of Lumilite – a zeolite based material composited with activated sludge (L+AS) was established to continuously treat domestic wastewater in twelve days to assess the treatment capacity of COD, BOD₅, TSS, TN and TP by comparing with the performance of control pilot consisting of aerobic activated sludge (AS) operated simultaneously under the same conditions. Input COD, BOD₅, TSS, TN, and TP loads were 434.0 ± 12.0 , 214.0 ± 5.0 , 75.0 ± 5.0 , 77.0, and 7.6 mg/l, respectively. Treated wastewater was collected every three days for load residue determinations. The results showed that L+AS was more powerful than AS in reducing all examined pollution concentrations throughout the experiment. Specifically, TN reduction performances of L+AS ranged from 34.9% to 56.4% and peaked on day 9, whereas those of AS were 41.4 – 50.1% and peaked on day 6. Treated wastewater quality met respective column A standards of QCVN 14:2008/BTNMT in L+AS after 6 days of operation. In contrast, BOD₅ outputs of AS did not clear the column A standards to the end. This study implied that the composition of Lumilite and activated sludge could be an applicable treatment for high shock loads of pollutants in Vietnam.

Keywords: lumilite, zeolite, wastewater, sludge, treatment

B-14. SUSTAINABLE ADAPTATION TO CLIMATE CHANGE IN SOC TRANG COASTAL ZONE- HAU ESTUARY-MEKONG DELTA BASE ON ITS ECOSYSTEM SERVICES

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Abstract

Soc Trang province is located along coastal zone area near Hau estuary, which is rich natural resources and diverse unique ecosystems by interfacing between upstream freshwater flow and saltwater tidal. People in the area are highly reliant on aquatic ecosystem productivity and related aquaculture cultivation. This coastal zone is not only at risk from unsustainable farming and development, it is also negative ecological consequences from affected by the impacts of climate change, which will cause the increased intensity of storms, salinity intrusion by floods and rising sea levels. This study was surveyed on typical ecosystems and their services exist in the area. There are mangrove forests, coastal sand dune, fresh water and tidal ecosystems which provide ecosystem services for local communities in their livelihood and resilient to the adverse challenge of climate changes.

Keywords: ecosystem services, climate change adaptation, Soc Trang coastal zone

B-15. RISK ASSESSMENT AND RISK MANAGEMENT IN DOMESTIC WATER SUPPLY SYSTEM IN PLEIKU CITY—GIA LAI PROVINCE

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Abstract

Water is essential for maintaining life, ensuring a safe and continuous supply of water, therefore, should be given the priority. Developing countries often face a number of problems with domestic water supply systems such as treatment plants that use old technology, degraded equipment leading to inefficient treatment, and a network of degraded piping, which could cause re-pollution of treated water during transport. Pleiku city is located in the Central Highlands region of Vietnam, and the city has built two treatment plants and a network of water supply pipelines in the core area. An analysis of the current state of the water supply system including water supply, treatment plant and pipeline system, helps identify existing problems in the system. Through mixed methods, hazards or hazardous events identified as a basis for risk assessment. The assessment was performed by experts and senior people, and then considered the existing measures to reassess the residual risk. Finally, priority risks are identified to focus on proposing the possible solutions that will improve the performance and management of domestic water supply systems.

Keywords: Water supply, risk management, water pollution

B-16. ISOLATION AND IDENTIFICATION OF THERMOPHILIC BACTERIA FROM HOT SPRINGS IN THE SOUTH OF VIETNAM

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Abstract

The thermophilic bacterium is one of the objects for various worldwide scientific studies by microbiologists. This study aimed to isolate and identify thermophilic bacteria from hot springs in Ba Ria - Vung Tau and Khanh Hoa provinces, Vietnam. In the results, six thermophilic bacterial strains (NS1, NS3, NS4, BS5, NW6, and BB9) that could grow at 55°C were purified from the hot spring ecosystems. All isolates were rod shape, Gram-positive, and endospore forming. The results of 16S rDNA sequences and phylogenetic analysis showed that these isolates belonged to group I of *Bacillus* genus (the thermophilic group). In which, strain NS1 (99%) was identified as *Bacillus depressus*, NS3 (100%) and NS4 (99%) are *Bacillus licheniformis*, while BS5 (100%), NW6 (99%) and BB9 (99%) are *Bacillus subtilis*, *Bacillus cereus*, and *Bacillus tequilensis*, respectively. They are promising strains for industrial applications, such as the production of extracellular enzymes that can be stable at high temperature. In addition, this study provides a useful insight into the applications of *Bacillus* sp. as a key to convert the biomass into biopolymers, bioethanol, biopropanol, and clean fuels (H₂ production).

Keywords: 16S rDNA, *Bacillus* sp., hot spring, thermophilic bacteria.

B-17. ASSESSING SITUATION OF GROUNDWATER EXPLOITATION AND PROPOSING THE MANAGEMENT SOLUTION IN PLEIKU CITY, GIA LAI PROVINCE

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Abstract

Water plays an important role in human life and production, especially groundwater. Although groundwater accounts for only 0.9% of global water supply, it is preferred by humans. Otherwise, surface water sources are often polluted and the exploitation depends on seasonal fluctuations. Therefore, groundwater is less influenced by external factors and the quality is

stable. In recent years, Pleiku city in particular and Gia Lai province in general have been on industrialization and modernization. The development of environmental protection in which the water environment, especially resources groundwater is a very important concern. Therefore, the assessment of the status of exploitation and use of groundwater, as well as the quality and quantity of groundwater is essential. The obtained results indicate that groundwater in Pleiku city was under shortage for many activities, especially in agricultural production. Understanding about groundwater in research region is very necessary for the management of underground water at the present and in the future.

Keywords: groundwater, shortage, pollution, assessment, management

B-18. CONCENTRATIONS OF HEAVY METALS IN WATER FROM THE SOUTHERN COAST OF VIETNAM

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Abstract

Concentrations of heavy metals (Cd, Pb, Hg and As) in water collected from seven coastal provinces (Kien Giang, Ca Mau, Bac Lieu, Tra Vinh, Ben Tre, Tien Giang and Ho Chi Minh City) between December 2012 and July 2015 were evaluated. The average total concentrations ($\mu\text{g/L}$) of As, Cd, Pb and Hg in water ranged from 2.90 to 6.38, < 0.039 to 0.322, 4.26 to 10.5 and < 0.01 to 0.118, respectively. In general, no statistically significant differences were found for total concentrations of heavy metals between two seasons and among provinces. The average concentrations ($\mu\text{g/L}$) of As, Pb and Hg in suspended particulate matters (SPM) ranged from 0.392 to 7.32, 0.365 to 18.7 and < 0.01 to 0.038, respectively; whereas, concentrations of Cd were not detected in most of SPM samples. There were positive linear relationships between concentrations of heavy metals in water and SPM, except Cd. The results showed that the concentrations of metals analyzed in water remained below quality guidelines for the protection of aquatic life recommended by international and Vietnamese organizations. However, As levels in 2/103 and 5/103 of water samples exceeded the QCVN 10:2008/BTNMT for maximum permitted level using for aquaculture and aquatic life protection (20 g/L) and the Canadian water quality guidelines for the protection of aquatic life (12.5 g/L).

Keywords: Heavy metal, southern coast, suspended particulate matter, water.

B-19. ASSESSING ECOLOGICAL CHANGES IN THE RIVER BASIN OF DA DANG RIVER, LAM DONG PROVINCE USING GIS

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Abstract

Da Dang river basin, Lam Dong Province, one of the major tributaries of Dong Nai River, is an area with diverse ecosystem types and biological resources. Therefore, effective management of the ecosystems particularly the natural ecosystems plays an important role in the sustainable development of the local area. In this study, we used the Geographic Information System (GIS) tool to develop the component maps and identify the variation in the total area and distribution of nine natural ecosystems types of Da Dang river basin, Lam Dong Province over the period from 2010 to 2015. Our results showed that the natural and human had a substantial impact on the studied natural ecosystems. These factors caused the increase or decrease in the area of the constituent ecosystems. Specifically, the area of the primary forest ecosystem was decreased considerably (3,577.15 hectares) whereas there was an increase in the area of the secondary forest ecosystems, the forest ecosystems, and the residential ecosystems.

Keywords: ecosystem, ecological changes, Geographic Information System (GIS), river basin.

B-20. ASSESSMENT OF NATURAL AND SOCIO-ECONOMIC CONDITIONS OF ETHNIC MINORITY COMMUNITIES WITHIN LANG BIANG BIOSPHERE RESERVE

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Abstract

The main objective of the survey in Bon Dung 1 village was to collect necessary data and information as a basis to establish and improve the cooperation management mechanism, which had been implemented in some villages, and to determine potential options for livelihood improvement. Specific objectives include: (1) To survey the existing situation, usage and management of forest and agricultural resources in the village, including access to and legal and practical ownership of the resources; (2) To classify and assess current status of households according to their income, livelihoods and forest access; focusing on groups at risk, vulnerable groups and groups with differences in production management, access to finance and market and livelihoods development. In preliminary village survey, collected secondary data, including documents, reports and maps from different stakeholders. Survey and information collection activities in Bon Dung 1 village were conducted and using PRA tools. The survey results show that the major differences between household economic groups are the lack of arable land and labor. But the shortage of labor is believed to have strongest influence to household's income. Among the livelihood activities, except the source from gathering FNTF, all other sources have participation of every households groups. In agriculture, the gap of income between groups is caused by inadequate investment. The informal credit from private lenders can meet the emergent need of households on cash meanwhile the formal credit cannot. But this informal credit also lead to the situation that farmers have to bear the loss of income due to very high interest rate as well as other problems.

Keywords: livelihood, labor, income

B-21. APPLYING ASP.NET, OPENLAYERS AND GEOSERVER FOR MANAGING LAND INFORMATION IN WARD 1, GO VAP DISTRICT, HO CHI MINH CITY

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Abstract

With the strengths that WEBGIS brings, as well as the advantages of the Visual Studio tools provided by Microsoft, the building of WEBGIS in the Ward 1 area, Go Vap District, Ho Chi Minh City will provide basis and premise for land management in a security, quick, in time manner and people will have a specific, exactly look up information from their land parcels. Through the research and studying on WEBGIS technology showed that GeoServer-openLayers is a open source code technology which has many advantages and simply for building web maps, brings an effect in land administration, allows land users and managers accessing, exploiting information for each parcel, storing, monitoring land information to decide problems which relate to land delivering, renting, exchanging, changing land use purposes. This is a foundation that established a legal relationship between the Government and land user. Data system was established on standardized layers of land, present land use, soil by softwares such as: Microstation, Viliis, Arcgis. This is source of the important input data to carry GIS applications as accessing, interpreting information layers to build Websites, thematic maps. The research helps forcing quickly the speed, increasing the unity and science of looking up informations of land parcel for citizens who have land information demands in the case study.

Keywords : WebGIS; GeoServer; OpenLayers, open source code, land information;

B-22. APPLICATION OF GIS TECHNOLOGY FOR BUILDING MAP OF SALINE INTRUSION IN CAN GIUOC DISTRICT, LONG AN PROVINCE

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Abstract

Saline intrusion, which can be facilitated by natural conditions, human activities and climate change, is a big threat to mankind

from economic, social environmental perspective. It is increasingly affecting the ecological zones and systems of agricultural cultivation, especially in the coastal low-lying areas of the Mekong River Delta. Therefore, sustainable resource management is urgently needed. In this study, based on figures and parameters in the stations in the study area the high waterline interpolation in Can Giuoc district, Long An province, according to sea level rise: 1 m; 1.2 m; 1.6 m; 1.8 m; 2 m; 2.2 m. Then, using the tools in ArcGIS Desktop 10 software supplement related objects on the layer of DEM incorporating some actual investigated results (data from measuring salinity of systems stations) to build map of saline intrusion. From this result, research will be advance to the reviews and predictions in details to areas which are salty according to different levels as a background to suggest, orient solutions for cultivating of agricultural land suitably and sustainably in condition of climate change and sea-level rise is increasing in the area of research.

Key words: GIS, map of saline intrusion, DEM, salty soils

B-23. INCLUDING MANGROVES IN THE REDD + AGENDA TO IMPROVE LIVELIHOODS OF COMMUNITIES FOR CONSERVATION

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Abstract

The research based on the desk review of secondary information on implementation of REDD+ in Vietnam and the consultations with Vietnam REDD+ Office, UN-REDD program, and other stakeholders involving to REDD+ agenda in order to including mangrove forest into REDD+ agenda. The research found that, Viet Nam is one of the most vulnerable countries to the adverse effects of climate change, facing potential extensive economic damage and loss of life. The country therefore has much to gain by joining the international challenge to mitigate GHG emissions. Mangroves play very important role in coastal protection, biodiversity conservation. The forest is key factor to adapt climate change and improving livelihood of poor human communities in coastal zones. Mangroves defined as one forest category and monitored in National Forest Inventory program. The carbon stock of mangrove was separately reported in the Viet Nam's Submission on Reference Levels for REDD. REDD+ for mangrove have been piloting in Provincial REDD+ Action Plan (PRAP) and five SiRAPs in Ca Mau province. For COP 21 in Paris in 2015 and COP23 in Bonn, Vietnam submitted concrete plans for mangrove protection and rehabilitation in coastal Red River Delta and Mekong Delta. Government of Vietnam pays much effort prioritizing investment for mangrove forest protection and rehabilitation. REDD+ projects offer great potentials for mangrove protection, avoid of deforestation due conversion of mangrove forests for other uses. Considering drivers of mangrove deforestation and degradation, and barriers to enhance forest carbon stock, shortcoming in institution and policy aspects, and the lessons learned from a number of successful mangrove carbon projects such as the MAM or the SGF projects have been implemented by IUCN and UN-REDD program in Ca Mau, the research proposed REDD+ projects for mangrove should consider to following areas (1) Supporting ecological forest-shrimp farming; (2) Supporting monitoring mangrove carbon stocks; (3) Involvement of community and private sector into mangrove and coastal ecosystem management; (4) Multidisciplinary coordination in mangrove forest management; (5) Mangrove rehabilitation in abandoned extensive farming.

Keywords: REDD+, livelihood, mangrove

B-24. ROLE OF GREEN CHEMISTRY IN CONTROLLING ENVIRONMENTAL POLLUTION AND CHEMICAL HAZARDS

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Abstract

Chemistry brought revolution in human life by the discovery of drugs, antibiotics, improving world's food supply due to the discovery of hybrid seeds, herbicides, insecticides, pesticides, fertilizers etc. These advancements generated a lot of toxic and hazardous chemicals that are not only harmful to our health but also damaging our environment and become a major challenge for human now a days. The pollution has received the attention of researchers and thus introduces new concept 'Green

chemistry'. Green chemistry is the design of chemical products and processes that reduce or eliminate the use or generation of hazardous substances. Green chemistry encompasses all aspects and types of chemical processes that reduce negative impacts to human health and the environment. The three main developments in green chemistry include the use of super critical carbon dioxide, water as green solvent, aqueous hydrogen peroxide as an oxidizing agent and use of hydrogen in asymmetric synthesis. In order to reduce carbon footprint, the traditional methods of heating are increasingly replaced by microwave heating. It also saves a lot of time. Infact, Green chemistry is a type of Pollution Prevention. This paper mainly highlights on applying Green chemistry principles to day to day life to control environment pollution as well as chemical hazards.

Keywords: Pollution, Chemical hazards, Green chemistry, Green solvents.

B-25. ALKALI HYDROLYSIS AND FERMENTATION OF *Prosopis juliflora* FOR LIGNO-CELLULOSIC ETHANOL PRODUCTION

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Abstract

One of the greatest challenges for the growing society in this century is to meet the energy demand for agricultural motive power, transportation, heating, lighting and industrial processes, which have significant impact on the environment. One of the promising alternative fuels to gasoline in the agriculture and transport sector is cellulosic ethanol. It is not only produced on a renewable basis from various biomass sources, including sugarcane, corn, trees, grasses, yard wastes, agricultural residues, and forestry wastes, but also cause less net greenhouse gas emissions during combustion. Lignocellulose-to-ethanol conversion is a promising technology to supplement corn-based ethanol production. For ethanol production; feedstock availability, its variability and sustainability are the main issues to be addressed. Now a day research on non-food crops and cellulosic materials is drawing greater attention because they are cheap, easily available, and profitable as compared to food crops and also reduce inflation of the cost of food crops used for cellulosic ethanol production. An investigation was conducted to explore the potential of *Prosopis juliflora* for lignocellulosic ethanol production. Sodium hydroxide (NaOH) pretreatment of *Prosopis juliflora* woody substrate was performed at 100, 120 and 140 °C in an autoclave at 15 psi, with combination of residence times (15, 30, and 60 min) and NaOH concentrations (1, 2 and 3%). Hydrolysis was carried out with CTec2® Cellulase enzyme (Novozymes, China) at different loading levels (0, 15 and 30%) on the untreated and selected pretreated samples for fermentable sugar production. Batch fermentations of enzymatic hydrolyzates were carried out with 5 g/l *Saccharomyces cerevisiae* at 30 °C. The maximum rate of saccharification (26.07 mg/g/h) was attained at 12 h for sample pretreated at 120 °C, 60 min, 2% NaOH loaded with 30% enzyme. A total maximum yield of saccharification (583.9 mg/g) was achieved after 72 h of incubation, with a saccharification rate of 8.11 mg/g/h. The maximum carbohydrate conversion of 90.86% was recorded loaded with 30% enzyme. Fermentation of hydrolyzate containing 46.71 g sugar/l sample gave maximum ethanol of 21.84 g/l with a yield of 0.47 g/g sugar (0.27 g/g dry biomass) and productivity (0.91 g/l/h) after 24 h of fermentation.

Keywords: Alkali hydrolysis, Prosopis juliflora, lignocellulose, fermentation, ethanol production

B-26. BUILDING TOOLS TO CONVERT DATABASE STRUCTURE FOR COMPLETING THE CADASTRAL DATABASE OF DISTRICT 6, HO CHI MINH CITY

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Abstract

A modern land information system with a complete cadastral database for managing, exploiting and sharing land information in the most effective way is very necessary to complete and modernize the land management system of each country. However, as one of the first unit in our country that got cadastral database, District 6 - HCMC was built the database on their own way. Therefore, the process, content and data structure of this database is not correct to current regulations and not synchronized with cadastral database of other localities. This is the reason why District 6 has encountered many difficulties and inadequacies in managing, exploiting, operating and sharing the cadastral database, especially integrating database to upper levels. The study has used C#.Net programming language in building tools to convert database structure and

successfully transformed the cadastral database of Ward 9, District 6 from existing structure to new structure in accordance with the regulation at Circular No. 75/2015/TT-BTNMT of Vietnamese Ministry of Natural Resources and Environment. The results have helped complete and improve the accuracy of cadastral database of Ward 9 - District 6 and contributed effectively to the local land management, which aims to form an transparent, perfect and efficient land administration system.

Keywords: Cadastral database, C#.Net programming language, database structure, database standard, database integration.

B-27. ASSESSMENT OF SOIL MOISTURE ADEQUACY FOR RAINFED CROPS UNDER SEMI-ARID AGRO-CLIMATIC CONDITIONS : A CASE STUDY

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Abstract

Land Resource and intensive hydrological investigations of Jagir-Venkatapur micro-watershed (4D2D8D2a. & 4D2D8D2b) under semi-arid agro climatic conditions in Raichur District of Northern Karnataka reveal that moderate to deep clay soils (100 to > 150 cm) are susceptible to moderate erosion due to lack of comprehensive conservation measures. The erratic monsoonal rainfall pattern (30-54 rainy days) with moderate peak intensity (30- 60 mm ha⁻¹) and event depth (0.5 -20 mm) coupled with low constant infiltration rates (12-15 mm ha⁻¹) have caused the inconsistent variation in profile soil moisture (40 to 8.5%) during cropping season. The analysis of profile soil moisture variability across the micro-watershed throughout the prevailing red gram cropping season as compared to Evapo-transpiration using net radiometer has shown possibility 175 days as length of growing days. During 2016-17, The red gram crop commensurating with dwindling soil moisture, crop yield drastically varied in the range of 7.5 -15 t ha⁻¹ which demands need for soil conservation measures to tide over the moisture stress and to ensure uniform crop yield.

Keywords: conservation, soil moisture, redgram, net radiometer

B-28. SITUATION AND SOLUTION TO COMPLETE THE IMPLEMENTATION MECHANISM OF LAND FINANCIAL POLICIES AT DIST.9, HO CHI MINH CITY

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Abstract

Research object: Analysing many inextricable problems in legal documents about land price, land price determined-method, detailed regulations in legal documents about land financial policies. Promoting some methods to solve the inappropriate obstruction when performing land financial policies and many conflicting and accumable issues in land valuation to complete the implementation mechanism of land financial policies. This project is only researched in practical implementation mechanisms of land financial policies within urban area, illustrated by data collection in district 9, HCM city. Using the document synthesis method, the described statistical method, the proven method, the qualitative method, the comparative method, the expert method combined with the survey method and practical experience. Achieved results as following: (1) Theoretical studies about land financial policies as a whole, then clarifying the tax nature, and implementation mechanism of land financial policies. (2) Systematically analyzing the current land financial policies with the proven data in the district 9. Implementation mechanisms of land financial policies are studied in the overall relationship with the issues related to land state management, i.e. compensation when retrieving land, categories of financial obligation and land price. Then showing the achieved results (3).

Keywords: Land policy, land financial policy, land price, land valuation, compensation

Theme C

Life and Biomedical

Sciences

C-1. NEW SHIITAKE *L. PLATINEDODES* AND *L. LATERITIA* IN SOUTH VIETNAM - TROPICAL SPECIATIONS OF *LENTINULAEDODES* - REVISED AND CULTIVATED DATA

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Abstract

L. platinedodes and *L. lateritia* found from South Vietnam contributed for the International Project lead by David S. Hibbett et al. 2016, have been revised and cultivated at large scales. *Lentinulaplatinedodes*, sp. nov. with novel morphological and molecular characters, and particularly ITS sequences have comparatively analyzed to determine a new clade between the New and Old World Shiitake populations of *Lentinula* spp. as resulted from intercontinental dispersals of *Lentinula edodes* and segregations of taxa, and *Lentinula lateritia* as one of the secondary speciation. The comparative data and cultivation experiments of these taxa have been undergoing and their ontogenesis in cultivations are investigated to show the primitive forms of *Lentinula edodes*, more or less fibrillose and pigmented as well as from which the tropical forms and speciation of *Lentinula edodes* with glabrous pilei and somewhat slender stipes deprived.

Keywords: *Lentinulaplatinedodes*, *L. lateritia*, Shiitake tropical speciation, *Lentinula* phylogenetic relationship

C-2. THE SIMILARITY AND DIFFERENCE IN KARYOTYPE OF F1- HYBRIDS OF MALE GAUR (*BOSGAURUSGAURUS*) WITH DOMESTIC CATTLE (*BOSTAURUS INDICUS*) IN SOUTH VIETNAM FROM GAYALS (*BOSGAURUSFRONTALIS*) IN SOUTH CHINA

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Abstract

The phylogenetic analysis based on whole-genome suggested that Gayal was a hybrid descendant from crossing of male wild gaur and female domestic cattle to form fertile populations with karyotype $2n=58$ in Yunnan, South China. The Gayal karyotypes shown the Robertson translocations so clear 2/29 and completely paired. Since 2009 at Phuoc Binh National Park, Ninh Thuan, South Vietnam, one male gaur wild makes inter courses with the females and more 20 calves suspectedly hybrid F1 have been born and recorded upto 2016. The results of karyo type analysis of calves suspectedly hybrid F1 obtained have been shown as follows:

1. The chromosome number $2n=58$ for 14 hybrid individuals both male and female, expressed as the intermediate results from gaur ($2n=56$) crossing with domestic cows ($2n=60$).
2. The short-arms of one of the chromosome pairs No. 1, 2 and due to non-paired chromosomes No. 28, 29 are complicated results of Robertson translocations, and they are not paired, so the inbred crossings of F1 unfruitful, the real F2 (crossings between F1 male and female individuals - inbreeding) have not yet obtained for high parental nonfertility, experiments are undergoing.
3. Two backcross female individuals and one male obtained from F1 female with a bull and F1 male with domestic cow, due to F2, possess the balance chromosome numbers $2n=60$ promising for practice of further breeding.

Present Gayals in South China would be similar to current F1 hybrids of wild male Gaur x domestic cattle in South Vietnam, however, their genomes comparatively questionable.

Keywords: *Gayals*; *Gaur*; *Hybrids*; *Karyotype*; *Backcross*.

C-3. CURRENT STATUS OF *HUMPHREYAENDERTII* (GANODERMATACEAE) FOUND IN CATTIEN AND PHUOCBINH NATIONAL PARKS IN SOUTH VIETNAM

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Abstract

Fungi of the Ganodermataceae have been studied intensively during last 50 years for their importance as *MateriaMedica* within almost taxa, particularly promising in *Ganoderma* - type genus, but quite lacking in *Humphreya* due to insufficient investigations in biodiversity and poor practical experience of utilizations. *Humphreyacoffeatum* the type species has been found the first time in Latin America, then in South East Asia and South China. *HumphreyaLloydii*, the second one recorded in Africa with *H. eminii* - the robust one, at that time 4 species genus designated, also has been found in Africa, then in South East Asia and South China. Both the species mentioned and described seem included the velvety and semi-glossy - glossy forms, but almost specific basidiospores with variable reticulate ornamentations in the Ganodermataceae. However, in Vietnam the first representative of *Humphreyaendertii* recorded quite semi-glossy both the pilei and stipes. In 2007 and 2014 we have collected some specimens in Cat Tienans in PhuocBinh National Parks adjointive Dong Nai and NinhThuan Provinces, South Vietnam, determined as *Humphreyaendertii*, with specific basidiospores, quite similar to both *H. Lloydii* and *H. coffeatum*. The sequencing results of ITS1-4 have been obtained in comparison with latest sequences of representatives in the Ganodermataceae to show high similarity and close phylogenetic relationships between taxa including in 6 genera: *Ganoderma* Karst., *Amauroderma* Murr., *Magoderna* Stey., *Tomophagus* Murr., *Haddowia* Stey and *Humphreya* Stey., inspired of the principally amaurodermoidbasidiospore type of the *Foraminispora* and *Furtadora* newly-suggested at generic rank in 2017.

Keywords: *Humphreya* spp, South Vietnam, ITS, semi-glossy, spore

C-4. GENETIC DIVERSITY OF *BALANTIDIUM COLI* CAUSED DIARRHEA IN WEANED PIGS SAMPLED FROM PIG-FARMS

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Abstract

The objective of this study was to determine the genetic characterization and diversity of *Balantidium coli* caused diarrhea in post-weaning pigs collected from pig farms of southern, Vietnam. Twenty field isolates of *B. coli* were isolated from twenty 30-to-45 days old post-weaning pigs burden diarrhea for sequencing and genomic analysis. The findings showed that nucleotide sequence similarity of among *B. coli* isolates in this study ranged from 97.4% to 99.6%. The homology between the studied isolates and the reference strains of different countries showed the variety. The genetic characterization in these field isolates appeared the pattern of mutation including replacement, depletion and insertion of one or more nucleotides compared with reference strains (SP08-Spain). *B. coli* isolates in this study were dropped into two groups of phylogenetic tree, group A of the same clade with reference strain JAP13-Japan, C1-China, C2-China and group B of the same clade with reference strain SP08-Spain, PHIL10-Phillipines. In particular, the *B. coli* isolates collected in Dong Nai and Ben Tre had the high genetic diversity which were divided into both groups (A and B) in of phylogenetic tree. Results showed that at the 18S rRNA gene segment of field *B. coli* isolates present three existed pattern of mutations and genomic diversity.

Keywords : genomic diversity, *Balantidium coli*, diarrhea, weaned pigs.

C-5. COMPARING IMMUNOLOGICAL EFFICACY OF INFECTIOUS BURSAL DISEASE M.B STRAIN VACCINE WITH COMMERCIAL VACCINES

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Abstract

Gumboro virus live vaccines are very common to prevent Infectious Bursal Disease (IBD) on chicken. However, the successful vaccination depends much on maternal antibodies breakthrough, vaccination technique, immune system of chickens, and especially strains in the vaccine. The purpose of this study was to compare a new vaccine with M.B Gumboro virus strain and the other commercial vaccine strains (LIBDV and 2512) in terms of fast antibody immune response and interference to ND vaccination. Six white broiler chicken houses, each with 15,000 to 16,000 chickens, were divided in two groups: two houses using M.B strain at 7-8 and 14-15 days of age (group 1), and four houses using a vaccine program with LIBDV strain at 9-10 days old and 2512 strain at 19-20 days old (group 2). Blood samples were collected immediately prior to the 1st vaccination, at 21, 28 and 35 days old for IBD and ND antibody. Comparison of lesion scores and uniformity of the bursa of Fabricius (BF) at 28 and 35 days old was carried out. Results showed that both groups had good response immunity, but M.B strain group showed significantly higher IBD antibody titres at 28 and 35 days old. Antibody titres for ND and histopathological lesion scores of BF were not significantly different between 2 groups. The BF in group 1 is more uniform and less lesion when comparing with group 2. In conclusion, IBD vaccine with M.B Gumboro virus strain can give better immunological efficacy.

Keywords: M.B strain, maternal antibodies breakthrough.

C-6. SUCCESSFUL BIOSYNTHESIS OF SILVER AND GOLD NANOPARTICLES FROM CRINUM LATIFOLIUM L. LEAVES'S EXTRACT WITH FULL ANTIBACTERIAL PROPERTIES

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Abstract

Nanotechnology is being known to have diverse applications from agriculture to medicine. Conventional procedures use chemical and physical methods to synthesize the nanoparticles causing the damage to human if applied. Recently, the novel synthesis of nanoparticles from the plants is considered as the prospect of nanotechnology. In this study, Silver nanoparticles (AgNPs) and Gold nanoparticle (AuNPs) were synthesized by using the *Crinum latifolium* L leaves's extract. The UV-Vis technique is used to optimize the process of the nanoparticle's synthesis. The result showed the optimal condition for both AgNO₃ and HAuCl₄.3H₂O solution is 1.5mM in 80 minutes, and the ratio of extract per solution of AgNO₃ or HAuCl₄.3H₂O is 1:6.5. Using TEM and XRD techniques to determine the characteristics of synthesized nanoparticles, although the results showed the size of AgNPs ranging from 20 to 27nm significantly larger than that of AuNPs from 15 to 17nm, both synthesized nanoparticles are determined to be highly durable through Zeta's measurement. The spectrum results from FTIR and EDX confirmed that the materials used to synthesize nanoparticles contained significantly high amounts of organic compounds. Remarkably, while AuNPs did not show any antibacterial activity, AgNPs exhibited strongly resistant properties to *Agrobacterium tumefaciens*, *Escherichia coli* and *Trichoderma harzianum* with the MIC observed 0.0162; 0.0215 and 4.86ig/iL, respectively. Certainly, this study would provide the extremely valuable clues in the strategy to finding the novel procedures to synthesize the green and safe nanoparticles including AgNPs with the properties to strongly resist against the harmful microorganisms without causing damage to environment.

Keywords: Silver nanoparticles, gold nanoparticles, novel synthesis, Crinum latifolium L leaves's extract, and antibacterial activity.

C-7. OPTIMIZE PROTOCOL TO PRODUCE ANTIGEN MASS OF INACTIVATED ACTINOBACILLUS PLEUROPNEUMONIA IN LABORATORY CONDITION

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Abstract

This study aims to produce antigen of *Actinobacillus pleuropneumoniae* (APP) which is the causative agent of pleuropneumonia in swine. Three liquid medium (BHI broth, MHI broth and TYE broth) was used to evaluate the growth ability of APP in the condition of supplementing with 10 µg of nicotinamide adenine dinucleotide per ml of media. Resultant optimal media was used to determine its growth curve and mean generation time (MGT). To generate inactivated whole-cell antigen, the APP suspension was treated with different formaldehyde concentration (0%, 0.05%, 0.1%, 0.2% and 0.4%). Results indicated that BHI medium was the best for growing APP, in which, the lag phase was 2 hours and the time to enter exponential phase was 2-6 hours, and the stationary phase lasted for 18 hours before death phase. The mean generation time (MGT) is about 27 to 28 minutes. The minimum formaldehyde concentration and time to kill all the APP cells was 0.1 % at 2 hours.

Keywords : Actinobacillus pleuropneumoniae, inactivated whole-cell vaccine, growth curve, mean generation time (MGT).

C-8. DEVELOPMENT OF MULTIPLEX PCR TEST TO DIFFERENTIATE HAEMOPHILUS PARASUIS SEROVAR 4 AND SEROVAR 5/12 FROM HPS SPP. IN SWINE

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Abstract

Haemophilus parasuis (HPS) causes polyserositis in swine characterized by pneumonia, pleurisy, peritonitis, cardiomyopathy, arthritis and meningitis. HPS serovars 4, 5 and 12 are among the most prevalent and pathogenic strains circulating in many countries. Early detection, diagnosis and treatment can prevent serious problems, thus in the current research, a multiplex PCR (mPCR) test was developed in order to improve the speed of diagnosis and distinction of these serovars from HPS spp. Three pairs of specific primers were designed to detect HPS spp. (peptidase M15 gene), HPS serovar 4 (gene wciP) and serovar 5/12 (gene wcwK) with predicted products of 275 bp, 180 bp and 373 bp respectively. The thermal cycling condition was: initial denaturation at 95°C in five minutes; followed 40 cycles of 95°C/20 seconds, annealing temperature of 63°C/30 seconds and elongation step at 72°C/30 seconds; and a final elongation of 72°C for 5 minutes. The detection limit of mPCR was 200 copies/reaction for the three genes. Sequencing of mPCR products performed with clinical samples collected from HPS-suspected pigs indicated that the mPCR test functioned accurately. In conclusion, the developed m-PCR test successfully detected and distinguished HPS spp., HPS serovar 4 and serovar 5/12.

Keywords: Pigs, swine, Haemophilus parasuis (HPS), polyserositis, multiplex PCR (m-PCR).

C-9. DIFFERENTIATION OF CLOSTRIDIUM PERFRINGENS TYPE A AND C IN PIGS USING MULTIPLEX PCR

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Abstract

Clostridium perfringens, currently classified into five types (A, B, C, D, E) on the different toxin produced. Type A and C are known as the causative agent of enteritis and enterotoxemia in newborn and young piglets with severe lesions of intestinal damage including edema, hemorrhage, and necrosis. A multiplex PCR (mPCR) was developed, in order to quickly and early determine presence of the pathogenic bacterial type based on the genes of *cpa*, *cpb*, *cpb2* and *cpe* encoding alpha toxin, beta

toxin, beta2 toxin and epsilon toxin with predicted products of 324 bp, 196 bp, 257 bp and 107 bp respectively. Amplification of the targets was initiated at 95°C in five minutes; followed by 35 cycles of 3-step cycling comprising denaturation at 95°C for 30 seconds, the annealing temperature of 57°C for 30 seconds and 72°C for 70 seconds for the extension, and a final extension of 72°C for 10 minutes. The detection limit of m-PCR assay was 2.103 copies/reaction for four genes. Sequencing of mPCR products performed with clinical samples collected from *C. perfringens*-suspected pigs showed that the mPCR test functioned specifically. In conclusion, the developed mPCR test successfully distinguished *C. perfringens* type A and *C. perfringens* type C. Analysis of the bacteria isolated from field samples collected in this study indicated that *C. perfringens* type A counted for more than 70%, suggesting that type A is more popular compared to type C in Vietnam.

Key words: Piglets, *Clostridium perfringens* (*C. perfringens*), diarrhea, multiplex PCR (mPCR).

C-10. NOVEL SYNTHESIS AND CHARACTERIZATION OF ANTIBACTERIAL ACTIVITY OF SILVER NANOPARTICLES AND GOLD NANOPARTICLES SYNTHESIZED FROM ARCTIUM LAPPA LINROOT'S EXTRACTS

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Abstract

In this study, Silver nanoparticles (AgNPs) and Gold nanoparticles (AuNPs) were synthesized by a simple and eco-friendly process: using extracts from roots of *Arctium lappa* Linn (Burdock) as a reducing agent for both two substances AgNO₃ and HAuCl₄. Modern analytical techniques including UV-Vis, TEM, FT-IR, XRD and EDX were used to analyze the properties of AgNPs and AuNPs. The results show that the appropriate synthetic condition is 90°C in 90 minutes, and the ratio of extracts per substances for each reaction is 1:20 with the concentration 1mM for both AgNO₃ and HAuCl₄.3H₂O. Although the condition for reactions was not optimized perfectly yet, our results still showed the reaction efficiency was significantly high with 86.33% and 83.08% for AgNPs and AuNPs, respectively. The synthesized AgNPs and AuNPs had the surface plasmon resonance at 444nm and 541nm wavelengths, respectively. The size of AgNPs is about 21nm and about 24nm for that of AuNPs. The synthesized AgNPs in the extracts showed the antimicrobial activity with the diameter of inhibition zone for *Agrobacterium tumefaciens*, *Escherichia coli* and *Trichoderma harzianum* is 6.5mm; 7mm and 10mm, respectively. More interestingly, our results showed the minimum inhibitory concentration (MIC) to bacteria as well as fungi is significantly low compared to ampicillin. In detail, it is 0.216ig; 1.08ig and 4.32ig for *Agrobacterium tumefaciens*, *Escherichia coli* and *Trichoderma harzianum*, respectively. AuNPs did not show the antimicrobial activity on both three species used in this study. Our study revealed that *Arctium lappa* Lin root's extracts could be further considered as a highly potential substance in the process to synthesize AgNPs or other nanoparticles with the strongly antimicrobial properties without causing the toxicity to the body.

Keywords: Silver nanoparticles, Gold nanoparticles, Novel synthesis, *Arctium lappa* Linn, and antibacterial activity.

C-11. CHARACTERIZATION OF CONE SNAIL VENOM BY LC MALDI-TOF MS

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Abstract

The venom of cone snails is composed highly conopeptides that target a variety of ion channels and receptors on the nerve system. The venom of *Conus* genus represents unexploited resources of potential pharmaceutical compounds. The venom of *Conus marmoreus* collected in Nha Trang bay was separated by reversed-phase high-performance liquid chromatography (RP-HPLC), and fractions were analyzed using matrix-assisted laser desorption ionization-time of flight mass spectrometry (MALDI-TOF-MS). The results of RP-HPLC showed that the crude venom consists mainly hydrophobic peptides. Using MALDI-TOF MS analysis of crude venom yielded a total of 7543 distinct masses. Besides, there were 1751 compounds found

in the crude venom of *C. marmoreus* in NhaTrang bay. Among them, we determined the molecular weights of 39 peptides of *C. marmoreus* venom in Vietnam compared to the total 92 peptides of *C. marmoreus* previously identified.

Keywords: *Conusmarmoreus*, *Conopeptide*, *Venom*, *LC MALDI-TOF MS*.

C-12. NEUROANATOMY OF PELLUCIDHAPTOR KRITSKYIA FROM GOLD FISH CARASSIUS AURATUS, NILSSON, FROM MEERUT (U. P.), INDIA

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Abstract

Chemical named 5-bromo indoxyl acetate has been used to describe the nervous system of an oviparous monogenean *Pellucidhaptor* Price and Mizelle (1964), a gill parasite of *Carassius auratus*. Central nervous system consists of paired cerebral ganglia from which anterior and posterior neuronal pathways arise. These neuronal pathways are interlinked by cross connectives and commissures. Paired dorsal, ventral and lateral nerve cords emanate from the cerebral ganglia, connected at intervals by transverse connectives. Huge arrangement of dorsal, ventral and lateral nerve cords and their innervations have been examined. Peripheral nervous system (PNS) includes innervations of the alimentary tract, reproductive organs and attachment organs (anterior adhesive areas and haptor). Both the CNS and PNS are bilaterally symmetrical, and better developed ventrally than laterally and dorsally.

Keywords: *Neuroanatomy*, *Pellucidhaptor kritskyia*, *Carassius auratus*, *gold fish*, *peripheral nervous system*

C-13. NOVEL PROTEINS, CAROTENOIDS AND OMEGA 3 FATTY ACIDS FROM THE AUSTRALIAN AQUATIC PLANTS AND MICROBIAL SPECIES

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Abstract

Azolla and *Duckweed* species are some of the fastest growing plants, producing substantial biomass when grown in wastewaters and natural ecosystems. Their biomass has a unique chemical composition resembling the combination of terrestrial bioenergy crops including proteins, starch, polyphenolic compound, and lipids. *Thraustochytrids* are single-cell microorganisms, 5- 20 µm in diameter commonly found in the marine environment, in both tropical and sub-tropical mangrove areas. They play an important role in the marine ecosystem, particularly cycling of waste material in highly brackish water. Due to the capacity of accumulating high concentration of omega 3 enriched lipids, carotenoids and squalene, *Thraustochytrids* have received increased attention in the recent years. Thus *Azolla*, *Duckweed* and *Thraustochytrids* can provide novel proteins, healthy oils (omega-3 fatty acids), polyphenolic compounds and carotenoids. This work is focused on the application of the Australian aquatic plants *Azolla* and *duckweed*, and the marine *Thraustochytrids* as the source of novel and healthy food.

Keywords: *Azolla*, *Duckweed*, *Thraustochytrids*, *omega-3 fatty acids*, *polyphenolic compounds*,

C-14. MI-SP5 GENE SILENCING REDUCES SIGNIFICANTLY REPRODUCTION OF MELOIDOGYNE INCOGNITA IN RICE (ORYZA SATIVA)

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Abstract

Root-knot nematode (RKNs) are telluric pests causing severe agricultural loss in almost all plants growing system including

cereals. These obligate biotrophic parasites affect the rice production in all cultivated countries by penetrating the root system where they hijack the plant metabolism to their own benefit. The RKN *Meloidogyne incognita* establishes a compatible interaction with the plant host thanks to effectors produced by esophageal glands and secreted in the plant cell through the stylet. Since RKNs are refractory to transformation and mutagenesis, interference, RNA interference (RNAi) approach emerge as the most promising technique to get inside the functional analysis of nematode effectors. In this study, we show that *M. incognita* SP5 gene is transcribed in the subventral gland of preparasitic second-stage juvenile nematode (J2). The expression level of Mi-SP5 reached a maximum at 6 days after inoculation and decreased in later parasitic stages. Subcellular localization of transiently expressed chimeric Mi-SP5-GFP proteins showed an enrichment of fusion protein in onion cell wall. In vitro RNA interference by soaking approach showed specific transcript knockdown of Mi-SP5 in J2 with a fitness effect reflected by a reduction of 50% of egg production. Similarly, host-mediated RNA interference in transgenic rice plants reduce egg production. These results suggest that Mi-SP5 plays an important role in *M. incognita* pathogenic to rice.

Keywords: *Meloidogyne incognita*, soaking, host-derived RNAi

C-15. A METABOLICALLY RESPONSIVE FEEDING STRATEGY FOR ENHANCED BACTERIAL CELLULOSE PRODUCTION IN FED-BATCH SHAKING CULTURES

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Abstract

Bacterial cellulose (BC) is the extracellular cellulose produced by bacteria with unique nanostructure and superior properties over plant cellulose. A new feeding fed-batch strategy was applied to enhance BC production in shaking cultures. BC was produced in shake flasks using *Gluconacetobacter xylinus* subsp. *xylinus* KCCM 41431 at 26°C and 165 rpm for 10 days. The feed medium (4% initial volume, fructose in water) was initially added to the basal medium containing fructose, yeast extract, KH₂PO₄, (NH₄)₂SO₄, MgSO₄·7H₂O and ethanol at the second day after inoculation, and was then added 1 times/day for 6 days. The fructose concentration in the feed medium was calculated to achieve a desired post-feed fructose concentration equaled to the initial fructose concentration in the basal medium. The highest dried BC yield (16.72 g/l) was obtained from the 40g/l fructose fed-batch culture, and was 1.3 and 1.8-fold higher than those from the 30 g/l fructose fed-batch and batch cultures, respectively. Therefore, an optimal metabolically responsive fed-batch feeding strategy could be applied for improvement of BC production in shaking cell cultures.

Keywords: *Gluconacetobacter xylinus* subsp. *xylinus*, KCCM 41431, bacterial cellulose (BC), fed-batch, shaking cultures

C-16. COLLECTION, IDENTIFICATION AND CULTIVATION THREE SPECIES OF GENUS MACROCYPBE PEGLER AND LOGDE FOR COMMERCIAL PRODUCTION IN CAT TIEN NATIONAL PARK, SOUTH VIET NAM

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Abstract

There are 7 species of Genus *Macrocybe* Pegler & Logde. recorded in the world, include : *Macrocybe crassa*, *M. giganteum*, *M. lobayensis*, *M. pachymeres*, *Macrocybe praegrans*, *M. spectabilis*, *M. titans*. Most of them are edible; the culture technologies have been developed for some species. There are few studies about this genus especially cultivation trials. This study describes the three species of this genus recorded to date in South Vietnam such as *Macrocybe titans*, *Macrocybe giganteum*, *Macrocybe crassa* which was found, particularly in Cat Tien National Park, the world natural biosphere reserve of Viet Nam. We also study popular cultivations of *Macrocybe crassa*, *M. giganteum* and particularly *M. titans* in the mushroom farm in Cat Tien National Park. Our morphological researches show that specimens collected in Cat Tien National Park are strongly similar to the descriptions of typical species. Our molecular data for the gene 25S-ribosomal RNA also showed that the sequence of specimens collected in Cat Tien National Park have high similarity to that one of genus *Macrocybe* Pegler &

Logde from Genbank. Our cultivation studies also show that mycelium of *Macrocybe titans* can grow very well in PGA medium including potato, glucose, and agar. We found the best recipes of medium for fruitful cultivations: sawdust, rice straw and added nutrients, suitable for commercial culture at large scales in Viet Nam.

Keywords: *Macrocybe pegler*, Cat Tien National Park, *Macrocybe titans*, *Macrocybe gigateum*, *Macrocybe crassa*

C-17. SURVEY OF FERMENTATION CONDITION FOR CANDIDA BOMBICOLA ACTT22214 FROM MOLASSES AND SOYA OIL TO SOPHOROLIPID PRODUCTION

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Abstract

Sophorolipids (SLs) is a glycolipid biosurfactant that is synthesized by fermentation using yeast strains. SLs are being considered to replace chemical surfactants that are made from petroleum or produced by chemical compounds. Thanks to its outstanding properties such as: good biodegradability, low toxicity, eco-friendly, economical non-renewable resources, specific activity in extreme conditions of temperature, pH, high salt concentration that SLs have high application potential in life. In this study, factors such as soybean oil content, molasses content, fermentation time, pH, and temperature were observed in the fermentation of SLs by *Candida bombicola* ACTT22214. SLs products will be tested for antimicrobial activity, antioxidant activity, emulsification, foaming ability. The highest content of SLs was 45.27 ± 0.30 g/l under conditions of: soybean oil content 5%, molasses content 150 g/l, fermentation time 7 days, pH = 5, 28°C fermentation temperature. The antibacterial activity of SLs is high: the best resistance to *Candida albicans* (16.33 ± 1.15 mm), good resistance to *Bacillus spizizenii* (13.67 ± 0.58 mm), resistance to *Staphylococcus aureus* (12.67 ± 1.15 mm), relatively weak resistance to *Pseudomonas aeruginosa* (11.33 ± 0.58 mm) and *Escherichia coli* (9.67 ± 0.58 mm). The antioxidant capacity of SLs is quite high with an IC₅₀ value of 6.024 mg / ml. The emulsifying capacity of SLs is equivalent to the emulsification of the tween 20 surfactant at a concentration of 5 – 10 mg/ml. SLs have the ability to foam evenly from concentrations of 5 to 20 mg/ml but not higher than the corresponding concentrations of tween 20, SLs are smooth, even, stable longer than tween 20.

Keywords: Sophorolipids, *Candida bombicola*, surfactant, fermentation

C-18. CHARACTERIZATION OF ACNE MICROBIOME AND EVALUATE THE EFFICACY OF BIOLOGICALLY SYNTHESIZED SILVER NANOPARTICLES OF FARSETIA HAMILTONII EXTRACT AGAINST PROPIONIBACTERIUM ACNES

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Abstract

Propionibacterium acnes (*P. acnes*) is the relatively slow growing, Gram-positive, a typically aerotolerant anaerobic bacterium that plays a major role in the pathogenesis of acne. Microbial fluctuation of common resident microbes on the skin is the main inducer of this multifactorial disease, where each microbe plays an important role in possessing their own purpose and style in protecting the human body. Our primary objective was to characterize acne microbiome in the Indian patients. 367 bacterial strains were isolated from 82 acne patient's specimens from different tertiary hospitals. The isolated cultures were characterized by using 16S rRNA sequencing. Out of 367 bacterial strains; *P. acnes* (38%), *Staphylococcus* sp. (26%), MRSA strains (8%), *K. pneumoniae* (7%), *Bacillus* sp (5%) and *Paenibacillus* sp. (2%) were found to be the most common species in acne lesions. Across the globe, the pervasiveness of antibiotic resistance is a problem in acne patients due to patient compliance, regional prescription practices and genomic variability in *Propionibacterium acnes*. The purpose of this study to demonstrate the therapeutic potential of silver nanoparticles (AgNPs), which were biosynthesized using the extracts of *Farsetia hamiltonii* plant. The characterization of AgNPs formation had confirmed by using UV-Vis spectrophotometry, Dynamic Light Scattering (DLS), and Transmission Electron Microscopy (TEM). These nanoparticles showed the enhanced

antimicrobial potential against resistant *P. acnes* that were later confirmed by TEM. These particles exhibited minimal toxicity to the human blood cells.

Keywords: *Propionibacterium acnes*, silver Nanoparticles (AgNPs), *Farsetia hamiltonii*, transmission electron microscopy (TEM).

C-19. POTENCY OF BIOSYNTHESIZED GOLD NANOPARTICLES AGAINST MDR PATHOGENS AND CANCER

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Abstract

On account of the expanding pervasiveness of microbial imperviousness to conventional treatments, the improvement of novel antimicrobials is domineering. The potential mortal impact of the biosynthesized (AuNps) gold nanoparticles against skin (Acne) and resistant pathogens was elucidated. AuNps were synthesized using *Citrus maxima* plant fruit, leaf and peel extract. The characterization through UV-Vis spectrophotometer, DLS analyzer and TEM confirmed the production of AuNps of size below 100 nm. The nanoparticles displayed worthy antioxidant activity, measured by DPPH assay. AuNps revealed commendable antimicrobial activity against skin (Acne) and resistant pathogens gaged by using microwell plate dilution process which was later confirmed through TEM imaging. Hemolysis revealed the minimal toxic effect of the nanoparticles on human red blood cells. Cell Titer-Glo cell viability and trypan blue assays were carried out for the toxicity evaluation on mammalian cell lines. The nanoparticles displayed significant toxicity on cancerous cell line (HT-1080 & B16) and relatively low toxicity on normal cell line (MRC-5). The apoptotic topographies were confirmed using AO/EtBr dual dye staining, DNA fragmentation assay, caspase-3 assay and Cell cycle analysis using FACS. Our results demonstrate that the biosynthesized nanoparticles could be used against multi drug resistant pathogens as well as it can be further studied for formulation into anticancer agents. Study thus, takes the age old known potential of gold against diseases to a next level of research.

Keywords: Nanoparticles, antimicrobial, antioxidant, multi-drug resistance

C-20. MECHANISM AND PROBIOTIC EFFECTS OF PIGMENTED BACILLUS AQUIMARIS SH6 ON WHITE-LEG SHRIMP (*LITOPANAEUS VANNAMEI*)

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Abstract

Bacillus aquimaris SH6 spores are potential in the novel development of food supplement for shrimps, based on their ability to produce carotenoids and beneficial effects to shrimp's health. However, the mechanisms by which SH6 spores colonize, germinate in shrimp's gut as well as its probiotic effect on shrimps have not been described. In this study, the shrimps (weigh of 1.5-2 g) from The Research Institute For Aquaculture Quy Kim, Hai Thanh, Duong Kinh Dist. Hai Phong Province were used during experiment period. Our data revealed that the numbers of SH6 in white-leg shrimp's gut gradually increased during 28 day feeding with SH6 spores at different concentrations (SH6 spore-H: 5 x 10⁶ CFU/feed pellet; SH6 spore-M: 1 x 10⁶ CFU/feed pellet; SH6 spore-L: 2 x 10⁵ CFU/feed pellet): all starting from 5-10 x 10² CFU/gut at day 1 and reaching up to 6,5 x 10³ CFU/gut at the day of 28. Accordingly, microbiota in shrimp's gut of the three SH6 spore groups became more diversified with increased counts of most abundant 7 useful bacterial species, resulting in about 2-8 fold increased total bacterial live counts (3,8-4,5 x 10⁴ CFU/gut) compared to the control groups (Negative control: 9,0 x 10³ CFU/gut; Carophyll group: 2,2 x 10⁴ CFU/gut; SH6 carotenoid: 5 x 10³ CFU/gut). By measuring mRNA expression of SH6 amylase, we detected germination of the live SH6 spores. Besides, a marker of immune system like SOD activity was found increasing nearly twice at the day of 14 and nearly triple at day 28 of feeding among SH6 spore groups compared to other three control groups (Negative, Carophyll, and SH6 carotenoids). The astaxanthin level and red color score were highest in the Carophyll and SH6

carotenoids groups (OD₄₈₀ = 1.6-2.2; red score: 22), then followed by the SH6 spore-H and SH6 spore-M groups (OD₄₈₀ = 0.81; red score: 21), which was 1.6 fold higher than the control and SH6 spore-L group (OD₄₈₀ = 0.37-0.50; red score: 20). Growth rate (GR) was most effective in the SH6 carotenoid group (6.78%/day). SH6 spore-H and SH6 spore-M are almost similar in GR (6.46% and 6.47%/day, respectively); which was faster than the SH6 spore-L (4.89%/day) and control groups (5.36%/day) or carotenoid-fed groups (4.56%/day). In conclusion, SH6 spores have ability to colonize, germinate and improve useful microbes of shrimp's gut to show its probiotic activity to the host at the optimal SH6 spore dose of 1×10^6 cfu/g pellet.

Keywords: pigmented, *Bacillus*, carotenoid, supplement, shrimp, gastrointestinal tract.

C-21. ANTIFUNGAL ACTIVITY AND CYTOCHROME P450 GENE ANALYSIS OF ENDOPHYTIC ACTINOMYCETES FROM HALOPHYTES

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Abstract

Endophytic actinomycetes are remarkable producers of natural products. They produce valuable antibiotics including anti-fungal polyenes such as amphotericin, nystatin, piramicin, etc. One hundred and four endophytic actinomycetes isolated from halophytes were tested for antifungal activity against *Aspergillus niger* using agar plug assay. Thirty-four strains showed antagonistic activity against *A. niger*. These positive strains were then investigated for cytochrome P450 hydroxylase (CYP) genes involved in polyene biosynthesis using PCR with specific primers.

The results revealed the presence of 350 bp fragment of CYP genes in 15 positive strains. The PCR products were then purified and sequenced. The nucleotide and deduced amino acid sequences were compared to the database from GenBank and phylogenetic tree of cytochrome P450 hydroxylase was constructed. The results indicated that cytochrome P450 hydroxylases from 15 endophytic actinomycetes were grouped in the same clade of FscP and CanC that played important role for FR-008 and candicidin production, respectively. Further PCR amplification should be performed to identify potential novel CYP genes relating to novel polyene metabolites.

Keywords: Endophytic actinomycetes, anti-fungal, polyene, cytochrome P450 hydroxylase, CYP

C-22. INVESTIGATION OF THE MICROBIOLOGICAL PERFORMANCE OF CACAO FERMENTATION

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Abstract

One of the most important factors affecting quality of cacao bean is microorganism participation into the cacao bean fermentation. In this process, microorganisms including yeast and bacteria hold the main role for the fermentation in cacao pulp as the fermenting medium. The isolation, identification and investigating interaction of these yeast and bacteria in the fermentation can provide thoroughly understanding and appreciate the effect and dominant roles of the yeast and bacteria in the fermentation process. Samples were taken from cacao fermenters in order to isolate, identify the yeast and bacteria in the fermentation process. The achieving isolation results were obtained 5 yeast strains including: *Saccharomyces cerevisiae*, *Hanseniaspora uvarum*, *Pichia manshurica*, *Pseudozyma* sp., and *Debaryomyces Hansenii* and 3 bacteria strains including *Lactobacillus plantarum*, *Bacillus coagulans*, and *Acetobacter lovaniensis*.

Keywords: yeast, bacteria, cacao bean fermentation, microorganism of cacao fermentation

C-23. NEUROANATOMY OF *DACTYLOGYRUS* SP., A MONOGENEAN GILL PARASITE OF THE AQUARIUM GOLD FISH *CARASSIUS AURATUS*

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Abstract

Dactylogyrus is one of the common parasites of fishes and found easily. Like all *Dactylogyrids*, monogeneans of the genus *Dactylogyrus* are oviparous. According to present study *Dactylogyrus* a gill parasite of an aquarium gold fish, *Carassius auratus*. The present work involved description of nervous system of *Dactylogyrus* sp. Here author used indoxyl acetate as substrate to demonstrate the nervous system of *Dactylogyrus*. The central nervous system (CNS) and peripheral nervous system (PNS) for cholinesterase were found to be highly reactive and stained extensively in a dark blue color. It hoped that such study will throw some light on the nervous system of *Dactylogyrids*. It may also help researchers to find an anthelmintic drug that may specifically target neural elements of the parasite without substantial side effects on the host.

Keywords: Neuroanatomy, *Dactylogyrus* sp., *Carassius auratus*, parasite, central nervous system

C-24. BIOCHEMICAL ASSAY OF HIGH VALUE PIGMENTS OF DIFFERENT SPIRULINA SPECIES CULTURED IN FIBRE GLASS CHAMBER

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Abstract

The prospects utilized *Spirulina subsalsa* and *fusiformis* for biochemical analysis of pigments. The relative performance of these species was investigated with respect to their growth performance (Optical density) and pigment production (Chlorophylla, carotenoids, phycobiliproteins-allophycocyanin, phycocyanin, phycoerythrin). Chlorophylla, carotenoids and phycobiliproteins percentage in *S. fusiformis* were 1.11%, 0.12% and 8.88% while in *S. subsalsa* the percentage were 1.23%, 0.14% and 8.98% respectively. Although no significant difference was observed in between the selected species but *S. subsalsa* was found slightly enriched pigment as well as growth wise then those of *S. fusiformis*.

Keywords: Pigments, *Spirulina*, Chlorophylla, carotenoids, phycobiliproteins, allophycocyanin.

C-25. GREEN SYNTHESIS AND EVALUATION OF THE ANTIMICROBIAL ACTIVITY OF SILVER NANO PARTICLES SYNTHESIZED FROM STEREOSPERMUM BINHCHAUENSIS V.S. DANG'S EXTRACTS

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Abstract

Silver nanoparticles (AgNPs) exhibiting valuable properties that are potential for a variety of biomedical applications. Although, there are several researches focusing on how to produce AgNPs effectively with high quality, recently, green synthesis by plant extract (phytochemicals) is considered as a breakthrough in AgNPs production. This method shows the advancement over chemical, physical, and other biological methods due to its non-toxicity, cost-effectiveness, environment-friendliness, and potential to scale up for industrial production. In this study, AgNPs were synthesized from aqueous silver nitrate using *Stereospermum binhchauensis* V.S. Dang's extracts as reductants and stabilizers. The aqueous silver ions, when exposed to phytochemicals in those extracts, were reduced and resulted in AgNPs ranged from 5 to 40nm. AgNPs's characteristics were then examined by using several techniques including UV-visible spectrophotometer, TEM,

HRTEM, EDX, XRD, Zeta, GT-DTA, and FT-IR. Furthermore, a disk diffusion method was used to screen for antimicrobial properties of synthesized AgNPs. Interestingly, our synthesized AgNPs showed their extremely strong resistance to bacteria as well as fungi. In detail, AgNPs formed by *Stereospermum binhchauensis* V.S. Dang's extract showed the diameter of the inhibition zone (mm) is 7 ± 0.5 mm for both three species including *Escherchia coli*, *Agrobacterium tumefaciens*, and *Trichoderma harzianum*. More remarkably, the MIC values (ig) were found to be 0.81; 0.486 and 4.86 ig for *Escherchia coli*, *Agrobacterium tumefaciens*, and *Trichoderma harzianum*, respectively. The results revealed that this method could be considered as a promising alternative compared to conventional methods for the production of AgNPs with the strongly antimicrobial activities without the involvement of any hazardous chemicals.

Keywords: Green synthesis, Silver nanoparticles, *Stereospermum binhchauensis* V.S. Dang, Antibacterial activity.

C-25. DEVELOPMENT OF *Cordycepsmilitaris* UNDER DIFFERENT MONOCHROMATIC LIGHTS

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Abstract

Light is an essential environmental factor for the stroma's production, accumulation of bioactive substances and pigmentation in *Cordycepsmilitaris*. In this study, different LED monochromatic lights (blue, green, red) were used for *C. militaris* cultivation. Effects of various monochromatic lights on bio-efficiency of stroma, biomass, and content of cordycepin were evaluated. Further more, expression of the Cmwc-1 gene in different light conditions was investigated. The blue-light of 400 lux intensity highly affected stroma formation (16.97%). Red-light of 800 lux was the most optimal for biomass increasing (32.05g), then green-light of 800 lux (29.95 g), blue-light of 400 lux (25.26 g), darkness (13.89 g), and white-light (29.33g). Content of cordycepin obtained under 400 lux blue-light was 4329.77 μ g/g, higher than that of 800 lux green-light (3364.00 μ g/g), 800 lux red-light (2797.77 μ g/g), white-light (2293.20 μ g/g) and darkness (1413.91 μ g/g). Cmwc-1 was highly expressed in blue-light of 400 lux. Under dark condition, its expression was quite low. This result indicates that Cmwc-1 gene is a light-sensitive gene, particularly under blue light. These results suggested a possibility of substitution of the white-light by monochromatic lights for increasing biomass and bioactive substance in *C. militaris*.

Keywords: adenosine, cordycepin, *Cordycepsmilitaris*, monochromatic light, stroma

C-26. ISOLATION AND SELECTION OF SOME BACTERIAL SPECIES CAPABLE OF TREATING NITROGEN COMPOUNDS IN THE WHITE SHRIMP (*LITOPENAEUS VANNAMEI*) CULTURE MODEL BY BIOFLOC TECHNOLOGY

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Abstract

Nowadays, agglomeration of nitrogen compounds in *Litopenaeusvannamei* ponds is a popular phenomenon. The degree of accumulation depends on the biomass increasing and the amount of food. *Litopenaeusvannamei* has high demand of protein but most of the food is not consumed and excreted out as nitrogen compounds that influence the growth and health or lethal to *vannamei*. Biofloc technology is an advanced solution for the shrimp farming. By adding carbon into the farming system with a ratio of C / N and maintaining in a fit level, heterotrophic bacteria rapid development is applied both waste treatment and food source for farming. The purpose of this research is to subdivide and select strains that can generate floc and process nitrogen in model white shrimp rearing technology biofloc with 4 additional treatments are corresponding molasses the rate of C / N is different. The results showed that the particle size and volume floc in treatment with molasses in higher concentration than others similarly, and the highest treatment has ratio of C / N reached 20 with the floc particle size and volume floc turn is 20.03 ± 8.08 μ m and 14.42 ± 11.75 ml / l. In addition, this research isolate 6 strains that can generate and process nitrogen compounds *Bacillus pumilus*, *Pseudomonas stutzeri*, *Pseudomonas stutzeri*, *Kocuriarosea*, *Rhodococcuscoryne bacterioides*,

Agrobacterium tumefaciens. Besides, *Pseudomonas stutzeri* strain had the highest floc formation at 47%. *Bacillus pumilus* and *Rhodococcus corynebacterioides* are capable of treating high ammonium at 99.69% and 99.86% at 12 hours. *Pseudomonas stutzeri*, *Pseudomonas stutzeri* and *Agrobacterium tumefaciens* showed the highest nitrite treatment rates of 99.86%, 99.86% and 99.77%, respectively, after 30 hours. *Pseudomonas stutzeri* has a high nitrate treatment capacity of 98.1% after 30 hours.

Keywords: biofloc, floc, nitrogen, ammoniac, nitrite,.

C-27. INVESTIGATION OF PROBIOTIC PROPERTIES OF YEAST ISOLATED FROM FRUIT AT CUC PHUONG NATIONAL PARK

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Abstract

Besides being important in the fermentation of foods and beverages, yeasts have shown numerous beneficial effects on human health. Among these, probiotic effects are the most well known health effects including prevention and treatment of intestinal diseases and immunomodulatory effects. In the course of a survey of probiotic yeasts living in the natural environments in Vietnam, a novel yeast strain (SB2), was isolated from fruit at Cuc Phuong national park. This strain was able to grow at 37°C, producing high biomass and has antibacterial activity against *Salmonella enteric*. Yeast strain was identified as *Saccharomyces cerevisiae* var *boulardii* SB2 on the basis of morphology and ribosomal gene ITS regions analysis. It demonstrated distinctive probiotic characteristics including lipase enzyme activity, antibacterial activity against 5 tested bacterium, acid tolerance (pH2), bile salt tolerance (0,3%), survival of model gastrointestinal conditions and antibiotic resistance at low concentration (10-20 mg/l). The isolate also showed adhesion attributes such as cell surface hydrophobicity (58.65 %) and autoaggregation ability (67.95%). These results show that *Saccharomyces cerevisiae* var *boulardii* SB2 may be promising candidate strains for use as probiotics.

Keywords: Probiotic, *Saccharomyces cerevisiae* var *boulardii*, in vitro

C-28. THE EFFECTS OF EXTRACTION METHODS ON THE FUNCTIONAL PROPERTIES OF FLAX-SEED PROTEIN ISOLATE

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Abstract

Solubility and emulsifying characteristics (droplet size, zeta potential, emulsifying activity index-(EAI) and emulsifying stability index-(ESI)) of flaxseed protein isolate (FPI) obtained using two different extraction methods including alkaline-acid precipitation (AP) and alkaline-ethanol precipitation (EP) are elucidated. The purity, solubility, emulsifying ability and the productivity of FPI were strongly affected by the extraction methods. The AP method produced higher purity FPI than the EP method; however, its yield was lower than that of the EP extraction. The EP extracted FPI showed higher solubility but poor emulsifying ability as compared to AP extracted FPI. Conversely, AP extracted FPI illustrated a better emulsifier with lower solubility in comparison with the EP extracted FPI.

Keywords: Flaxseed proteins isolate, solubility, emulsification, extraction, and isolation.

C-29. SCREENING AND OPTIMUM INCUBATING CONDITIONS BY LACTOBACILLUS APPLIED FOR GAMMA-AMINOBUTYRIC ACID RICH TEA FERMENTATION

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Abstract

Gamma-aminobutyric acid (GABA), a neurotransmitter in humans brains, has several physiological functions such as relieving anxiety, depression, and insomnia as well as having an anti-stress effect in humans. In recent years, the trend of adding GABA to food and drink products has been popular; therefore, increasing GABA production is required to support commercial demand. To find a high γ -aminobutyric acid producing lactic acid bacteria, 263 strains of lactic acid bacteria isolated from traditional fermented food samples in various areas of Vietnam were screened by thin layer chromatography analyses. Among them, 72 strains possessed the GABA-producing ability in MRS broth with 1% monosodium glutamate (MSG). The effect of fermentation was investigated by inoculating fresh tea leaves with 72 strains. Two strains (VTCC-B-439 and VTCC-B-411) exhibited the highest GABA-producing ability among the screened strains under anaerobic condition in tea shoots. Morphology analysis and phylogenetic analysis based on the 16S rDNA sequence indicated that these strains belonged to genus *Lactobacillus*. The strains were named as *Lactobacillus plantarum* VTCC-B-439 and *Lactobacillus casei* VTCC-B-411. Effect of fermentation parameters by inoculating fresh young tea leaves, including initial glutamic acid level, aerobic and anaerobic incubation, moisture content, inoculum rate and incubation time on GABA production were investigated via a single parameter optimization strategy. The optimum conditions for maximum GABA production by VTCC-B-439 and VTCC-B-411 strains were an initial MSG concentration of 0.1%, anaerobic incubation, moisture content of 70%, inoculum rate of 10% and incubation time of 48h, which produced 7.23 and 7.64 mg/g tea dry, respectively. The results reveal that *Lactobacillus plantarum* VTCC-B-439 and *Lactobacillus casei* VTCC-B-411 exhibit a great application potential in large-scale fermentation for the production of GABA rich tea.

Keywords: Gamma-aminobutyric acid, *Lactobacillus*, GABA rich tea.

C-30. ENHANCE THE QUALITY OF CORDYCEPS MILITARIS BY SELENIUM SUPPLEMENTING INTO CULTURE MEDIUM

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Abstract

Cordyceps militaris is a well-known and valued herb in Chinese traditional medicine. *C. militaris* production has been studied and developed vigorously. *C. militaris* was cultured on different semi-solid media, including: pupal-bran mix, pupal, corn-millet mix and added sodium selenite with concentrations of 0, 2.5, 5.0, 7.5, 10.0 ppm. After culturing, the fruit-bodies and mycelium were harvested and evaluated cordycepin content by HPLC method. *C. militaris* developed quickly and created high quality when selenium was added into cultural medium. On silkworm pupal-bran mix substrate added sodium selenite of 7.5 ppm, biomass ratios of fresh and dried fruit-bodies were the highest with 49.15 % and 33.23% respectively, not significantly different when compared with those of silkworm pupal added sodium selenite of 5.0 ppm (40.26% and 29.57%). The highest content of cordycepin was obtained in the fruit-body on the silkworm pupal added sodium selenite of 5.0 ppm (23.22 mg/g). The results indicated that it is possible to enhance quality of *C. militaris* through supplementing sodium selenite of 5.0 ppm into culture medium.

Keywords: cordycepin, *C. militaris*, sodium selenite, selenium

C-31. GENERATION GENE TOXIC OF *BACILLUS THURINGIENSIS* VAR. KURSTAKI BY PCR AND SDS-PAGE METHOD

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Abstract

Many domestic and international studies have isolated *Bacillus thuringiensis* from a variety of habitats and obtained numerous collections of very diverse strains of *B. thuringiensis* capable of killing a wide range of insects and pests. Identification of *B. thuringiensis* strains containing the desired cryptan genotype, cloning and sequencing of the toxin gene are essential. In addition, insecticidal effects based on Cryoprotectant, Cry, Cyt, and VIP are synthesized by specific genes during the growth and development of *Bacillus thuringiensis* var. kurtkisi (Btk). One of the highest toxins in Btk is endotoxin that is regulated by the Vip3A gene fragment. According to the analysis of 2200 acres of land from 22 provinces and cities, Vietnam has identified 350 ecologically purebred colonies with rhombus (36.0%), oval (23.7%), globular (24.3%) and other (16.0%). The SDS-PAGE technique utilizes the selected Vip3A primer and is designed to amplify the Vip3A gene sequence. The results showed that the amplified product was about 3.4 kb in size and showed only a single band and no byproducts. Non-crystalline strains are not productive in PCR. Comparison of product size of samples with positive control, *Bacillus thuringiensis* var. kurtkisi has been shown to carry the Vip3A gene. For identification by molecular biology, the detection of Bt strains carrying the cry1 and cry2 genes has also been shown to be more effective and can be used to select strains of bacteria.

Keywords: *Bacillus thuringiensis*, gen Vip3A; protein Vip3A

C-32. PREPARATION AND ANTIFUNGAL ACTIVITY OF NANOCHITOSAN LOADING METAL IONS AGAINST RED BREAD MOLD (*NEUROSPORA* SPP.) ON MUSHROOMS

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Abstract

Nanochitosan loading with metal ions has been more consideration because of its high antibacterial and antifungal activities. In this research, the antifungal activity of the product was used against to red bread mold (*Neurospora* spp.) on some tropical mushrooms. The effect of the different molecular weight (Mw) and degree of deacetylation (DD) on the antifungal activities was observed. The lower Mw and the higher DD can present the higher activity. It showed that the Mw of 80 and the DD of 93% exhibited the highest activity. This method is environmental friendly and safety for farmers and costumers.

Keywords: Nanochitosan loading with metal ions, red bread mold, antifungal activity, tropical mushrooms.

C-33. EXAMINATION OF RICE BLAST FUNGUS AVIRULENT GENES, AVR-PIK AND AVR-PI9 IN THAILAND RICE BLAST ISOLATES

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Abstract

Rice blast disease, caused by *Magnaporthe oryzae* is one of the most threats to rice yields worldwide. The susceptibility and resistance of rice to rice blast disease depend on the combination of the resistant (R) genes in plant and effector (AVR) genes

in fungus that follows gene-for-gene interaction. In rice, resistance to blast is available but it tends to rupture over time as the rapid adaptive evolution of rice blast fungus. In this study, a total 18 rice blast isolates from 18 infected leave samples in Northeast and Central Thailand were used to observe the nucleotide sequence variation in AVR-Pik and AVR-Pi9 genes with gene-specific primers of which amplicon sizes were 626 bp and 342 bp, respectively. PCR analysis revealed that AVR-Pik-D and AVR-Pi9 were detected in 10 out of 18 Thai rice blast isolates. This result implied that there was no genetic diversity. The information of this study can be used for determining the virulence spectrum of a rice blast pathogen population and predicting the effectiveness of target R genes (Pik and Pi9) in rice varieties for the rice blast resistance breeding program.

Keywords: AVR-Pik; AVR-Pi9; Genetic diversity; Magnaporthe oryzae; Rice blast disease.

C-34. THE ROLE OF MICRORNA 144 IN OSTEOARTHRITIS

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Abstract

Micro RNAs are short endogenous non-coding RNA molecules, typically 19-25 nucleotides in length, which negatively regulate gene expression. In osteoarthritis (OA), several genes necessary for cartilage homeostasis are aberrantly expressed, with a number of microRNAs implicated in this process. MicroRNA 144 is one of two miRNAs up-regulated in the joints of mice after destabilization of the medial meniscus surgery (DMM) at day 1 post-surgery. Therefore, this study was to define miR-144 function. In the results, expression of miR-144 was up-regulated in whole mouse joints at day 1 post DMM surgery. Interestingly, in end-stage human OA cartilage, miR-144 was also up-regulated compared to control cartilage. TGF β 1 and IL-1 had little effect on miR-144 expression in human articular chondrocytes. Functionally, miR-144 was able to positively regulate the TGF β /Smad, IL1/NF κ B signalling pathways. The TGF β 1 induced gene PAI1 was further induced by miR-144 overexpression in cells stimulated with TGF β 1. Also, overexpression of miR-144 led to an increased level of Smad3, p-Smad3 in both whole cell lysates or nuclear fractions, further confirming the inducing effect of miR-144 on TGF β /Smad signalling. Similarly, miR-144 further increased the expression level of the IL-1-responsive gene MMP13 and increased p65, p-p65 in whole cell lysates or nuclear fractions. These data identify miR-144 as microRNAs which act early in the development of OA. We have shown that it has functional impact on several relevant signalling pathways in OA.

Keywords: IL1/NF κ B signalling pathway, microRNA 144, osteoarthritis, TGF β /Smad signalling pathway

C-35. IMPACT OF INTERVENTION ON NUTRITIONAL STATUS, MENTAL HEALTH, SLEEP QUALITY AND PERCEIVED STRESS AMONG RURAL ELDERLY

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Abstract

Nutritional Status, Mental health, Sleep quality and Perceived Stress of 198 rural elderly from six villages of Dharwad Taluk of age 60 to 88 yrs and SES was assessed using standard measures. A sizable proportion of elderly had moderate and high level of perceived stress (86.8%), 42.4 percent had severe sleep problems, mild cognitive impairment (65.2%) while only 6.1 percent had normal nutritional status. An intervention programme of 10 weekly sessions, with six hours per session was developed and conducted in the day care centre established in college of community science in 2015-16 on 153 elderly in five batches, village-wise. The focus was on positive attitude towards ageing, restoration of physical health through nutrition and exercise, social participation and recreational activities, practices for healthy life and sound relationships with family members and friends, mental health issues and health checkup camps. A non-experimental research design with single group pre test and post test design and analysis with paired "t test" was employed. On post-testing it was noticed that on perceived

stress 47 percent each were in normal and mild level, only 9.8 percent had severe sleep and 41.8 percent had good/great sleep. The cognitive impairment was mild in 30.7 percent while rest were normal. None were in malnourished category and 54.5 percent were normal. The intervention proved to be effective. The elderly were highly satisfied and stated that the programme had beneficial effect on physical and mental health.

Keywords: Ageing, Elderly, Nutritional Status, Mental health, Sleep quality, Perceived Stress, intervention.

C-36. ASSESSMENT OF SILVER MYCONANOPESTICIDE AGAINST WHITE GRUBS AND EVALUATION OF ANTIMICROBIAL EFFICACY

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Abstract

There is a considerable yield loss recorded in crop production in India due to various pest and fungal attacks. In the present study fungicidal efficacy of silver nanoparticles were tested against fungi *Phytophthora infestans* and *Aspergillus flavus* that caused late-blight of potato and ear rot in maize respectively. The pesticidal efficacy was tested against white grubs, a potent pest of sugarcane in western Uttar Pradesh. The AgNPs were synthesized by using *Aspergillus niger* and characterized by color based method, laser-beam, UV-Vis Spectroscopy and Scanning Electron Microscopy (SEM). The AgNPs were tested against the fungi *Phytophthora infestans* & *Aspergillus flavus* and different life-cycle stages of white grubs. The development of paint-like mustard color solution by color-based identification method confirmed the synthesis of AgNPs. The formation of AgNPs was also confirmed by laser-beam scattering. The UV-Vis spectroscopy had shown peak at 400-425nm, corresponding to AgNPs. The SEM result confirmed the synthesis of nanoparticle ranging between 72nm to 95nm size. The media treated with AgNPs shown clear inhibition of fungal growth. The AgNPs were also found to interfere with the life-cycle of white-grub. The pupa could not undergo into development in insect-form and died. The first-instar and third-instar larva were also killed with the AgNPs treatment within 30-45 minutes time.

Keywords : Silver nanoparticle, myconanoparticles, nanopesticide, white grub, late-blight disease, ear rot, Phytophthora infestans, Aspergillus flavus, Aspergillus niger.

C-37. BIOSYNTHESIS OF SILVERNANOPARTICLES AND EVALUATION OF ITS EFFICACY AGAINST FUSARIUM DISEASE IN PEA PLANT

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Abstract

The present study involves synthesis of silver nanoparticles (AgNPs) by using plant extracts and evaluation of its fungicidal effect against *Fusarium* wilts disease. More specifically, AgNPs were prepared by plants material such as bamboo (Gaint Buddha belly bamboo), and akash bail (*Cassytha filiformis*). For the confirmation of the synthesized nanoparticles, these were characterized by UV-Vis spectrophotometer, FTIR, and SEM. The spectrophotometry peak of giant Buddha belly bamboo and akash bail (*Cassytha filiformis*) at 120 hr (468 nm), and 120 hr (440 nm) was observed respectively. Further, *Fusarium* was isolated from pea plant root. In this research work the comparative study of different chemical pesticides and silver nanoparticles will be done and also in vitro and in vivo effect of silver nano particles against *Fusarium* disease will be determined.

Keywords: Fusarium, silver nanoparticles, plant extract, nanopesticides.

C-38. EVALUATION OF SILVER AND ZINC MYCOGENIC-FUNGICIDES AGAINST EARLY BLIGHT AND LATE BLIGHT

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Abstract

Silver nanoparticles (AgNPs) and ZnNPs were prepared by: Mycogenic using *Aspergillus niger* and *Aspergillus flavus*. The antimicrobial activity of AgNPs was evaluated in the field against *Alternaria solani* and *Phytophthora infestance* which cause early blight and late blight disease of potato respectively. Disease severity, vegetative and biochemical parameters of plant were determined. UV-Vis spectroscopy, FT-IR spectroscopy, and Dynamic Light Scattering (DLS) characterized AgNPs and ZnNPs. Had a nanoparticles mean diameter (77.45 nm) using *Aspergillus niger* and (96.47 nm) with *Aspergillus flavus* of nanoparticles. Application of AgNPs and Zn NPs with 2mM and 1mM as plant foliar resulted in highly effective inhibitor of disease severity that recorded (8.39%) compared to the untreated plants (86.17 %) after 75 days of sowing. Also, a significant increase in growth and physiological parameters was recorded. Accumulation of Ag and Zn in plant tissues reached minimum value but all plant parameters were improved including physiological parameters and yield. It is concluded that the application of AgNPs and ZnNPs are recommended as plant foliar for controlling plant pathogen and improving plant yield.

Keywords: Silver and Zinc nanoparticles, potato, late blight and early blight disease.

C-39. SYNTHESIS AND EVALUATION OF EFFICACY OF SILVER MYCONANOPARTICLES AS A POTENTIAL PEST CONTROL AGENT AGAINST WHITE GRUB

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Abstract

There is a considerable yield loss recorded in crop production in India due to various pest attacks and among these the white grubs (family Scarabaeidae) of sub families *Melolonthinae*, *Rutelinae* and *Dynastinae* are most recalcitrant. The larval stage of this pest causes yield loss as high as 80 to 100% in India. In the present study silver myconanoparticles (AgNPs) were tested for its pesticidal activity against white grubs. The AgNPs were synthesized by using *Aspergillus niger* and characterized by color based method, laser-beam, UV-Vis Spectroscopy and Scanning Electron Microscopy (SEM). The AgNPs were tested against larva and pupa stages of white grub. The development of paint-like mustard color solution by color-based identification method confirmed the synthesis of AgNPs. The formation of AgNPs was also confirmed by laser-beam scattering. The UV-Vis spectroscopy had shown peak at 415-420nm, corresponding to AgNPs. The SEM result confirmed the synthesis of nanoparticle ranging between 67nm to 93nm size. The AgNPs were found to interfere with the life-cycle of white-grub. The pupa could not undergo into development in insect-form and died. The first-instar and third-instar larva were also killed with the AgNPs treatment within 30 minutes.

Keywords: Silver nanoparticle, myconanoparticles, nanopesticide, white grub, *Aspergillusniger*.

C-40. HEALTHY AGING AND WELLNESS

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Abstract

This paper attempts to analyse the correlation between Healthy Aging and wellness in today's perspective. Healthy aging and wellness is one of the most significant matter of concern in the 21st century. In India, the number of adults over the age 60 is increasing rapidly. Disability and reduced quality of life and chronic disease disproportionately affect older adults. In fact, most of the aged are having at least one chronic disease. Fortunately, scientific evidence has shown that healthy aging can prevent, delay and minimize the severity of chronic diseases and disabilities later in life; thus improving personal health and reducing pressure on health care systems. Healthy aging is an evidence based approach to improving overall personal health and wellness, focusing on key areas like maintaining an active lifestyle, having a balanced diet, staying socially connected. Health and wellness for seniors involves a complex interplay of numerous factors, including personal choices, life events, good health policy, supportive environments, strong community action and a health system that contributes to the pursuit of health. Population aging is one of the most significant trends of the 21st century. As India prepares for the most expected growth in the number of seniors in the coming years and as the life span extends, healthy aging and wellness is important to maintain a positive attitude, to remain independent and maintain mobility. This review of literature concludes with the observation that the most proven way to accelerate your life's potential is to nurture the healthy ageing of your body. The sooner you start to optimise your health to support healthy ageing, the sooner you can start to turn back the clock. If you want to ensure your life is long, fruitful & filled with vitality & energy, take the steps today to live the life you most desire by being well and aging healthy.

Keywords : Healthy aging, wellness, chronic disease

C-41. DEFAULT PARAGRAPH FONT;HYPERLINK;FOOTER CHAR;PRIMARY STUDY ON THE BACTERIAL STRAIN UL485ISOLATED FROM CHAO IN HUE PROVINCE, VIETNAM

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Abstract

Lactic acid bacteria (LAB) have been applied in many fields like food industry, pharmacy and medicine due to their valuable properties such as the ability to secrete some bioactive compounds including organic acids, exopolysaccharides and bacteriocins. In this study, the identification and the nucleotide sequences of *plnA* and *plnEF* genes of a LAB strain isolated from the fermented tofu "chao" in Hue province (Vietnam) were studied. In particular, the strain was identified as *Lactobacillus plantarum* and the sequences of the *plnA* and *plnEF* genes were 95% and 98% identical to those of *L. plantarum* sub sp. *plantarum* strain E1 on the Gen Bank, respectively.

Keywords: activity, bacteriocins, bioactive compounds, Lactic acid bacteria (LAB)

C-42. EMPOWERMENT LEVEL AMONGST THE ADOLESCENT GIRLS IN AGRA DISTRICT

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Abstract

Education is one of the most important ways to empower the women. So, present study has been undertaken to know the current status of empowerment level like pertaining to their decision making, power in home, political and legal awareness and

other such related variables of adolescent girls studying in class 11th living in Agra District of Uttar Pradesh. The study was conducted on 120 Adolescents girls. The sample was selected by multistage stratified random sample technique. Standardized tool was used in this study. Significant association was observed between distribution of rural and urban subjects according to empowerment level ($\chi^2=9.49$). Significant association was observed between frequency of empowerment level of adolescent girls belonged to working and non working mothers ($\chi^2=11.7$). The mean score of empowerment level above 17 year girls (190.15) was higher than below 17 year girls (171.62). This difference was also found to be significant ($t=2.17$ $P<0.05$). However the present study shows that non significant difference was found between empowerment level of above 30000 monthly parental income group girls and below 30000 monthly parental income group girls. This difference was also found to be non-significant ($t=1.52$). Conclusions derived were that, subjects living in urban area, having working mothers, are more empowered in comparison to their rural and non working mother counterparts. In the present study results show that age factors also affect the empowerment level.

C-43. EXTENSION STRATEGY FOR ENHANCING PULSES PRODUCTION AND NUTRITIONAL SECURITY IN INDIA

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Keywords: Cluster frontline demonstration, Pulses productivity, Frontline extension, Yield advantages.

Abstract

Government of India, Ministry of Agriculture & Farmers Welfare under NFSM focusing on Cluster Frontline Demonstrations on Pulses with an objective to enhance the production of pulses for nutritional security. The package demonstrations were co-ordinated at Division of Agricultural Extension, ICAR, New Delhi by involving all eleven ICAR-ATARIs located in different places in India. The climate change has destroyed the pulses yield during October 2014 & further, unseasonal rainfall in 2014-15 during end of Feb. 2015 & first week of March reduction in yield, pulses price gone higher and 4-5 million tones pulses imported. Frontline Demonstrations on major pulses i.e. chickpea, lentil, field pea, black gram and green Gram were implemented by Farm Science Centers (KVKs) in 26 states 474 districts with 14435ha area in 2015-16, 567 district with 28968 ha area in 2016-17 and 549 districts in 31366 ha area in 2017-18.

The districts level farmers were selected based on their willingness to laid out the demonstrations in a cluster basis and approachable situations in recommended package of practices (ICM, INM, IPM, IDM, RCT etc.). The pulses production ranges between 17-18 million tons during 2011-12 to 2014-15 and productivity 7.55 q/ha. The major pulses growing states are Karnataka, MP, Maharashtra, Rajasthan and UP. During 2015-16 the pulses availability was 37 g/capita/day against 52 g/capita/day requirement by ICMR recommendations. The wilt resistant variety JG -11 intercropped with coriander (10:2) resulted yield of 23.5q/ha which was 38 % higher over local check. Pigeon pea (LRG 41) resulted yield of 17.5q/ha under drip irrigation. Chick pea irrigated by sprinkler in Beed district resulted yield of 23.5 q/ha, whereas in Sholapur variety Digvijay resulted yield of 38.75q/ha under BBF/drip irrigation system. Presently the pulses production is 22.5 MT with the joint efforts by ICAR and Ministry of Agriculture and Farmers Welfare.

On the basis of results yield gain of 50-60 percentage was observed in different pulses crop over existing farmer practices. Hence, there is an opportunity to double the pulses production and ensure protein security to the vegetarian people of the country. Building farmers' capacity on correct use of these technologies at the farm and ensuring the institutional convergence for technological backstopping and necessary support services.

Theme D

Physical, Chemical and Mathematical Sciences

D-1. CHEMICAL CHARACTERIZATION AND EVALUATION OF ANTIBACTERIAL POTENTIAL OF ESSENTIAL OIL OF *CURCUMA CAESIA*

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Abstract

Curcuma caesia rhizome (family Zingiberaceae) was collected from Orissa and its essential oil was obtained by Microwave assisted method. The chemical composition of oil was investigated by GC-MS. Moreover, the essential oil was evaluated for its antimicrobial activity against two Gram-positive and three Gram-negative bacteria. The investigation leads to the identification 48 of constituents of the total oil. The essential oil of *C. caesia* was characterized by a high content of eucalyptol (37.57), Camphor (14.54), Camphene (4.53), Germacrene D (8.68), Longiverbenone (8.85), Terpinen-4-ol (2.51) and α -Terpineol (2.51) were identified as the main components. The antimicrobial study was evaluated against *Salmonella typhimurium*, *Bacillus cereus*, *Escherichia coli*, *Pseudomonas aeruginosa* and *Staphylococcus aureus*. The oil exhibited antimicrobial activity against *S. typhimurium*, *P. aeruginosa*, *E. coli* and *S. aureus*.

Keywords: *Curcuma caesia*, Microwave assisted extraction, Antimicrobial activity, Essential oil

D-2. EFFECT OF THAWING METHODS ON ANTIOXIDANT CAPACITY OF FROZEN STRAWBERRY (*FRAGARIA ANANASSA*) AND MULBERRY (*MORUS NIGRA*)

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Abstract

The aim of this study was to evaluate the antioxidant capacity of thawed frozen strawberries (*Fragaria ananassa*) and mulberries (*Morus nigra*). Both types of fruit were frozen in a freezer with a cooling rate of 1°C/min and stored at -18°C in 1 week before thawed at ambient temperature, cold temperature (4°C) and in a microwave oven. ANOVA, LSD test and Principle Component Analysis (PCA) were applied to compare the effect of thawing methods. Results showed that different thawing methods affected significantly ($P < 0.05$) drip loss, vitamin C content, total phenolic content (TPC) and antioxidant capacity of strawberries and mulberries. The strong negative correlation was found between the drip loss and the remaining vitamin C as well as between the thawing time and the antioxidant capacity of thawed fruit. Among three thawing methods, microwave was considered as the most effective method to retain antioxidant capacity, vitamin C and total phenolic content for both strawberry and mulberry.

Keywords: Strawberries; mulberries; freezing; thawing; antioxidant capacity

D-3. PHYSICO-CHEMICAL CHARACTERIZATION OF BLACK SOLDIER FLY LARVAE (*HERMETIAILLUCENS LINNAEUS*) OIL

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Abstract

The black soldier fly (BSF), *Hermetia illucens* (Linnaeus), is a non-pest fly with a relatively high content of protein (40-45 wt%) and fat (27-35 wt%). The BSF larvae can be valorized as animal feed in order to replace conventional feed ingredients for poultry like fishmeal and soybean meal, which have a high environmental impact. Currently, there are very little studies that report on the availability and composition of BSF larvae oil. In this study, BSF larvae oil was studied for its physicochemical characteristics and fatty acids composition. Fatty acid composition was analyzed by AOAC 2012 (969.33) and the results showed that major saturated fatty acid was lauric acid (31.9%) and major unsaturated fatty acid were linoleic acid (13%) and linolenic acid (1.7%). The physicochemical properties of the BSF larvae oil including viscosity, FFA content, acid value, saponification value, iodine value and peroxide value were 100.4 \pm 0.5 cP, 5.974 \pm 0.023%, 11.876 \pm 0.01 mg KOH/g, 213.218 \pm 0.023 mg KOH/g, 73.4 gI₂/100g and 176 mEq/kg, respectively. Results of this study contribute to develop further research on BSF larvae oil's application in various sectors.

Keywords: black soldier fly (BSF), larvae, *Hermetia illucens* (Linnaeus), fatty acid

D-4. OPTIMIZATION OF MICROCAPSULES OF W/O/W DOUBLE EMULSIONS OF DRUMSTICK (*Moringa oleifera*) LEAVES EXTRACT LOADED IN MALTODEXTRIN MATRIX BY SPRAY DRYING

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Abstract

A water-in-oil-in-water (W/O/W) multiple emulsion containing drumstickleaves extract was prepared using coconut oil as the oily phase and maltodextrin as wall material in outeraqueous phases. The w/o was prepared by stirring at 1000 rpm and then ultrasonic homogenization was applied in the next step. The emulsions were immediately spray-dried based on the variation of maltodextrin concentration and wall-to-core ratio to optimize the powder recovery, encapsulation efficiency and specific energy. Increasing wall-to-core ratio led to the increase of particle size and the decrease of polyphenol content in powder. Scanning electron microscopy indicated that the W/O/W microcapsules were spherical in shape. The high encapsulation efficiency for polyphenol of 95% was obtained at maltodextrin concentration of 20% and wall-to-core ratio of 4.5 but low powder recovery (24%) and high specific energy consumption (53.3 Wh/g). The multiple optimization analysis technique was used to obtain high powder recovery (43.6%), low specific energy consumption (30.3 Wh/g) and relative high encapsulation efficiency for polyphenol of 82% at maltodextrin concentration of 24.3% and wall-to-core ratio of 4.3.

Keywords: double emulsion; microencapsulation; polyphenol; spray drying; optimization

D-5. WATER HYACINTH (EICHORNIACRASSIPES) AS AN EFFECTIVE BIOSORBENT FOR SORPTION OF PHENOL

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Abstract

In the present paper, the sorption of phenol using low-cost water hyacinth activated carbon (WHAC) has been presented. The effect of various parameters such as pH, biosorbent dose, temperature, initial phenol concentration and contact time were studied and optimized. The optimum biosorbent dosage, equilibrium contact time, and pH were found to be 5 g/l, 350 min, and 6 respectively. The entropy change and heat of sorption for phenol-WHAC system were estimated as 40.85 kJ/mol K and -27.81 kJ/mol, respectively. The sorption of phenol onto WHAC was found to be exothermic in nature. The negative value of Gibbs free energy indicates the spontaneous nature of phenol sorption onto WHAC.

Keywords: water hyacinth activated carbon, phenol, biosorption, Gibbs free energy

D-6. IMPORTANCE OF HIGH PERFORMANCE THIN LAYER CHROMATOGRAPHY AND UV SPECTROSCOPY IN ANALYSIS OF HOMOEOPATHIC DRUG DATURA FEROX

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Abstract

High-performance Thin Layer Chromatography (HPTLC) and UV is an important tool for the qualitative and quantitative phytochemical, chemo profiling and marker compound analysis of homoeopathic drugs/tinctures (HT). According to the phyto equivalence concept the full HT can be seen as the active compound, because the several constituents act together being responsible for its therapeutic effect. *Datura ferox* in Homoeopathy frequently used in the treatment of bronchitis in asthma, mental illness, respiratory disorders, ADHD (attention deficit hyperactivity) and drug detoxification. Present study reveals the LOD (4.09%), Total Ash (1.99%), Alcohol extractive values (5.24%), Water extractive values (2.94%), Total solids (0.52%), Wt/ml (0.84g) and Alcohol content (72%). In UV Spectroscopy max. observed at 325 nm in HT. HPTLC analyses of in house HT were performed by using chloroform methanol (9:1, v/v) as mobile phase. Under UV light (254nm), two spots appear at R_f 0.44, 0.53 (brown). Under U.V (366nm), five spots appear at R_f 0.36, 0.43, 0.51, 0.58, 0.81 (blue). After spray with Anisaldehyde Sulphuric acid eight spots appears at R_f 0.36 (light orange), 0.43 (orange), 0.57 (blue), 0.62 (Purple), 0.66 (blue), 0.69 (brown), 0.78 (purple) and 0.83 (blue). The present physicochemical and phytochemical data are to be considered as Pharmacopoeial standards for aforesaid drug

Keywords: *Daturaferox*, Homoeopathic drug, Chemoprofiling, H.P.T.L.C fingerprint.

D-7. CHEMOPROFILING OF HOMOEOPATHIC DRUG ROSA DAMASCENA

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Abstract

Chemo profiling of homeopathic drug/tincture (HT) represents a comprehensive approach for evaluation of quality, purity, safety and efficacy of HT. According to the phytoequivalence concept the full HT can be seen as the active compound, because the several constituents act together being responsible for its therapeutic effect. *Rosa damascena* is commonly used as the anti-inflammatory, antidepressant, antispasmodic, aphrodisiac astringent, antibacterial, antiviral, antiseptic, blood tonic and as the expectorant. Present study shows LOD (12.90%), Total Ash (3.88%), Alcohol (6.91%), Water extractive values (25.43%), Total solids (0.023%), Wt/ml (0.94g) and Alcohol content (49-52%). In UV spectroscopy max. observed at 217 & 266 nm in HT. HPTLC analysis of in-house HT was performed by using chloroform methanol (9:1, v/v) as mobile phase. At UV 254 nm, five spots appear at R_f. 0.27, 0.35, 0.45, 0.55 and 0.80 (all blue). At UV 366nm, nine spots appear at R_f. 0.28 (purple), 0.33 (light orange), 0.37 (orange), 0.46 (orange), 0.58 (blue), 0.63 (blue), 0.75 (orange), 0.81 (pink) and 0.86 (orange). After spraying with AS reagent six spots appear at R_f. 0.27 (yellow), 0.43 (blue), 0.54 (blue), 0.64 (blue), 0.70 (blue) and 0.82 (blue). The present physicochemical and phytochemical data are to be considered as Pharmacopoeial standards for aforesaid drug.

Keywords: *Rosa damascena*, Homoeopathic drug, Chemoprofiling, H.P.T.L.C fingerprint.

D-8. INFLUENCES OF METAL DOPING ON ELECTRONIC AND MAGNETIC PROPERTIES OF MOS₂ MONOLAYER

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Abstract

Manipulating electronic and magnetic properties of dichalcogenides by doping has attracted much attention recently. By using the density functional theory method and the Hubbard-U parameter method, we have examined the structural, electronic and magnetic properties of MoS₂ that have been doped by the transition metals (V, Mn, Fe, Co, Cu). At the same time, we also incorporated a polymer layer onto MoS₂ monolayer during the study. We found that doping has altered the available characteristics of MoS₂ in a positive direction for application to electronic components. Particularly Cu doping gives comparatively different results than the rest. Our results can be used as a reference for experiment.

Keywords: Dichalcogenides, density functional theory, electronic and magnetic properties, transition metal, doping.

D-9. ACTIVITY CONCENTRATIONS OF NATURAL AND ARTIFICIAL RADIONUCLIDES IN VEGETABLES AT THE AGRICULTURAL AREA OF HOC MON DISTRICT, HO CHI MINH CITY, VIETNAM AND THEIR RADIOLOGICAL IMPACTS ON HUMAN

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Abstract

In this work, we investigated the activity concentration of natural and artificial radionuclides in vegetables at agricultural area of Hoc Mon district using the HPGe gamma spectrometer. The results showed that there are accumulation of both natural radionuclide in uranium series, thorium series, ⁴⁰K and artificial radionuclide of ²¹⁰Pb in surveyed vegetable samples with the different activity concentrations. The activity of ⁴⁰K isotopes in vegetable samples are always higher than that of other isotopes in U series and Th series (about 100 times), most notably in basil, cabbage, spinach, broccoli with an activity of (148.1 ± 4.7) Bq/kg; (148.1 ± 4.8) Bq/kg; (130.2 ± 4.2) Bq/kg; (122.3 ± 4.0) Bq/kg; There is no radioactivity equilibrium between ²³⁸U and its progenies, ²³²Th and its progenies in surveyed vegetable samples. It is caused by a uptake competition

for different radio isotopes in the same vegetable. The values of the annual effective dose due to ingestion are high for turnip, tossa jute and sweet potato leaf respectively. However, these values are still less than 1mSc/y in all cases of surveyed vegetables. It can be concluded that the radiological impact in surveyed vegetables is negligible.

Keywords: Radioactivity, vegetable, HPGe, gamma spectrometer, annual effective dose.

D-10. THERMOSOLUTAL INSTABILITY OF AN INCOMPRESSIBLE VISCOUS FLUID PERMEATED WITH MAGNETIC FIELD IN AN ANISOTROPIC POROUS MEDIUM

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Abstract

In this paper, we examine, the framework of linear stability analysis with the model suggested by Brinkman, the thermosolutal stability of an incompressible viscous fluid in the presence of magnetic field confined in an anisotropic porous medium. Uniform temperature with concentration gradients is maintained along z-axis. The different properties associated with magnetic field have attracted a number of different results on stability by using normal mode analysis technique and perturbation. The particular case, which holds under the physical situations of the thermal diffusivity and solute diffusivity are, such that both are equal are also considered. In this paper, the important results obtained include different conditions of stability, existence of oscillatory modes, non-oscillatory modes, discussion for stable and unstable modes, if exist in the problem.

Keywords: Thermosolutal instability, anisotropic porous medium, incompressible viscous fluid and magnetic field.

D-11. TUNING ELECTRONIC STRUCTURES AND OPTICAL PROPERTIES OF MoS₂ MONOLAYER BY HALOGEN AND POLYMER DOPING

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Abstract

With a bandgap of approximate 1.8eV, MoS₂ monolayer (MoS₂ML) is an alternative for the applications in electronic components. Recently, its optical properties have been gaining increasing interest as it can be used in photoelectric equipment and optical catalysts. The band gap control of MoS₂ML is a technique necessary for the development of nano-electronic devices. In this research, we use the density functional theory to evaluate the electronic structure and optical properties of MoS₂ML that is manipulated by doping halogen atoms and polymers. The polymer doping onto MoS₂ML is very beneficial for making field effect transistors, which protect the equipment from gas sensitivity and humidity. The results should suggest an appropriate way to control the electronic structure and optical properties of MoS₂ML.

Keywords: Dichalcogenides, electronic and optical devices, density functional theory, doping.

Theme E

Engineering & Technology

E-1. AN EXPERIMENTAL STUDY ON DRYING OF PEPPERCORNS IN FLUIDIZED-BED DRIER

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Abstract

Vietnam is the largest peppercorns producing and exporting country in the world. The annual productivity of peppercorns is over 200,000 tons. Recently, two popular methods for drying peppercorns in Vietnam have been used as sun directed drying and flat-bed drying. The drying time normally takes 2 - 3 days for the peppers to reach the desired moisture content by sun-directed drying and it is from 16 to 20 hours by flat-bed drying method. However, in order to reduce the drying time while still preserving the peppers quality, one kind of dryer is fluidized-bed dryer has been proposed, manufactured and tested. The experiments were conducted to determine drying rate of peppercorns at different levels of drying air temperature (40⁰C, 50⁰C, 60⁰C) and at different drying air velocity (4.0 m/s, 5.0 m/s, 6.0 m/s). With its advantages like high mixing ability, improved solid-gas contact and high drying air temperature, the drying rate and the uniformity of dried-product dried by this method are higher than those of the flat-bed dryer. Furthermore, the results have also shown that the drying time is in range of 3 to 4 hours for the peppercorns to reach the moisture content of 14%. The color and the specific volume of the dried-peppers are equivalent to those of control samples dried in a flat-bed dryer.

Keywords: pepper, drying method, fluidized-bed dryer.

E-2. A STUDY ON TILLAGE MACHINE FOR WATERMELONS LAND PREPARATION-CASE IN TIEN GIANG PROVINCE, VIET NAM

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Abstract

Watermelon is one of the popular plants in agricultural productions of Tien Giang Province, Viet Nam. This fruit has been contributed to increase the farmers' income significantly. However, one of the difficulty now is the land preparation has not been done well leading to delay the time planting. One model of suitable tillage machine combined with the four-wheel tractor for watermelon land preparation in Tien Giang province has been developed successfully in order to overcome the shortage of agricultural labour and to reduce the hard-working level of farmers. The machine has four mould-board in which the first two is in symmetry and can tillage soil about 11 cm in depth and the second one is as the same to make more tillage depth with more than 10 cm. The experimental investigation indicates that the machine completely passes the demands for watermelons land preparation in TienGiang Province with its capacity is about 1,35 ha per hour which is more than 65 times compared to the one of farmer.

Keywords: Land preparation, tillage, watermelon

E-3. INVESTIGATING EFFECT OF CHANGING BASE LENGTH TO MOTION COMFORT ON COACH IS MADE AND ASSEMBLY AT VIETNAM

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Abstract

The requirement to increase the quantity of passenger when travelling between with other city is a big issue for auto manufacture at VIETNAM from base chassis. Increase quantity of passenger is affected to motion dynamic, safe, reality...

This index must satisfy the standard of the Ministry of Transport Vietnam. Otherwise, the vehicle need calculate comfort of passenger and driver. The aim of this study was to investigate the effect of extending the base length to comfort of passenger and driver aim to carried more passengers. The vehicle model used is the sixteen degrees of freedom half car model vehicle. The simulation of sixteen degrees of freedom state space model is carried out using Matlab. The study use root means square (RMS) to determine the comfort of passenger and driver.

Keywords: comfort, coach, sleeper coach, base length

E-4. A COMPARATIVE STUDY OF EVOLUTIONARY AND GENETIC ALGORITHMS IN COURSE TIMETABLING

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Abstract

Course timetabling is the task of arranging courses, classrooms, lecturers, students, etc. such that the hard constraints are not violated. In addition, the violation of soft constraints is the least. To date, many approaches have been proposed to deal with generating such an optimal timetable. However, it can be seen that some proposed methods can be efficient with a given problem can be inefficient with others. It is due to most of the proposed methods only focus on finding a good timetable for particular institutes (or universities). This paper presents a comparison of the use of different algorithms (i.e. genetic and evolutionary algorithms) for solving course timetabling problem with respects to executing time and the quality of obtained timetable.

Keywords: PSO, genetic algorithm, course timetabling

E-4. BUILDING A SYSTEM FOR SIMULATING THE YIELD OF AGRICULTURAL CROPS BASED ON INFERENCE AND LEARNING BAYESIAN NETWORKS

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Abstract

With the importance of smart farming, the simulation of the yield of agricultural crops is necessary. The algorithm dealing with uncertainty factors of the agricultural model is very important. Bayesian network inference is a very effective one within various methods dealing with uncertainty. In this paper, we applied Bayesian network method to yield of agricultural crops model; designed Bayesian network structure in a yield of agricultural crops model; assigned the local probability distribution and discussed the way to acquire and propagate related evidence. The practice has proven Bayesian network approach for the yield of agricultural crops model is a very effective method.

Keywords: Bayesian network, inference, the yield of agricultural crops.

E-5. EXPERIMENTAL STUDY TO VERIFY THE EFFECT OF PARAMETERS ON SURFACE ROUGHNESS WITH 9XC HARDENED STEEL AFTER LASER ASSISTED TURNING

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Abstract

Turning hardened materials, it is often necessary to use high-speed machine, technology system of high rigidity and using cutting tools made of super-hard materials, ... This paper presents the experimental study for processing turning hard 9XC

steel (62HRC) with the assisted laser. The study using T6M16 universal turning lathe and cutting tool materials was TiAlN coated carbide. In order to verify the influences of parameters on surface roughness after processing, various parameters such as laser power, speed cutting, and feed rate had been selected using planning experiments using orthogonal arrays. The results show that the effect of parameters on surface roughness was 69,4% of laser power, 3,92% of speed cutting and 24,7% of feed rate. This result also confirms that it is possible to use laser assisted turning method to replace the above methods of processing.

Keywords: 9XC hardened alloy steel, laser power, cutting speed, feed rate, surface roughness.

E-6. ASIAN AGRICULTURE 4.0

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Abstract

Asia Food Project is proposed which is the similar concept to Asia Rice Project that the author proposed in May 2014 at JSAMFE, Japanese Society of Agricultural Machinery & Food Engineers. Asia is one of the regions consisting of many countries, in which most of them are still agricultural countries, producing a huge amount of resources available for not only food but also energy and eco-friendly material production. They can be defined as resource-oriented countries. On the other hand, we have technology- oriented countries like ASEAN "Plus 3" which means People's Republic of China, Japan & South Korea. The main concept of the project consists of collaboration together by those categorized countries between resource-oriented and technology-oriented ones. In this paper, the importance of high tech agriculture named smart agriculture and its transfer is emphasized for ASEAN Economic Community to promote regional economy and peace keeping. In addition, the way how the project should be promoted and managed to follow the steps and achieve the final goal is also discussed.

Keywords: Global tetralemma, ASEAN Economic Community, Asia food project, bio -energy, Smart agriculture, world food pantry

E-7. A STUDY ON DESIGN AND MANUFACTURE THE COFFEE FRUITS PICKING MACHINE

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Abstract

The quality of Vietnam coffee bean highly depends on the coffee fruits picking process. Traditionally, most of coffee farms and households in Viet Nam have used two methods for coffee fruits picking. The first one is the farmers use the hand for picking then place coffee fruits in the basket that is very low productivity. The other is coffee fruits have been removed to fall into the canvas on the earth and they are collected by the hand which would need more pieces of canvas. This paper recommends of the new model for coffee fruits picking that could overcome some above inconvenience. The machine works by using a 12 volts battery, be controlled by a picker and the coffee fruits are collected into the basket via a tube has been designed and manufactured. The results showed that the machine contributes to increase the coffee picking productivity and to decrease the number of farmers for picking.

Keywords: coffee fruits, coffee picking machine, coffee bean, coffee picking method.

E-8. A CASE STUDY OF DESIGN OF LOW-COST RICE COLOR SORTER MACHINE

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Abstract

Nowadays, the modernization for agricultural production in general and for rice processing in particular is high requirement of Vietnam economy. However, mostly rice processing machines have been imported with big productivity that consume much energy, high cost and spend more foreign currency of Vietnam. Hence, a new model of the rice color sorter machine with low-cost is necessary. This paper presents the redesigned rice processing assembly in which the rice color sorter machine with its productivity of 0.8 ton per hour and cost equal about two-third comparing to imported one is designed and manufactured. Testing results showed the machine is a good-working condition and suitable for Vietnamese market

Keywords: Rice color separator, rice color sorting machine, rice injection nozzles.

E-8. DETERMINING THE EFFECTIVE METHOD FOR ONE-SUN-DRIED SQUID DRYING

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Abstract

The research aimed to determine the effect of different drying methods including heat pump drying, hot air drying, combined infrared and heat pump drying, and combined infrared and hot air drying on the quality of one-sun-dried squid. With each method, squids are dried at three temperature degree of 40, 45 and 50°C. The quality of the product is assessed by protein content, organoleptic quality and drying rate. The research results showed that combined infrared and heat pump drying at temperature of 45°C is the most appropriate method of drying one-sun-dried squid. After drying, the protein content reaches 22/100 gram-squid; drying time is 180 minutes, the average drying rate is 3.33% H₂O/h and the squids color is best retained.

Keywords: one-sun-dried squid, drying rate, drying time, heat pump drying

E-9. AUTOMATIC CONTROL OF BIRD'S NEST DRYER PROCESS

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Abstract

Edible bird's nest is one of the most expensive and most appreciated animal products due to the great amount of time and effort in harvesting and processing these nests. The harvested nests, both from nature and purpose-built nesting houses, are typically contaminated with bird's feather, waste and dust that need to be cleaned, dried and processed before being stored or sold. In this paper, a proposed dryer system for edible bird's nest based on vacuum drying method was designed, fabricated and tested to improve the quality and food safety of bird's nest products. The vacuum drying process parameters including vacuum pressure, trays' temperature stability and drying time duration are automatically monitored and controlled by a Programmable Logic Controller (PLC) and a Human-Machine Interface (HMI) unit. The results show that the properties of the dried bird's nest, e.g. color, taste and shape, are preserved to be comparable to the original harvested bird's nest whereas the moisture content is reduced from 32-35% wet basic to 6-8% wet basic after 8-12 hours of drying.

Keywords: Bird's nest; Vacuum dryer; Bird's nest drying.

E-10. FIELD PERFORMANCE EVALUATION OF A STUBBLE CUTTING MACHINE COUPLED WITH A WINDROW GATHERING SYSTEM

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Abstract

Stubble left in the field after harvest is a by-product in rice-based production system. At present, most of stubble is burned in the field or mulched in soil. In some places, such as Long An, Binh Thuan Provinces where the need of straw is more than the supply, stubble collection at local rice field is considered as a proper solution to this issue. With the height of stubble after harvesting of 25.3 cm, the available stubble yield (excluding straw) is 3.1 ton per hectare at converted moisture content of 12%. In a previous research, the use of combine harvester to cut stubble simultaneously with harvesting stage is inappropriate because of its improper design for this purpose. Thus, cutting and gathering the stubble is still a challenge related to technical and economic aspects. In this study, the performance of a rice stubble cutting machine coupled with a windrow gathering system was evaluated together with economic analysis on the use of the machine. As the results, the machine operated well on field with cutting capacity of 1.0 hectare per hour and fuel consumption of 4.6 liters per hour. At the cutting height of 7.9 cm, collected stubble yield is 2.0 tons per hectare with the stubble loss in field is 7.3%. Using the machine for stubble cutting and gathering not only contributes to increase rice farmers' income but also to create more benefits such as avoiding in-field burning of stubble which causes greenhouse gas emissions.

Keywords: Stubble, cutting machine, windrow gathering, performance evaluation.

E-11. EMERGING TRENDS IN RESEARCH OF BIOLOGICALLY ACTIVE MOLECULES : A FUTURE ANALYTICAL APPROACHES TO INVESTIGATE AND CONTROL VARIOUS DISEASES

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Abstract

Infectious diseases and lifestyle diseases are the major concern as they affect more than 75% world population. Both the diseases are related to microbes so it is a challenge for the microbiologist to control these diseases using different strategies. Infectious diseases are the second leading cause of death worldwide and there is an urgent need to discover new drugs to combat drug-resistant pathogens. The anti-infective arena is experiencing a shortage of lead compounds to treat these diseases. Now with the development of new molecular techniques a very promising approach in this respect is to explore the microbial community by cloning genes of uncultured microorganisms (Metagenomic and Metabolomic approach) as a new genetic resource or to isolate microorganisms from most diversified environments. The discovery of novel natural products has entered a new era with the exponential growth of available genetic data from microorganisms. Advances in DNA sequencing and bioinformatics technologies, especially the use of genome scanning instead of sequencing the whole microbial genome, now make it possible to rapidly identify gene clusters that encode bioactive natural products and to make computer predictions of chemical structure based on the sequence information. This is further strengthened by the Human microbiome project which proved that numbers of diseases are associated with microbial population of the human body and their interaction of microbes present in the food. Fruit and vegetable contains a large number of microbes and is a major source of disease fighting chemicals. These microbial communities, however, remain largely unstudied, leaving almost entirely unknown their influence upon disease and a source of novel bioactive molecules like gold and silver nano particles, DNazymes, G-quadruplex, carotenoids and enzymes. Advances in DNA sequencing technologies have created a new field of research, called fruit metagenomics, allowing comprehensive examination of microbial communities, even those comprised of uncultivable organisms. The combination of metagenomics and metabolomics study will lead to the discovery of novel biologically active molecules with various applications.

E-12. BERBERINE INDUCES TOXICITY IN HELA CELLS THROUGH PERTURBATION OF MICROTUBULE POLYMERIZATION BY BINDING TO TUBULIN AT A UNIQUE SITE

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Abstract

Medicinal herbs are reservoir of therapeutically bioactive phyto-constituents. Berberine i.e. 5, 6-dihydro-9, 10-dimethoxybenzo[g]-1, 3-benzodioxolo [5, 6-a] quinolizinium is produced by many plant species including the barberry. Berberine, an isoquinoline alkaloid is one of the widespread representatives belonging to the family of protoberberine alkaloids.

Berberine is produced by many plant species including the barberry (*Berberis aristata*), the meadow rue (*Thalictrum*), the goldenseal (*Hydrastis Canadensis* L.), the celandine (*Chelidonium*), *Phellodendron amurense*, etc. In traditional medicinal system berberine has been used for its diverse pharmacological actions in curing arrhythmia, diabetes, hyperlipidemia etc. Further, it exhibits remarkable anticancer activities and is currently under clinical trials. Recently, it has been reported that the anticancer activity of berberine could be partly due to its inhibitory actions on tubulin and microtubule assembly. Berberine inhibited the proliferation of HeLa cells with an IC₅₀ of 18 μ M and induced significant depolymerisation of interphase and mitotic microtubules. At its IC₅₀, berberine exerted a moderate G2/M arrest and mitotic block as detected by FACS analysis and fluorescence microscopy respectively.

Keywords: Berberine, cancer, FRET and tubulin

E-13. CHARACTERIZATION OF ACNE MICROBIOME AND EVALUATE THE EFFICACY OF BIOLOGICALLY SYNTHESIZED SILVER NANOPARTICLES OF FARSETIA HAMILTONII EXTRACT AGAINST PROPIONIBACTERIUM ACNES

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Abstract

Propionibacterium acnes (*P. acnes*) is the relatively slow growing, Gram-positive, a typically aerotolerant anaerobic bacterium that plays a major role in the pathogenesis of acne. Microbial fluctuation of common resident microbes on the skin is the main inducer of this multifactorial disease, where each microbe plays an important role in possessing their own purpose and style in protecting the human body. Our primary objective was to characterize acne microbiome in the Indian patients. 367 bacterial strains were isolated from 82 acne patient's specimens from different tertiary hospitals. The isolated cultures were characterized by using 16S rRNA sequencing. Out of 367 bacterial strains; *P. acnes* (38%), *Staphylococcus* sp. (26%), MRSA strains (8%), *K. pneumoniae* (7%), *Bacillus* sp (5%) and *Paenibacillus* sp. (2%) were found to be the most common species in acne lesions. Across the globe, the pervasiveness of antibiotic resistance is a problem in acne patients due to patient compliance, regional prescription practices and genomic variability in *Propionibacterium acnes*. The purpose of this study to demonstrate the therapeutic potential of silver nanoparticles (AgNPs), which were biosynthesized using the extracts of *Farsetia hamiltonii* plant. The characterization of AgNPs formation had confirmed by using UV-Vis spectrophotometry, Dynamic Light Scattering (DLS), and Transmission Electron Microscopy (TEM). These nanoparticles showed the enhanced antimicrobial potential against resistant *P. acnes* that were later confirmed by TEM. These particles exhibited minimal toxicity to the human blood cells.

Keywords: Propionibacterium acnes, Silver Nanoparticles (AgNPs), Farsetia hamiltonii, Transmission Electron Microscopy (TEM).

Theme F

Social Sciences and

Humanities

F-1. FACTORS AFFECTING CONSUMERS' CHOICE OF BIO-FUEL: THE CASE OF E5 IN HO CHI MINH CITY, VIETNAM

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Abstract

Bio-fuel (E5) has gradually been substituted for fossil fuel (RON 92) to reduce the environmental cost by vehicles using gasoline in Vietnam. However, the consumers are reluctant in using E5, the study examines factors affecting consumers' choice toward E5, based on information 209 gasoline of consumer surveyed in Ho Chi Minh city in 2016 and applied the Technical Acceptance Model (TAM) and Theory of Planned Behavior (TPB) with Structural Equation Model (SEM). The result obtained in this study showed that the direct impact of behavioral intention and perceived behavioral control was consistently significant. The indirect impact of perceived usefulness, compatibility was consistently significant pass the mediating factor that is the attitude, self-efficacy and resource facilitating conditions are consistently significant via perceived behavioral control. The study also tested the impact of demographic factors of consumers such as gender, age, education and income.

Keywords: Nguyen Van Ngai, Bio-fuel, consumers' choice.

F-2. AGRICULTURAL SUSTAINABILITY ASSESSMENT : APPLICATIONS TO VEGETABLE PRODUCTION IN AN GIANG PROVINCE, VIETNAM

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Abstract

Agricultural sustainability assessment has long been controversy on its definition, measurement methods, and indicators. This study aims at consolidating a review on methods and indicators to facilitate this issue. The scientific contribution of this paper is to provide a three-step protocol for assessing agricultural sustainability. A case study of vegetable production in An Giang Province was employed to calibrate the protocol. The results provide a more transparent and stepwise context-based approach to the protocol. The proposed protocol could be applied by researchers from different geo-regions for examining the sustainability of other agricultural commodities.

Keywords: Agricultural sustainability, indicator-based framework, three-step protocol, vegetable production

F-3. RICE VALUE CHAIN STUDY IN TRA VINH PROVINCE, VIETNAM

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Abstract

Analysis of the rice value chain in TraVinh province, Vietnam, based on the integrated approaches of Gereffi and Korzeniewicz (1994), Kaplinsky and Morris (2000), GTZ ValueLinks (2007) and Chanerin Maneechansook (2011) along with direct interviews of 200 individual chain actors in the province. Research objectives consist of (1) Analysis of the stages in the rice value chain, (2) Chain economic analysis includes production cost, cost-added, value added, chain income of each actor and the entire chain, (3) chain upgrading strategies of rice product in the TraVinh province towards sustainable development. The conclusions indicated that there were many difficulties and challenges in rice value chain in TraVinh including: inefficient production from many stages in the chain, lack of vertical and horizontal linkages in production and distribution. Many solutions were proposed for upgrading rice value chain in terms of market information, linkage development and policies.

Keywords: Value chain, rice, linkage, value added, TraVinh province.

F-4. GOVERNANCE PATTERNS OF PIG VALUE CHAINS IN THONG NHAT DISTRICT, DONG NAI PROVINCE

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Abstract

This study aims at determining governance patterns of pig value chain in Thong Nhat district, Dong Nai province. The scientific contribution of this paper is to provide a theoretical framework to facilitate controversy on value chain governance. Qualitative research was employed as a fundamental methodology to identify key factors that drive pig value chains. Two typical channels, channel 1: self-raising farms and channel 2: long-term contract farms, was selected to highlight different characteristics of governance pattern along the chains. Key findings were: (1) market relation was the dominant type of channel 1 while relational governance was applied to channel 2. The results of this paper could be applied to other agricultural value chains.

Keywords: pig value chain, governance patterns

F-5. MAPPING OUT SOCIO-ECONOMIC DRIVERS OF ANTIMICROBIAL USAGE IN POULTRY FARMS IN VIETNAM : A COMBINED PARTICIPATORY EPIDEMIOLOGY AND Q-METHODOLOGY APPROACH

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Abstract

In Mekong Delta of Vietnam, antimicrobials are widely used by poultry farmers to raise their flocks, however little is known about socio-economic drivers and farmers' perceptions of antimicrobial use (AMU). The study aims to identify these drivers related to farmers' perception of this behaviour. 26 focus group interviews were conducted on 73 advisors (veterinarians, vet-shop owners and community animal health workers (CAHWs) and 125 chicken/duck farmers in 5 districts of Dong Thap province. Through interviews, 46 statements relevant to AMU including antimicrobials' perceived reliability, practice, costs and impact on flock health were developed. Those statements were then processed by using Q-methodology on two structured populations: (1) veterinarians, vet-shop owners and CAHWs (n=26), and (2) chicken and duck farmers (n=28). Four and three discourses were selected in farmer group and advisor group respectively, representing 50-55% of the total explained variance. These discourses contain different perceptions of AMU knowledge and behaviours of farmers. We found only one consensus point of Population 1: the cost of antimicrobial is more expensive than the cost of other biosecurity methods. Consensus points of Population 2 were: (a) Good-quality drugs have a relatively higher price than low-quality counterparts, (b) Controlling disease using antimicrobials is more costly than using other biosecurity methods. The methodology presented here allowed to obtain meaningful insights into perceptions of the different stakeholders involved in antimicrobial prescription and usage in poultry farming. This knowledge can contribute improvement to success of intervention strategies aimed at curbing indiscriminate use of antimicrobials in the region.

Keywords: Antimicrobial use, poultry, Q-methodology, participatory epidemiology.

F-6. PRICE RISK PERCEPTIONS AND MANAGEMENT STRATEGIES IN VIETNAMESE PANGASIOUS PRODUCTION

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Abstract

The high price volatility in farm-gate prices may lead Vietnamese pangasius farmers to reduced investment in technological innovations to the quest for environmental sustainability by the international customers. This study explores price risk perceptions and management strategies of farmers in their pangasius production. The study uses an exploratory approach to explore the price risks and management strategies and statistical analysis to measure the degree of price volatility. Data are obtained through structured surveys with 100 farmers in three provinces of An Giang, Can Tho, and Dong Thap. The results showed that most of the farmers perceived as price volatility with the deviations of prices by 10-24% from their expected levels. We further find that price risk management strategies were not perceived as effective measures to mitigate the price risks. Findings on the price risk perceptions and management strategies are useful to support public and private of price risk management decision towards increasing the sustainability of pangasius production.

Keywords: price risk, perceptions, management strategies, pangasius

F-7. THE IMPACT OF POVERTY REDUCTION POLICIES TO INCOME INEQUALITY FOR ETHNIC MINORITY GROUP : THE CASE STUDIES IN DUC TRONG DISTRICT, LAM DONG PROVINCE

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Abstract

In this study, Lorenz curve and the Gini coefficient was employed to measure the poverty reduction policies to income inequality for the ethnic minority group. The data were collected by interviewing 258 households in the N'hol Ha and Tan Thanh commune, Duc Trong district. Key results showed that the poverty reduction policies have not influenced to income inequality for ethnic minority group as reflected by the Lorenz curve of receiving support group near 450 group not supported. This means that the Gini coefficient of receiving support group (0.39) is lower the Gini coefficient of non-support group is (0.48).

Keywords: Income inequality, poverty, policy, ethnic

F-8. CARNAP'S CONTRIBUTIONS TO THE DEVELOPMENT OF SEMANTICS

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Abstract

Rudolf Carnap (1891-1970) continued to study semantics to construct an exact philosophy after finishing the syntax period. The researchers call this stage in the Carnap's career the semantics period. His view in this phase combined with previous syntactic conceptions are considered to be tools for the construction of the logic of science. This paper mainly analyzes the Carnap's semantic thought through three main stages in his career from 1934 to 1947. His ideology was presented concentratedly in some of his works, namely The logical syntax of language (1934), Introduction to Semantics (1942) and Meaning and Necessity (1947). Carnap's view on semantics has profound implications for later philosophers, and is of great significance to the modern Western philosophy in general, analytic philosophy in particular.

Keywords : Rudolf Carnap, modern western philosophy, semantics, syntax, analytic philosophy.

F-9. STRESS AND STRESS MANAGEMENT AMONG SINGLE PARENT FAMILIES

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Abstract

Single parent family may be defined as a family comprising of a single mother or father having their dependent children. Being single parent is twice the work, twice the stress due to added responsibility and tears with emotional problems. Hence the present study was undertaken with an objective to know the stress and stress management among single parents. The sample for the study were selected from seven district, which comes under UAS Jurisdiction, Dharwad center, Karnataka, India. Among each district two taluks were randomly selected where from each taluk two villages were randomly selected for the study. Among each village 15 single parent were selected which comprised of totally 420 single parent families. The criterion for selecting was the female single parent should have at least one child/ children aged from 1-25 years. The data was collected using the socio-economic scale by Aggarwal et al., (2005), general stress inventory developed by Ivancevich and Matteson (1980) and Depression Anxiety Stress Scale by Lovibond & Lovibond (1995). The results showed that about 87.14 per cent had high level stress followed by average stress (7.14 %) and low stress (5.71 %). There was significant difference found in localities with general stress. The results also found significant relationship and association of age and SES with stress. The intervention programme was found to be effective in reducing the stress, anxiety and depression levels among single mothers.

Keywords: single parent family, children, stress management, anxiety, depression

F-10. ASSESSMENT OF SUSTAINABLE TOURISM DEVELOPMENT IN CU CHI DISTRICT, HOCHIMINH CITY

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Abstract

Cu Chi is a district to the north of Hochiminh City, in the Northern Key Economic Region connecting Southeastern Region and Northwestern Region. Although major industrial zones surround the district, tourism is a potential direction for development. The article aims to introduce research from field survey and assessment of natural and social resources from which sustainable tourism can be developed. We identified and ranked 12 potential tourism sites. Of which 4 sites are ranked as in favourite condition, 6 are in fairly favourite condition and 2 are in very favourite condition. This provides an important basis to propose sustainable tourism development.

Keywords: Assessment, tourism, AHP, Cu Chi district

F-11. BREAST FEEDING PRACTICE : EFFECT ON COGNITIVE DEVELOPMENT AND INFANT MORBIDITY

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Abstract

WHO recommends mothers worldwide to exclusively breastfeed infants for the child's first six months with continued breastfeeding along with appropriate complementary foods up to two years of age or beyond to achieve optimal growth, development and health. Evidence is emerging that breast feeding is important in brain and visual development of preterm as well as term infants and associated with a decreased risk of overweight. In this context the present study was conducted to examine the association between breast feeding practices and infant morbidity, infant growth and cognitive development. The

population of the study consisted of 180 mother –infant dyads, where the infants were in the age group of 3 to 24 months and their mothers in the age range of 17-45 years from both urban and rural area in northern Karnataka. The tools used for the study were Socio – economic status scale developed by Aggarwal et al. (2005) and a self structured questionnaire to document the feeding practices, patterns, knowledge and attitude of mothers towards breast feeding. The growth of the infant was assessed based on WHO growth indicators and Bayley scale of infant and toddler development, third Edition (Bayley-III) was used to measure the cognitive development. The percentage distribution of the children based on breast feeding practices revealed that 46.7 per cent children were exclusively breast fed, while 40 per cent were complementarily breast fed and 13.3% were bottle fed. A significant association between breastfeeding practices and weight for age of the child was found where 80 per cent among obese children were never breast fed babies. The mean cognitive scores of exclusively breast fed children was 17.53 points higher than never breast fed children and it was 13.36 points higher than complementarily breast fed children.

Keywords – Breast feeding, morbidity, growth, cognitive development

F-12. AN ANALYSIS OF FACTORS AFFECTING KEY COMPETENCIES OF COLLEGIATE STUDENTS IN HO CHI MINH CITY

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Abstract

Literature reviews on competency mismatch between graduates and employer are abundant. Different industries in different countries require different competencies. Thus, understanding the underlying factors that affecting graduates perception on competency, which trigger their call-to-action competency training effort, is more important. This study sets out to investigate such matter. A competency framework for collegiate students was construct to investigate underlying factors that contribute directly to the effectiveness of their competency training. A survey of 300 students in 5 universities was employed. Results show significant differences in competency among students in term of socio-demographic characteristics.

Keywords: competency, knowledge, skills, attitude, ASK model

F-13. NUTRITIONAL AND HEALTH STATUS OF SIDDI MOTHERS OF KARANTAKA

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Abstract

The Siddis are the primitive tribal group of Karnataka that are lagging behind the demographic, social and economic indicators. The studies related to health and nutritional issues among tribal populations are found to be few, therefore, it is worth investigating the changing perspectives of nutritional status and health problems of Siddi tribal mothers. Study was conducted on 60 Sidditribal and 60 non-tribal mothers (18-49 years age group) from 6 villages of Dharwad and Uttar Kannada districts of Karnataka state during 2017. Structured interview schedule was used for collection of personal characteristics. Using anthropometrics measurements and PGI health questionnaire respectively assessed nutritional status and health. Results indicated that, 39 % of mothers (tribal and non-tribal) had ideal body weight and equal percentage of them exhibited overweight and obese (25.0 %) and only 11 % were underweight. No significant difference and association were observed in the nutritional status of tribal and non-tribal mothers. Significant association was found between different categories of BMI and socio economic status of non-tribal mothers only. The significant association and positive relationship was observed between age and BMI of tribal mothers indicating, increase in age disposes them to various health problems. It was observed that tribal mothers exhibited less health problems ($M=125+36.12$) compared to non-tribal mothers ($M=129+.26.9$) but it was not significant. The findings significantly showed that lower the socio economic status higher the health problems in case of non-tribal mothers. Significant association was observed between health problems and education of mothers (tribal and

non-tribal) but it was not evidence with the age of the mothers. The study highlighted that significant relationship between BMI and health problems of mothers ($r=0.25^{**}$) indicating that an underweight mother suffers from various health problems.
Keywords: Siddis, tribes, nutritional status, health, BMI.

F-14. ACADEMIC PROBLEMS OF DYSLEXIC CHILDREN AND PARENTS AWARENESS AND KNOWLEDGE ON DYSLEXIA-AN ASSESSMENT STUDY

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Abstract

A study on academic problems of 380 dyslexic children studying in 5th to 7th standard revealed that, phonemic segmentation was highly and negatively correlated to risk quotient indicating lower scores on phonemic segmentation and spoonerisms will lead to higher risk of dyslexia. There was negative and significant relationship between two minute spelling and one minute writing risk quotient. Lower scores on two minute spelling lead to higher risk of dyslexia. Risk indices of semantic fluency and verbal fluency showed negative and significant relation indicating lower the scores higher risk of dyslexia. Results on parents' awareness and knowledge on child's dyslexic problem reveal that, 77 per cent were aware that there are some problems in child and hence the child is lagging in academics. About 14 per cent of parents knew since childhood, 13 per cent have known from past 3 years. About 23 parents reported they identified problem only after the assessment carried out by researcher.

Keywords: assessment, dyslexia, awareness, knowledge.

F-15. EMPOWERMENT LEVEL AMONGST THE ADOLESCENT GIRLS IN AGRA DISTRICT

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Abstract

Education is one of the most important ways to empower the women. So, present study has been undertaken to know the current status of empowerment level like pertaining to their decision making, power in home, political and legal awareness and other such related variables of adolescent girls studying in class 11th living in Agra District of Uttar Pradesh. The study was conducted on 120 Adolescents girls. The sample was selected by multistage stratified random sample technique. Standardized tool was used in this study. Significant association was observed between distribution of rural and urban subjects according to empowerment level ($\chi^2=9.49$). Significant association was observed between frequency of empowerment level of adolescent girls belonged to working and non-working mothers ($\chi^2=11.7$). The mean score of empowerment level above 17 year girls (190.15) was higher than below 17 year girls (171.62). This difference was also found to be significant ($t=2.17$ $P<0.05$). However the present study shows that non-significant difference was found between empowerment level of above 30000 monthly parental income group girls and below 30000 monthly parental income group girls. This difference was also found to be non-significant ($t=1.52$). Conclusions derived were that, subjects living in urban area, having working mothers, are more empowered in comparison to their rural and non working mother counterparts. In the present study results show that age factors also affect the empowerment level.

Keywords: empowerment level, adolescent girls, rural and urban areas.

Theme G

Library and Information Science

G-1. APPLIED ROUGH SET TOPROCESSING DATE THE ADVISOR SUPPORT SYSTEM

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Abstract

Today, the combination and integration between the fields of science and technology, in particular, information technology has brought about important applications in the fields of education and training. Learning space expanded, information access tools and methods of acquiring knowledge is constantly improved, giving students the opportunity to explore and learn constantly in a world where knowledge becomes the foundation of success. Along with the innovative thinking of university training, encouraging the initiative and creativity of learners teachers, requiring innovative methods of teaching, learning, and management. At the same time, the tools to help teaching and learning process increasingly innovative and integrated application systems in universities is developed to meet the requirements of improving the quality of education. Research refers to the build system supports learning, teaching and training applications in the processing of raw data system.

Keywords: Academic advisor, Support systems, Adaptive systems, Rough set, Education program, Recommendation system, Data processing

G-2. USING STATISTICAL METHOD IN THE ADVISOR SUPPORT SYSTEM TO ANALYZE AND FORECASTING PROFESSIONAL CAPACITY OF LEARNER

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Abstract

Industry 4.0 combines the technologies that affect many sectors, such as education, health, agriculture, etc. The combination and integration between the fields of science and technology, especially information technology has brought important applications in the field of education and training. Learning space is expanded, information access tools and methods to acquire knowledge continuously improved, giving learners the opportunity to explore and continuous learning in a world where knowledge becomes the foundation of success. Along with innovative thinking process of higher education - to encourage active, creative learners requires innovative methods of teaching, learning, and management. At the same time, the tools support the teaching and learning process is increasingly improved, the integrated application systems in universities was developed to meet the requirements of improving the quality of training. The research refers to the adaptive support system, user models of knowledge management systems to help improve the professional capacity of learners; we also see the univariate and multivariate statistical methods and Principal Components Analysis. We build the software that supports academic advisors based on statistical methods.

Keywords: Principal Components Analysis (PCA), statistical method, support academic advisor, adaptive support system, knowledge management system

G-3. BUILDING A QTI QUESTION BANK AND ASSESMENT DELIVERY TOOL

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Abstract

Question bank is the core component of electronic testing systems used to assess learning outcomes, to ensure the quality of teaching and learning in a training organization. Choosing the right question model will allow for the representation a wide



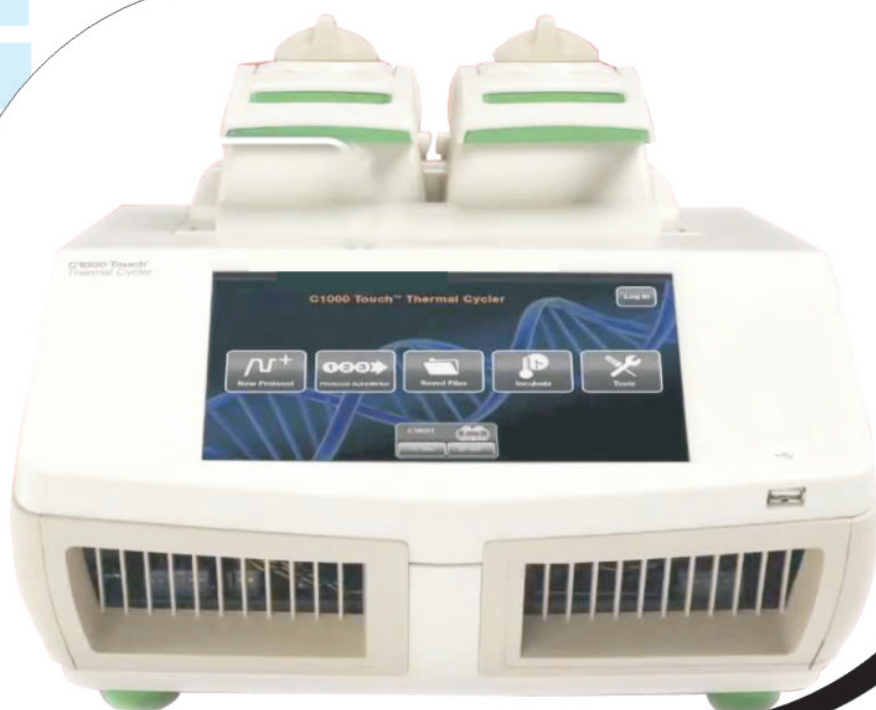
variety of types of questions, reuse and efficient use of the question bank. In this study, we propose the question bank model in the XML format of the most commonly used standard, QTI (Question and Test Interoperability), which defines the specifications to represent the questions, tests and examination results. We extended some of the metadata specifications for the question to support the management, lookup, and generate of intended-tests from the question bank. A based-web authoring tool is developed for creating questions of various types for question banks and storing them in the XML primitive document format in an XML-enabled MySQL database. A lightweight assessment delivery module is also developed based on the QTIWorks open source tool, intended to distribute the test to candidates, provide display services, process responses and report results. It is designed to be a REST-based web service architecture that can be used in a variety of contexts, such as stand-alone applications or in the virtual learning environment of LMS (Learning Management System) systems.

Keywords: test, question bank, metadata, authoring tool, assessment delivery tool, QTI, LMS.



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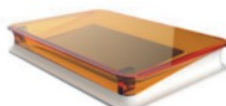
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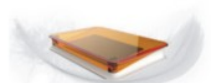
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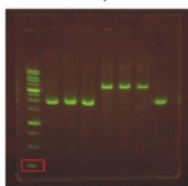


Better User Experience

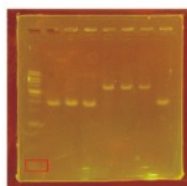
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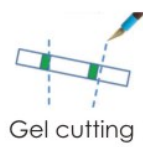
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