



National Conference

on

**“Technological Interventions in Life Sciences,
Food, Agriculture &
Allied Health Sciences –
A Paradigm Shift towards a Better Future”**

Date: May 19-24, 2022

Book of Abstracts



Organized by

**Departments of Biotechnology, Microbiology,
Agriculture, Psychology, Food & Nutrition**

SWAMI VIVEKANANDA UNIVERSITY

Barrackpore

Editors:

**Dr. Pijush Mallick, Dr. Subhasis Sarkar, Dr. Tanmoy Sarkar,
Dr. Sibashish Baksi, Dr. Manisha Maity, Dr. Semanti Ghosh,
Dr. Pritha Pal, Ms. Lina Sarkar**



About the Conference

About the Conference: Over the years, technology has revolutionized our world and daily lives too. Moreover, technologies in the contemporary era, has created amazing tools and resources, serving humankind to a great extent. Modern technology has created the way for multi-functional devices which are extremely important in the fields of life sciences, healthcare, agriculture etc. Recent devices have been discovered faster and higher-powered than ever before, as a result of advancement in technology. Therefore, the essence of continuous research and development in making new devices, implying technologies, is the need of the hour.

With this revolutionary research, technology has also made our lives better. In context, research and development in technological advancement and their appropriate implication is required for the growth of biological sciences, healthcare, agriculture, food sciences etc. In contrast, the conference is aiming at amalgamation of different fields of science to elucidate advancement of technologies in various relevant fields. In order to have brain storming sessions, the fruitful deliberation, debate and knowledge sharing from various participants, experts and aspirants of different backgrounds would hold a great contribution in this conference. The conference would be enlightened by the presence of experts belong to the backgrounds like Biotechnology, Microbiology, Food Nutrition, Psychology and Agriculture through sharing valuable notes and discussions on technological advancement for a better future.



About the University



Swami Vivekananda University (SVU) aims to actualize Swami Vivekananda's educational vision of life building, and character-making education by combining the best elements of the East and the West. Swami Vivekananda's emphasis on man-making and character-building education is always being kept in view in all the programs and courses of study in the University bearing his hallowed name. In this era of economic liberalization, globalization and technological super advancements our motto is to put quality education in the light of Swamiji's vision of spreading education throughout the society. From the infrastructural aspect, the University is well-fortified, providing state-of-the-art lab facilities for research. The library is highly enriched with relevant books together with accession of journals of national and international repute.

As a university, it focuses on blending of academic & industry experience strongly, and on offering flexible learning - such as modular career courses at a very reasonable fee. Additionally, our infrastructure of training and placement serves as a thorough system of panoramic grooming of students, transforming them more employable in the competitive world. This has ever been a great contributor to our excellent placement.

Besides, frequent participation in social & cultural activities: various outreach programs too, have been an intrinsic part of our ethical-education practice since inception. Our endeavors are in the direction of holistic development. We are inclined to contribute not just to the work-force across all industries but also to the very fabric of the society where we live in.

Honorable Chancellor's message



Swami Vivekananda University started its journey with a vision of providing world-class education to bright young minds from all strata of the society, so that they may emerge as global citizens. In order to fulfill this vision, seminars, workshops, awareness program, outreach programs and various other academic gatherings are held in the University premises. In contrast, National Conference Technological Interventions in Life Sciences, Food, Agriculture & Allied Health Sciences – A Paradigm Shift towards a Better Future scheduled during 19- 24th May, 2022, is also one of such initiatives. We believe that innovation is the key to progress through rigorous research and technological development in the field modern science. This make us able to come up with new technical ideas and features that can be successfully introduced in our daily lives. We would like to provide a common platform for academicians, researchers and students, to have brainstorming sessions with new ideas, to be implemented to resolve the relevant problems.

This event is an initiative to bring experts together from multiple disciplines aiming at a fruitful collaboration and do our part in bringing about a better future. Therefore, you are encouraged and invited to participate and lend a hand in making the National Conference Technological Interventions in Life Sciences, Food, Agriculture & Allied Health Sciences – A Paradigm Shift towards a Better Future, a success.

Dr. Nandan Gupta
Honorable Chancellor
Swami Vivekananda University

Honorable Vice-Chancellor's message



It is my immense pleasure to cordially welcome you all to the National Conference Technological Interventions in Life Sciences, Food, Agriculture & Allied Health Sciences – A Paradigm Shift towards a Better Future scheduled during 19- 24th May, 2022. This conference provides an opportunity for the meeting of national scientists, research scholars, students and industry experts in the research fields of Biotechnology, Microbiology, Food Nutrition, Psychology and Agriculture.

I am extremely glad to say that this conference would provide a platform for interaction among great scientists and academicians from different areas of expertise and intends to explore the technological advances and its implication in various domains of Life Sciences, Allied Health Science & Agriculture for achieving a better future. This would also enhance the spirit of interdisciplinary research and academic activities. Innovation is extremely important for upgrading and progressing the livelihood of modern civilization, which is achieved through rigorous research and technological development in various field like Biotechnology, Microbiology, Food Nutrition, Psychology and Agriculture. The continuous research in the direction of technological advancement and their interventions in life sciences, allied health sciences and agriculture render us to generate innovative technical ideas and excel the scientific tempo. We expect that this conference could be able to provide a common platform for academicians, researchers and students, to have fruitful discussion sessions with new ideas. The conference will be successful as the dedication and efforts of our faculties and staff members are remarkable.

I would like to express my sincere appreciation to the organizing committee for their dedicated efforts to materialize the conference. I am sure that the conference will provide an opportunity for the participants to share their knowledge and get updated. I take great pride in welcoming all the participants in the conference and wish you all the success.

Prof. (Dr.) Subrata Kumar Dey
Honorable Vice-Chancellor
Swami Vivekananda University

Honorable Chief Operating Officer's message



I am pleased to announce the National Conference Technological Interventions in Life Sciences, Food, Agriculture, and Allied Health Sciences – A Paradigm Shift towards a Better Future, which will add another feather to Swami Vivekananda University, Barrackpore's multifaceted cap from May 19 to 24, 2022.

We must assimilate the materials and enliven our learning through our personal experiences as we embark on the path of higher education. This national conference strives to open doors to the world in order to inspire every learner to lead in both close and far reaches of life. The fundamental goal of advanced study is to obtain a desired livelihood, but the entire point of education is to transform mirrors into windows. This international conference takes the risk of simply achieving its goal through contact between delegates and resource people.

Dr. Nandan Gupta, the Honorable Chairman Sir, Swami Vivekananda University, the guiding soul behind our entire team, is the source of all our challenging attempts. I earnestly wish for the conference's success, which is the product of each member of team Swami Vivekananda University's serious heartfelt hard effort, and humbly request your thoughtful comments in order to overcome its limitations in the future.

Mr. Saurabh Adhikari
Chief Operating Officer
Swami Vivekananda University

Honorable Deputy Registrar's message



On behalf of the Organizing Committee, I welcome all to this signature event, the National Conference on Technological Interventions in Life Sciences, Food, Agriculture, and Allied Health Sciences – A Paradigm Shift towards a Better Future, May 19 to 24, 2022.

I look forward to learning the latest results from top industrial, government, and academic scientists on these topics and everything else that is presented. We are indeed in a time of great innovation in Life Sciences, Food, Agriculture, and Allied Health Sciences. The program has already shaped up to be excellent, and the networking opportunities will be indeed outstanding.

I add my best wishes for a successful and fruitful conference and my thanks to all organizers.

We're looking forward to an excellent meeting with great scientists from different areas.

Good wishes to all the participants!

Mr. Tanmoy Majumder
Deputy Registrar
Swami Vivekananda University

Honorable Dean's message



It brings me great pleasure to welcome you all to the National Conference Technological Interventions in Life Sciences, Food, Agriculture, and Allied Health Sciences – A Paradigm Shift Toward a Better Future, which will take place from the 19th to the 24th of May 2022.

Since the previous few decades, technology has advanced and its impact on life sciences has grown. The importance of constant research and development in creating new devices and technologies is critical. Technology has also improved our lives as a result of this groundbreaking research. Research and development in technological innovation, as well as their suitable application, are essential for the advancement of biological sciences, healthcare, agriculture, and food sciences. The conference aims to bring together scientists from many disciplines in order to shed light on technological advancements in a variety of domains. In order to have brainstorming sessions, the conference would benefit much from the fruitful deliberation, debate, and knowledge exchange of many participants, experts, and aspirants from varied backgrounds.

I'd want to offer my heartfelt gratitude to all of the committee members for their tireless work to make the conference a reality. I am hoping that the conference would allow attendees to share their knowledge in order to make the event a grand success. I take great pleasure in welcome all the research scholars, and students in the conference, and I wish you all the best of luck.

Prof. Somsubhra Gupta,
Dean of Science
Swami Vivekananda University

Convener's message



It gives me immense pleasure to present you all at National Conference on “Technological Interventions in Life Sciences, Food, Agriculture & Allied Health Sciences”, organized by School of Life Sciences, Agriculture & Allied Health Sciences, Swami Vivekananda University, Barrackpore, Kolkata on 19-24 May 2022. The conference is organized with the support of Swami Vivekananda University, and the hard work of management, faculty, staff and students.

The Indian population is increasing day by day, which is in need of high demand of resources, falling in need of technological applications merged with the advent of various innovations in the field of life sciences, agriculture and allied health sciences. Technology has always been the much-needed aspect which makes life easier in every field, opening up scope of development and advancement.

I would like to express my sincere thanks to all the committee members for their dedicated efforts to materialize the conference. I hope that the conference will provide an opportunity for the participants to share their knowledge towards technological interventions in fields of Life Sciences, agriculture and Allied Health Sciences. I take great pride in welcoming all the staff, research scholar, and students in the conference and wish you all the success.

Dr. Pijush Mallick,
Convener

Preface

We are pleased to place before you the **Book of Abstracts** of the National Conference on Technological Interventions in Life Sciences, agriculture and Allied Health Sciences. It is intended to provide a common platform to researchers, scientists, engineers, farmers and entrepreneurs throughout India to present their latest research findings, ideas, developments and applications in the fields of science. This volume will be of immense interest to Researchers in Academics / Industry as it contains a good blend of technical papers from students, research scholars and faculty members from various academic institutions. The major topics covered in this volume include Microbiology, Biotechnology, Agriculture, Clinical Nutrition & Dietetics, Psychology.

It is our pleasure to acknowledge the help we have received in finalizing the technical contents of this National Conference. We wish to thank all the Reviewers, Editorial Committee members and Staff members who helped us in completing the review process in a timely manner. We thank all the authors, co-authors, invited speakers for enriching our National Conference through their valuable participation.

We are also grateful to the Advisory Committee as well as Organizing Committee members of National Conference on Technological Interventions in Life Sciences, agriculture and Allied Health Sciences, for their valuable suggestions and guidance.

We would like to thank Dr. Nandan Gupta, Honorable Chancellor, Prof. (Dr.) Subrata Kumar Dey, Honorable Vice-Chancellor, Prof. Shoroshimohon Dan, Honorable Chief Mentor, Mr. Saurabh Adhikari, Honorable Chief Operating Officer, Mr. Tanmoy Majumder, Honorable Deputy Registrar, Prof. Somsubhra Gupta, Honorable Dean of Science for their constant support and valuable guidance for organizing this conference.

On this note, we heartily welcome all the delegates at this National Conference. We hope this academic forum will provide requisite intellectual stimulation for a healthy discussion, thus paving way to our own contribution towards an innovative society. It is our firm belief that the Conference will fulfill all the objectives with which it is being organized.

Dr. Pijush Mallick
Convener

Dr. Tanmoy Sarkar
Co-Convener

Dr. Subhasis Sarkar
Co-Convener

Dr. Sibashish Baksi
Co-Convener

Dr. Manisha Maity
Co-Convener

Ms. Lina Sarkar
Co-Convener

National Conference on ‘Technological Interventions in Life Sciences, Food, Agriculture & Allied Health Sciences, organized by School of Life Sciences, Agriculture & Allied Health Sciences, Swami Vivekananda University

May 19-24, 2022

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National Conference on ‘Technological Interventions in Life Sciences, Food, Agriculture & Allied Health Sciences, organized by School of Life Sciences, Agriculture & Allied Health Sciences, Swami Vivekananda University

May 19-24, 2022

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Programme Schedule

Venue: Seminar Hall–Nivedita Building

Date	Time	Program
May 19, 2022	10:00 AM– 10.10AM	Inaugural song and Lamp lighting
	10.10 AM– 10.15AM	Speech by Honorable Chancellor
	10:15 AM– 10:20AM	Speech by Honorable Vice-Chancellor
	10:20 AM-10:25 AM	Speech by Chief operating Officer
	10:25 AM-10:30 AM	Speech by Registrar
	10:30 AM-10:35 AM	Speech by Deputy Registrar
	10:35 AM-10:40 AM	Speech by Dean of Science
	10:40 AM-10:45 AM	Speech by Deans (individual Schools)
	10.45 AM -10:50 AM	Speech by Convener
	10.50 AM-11.00 AM	Tea Break
	11:00 AM–11:30 AM	Keynote Address by Prof. Samir Ranjan Sikdar, Bose Institute Domain: Rural biotechnology
	11:30 AM–12:00 NOON	Keynote Address by Prof. Sampa Das, Bose Institute Domain: Agriculture Biotechnology
	12.00 NOON – 12.30 PM	Keynote Address by Prof. Amit Krishna Dey, ISCA Domain: Food & Nutrition
	12:30 PM-1:00 PM	Keynote Address by Prof. Tarit Roychowdhury, Jadavpur University Domain: Water conservation
	1:00 PM-1:30 PM	Talk by Dr. Aryadeep Roy Chowdhury, St. Xavier's College Domain: Biotechnology
	1.30 PM- 2.00 PM	Oral presentation [OP01- OP02, OP72]
	2:00PM– 3:00 PM	Lunch
	3.00 PM – 4.00 PM	Talk by Dr. Prosun Tribedi, Neotia University Domain: Microbiology
	4.00 PM – 6.00 PM	Oral presentation [OP03- OP09]
May 20, 2022	11:00AM -12:00 noon	Talk by Dr. Pinaki Acharya, University of Calcutta Domain: Agriculture
	12:00noon-2:00 PM	Oral presentation [OP36-OP42]
	2:00PM-3:00PM	Lunch
	3:00PM-4:00 PM	Talk by Dr. Shilajit Barua, Vijaygarh Jyotish Ray College Domain: Microbiology
	4:00PM–6:00PM	Oral presentation [OP10-OP16]

Date	Time	Program
May 21, 2022	11:00AM -12:00 NOON	Talk by Dr. Subrata Trivedi, InBOL Healthcare Domain: Biotechnology
	12.00 NOON-12.30PM	Plenary lecture by Prof. (Dr.) Samirranjan Adhikari Domain: Cognitive psychology
	12:30 PM-2:00 PM	Oral presentation [OP17-OP23]
	2:00 PM-3:00 PM	Lunch
	3:00 PM- 6:00 PM	Oral presentation [OP27-OP31, OP65-OP67, OP70-OP71]
May 23, 2022	11:00 AM -12:00 NOON	Talk by Dr. Mitali Chatterjee, West Bengal Agriculture Service Domain: Agriculture
	12:00 NOON-2:00 PM	Oral presentation [OP44-OP49, OP24-OP26]
	2:00 PM-3:00 PM	Lunch
	3:00 PM- 4:00 PM	Talk by Dr. Subhash Halder, University of Gour Banga Domain: Food and Nutrition
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May 24, 2022	11:00 AM -12:00 NOON	Talk by Dr. Anindita Ray Chakravarti, Maharani Kasiswari College Domain: Food and Nutrition
	12:00 NOON-2:00 PM	Oral presentation [OP57- OP63]
	2:00 PM-3:00 PM	Lunch
	3:00 PM- 4:00 PM	Talk by Dr. Kumkum Mukherjee, University of Calcutta Domain: Psychology
	4:00 PM– 6:00 PM	Oral presentation [OP32-OP35, OP64, OP68, OP69]

Keynote Lectures

Prof. (Dr.) Samirranjan Adhikari, Professor, Department of Education, Sidho-Kanho-Birsha University, Purulia



Prof. Sampa Das
INSA Senior Scientist and Former Senior Professor,
Bose Institute

Prof. Amit Krishna Dey
Executive Secretary,
Indian Science Congress Association



Prof. Samir Ranjan Sikdar
Co-ordinator,
ST Specific Rural Biotechnology Program,
Bose Institute

Prof. Tarit Roychowdhury
Professor,
School of Environmental Studies,
Jadavpur University



Invited lectures & speakers



Dr. Aryadeep Roy Choudhury, Assistant Professor, Department of Biotechnology St. Xavier's College (Autonomous)
Domain: Biotechnology



Dr. Prosun Trivedi, Associate Professor, Department of Biotechnology, Neotia University
Domain: Microbiology



Dr. Pinaki Acharya, Associate Professor, Department of Horticulture, University of Calcutta
Domain: Agriculture



Dr. Mitali Chatterjee, Assistant Botanist at West Bengal Agriculture Service
Domain: Agriculture

Invited lectures & speakers



Dr. Subrata Trivedi, Senior Scientist, InBOL Healthcare
Domain: Biotechnology



Dr. Subhash Haldar, Head, Department of Food & Nutrition,
University of Gour Banga
Domain: Food and Nutrition



Dr. Anindita Ray Chakravarti, Assistant Professor, Department of
Food and Nutrition, Maharani Kasiswari College
Domain: Food and Nutrition



Dr. Shilajit Barua, Assistant Professor, Dept. Of Microbiology
and Convenor, Research and Guidance Cell.
Vijaygarh Jyotish Ray College
Domain: Microbiology



Dr. Kumkum Mukherjee, Academician & Researcher,
University of Calcutta
Domain: Psychology

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Cognitive Psychology and Thinking: An Outline

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There are a number of mental processes at the individual level such as information processing, attention, language use, memory, perception, problem solving, decision making, and thinking. According to Gerrig and Zimbardo (2002) cognitive psychology is defined as the study of these processes. Cognitive psychologists focus on mental processes and knowledge acquisition, whereas behaviourists centre upon behaviour (i.e., stimulus and corresponding response). In explaining learning, cognitive psychologists put their attention to the processes of organising information internally, they consider that learners are fully instrumental in their own learning, rather than controlled by external agencies and stimuli. As per APA Dictionary of Psychology thinking is a cognitive behaviour in which ideas, images, mental representations and other such hypothetical elements of thought are experienced or manipulated. Thinking is both a covert and a symbolic process that allows individual to form psychological associations and create models. Thinking is also known as cognition. It actually refers to the act of processing information, holding attention, storing and retrieving memories and selecting appropriate responses and actions. Again, thinking is the mental process in which beings form psychological associations and models of the world. In thinking an individual actually manipulates information as and when s/he forms concepts, engages in problem solving, reasons and makes decisions. Thought, the act of thinking produces more and more thoughts eventually. There are two main types of thinking divergent, in which one tries to generate a wider variety of possible alternative solutions to a single problem; and convergent, in which one tries to cut down multiple possibilities to find a single best answer to a problem. Thought process helps to define and organise experiences, plan, learn, reflect and create; but sometimes for a variety of reasons this may become unhelpful and this has a negative impact on behaviour.



Abstracts
for
Oral Presentation

The Effect of Probiotics and their Therapeutic Role on Various Diseases

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Abstract

During the last years probiotics gained the attention of clinicians for their use in the prevention and treatment of multiple diseases. Probiotic bacteria play a critical and functional role in clinical and nutritional applications. In the last decades, a wide number of scientific works and studies shed light on the crucial role of probiotic microorganisms and their potential to cure various ailments and disorders based on the promising findings and results of different *in vitro* and *in vivo* investigations, suggesting a powerful connection flanked by these so-called probiotics and the human immuno-modulatory responses. The issues that were noticed are included: Fibrocystic, diabetes, acne, colon cancer, cardiovascular, urinary tract infections, atopic eczema syndrome, food allergies and obesity. Probiotics main mechanisms of action include enhanced mucosal barrier function, direct antagonism with pathogens inhibition of bacterial adherence and invasion capacity, boosting of the immune system and regulation of the central nervous system. Enhancement in using drug treatment has led to the appearance of drug-resistance concern, thus probiotics can be a suitable choice. There is a mutual communication between the central nervous system and the liver, the so-called “microbiota-gut-liver axis” as well as a reciprocal communication between the intestinal microbiota and the central nervous system through the “microbiota-gut-brain axis”. This review focuses on the effect of probiotic bacteria and their metabolites on immune-boosting, prevention and treatment of these diseases.

Keywords: *In vivo*, *In vitro*, Probiotics, Immuno-modulatory response, Invasion, Metabolites.

Exploration of Potential Cellulolytic Bacteria aiming at Agro-waste Management

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Abstract

Cellulolytic bacteria are bacteria that can break down cellulose complexes into smaller oligosaccharides, which can then be converted to glucose. For bacterial growth, glucose is employed as a carbon and energy source. The goal of this research was to find cellulose-degrading bacteria. For the production of propanol and bioethanol cellulose bacteria used and harvest them onto waste also from ethanol production through culture of banana peel. Here substrate and basal culture also employed, by enhancing the basal culture medium with filter paper as substrate for cellulose degradation, cellulose degrading bacteria (CDB) were isolated from four different invertebrates (termite, snail, caterpillar, and bookworm) for isolating them. Enrichments in liquid media (tryptic soy broth) were used to select cellulolytic bacteria at high and low temperatures (4 and 60°C). Cellulolytic aerobic bacterial isolates from farming and forest soil had hydrolytic values ranging from 1.38 to 2.33 and 0.15 to 1.37, respectively. On cellulose Congo red agar medium, the maximum clearing zone and hydrolytic capacity (HC) of CDB. Here CMC plating method also put forwarded. Many cellulolytic bacteria have been studying from soil from forest, primitive or shift cultivation land to understand their behavior mainly endoglucanases, exoglucanases, and cello biases breakdown cellulose to fermentable sugars effectively.

Keywords: Aerobic Bacteria, Agriculture, Cellulose, Fermentation, Plating Techniques, Waste Management.

OP-03

Important physiochemical indicators for determination of Agricultural soil quality Suman Sarkar¹, Subhasis Sarkar^{1*}

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Abstract

Soil is very crucial part for agriculture land here its first priority to be studied. so far in recent years the development in soil science studied helped us to understand the component soil like pH, fertility, electrical conductivity and most important organic carbon dissolve there by which how much fertilizer and pesticide needed to be used in agro because agro crop are also can be found out as veggies, crops are mirroring soil personality, for that appropriate agro practices from various region and various types of soil sample has been collected. At this work, the physico-chemical parameters of soil in degraded and good sites were investigated, pH, Organic Carbon (OC percent), Water Holding Capacity (WHC), Soil Moisture Content (SMC), Bulk Density, Available N, P & K, Zn, Mn, Fe, Cu, and other soil characteristics had been examined. The pH ranged from 7.0 to 6.3. in the city area soil is collected from industrialized sites like food parks, logistic center for testing heavy metals. In the laboratory, the obtained samples were examined for seven heavy metals: Cr, Cd, Pb, Ni,

Cu, Fe, and Zn using Atomic Absorption Spectrophotometry (AAS). The findings suggested that a significant amount of these heavy metals was identified in tomato, pumpkin, and red amaranth, implying that heavy metals are present in our food chain. The number of heavy metals in rice plants has increased if the rice is grown in highly urbanized area but in the case of towns and river banks low levels of heavy metals found in veggies and crops as the alkalinity is maintained and fertility of soil is very high and organic carbon is moderate.

Keywords: Agronomy, Heavy Metals, Organic Carbon, Soil Pollution, Staple Food, Trace Elements.

OP-04

Mycoremediation of dye: A potential tool for environment clean up

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Abstract

The current status of the environment is a result of globalisation, urbanisation, and industrialization. Synthetic dyes have gained popularity in a variety of industries, particularly the textile industry. Dye is an important component in the creation of colour in textiles. Hazardous inorganic and organic compounds are created as a result of the processing and handling of food dyes, posing a serious threat to the ecosystem. As a result, it's critical to put in place cost-effective and effective anti-emissions measures. to protect natural resources and habitats. Biodegradation by fungi, also known as mycoremediation, is a term used in this context to describe the process of fungi degrading organic matter. Decomposing or mineralizing hardly or less degrading dye chemicals with possible fungi is a relatively inexpensive and environmentally benign process. Fungi are important in the deterioration and discoloration of food.

Keywords: Dyes, Decolorization, Fungal enzymes, Myco-remediation,

OP-05

Phosphate Solubilizing Bacteria (PSB): it's mechanism of solubilizing phosphate in soil, effect on plant and use as biofertilizer: a review

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Abstract

The number of populations is increasing day by day. As populations no is being increased, the demand of food is also increasing simultaneously. So, it's easy to understand that no. of population growing is directly proportional to the demand of food. To increase the yield of food crops a large number of chemical fertilizers is used every year. But certainly, these chemical fertilizers can cause long term damage to environment as well as on the bodies of those who will consume the grains also. In that case definitely we have to think some alternatives of chemical or artificial fertilizers. In addition, in spite of presence of sufficient amount of phosphate in soil, plant can't get the access of Phosphate as it forms complex with either inorganic metal ion or various organic compounds. On that note scientists and researchers have developed, studied and isolated some microorganisms which can play very significant role in this critical situation. These microorganisms live in rhizosphere region of plant and can increase soil fertility by solubilizing phosphorus /phosphate and also help in the development of plant. These are known as Phosphate Solubilizing Bacteria (PSB). This review discussed the different species of PSB, the mechanisms they follow to solubilize phosphate, their role in plant development. This research review also focuses on use of phosphate solubilizing bacteria for sustainable agricultural purpose.

Keywords: Agriculture, Biofertilizer, Phosphate Solubilizing Bacteria, Phosphate solubilizing mechanism, Plant Genetic Engineering.

OP-06

Role of Phytochemicals as a potent inhibitor molecule for Neurodegenerative Disorder

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Abstract

Neuroprotection by food and natural bioactive chemicals has been hypothesized to prevent the start and progression of neurodegenerative disorders such as Alzheimer's and Parkinson's disease (AD and PD) by modifying pathogenic variables. Phytochemicals obtained from plant

foods protect neurons by reducing oxidative stress, mitochondrial malfunction, neurotherapeutic malfunction, neurotropic factor deficiency, apoptosis, and aberrant protein build-up. The molecular mechanisms of phytochemicals as a potent inhibitor for neurodegenerative disorder are discussed in this review article. The decrease of disorder development done by targeting several pathogenic proteins with antioxidative, anti-inflammatory, and anti-myloidgenic capabilities, phytochemicals. Mitochondrial stress, apoptotic factors are all regulated by those target proteins. Neurotrophins such as BDNF (Brain-derived neurotrophic factor), NGF (nerve Growth Factor), NT3 (neutrophin 3) and NT4/5 are important in neurodegenerative disorders especially in AD. Phytochemicals that mediate neuroprotection signalling pathways, notably Trk receptor and p75 (NTR) superfamily. We mainly focus on this review, the phytochemicals such as phenolic derivate,

terpenoids, alkaloids, steroidal etc. despite the fact that these phytochemicals have gained interest due to their neurotropic potential activity.

Keywords: Antioxidant, Alzheimer's Disease, Neurodegenerative disorder, Parkinson disorder, Phytochemicals, Protein accumulation.

OP-07

An analytical approach of micro-RNA interaction study in ovarian cancer

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Abstract

Ovarian cancer is a high-mortality gynecological malignancy with a diverse form that makes early detection and primary prevention difficult. In order to establish relevant biomarkers for ovarian cancer, numerous researchers have investigated expression profile of microRNAs (miRNAs) in tissue and serum samples of patients. The oncogenic or suppressive effects of a number of miRNAs were also confirmed in functional tests. Despite the development of various biological markers (mRNA and protein biomarkers), ovarian cancer mortality remains a problem due to late detection, which is related to low specificities and sensitivities. Recent advancements in expression biology have turned towards this compulsive direction, focusing on identifying and developing specific and sensitive biomarkers, such as microRNAs (miRNAs), for cancer diagnosis and prognosis. miRNAs are a new class of short non-coding RNAs that suppress gene expression at the post-transcriptional level, either by translational repression or mRNA destruction. These systems could be implicated in a complicated chain of cellular processes linked to cancer pathogenesis. A number of miRNAs, including miR-23b, miR-146b, miR-200-a/b/c, miR-630, miR-31 influence the epithelial-mesenchymal transition pathway, modulating ovarian cancer cell invasiveness. miRNAs have such a broad range of functions in ovarian cancer that they have been recommended as potential treatment strategies in the future. In this review, we represent the regulation study of different micro RNAs and their target genes in ovarian cancer pathogenesis, their use as biomarkers as well as the study areas for future prospects.

Keywords: Biomarker, Gene expression, miRNA, mRNA, Ovarian cancer, Post transcriptional regulation.

Structural and functional relationship study in plant salinity stress

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Abstract

Due to increased use of low-quality water for irrigation and soil salinization, saltiness is a major biotic factor affecting factory growth and product in numerous corridors of the world. Complex physiological features, metabolic processes and molecular or gene networks are each involved in factory adaption or forbearance to swab stress. For the product of swab-tolerant factory types in swab-affected locales, a thorough understanding of how shops respond to saltiness stress at colorful situations, as well as an intertwined strategy integrating molecular tools with physiological and biochemical procedures, is needed. Although the processes behind swab forbearance are far from being completely understood, recent exploration has plant several adaptive responses to saltiness stress at the molecular, cellular, metabolic, and physiological situations. This study presents a thorough assessment of important scientific improvements in biochemical, physiological, and molecular systems that regulate factory adaption and forbearance to swab stress. Here we are going to discuss about the proteins involved in plant salinity stress and their interactions with the salt tolerant factor which has a negative impact with the plant growth system. Some highly evaluated proteins that were observed under this stress are-Plant ferredoxin-like protein (PFLP),*Arabidopsis thaliana* Salt Tolerance Related Protein (STRP),OsEXPA7,ribulose-1, 5-bisphosphate carboxylase (RuBP), etc. This study is also going to focus on various transcription factors (tf), responsible for the enhanced tolerance under biological activity of plant development. TFs bZIP, MYBs, bHLH, C2H2-Dof, G2-like, AP2-EREBP, NAC, GATA, ARF, ERF, bZIP, and MYB were highly up-regulated in salt stress response.

Keywords: Plant stress, Protein-protein interaction,Proteasome, Salinity stress, Salt-tolerant plant, Transcription factors.

Role of pathogenesis-related (PR) proteins in plant microbes defense mechanism

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Abstract

PR proteins and antimicrobial peptides (AMPs) are a category of different compounds induced by phytopathogens and defense-related signaling molecules. They are important components of the plant innate immune system, especially in the case of systemic acquired resistance (SAR), molecular indicators of defensive signaling pathways. Despite the fact that PR proteins and peptides have been identified before the availability of modern scientific instruments, their biological function remains largely unknown. The previous PR genes have been shown to confer improved resistance to both biotic and abiotic stressors in investigations. As a result, they are one of the most promising prospects for generating various stress-tolerant crop types. Plant genetic engineering is widely regarded as one of the most exciting approaches of developing disease-resistant transgenic crops employing various antimicrobial genes such as PR genes. Overexpression individually or in combination, PR genes (chitinase, glucanase, thaumatin, defensin, and thionin) have a significant impact increased the level of plant defensive response against a variety of diseases. However, a thorough understanding of the signaling pathways that control the expression of these adaptable proteins is essential for strengthening agricultural plant resistance to numerous stresses, which is the future subject of plant stress biology. As a result, this analysis provides comprehensive summary of PR proteins, including classification, involvement in biotic and abiotic stress, and plant defensive signaling cascades. We also discussed the benefits and drawbacks of transgenic plants, PR proteins and peptides expression.

Keywords: Adaption Processes, PR proteins, Horizontal Gene Transfer, Pathogens, Plant Defenses, Moss-Microbe Interactions.

OP-10

Effects Of Plant Hormone on Root Initiation

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Abstract

Plant hormones are unique chemical compounds produced by plants. They are the most important internal variables that influence growth and development. Hormones are made in one region of the plant and transferred to other parts, where they are only effective in very little doses. A particular hormone may have varied effects based on the target tissue. Plant hormones serve a critical function in regulating plant growth and development. Plant hormones are among the most important biochemicals affecting plant growth and yield production under different conditions, including stress. It includes auxin, abscisic acid, ethylene, gibberellins, cytokinins, salicylic acid, strigolactones, brassinosteroids, and nitrous

oxide. Plant functioning under stress is affected by plant hormones, which can help the plant to tolerate the environmental stresses. Hormone signalling systems coordinate plant growth and development through a range of complex interactions. Plants are sessile organisms and therefore must adapt their growth and architecture to a changing environment. The unidirectional transport from shoot apex to root, rootward auxin transport, is regulated by PIN1. A plant hormone is an organic substance generated in one region of the plants and transmitted to another, where it triggers a physiological response at low concentrations. The important point about plant hormone is their interactions and cross talk, root initiation mechanism, and different plant proteins involved. Some of the most important findings related to the cross talk of plant proteins & hormones are presented in this review work.

Keywords: Arabidopsis, Cyclin Gene, Different Hormones, Pin Family Protein, Root Epidermal Cells

OP-11

Purification of Heavy Metal Polluted Soil & Water Using Phytoremediation

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Abstract

Water and soil contamination is currently one of the world's most serious problems. Various heavy metals such as zinc, arsenic, mercury, cadmium, and copper dissolve in water, causing a variety of health problems such as cardiovascular illnesses, kidney damage, and the risk of death in diabetic and cancer patients. Soil pollution can also reduce crop yields, affecting the food chain and economy. Different physical and chemical procedures for soil and waste water treatment are available, however they are insufficient in terms of cost and availability. But wouldn't it be wonderful if we could instead use nature to aid nature? "Phytoremediation", a technique in which plants absorb heavy metals from soil and waste water as a nutrient and purify the medium, is the greatest natural remedy for treating this problem. Since the 1990s, it has been an extensively employed approach. The damaging consequences of heavy metals in living systems are discussed in this article, as well as the function of phytoremediation in treating this problem, future possibilities and challenges.

Keywords: Bioremediation, Heavy Metal, Phytoremediation, Pollution, Purification.

OP-12

Uranium Contamination: its trace behind health risk!

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Abstract

Uranium pollution is a serious threat to human health around the world. Groundwater contamination, mining, phosphate fertilizers, nuclear plants, and military activities are all major causes of uranium contamination, whether natural or artificial. Many epidemiological and laboratory investigations have shown that uranium exposure in the environment and at work can cause a variety of health concerns. In natural and anthropogenic settings, uranium exposure can create health hazards due to its chemotoxicity and radiotoxicity: the former is expected to play a larger role in natural uranium exposure, while the latter is more important to enriched uranium exposure. India is the world's largest user of groundwater. In terms of global ground water resources, India accounts for 60% of irrigated agriculture and 85% of drinking water. Humans may be exposed to high levels of uranium through their drinking water, posing a health risk. Uranium is absorbed into the body by contaminated food or uranium-affected water. Uranium exposure has a negative impact on human health, as evidence shows that drinking uranium-contaminated water can induce chronic renal illness, bone deformities, and liver damage. Cancers caused by uranium include leukemia, prostate cancer, breast cancer, colorectal cancer, lung cancer, kidney cancer, and bladder cancer. The WHO has set a drinking water threshold of 30 g/L for uranium in drinking water. Globally, Uranium contamination is highest in countries like China, U.S, Germany, Spain, Korea, Myanmar, Mongolia, Burundi etc. In India, excessive levels of uranium in ground water have been discovered in 151 districts across 18 states.

Keywords: Cancer, Chemotoxicity, Chromosomal abnormalities, Health Risk, Radiotoxicity, Uranium Contamination.

OP-13

Nitrate contamination in ground water: its impact and risk!

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Abstract

Groundwater contamination by nitrate is a global problem and nitrate is a widespread contaminant of ground and surface water worldwide. Nitrate (NO_3^-) is one of the integral parts in the growth of life and it is a compound of nitrogen and oxygen, being normal part of human diet, found in many foodstuffs, particularly in leafy vegetables, fish & meat. Nitrate levels can be high in streams and rivers due to runoff of nitrogen fertilizer from agricultural

fields and urban lawns. It is essential for the growth of many plants' species, including most of those which are edible, but it becomes a problem if it gets into water in which it is not required. This leads to major environmental problem and also as a health hazard. Sodium nitrite is used as a food preservative, especially in cured meats. Nitrate is sometimes also added to serve as a reservoir for nitrite. Nitrogen is a major constituent of the earth's atmosphere; comprising nearly 80 % of the air we breathe. The primary source of all nitrates is atmospheric nitrogen gas. This is converted into organic nitrogen by some plants by a process called nitrogen fixation. Dissolved Nitrogen in the form of Nitrate is the most common contaminant of ground water. Some chemical and micro-biological processes such as nitrification and denitrification also influence the nitrate concentration in ground water.

Keywords-Nitrate, contamination, groundwater, methemoglobinemia, carcinogen, nitrogen

OP-14

Acute Arsenic Toxicity: An immediate awareness!

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Abstract

Arsenic (As) pollution in groundwater is one of the most serious health risks from a global perspective. Arsenic pollution of groundwater occurs as a result of natural or manmade sources in various parts of the world, posing a threat to human health and the environment. Arsenic enters human body through contaminated ground water consumed as drinking water. For drinking purposes, millions of people in many nations rely largely on groundwater having high levels of As. The immediate symptoms of acute arsenic poisoning include vomiting, abdominal pain and diarrhea. Gastrointestinal symptoms such as nausea, vomiting, abdominal discomfort, and severe diarrhoea have been linked to acute oral exposure to As. Long-term exposure to this level of arsenic could cause cardiovascular, respiratory, and gastrointestinal issues. It will have an impact on the neurological system, blood, and skin. The renal and hepatic systems will be affected as well. Arsenic contamination in groundwater is projected to affect roughly 108 countries (with concentrations exceeding the World Health Organization's recommended maximum tolerable limit of 10 ppb). Bangladesh's and India's arsenic pollution of groundwater is the world's worst arsenic disaster. In India, arsenic pollution of groundwater above the acceptable threshold has been observed in the states of West Bengal.

Keywords: Acute toxicity, Arsenic contamination, Cancer, Genotoxicity, Groundwater, Health hazards.

Flouride contamination: An alarming concern!

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Abstract

Water fluoridation is a big problem all around the world because over millions of people use ground water as drinking water, and posing health risks such as dental and skeletal fluorosis and many other health hazards effect. The majority of previous research has been limited to local or regional scales. According to World Health Organization (WHO), the safety limit of fluoride concentration in ground water is 1.5mg/l. India, China and Pakistan are the worst effected countries worldwide. The fluoride contamination results in dental fluorosis, skeletal fluorosis and even causes osteosarcoma in some cases. So, there is a need for a major concern in maintaining the fluoride level in ground water on a global perspective because the situation has major socioeconomic ramifications too. The study will evaluate over a century of global research on fluoride pollution in water and its impact on health. The distribution of fluoride contamination in water, as well as its sources, mobilization and association, were examined by the researchers and are discussed here. Studies have been carried out worldwide, including developing countries like India; however, remediation of this contaminant in ground water sources has been a much-needed aspect of research.

Keywords:Carcinogenic, Contamination, Fluoride, Health risk, Worldwide, India

Chronic Arsenic Toxicity: A silent killer!

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Abstract

Heavy metal concentrations in ground water continue to exceed the acceptable level recommended by regulatory bodies in various nations across the world. Arsenic is a toxic element that is present in some places of the world in excessively high concentration in ground water and soil. Chronic arsenic poisoning also called arsenicosis from arsenic contaminated ground water is one of the world's most serious public health issues. Arsenic poisoning over time can cause bone marrow depression, Blackfoot disease, cardiovascular

disease, diabetes, hypertension, variety of other illnesses and it has been linked to a number of malignancies like skin cancer, lung cancer, kidney cancer, urinary bladder cancer, oral cancer. Apart from that, arsenic induced DNA damage that leads to genotoxic effects. Drinking water collected from badly contaminated groundwater affects 137 million people in 70 countries across the world. Bangladesh and West Bengal, India, are the two countries in the world that have been hit the hardest so far. 26 million people in nine districts in West Bengal are chronically exposed to arsenic through their drinking water, which includes levels of arsenic substantially over the WHO acceptable limit of 10µg/l.

Keywords: Heavy metal, chronic arsenic, arsenicosis, cancer, genotoxicity, acceptable limit.

OP-17

Algal Biofuel- A step towards a sustainable future

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Abstract

Current fossil fuel reserves are insufficient to meet increased demand and are rapidly depleting. The hunt for alternative energy sources has been motivated by pollution, global warming, and soaring oil costs. Macro algae (green, brown, and red marine seaweed) are gaining traction as a feasible and promising source of renewable biofuels. Several researches have been conducted to evaluate macro algae's ability to produce a range of bio products, including biofuels. According to UN estimates, the global population will reach 8.5 billion by 2030 and 9.7 billion by 2050. Today, fossil fuels such as coal, oil, and gas are used to provide more than 85 percent of the world's energy needs. Increasing the efficiency with which energy is collected from fossil sources is one of the major concerns that will demand our attention in the next decades. Alternative fuels like hydrogen, natural gas, and propane, as well as alcohols like ethanol, methanol, and butanol, vegetable and waste-derived oils, and electricity. These fuels can be used in a single-fuel system or in a hybrid-electric or flexible fuel system with other fuels like conventional gasoline or diesel. One of the next-generation biofuel alternatives that has recently gained a lot of attention is the production of biofuels from microalgae. While research into algae production methods is still needed, downstream processing (such as biofuel generation) must also be investigated. In contrast to the finite nature, geopolitical volatility, and severe global consequences of fossil fuel energy, biofuels are gradually proving to be a viable renewable energy source.

Keywords: Algae, Biofuel, Global Energy Crisis, Green Energy, Pollution, Sustainable Energy.

Study about the absorption pattern of Soil Chromium by Perennial Flowering herbs

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Abstract

Living organisms by and large owe their sustenance to the natural boon- soil, a fundamental component that harbours life starting from micro communities in the form of symbiotic microorganisms, earthworms that serve as “natural tillers” of the earth benefitting agricultural practitioners to supporting the life of autotrophs- the contribution of which if summed will sound as an exaggeration. on the earth and which is the huge source of life, that is soil. The fertility of soil as has been discussed regularly gets hampered by the use of excessive pesticides and insecticide, however the toxic elemental incorporation resulting from both natural causes like weathering, volcanic eruptions dust transport with added anthropogenic xenobiotics like waste sludge, fossil fuel wastes are disrupting the poise of the ecosystem. The toxic elements accumulated in the soil are due to injudicious chemical practices in agriculture. Of all the toxic elements known the accumulation of heavy metals are of serious concern. Cr (VI) being the toxic form of chromium apart from Cr (III) is found percolating in the soil mainly through oxides and clay like bound phase. Reports suggest that concentration of Cr in soil may account to about 300mgkg⁻¹. Cr (VI) reduction to Cr (III) has been seen to inhibit growth of plants like *Glycine max*, *Vigna radiata* like plants compromising with its seed germination. It also interferes with stomatal conductance; the level of transpiration seems to get decreased. A tactful strategy has been undertaken to remove such obnoxious contaminants via phytoremediation. The review aims at employing known perennial as a bioremediating tool against waste water.

Keywords: Contamination, Chromium, Environment, Heavy Metal, Phytoremediation

Scavenging of Waste water using Oyster mushrooms

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Abstract

Water contamination is a never-ending perpetual trouble and ruefully it's a result of urbanization, industrialization along with population expansion, and other ancillary factors. Environmental deterioration had always impacted negatively on both biotic and abiotic components. The major impact of it had serious consequences on one of the pivotal natural resource- water. In addition to the agony of water scarcity the lack of treatment of wastewater in third world countries causes challenges and thus reuse and recycling becomes the only way out of the predicament. The challenge however lies to create cost effective, simpler, user-friendly technologies that prevent endangering the significant water-dependent livelihoods while also protecting our priceless natural resource. The best technique apart from conventional chemical techniques is to take resort to green bioremediation involving mushrooms and recycle the waste therein. Mushrooms growing on natural materials such as wheat straw, rice straw, and other agricultural wastes are been used for a long time as a nutritional ingredient being laden with rich protein content. Mushroom is also seen to be an effective bioremediation tool of their usage in the removal of an array of contaminants. These are easy to cultivate and has the propensity specifically to store a lot of heavy metals and other harmful compounds. Oyster mushrooms has been reported to act as “scavengers” of the environment by digesting dead wood, rejuvenating the soil and providing minerals in usable form to the ecosystem. This review highly rests on the importance of oyster mushrooms where extracellular oxidative enzymes produced by the mushrooms can be used to degrade a wide range of notorious chemicals and substances that pollute the environment.

Keywords: Heavy metals, Myco-filtration, Myco-remediation, Oyster mushrooms, Wastewater

OP-20

Water Reclamation through Nano-remediation & Bio-remediation: A weal against conventional chemical techniques

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Abstract

Worldwide unprecedented challenge has been posed due to socio-economical-demographic and environmental transitions. These threats mainly sprout from rapid pace in modernization and advancement of technologies for economic escalation and raising live standards. These however had been a bane since over the years there had been instances of loss of considerable biodiversity, risks in public health, aggravation of already existing health issues, decline of soil salinity and to add to the plight there is water scarcity that mainly had

resulted due to imbalance in the potable water available and its demand. Climate change, indiscriminate efflux of contaminants encompassing household to industrial waste water has profound effects on the standards of water quality. Recent reports suggest that approximately 90% of carbon dioxide from the environment is released into the aqueous environment and about 1.5% of coral reef degradation occurs through indiscriminate sewage discharge. To cope with this situation there should be judicious planning leading to recycling the waste water in a more convenient way over prevalent robust technologies. This review aims to focus on the participation of nano-based materials that have been revered highly for their large surface to volume ratio being one of the efficient candidates for solid waste recovery. Nanomaterials both metallic nonmetallic and polymeric materials have been the subject of interest for their diligent participation as catalyst, nanosorbents. Besides, the participation of natural materials and benevolent biological components in bioremediation of waste water has been discussed herein.

Keywords: Bioremediation, Nanomaterials, Waste water, Waste recovery

OP-21

Phytoremediation to absorb heavy metal from soil by *Ocimum sanctum*

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Abstract

Phytoremediation is one of the methods for Bioremediation of the soils which has been noticed in recent decades. Two years sapling of *Ocimum sanctum* selected and chromium(Cr) solution with 1, 2 and 3 gm concentrations, after add solutions in to soil of sapling *Ocimum sanctum*, eight months' later leaf, stem and roots were selected and Measuring chromium was determined by Atomic Absorption Spectrometer. The maximum level of chromium accumulation in the leaf, stem and root was 55.67, 50 and 65 mg/kg, respectively. Chromium could be absorbed easily by the plant's root and accumulated in the plants. *Ocimum sanctum* can also withstand the large concentration of heavy metals like Chromium and Fluorine in the sample. Chromium exists in nature in the trivalent and hexavalent form. However, with regards to health hexavalent chromium is more toxic. The collected information prompted us to study the phytochemical and Bioremediation of hexavalent chromium using *Ocimum sanctum* as the soil in Vellore is Chromium polluted. The research can be used for further studies and development of the *Ocimum sanctum* plant for Bioremediation and pharmacological use. Chromium may enter the natural soils by weathering of Cr-containing rocks, direct discharge from industrial operations, leaching of soils, among others. In the aquatic environment Cr may suffer reduction, oxidation, sorption, desorption, dissolution, and precipitation.

Keywords: Chromium, Heavy metals, *Ocimum sactum*, North of Iran.

Mycoremediation: A review on fungal bioremediation for heavy metals

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Abstract

Mushrooms are a saprophyte group of macro fungi with a characteristic fruiting body that have a unique capacity of heavy metal biosorption and degradation of organic pollutants. Interactions of toxic metals with fungi have long been important because metal toxicity is still the basis of many fungicidal preparations, while increasing pollution of the natural environment has piqued interest because of the dominant presence of fungi in metal-polluted habitats. The release of extracellular enzymes to the environment initiates the breakdown of organic pollutants which is also responsible for activities such as decomposition and nutrient cycling in natural settings. Heavy metal bioremediation also relies crucially on arbuscular mycorrhizal fungus. Filamentous fungi have a high tolerance and remediation capacity for heavy metals including Cd, Cu, and Ni, which is important for bioremediation of these metals from contaminated soil and waste water. Of course, they cannot be destroyed, but their solubility can be reduced or lowered, for example, by a change in oxidation state & either so that they become less dangerous in the ground, or so that they can be removed. Fungi have the ability to efficiently store heavy metals in their fruit bodies, rendering them unavailable or lowering their concentration in the environment. Biosorption is mediated by interactions such as adsorption, ion-exchange, and complexation and involves fungal cell walls including chitin, proteins, glucans, lipids, pigments, and polysaccharides.

Keywords: Mycoremediation, Fungi, Heavy metals, bioremediation, Biosorption.

Phytoremediation: A promising approach for in situ clean-up of heavy metals contaminated soils

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Abstract

Phytoremediation involves the removal of elemental pollutants or reduce their bioavailability in soil by using plants. The interaction between plant roots and pollutants,

present in the surrounding environment, are essential and responsible for such kind of remediation of contaminated sites. Plants usually uptake the pollutants followed by immobilization in roots, or microbial degradation living in the immediate surroundings of the plant roots. Usually, inorganic pollutants are extracted from the soil by the plant and immobilized in the root (Phytoimmobilization) whereas sometimes the pollutants are transported to the shoot and the same known as phytoextraction. For some inorganic elements (Hg, As) as well as some organic contaminants (methyl tert-butyl ether (MTBE), trichloroethylene (TCE)), uptake by roots followed by transfer to the shoot and transpiration to the atmosphere through the leaf stomata (phytovolatilization) are important mechanisms. Elimination of secondary air or water borne pollutants can also be achieved by phytoremediation and the same offers a potential solution to prevent human and ecological exposure pathways. Plants, along with its branches and leaves, cover the ground that eventually stabilizes the contaminated soil and lower the potential spread. In situ application, passive, solar-driven 'green' technology, ease of application, and adaptability to a wide range of metals, radionuclides, and organic chemicals are all advantages of using phytoremediation.

Keywords: Bioremediation, Phytoremediation, Heavy metal, Metal-contaminated sites, Phytoimmobilization.

OP-24

Mushroom crop improvement by chemical mutagen

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Abstract

In today's world where food scarcity and nutrition deficiency stand as a pivotal crisis and to meet this demand, mushroom can be counted as a potential source of nutritional supplement and has gained prominence not only as an exclusive culinary delicacy but also of its organoleptic wonder besides its medicinal merit. The advancement in biotechnology and mutation therapy has led to the cultivation of various species of mushroom like *Pleurotus*, white button, Shiitake and induction of these species by various mutagenic chemicals like sodium hypochlorite, ethyl methyl sulphonate (EMS), sodium benzochloride along with UV and gamma radiations gives rise to a newer strain with altered protein structure. Chemical mutagenesis results in the resistance to various abiotic factors with increased shelf life besides having greater degree of fruit body formation. Protoplasts from mycelium of a mushroom strains under the influence of mutagen like radiations results in a mutant dikaryon that gives rise to sporeless variety. This work centralizes on different techniques via which newer mushroom varieties can be grown with economical and nutritional advantages.

Keywords: Mushroom, mycology, mutagens, organic content, protein, spores

Phytoremediation to absorb heavy metal from soil by *Capsicum annum*

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Abstract

Heavy metal contamination has become a major concern around the world. These metals are natural components found in soil, but pollution occurs when their concentrations in the soil become too high as a result of anthropogenic (industrial) activities and natural processes. Chromium (Cr) is considered a human carcinogen among heavy metals. Cr exists mainly in two stable forms trivalent (Cr⁺³) and hexavalent (Cr⁺⁶) however bioaccumulation of Cr in the form of Cr⁺⁶ can mainly lead to toxic effects into human health. Numerous methods are available for remediation of the soil contaminated by heavy metals, but these methods have several advantages and disadvantages. However, phytoremediation technique using plants is certainly a better option than other methods because of green, efficient and cost-effective. Herein, we review the phytoremediation to absorb heavy metal from soil using plants, with a special reference to *Capsicum annum*. Mechanisms used to phytoremediation of soils contaminated by heavy metal are phytodegradation, phytoextraction, phytofiltration and phytostabilization. This review article comprehensively discusses the different phytoremediation techniques of heavy metal (Cr) contaminated soils using plant (*Capsicum annum*) and the disadvantages and advantages of phytoremediation.

Keywords: Heavy metal; Chromium Pollution; Soil; Phytoremediation; *Capsicum annum*.

A review on soil pollution by fly ash and phytoremediation of the contaminated soil.

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Abstract

Soil pollution is a worldwide problem of the modern industrial civilization. There are different sources of soil pollution such as industrial byproducts and waste, agricultural hazards, disposal of urban waste, sewer sludge, radioactive waste, hazardous materials which leak out due to mining activities, human and animal excreta as biological product etc. Huge amount of ash from Thermal power station is disposed of in surrounding land and water

bodies causing water, air and soil pollution. Human health and agricultural productivity both are hampered due to overflow of heavy metal containing pond ash toward surrounding five to six kilometer areas. Heavy metals such as Cd, Pb, Cu, Ni, Fe, As, etc. are present in the pond ash abundantly of the thermal power station than their costal average. Pond ash also contains radioactive pollutants such as ^{238}U , ^{232}Th and ^{40}K . During combustion of coal huge amount of fly ash are generated and accumulated in the disposal site. The ash is the source of trace elements and radionuclide contamination at surrounding area of Thermal Power Station. There are about 62500 thermal power plants in world where as 399 in India. In the world scenario those thermal power station areas are the hot spot for bioremediation due to generation of fly ash during coal combustion and adverse impact of fly ash on environment including human health. The review article is concerned with remediation of fly ash contaminated soil using different plant species and the future prospect in the field of phytoremediation.

Keywords: Phytoremediation, fly ash, thermal power, environment, soil pollution

OP-27

Study about absorption pattern of heavy metal by plant Vasaka (*Justica adhotoda*) and its characterizations

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Abstract

Environment pollution by heavy metal is a worldwide problem and this affects all the living organisms in nature. Like various other heavy metals, Chromium (Cr) and lead (Pb) contaminate our environment with numerous adverse effects. Currently, the limited number of ubiquitous existence of plants on vacant land and roadside, which is due to the soil infertility and pollution. The soil fertility is decreased by the heavy metal, which can be resolved by phytoremediation. Phytoremediation term consists of the Greek prefix 'phyto' (plant) and 'remedium' (root) is an efficient strategy for environmental clean-up. This process involves: phytofiltration, phytostabilization, phytoextraction, phytovolatilization and phytodegradation. The removal of heavy metal and detoxification of soil by phytoremediation technique, may increase the fertility of soil in the agricultural and industrial area. In the current scenario, phytoremediation by the plant, Vasaka (*Justica adhotoda*) would contribute significantly, by removing lead (Pb) and chromium (Cr) from the soil. This would improve the agricultural productivity and reduce the health issues, related to heavy metals. In consistent, post absorption morphological and genetic changes will also be studied with the plant (Vasaka), under study.

Keywords: Vasaka (*Justica adhotoda*) plant, Chromium (Cr) and lead (Pb), soil, Phytoremediation

Elucidation of the binding interactions between the long non-coding RNA SLNCR1 and the protein secretory phospholipase A2 during the onset of non-small cell lung cancer

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Abstract

Non-coding RNAs are known to be associated with different diseases. A class of non-coding RNAs referred to as long non-coding RNAs or lncRNAs are known to play pivotal roles in the onset of various types of cancers. The lncRNA referred to as SLNCR1 is known to have a binding partner in the form of secretory phospholipase A2 (sPLA2). The interactions between SLNCR1 and sPLA2 lead to the onset of non-small cell lung cancer. Till date no reports are available that would deal with the molecular mechanisms of the binding interactions between SLNCR1 and sPLA2. In the present work, we tried to determine the mode of the binding interactions at the residue level. We built the three-dimensional structures of the protein and the lncRNA and used molecular docking simulations to study the binding interactions. Thus, we tried to elucidate the mechanism of the binding between the SLNCR1 and sPLA2 to predict their roles in the onset of non-small cell lung carcinoma.

Keywords: binding interactions, cancer, docking, SLNCR1, sPLA2.

The prevalence of resistance to carbapenems in clinical isolates of *Klebsiella pneumoniae* in India, as well as in West Bengal

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Abstract

Health care-associated infections (HAI) are one of the most common public health problems in all over the world. HAI have significant impact on morbidity, mortality and quality of life and present an economic burden at the social level. Carbapenem resistance in Enterobacteriaceae (CRE) is a threat to public health in India, and also in West Bengal.

Carbapenem resistant *Klebsiella pneumoniae* is most important among them. We have analyzed the data of carbapenem resistance in *Klebsiella pneumoniae* from 2017 to 2020, as per the report of National Centre for Disease Control (NCDC). *Klebsiella pneumoniae* took 4th position in the priority pathogen list from 2017 to 2019 according to NCDC. But, in 2020 it took 3rd position, which is a serious matter of concern. Blood sample, pus aspirate (PA), urine and other sterile body fluid (OSBF) samples are included in this analysis. In 2017, there was 48.4% resistance to Imipenem and 53% resistance to Ertapenem in *Klebsiella pneumoniae*. In 2018, the resistance to Imipenem is 54% and the resistance to Ertapenem is 56%. In case of 2019, the resistance to Imipenem is 43%, the resistance to Ertapenem is 53%, and the resistance to Meropenem is 55%, whereas in 2020, the resistance to Imipenem is 43%, the resistance to Ertapenem is 42%, and the resistance to Meropenem is 43%. In 2014, Datta S et al. reported 13% resistance to Ertapenem and 9% resistance to Meropenem among children ≤ 5 years of age in West Bengal through the study period of 2007 to 2011. By analyzing all these data, we can come to this conclusion that it is necessary to give stress on strengthening of surveillance system by Government policy makers and researchers should try to focus on development of new drug design. Our team is working on strengthening of surveillance system through geographic information system (GIS) mapping and different statistical analysis; and also, on new drug designing which will open a new avenue in future.

Keywords: Carbapenems, public health, resistance, West Bengal, morbidity, mortality

OP-30

Study of epidemiological behaviour of malaria and its control in the Purulia district of West Bengal, India (2016–2020)

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Abstract

Purulia is a malaria-prone district in West Bengal, India, with approximately half of the blocks defined as malaria endemic. We analyzed the malaria case in each block of the Purulia district from January 1, 2016, to December 31, 2020. As per the API, 20 blocks of Purulia were assigned to four different categories (0–3) and mapped using ArcGIS software. An exponential decay model was fitted to forecast the trend of malaria cases for each block of Purulia (2021–2025). There was a sharp decrease in total malaria cases and API from 2016 to 2020 due to the mass distribution of LLINs. The majority of cases (72.63%) were found in ≥ 15 -year age group. Males were more prone to malaria (60.09%). Malaria was highly prevalent among Scheduled Tribes (48.44%). Six blocks were reported in Category 3

(high risk) and none in Category 0 (no risk) in 2016, while no blocks were determined to be in Category 3, and three blocks were in Category 0 in 2020. The exponential decay model prediction is oriented towards gaining malaria-free status in thirteen blocks of Purulia by 2025. This study will incite the government to uphold and strengthen the current efforts to meet the malaria elimination goals.

Keywords: malaria, West Bengal, decay model, elimination, Purulia, elimination

OP-31

Mobile Radiations Causing Loss Of Biodiversity: An Overview

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Abstract

The number of mobile phone users is increasing as the time passes and the technology keeps on evolving to meet the requirement of higher data rates than the previous generation. This in turn leaves a huge harmful biological impact on the biodiversity. The EMR emitted by the mobile antennas used at the base stations affects the cell structure of the living beings. To meet the demand of higher speed data transfer, we have now been used to 4G sets, instead of the older mobile sets without internet or with slow speed internet facilities. This is being even much more harmful, for both the flora & fauna, causing immense loss of biodiversity. As we know, any living organism in our mother Earth, has its own unique role in the ecosystem; so loss of any one will be disturbing the normal ecological balance, thus ultimately leading to environmental crisis. Nowadays, we are suffering from such crisis due to various reasons, mobile radiations being a primary one. Some recent studies have shown that due to mobile radiations, plants and animals are suffering equally, for example, loss of coconut yield & reduction in coconut water, sudden death & decline in the populations of sparrow, starling & many other birds, squirrels, and many more to add. We also know that experimental test of 5G radiation (which might come in future) in Netherlands in 2018, caused unexpected death of a large number of birds. Therefore, this is the high time that we should be aware of this curse of globalization & urbanization, and try to restrict ourselves, regarding use of such high frequency radiations, as much as feasible.

Key words: Mobile phone, EMR, Biodiversity, Ecological balance, Environmental Crisis, Globalization

OP-32

Impact of adverse childhood experiences on lifestyle diseases.

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Abstract

Studies have found many health problems related to stress. Stress seems to worsen or increase the risk of conditions like obesity, heart disease, Alzheimer's disease, diabetes, depression, gastrointestinal problems, and asthma. Anxiety disorders are mental conditions that involve excessive worrying or stress about specific situations or aspects of a person's life. Anxiety can disrupt a person's life by impacting their relationships with others, self-confidence and ability to complete daily tasks at work or school. One of the main symptoms of anxiety is rumination, which is over analyzing negative feelings or thoughts. Depression and to a lesser extent anxiety are associated with a cluster of unhealthy behaviour in subjects at risk of cardiovascular disease, suggesting the difficulty of modifying lifestyle in patients with anxious-depressive disorders. A heterogeneous group of people between the age group of 35-55 years took who were suffering from Diabetes, Cardiovascular disease or Obesity. The population size was taken as 60 were socioeconomic status were kept in mind and people from middle class background were taken. General Health Questionnaire was administered for the general screening of the population that whether they were suitable for further research or not. State-Trait anxiety inventory was administered to measure their state and trait anxiety level. DASS 21 was administered on them to have an overall idea about their depression, anxiety and stress. Significant correlation found between adverse childhood experiences and lifestyle diseases although gender differences were not found.

Keywords: Alzheimer's disease, Cardiovascular disease, Gastrointestinal problems.

OP-33

Effects of Test Anxiety on Academic Performance in High School Students

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Abstract

Background: Anxiety; before and after examination is a common phenomenon among students of high schools. Extreme anxiety may produce unfavourable psychological reactions, in this context, may result in academic failures. Such reactions may develop examination phobia in students suffering from anxiety, which has a direct correlation to academic achievement. Physiological disruptions may also occur out of such anxiety, like headache, stomach ache and palm sweating as examination comes nearer, which becomes a matter of worry to parents as well as the students themselves.

Objective: The main objective of the study is to investigate the effects of test anxiety on the academic performance in high school students.

Methods: A total of 60 high school students was taken as a sample, who voluntarily

consented to participate. Apart from the General Health Questionnaire, they were provided with the Test Anxiety Inventory (Spielberger,1980) which was used to measure the outcome variable of the study. TAI is a four-point Likert scale with 20 statements which is used to find out feelings experienced by the participants, and they were assured the confidentiality of their responses.

Results: The scores depicted that most of the students experience moderate to extreme anxiety before and after an examination which affects their performance and academic achievement as a whole.

Conclusions: The investigation concluded that a sufficient number of high school students experience test anxiety which affects their academic performance even as they have the knowledge which they were unable to represent due to such anxiety. It was recommended that counseling services should be provided to them, considering their psychological and physiological conditions arising out of test anxiety.

Keywords: academic achievement, academic performance, high school students, test anxiety.

OP-34

Impact of music intervention on Quality of Life and Anxiety amongst residents of Old age Homes

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Abstract

Old age is regarded as the most vulnerable period of human life cycle. This is the time when elderly people have to deal with numerous physical, psychological and social role changes that challenge their sense of self and living life happily. They often experience loneliness and depression either as a result of living alone or due to reduced connections with family members. In the changing social milieu, nowadays some elderly have to stay in old age homes in the later years of their lives. Thus, this shift to the new residence, away from kith and kin, is likely to make them feel more isolated and anxious and impact their quality of life. Music plays a great role in almost every aspect of life. During the twilight years of life, the role of music is also widespread. It stimulates feelings of wellbeing and provides a sense of enjoyment to the elders.

The objective of the present study is to examine the effect of music intervention on quality of life and anxiety among residents of old age homes. Music session included 45 minutes of singing along with guitar playing for two consecutive weeks in two selected old age-homes. The sample of the study comprised of 50 elderly individuals residing in old age homes. The data were collected using the “Older People Quality of Life Questionnaire-brief” (OPQOL-

brief) and “Geriatric Anxiety Scale-10” (GAS-10) in both pre and post intervention conditions on the same sample and t-test was computed to find out the difference between the pre and the post-test conditions. It is reported that the participants have lower anxiety and improved quality of life in the post test condition. Thus, it is evident that music plays an integral role in the quality of life of elderly people staying in old age homes.

Keywords: Anxiety, Elderly people, Music intervention, Quality of Life, Old-age home.

OP-35

Impact Of Social Networking On Academic Performance Of The Students In West Bengal

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Abstract

Social networking is a collective terminology for websites and applications that are used for communication, interaction, getting information at global level, community-based input, knowledge-sharing and collaboration. It is being highly used mainly by the members of young generation who use to spend a lot of time on electronic devices. This lessens the time for reading the books, reduces their interest and attention towards their study leading to deterioration of academic performance as reflected by the ultimate lowering of achievement score. The study conducted in the last decade revealed that most of the students got easily addicted towards social media with a consequence of scoring about 20% lower grades than a student without having social networking facilities. But the present study with the undergraduate and postgraduate students of science and technology background in West Bengal clearly indicates that with a few exceptions the usage of social media affects a little on their academic performance. Moreover, in many cases the students have to depend on it for their curriculum, course work, dissertation, collaboration and future prospects. Specially the students of technology background show a more dependence of social media for recent information on the technological advancement. Recent studies also went in agreement with this finding that the association between digital technology use, or social media use in particular, with the academic performance is very small and is only subjective.

Keywords: academic performance, digital technology, negative influence, positive effect, social networking.

Mitigation of Arsenic in Soil-Plant (Lettuce) System through Water Harvesting and Organic Amendments

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Abstract

The menace of arsenic pollution has by large affected a large number of countries through soil-plant-food chain continuum. Being a toxic carcinogenic metalloid its entry to human system has gained tremendous significance in the present day through water and diet, and several strategies of mitigation are being continuously sought for. In this pretext, a field experiment was conducted with a common winter vegetable (lettuce) at geogenically arsenic contaminated Ghentugachi village of Chakdah block in Nadia, West Bengal, India (23°02'N, 88°34'E, 9.75 masl) for two consecutive years to study arsenic accumulation in the edible leaves. Water harvesting techniques (through pond water) and organic amendments (Mustard Cake @ 1 t/ha, Vermicompost @ 3 t/ha and FYM @ 10 t/ha) as suitable management strategies have been explored in reducing arsenic contamination in soil-plant system. Results revealed arsenic accumulations to the tune of 2.73-3.00 mg/kg in lettuce leaf under conventional cultivation practices. Organic amendments and pond water irrigation separately and in combination reduced arsenic contamination in soil-plant system over shallow tube well (STW) drafted underground water irrigated and no manure situation. The use of surface pond water curtails arsenic load by 32.78% over STW. Vermicompost remained most successful among the organic amendments used with arsenic offloading of 46.49% over no manure situation. Conjunctive use of surface (pond) and underground (shallow tube well drafted) water also significantly reduced arsenic contamination in soil-plant system to a tune of 10.87%. The risk of dietary exposure to arsenic was assessed through computation of Provisional Tolerable Weekly Intake (PTWI), Hazard Quotient (HQ) and Target Cancer Risk (TCR). Consumption of lettuce leaf was critical in all dietary risk measures especially when associated with other dietary components, and our interventions curtailed their hazard. Thus integration of water harvesting along with vermicompost can be an effective alternative to curtail the risk of arsenic through diet.

Keywords: Arsenic, irrigation sources and organic amendments, lettuce, Risk assessment

Determination Of Critical Crop Weed Competition Period In Prevailing Rabi Crops Ininceptisol

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Abstract

Critical crop weed competition period helps to improve the crop health and subsequently productivity by utilizing the resources properly. Considering these facts, during rabi 2017-18 six field experiments on six dominant rabi crops (cereal-maize, pulse- lentil, oilseeds- mustard and linseed, vegetables-onion and chilli) were carried out at Instructional Farm, Jaguli, Bidhan Chandra Krishi Viswavidyalaya with major objectives to find out the critical crop weed competition period, weed biomass and yield attributes and yield through path analysis of some dominant rabi crops. Each of the six experiments was conducted with 6 weed management treatments [T1-Weed interference up to 10 DAS/DAP; T2-Weed interference up to 20 DAS/DAP; T3-Weed interference up to 30 DAS/DAP; T4-Weed interference up to 40 DAS/DAP; T5-Weed interference up to 50 DAS/DAP; T6 -Weedy check] with four replications following RBD. The results revealed that the yield was at par in between 10 and 20 DAS/DAP weed inference in maize, linseed, mustard and chilli while the same in between 1-10 DAP in onion and in 20 and 30 DAS in lentil. This may be due to the reason that the weed biomass was increased after 20 DAS/DAP in maize, linseed, mustard and chilli, after 10 DAP in onion and after 30 DAS in lentil. Therefore, considering the weed biomass, productivity and path correlation data 10-20 DAP in onion, 20-30 DAP in maize, linseed, mustard and chilli crops and in lentil crop 30-40 DAP may be the CCWCP in this Gangetic Inceptisol.

Keywords: Critical crop weed competition period, Weed Biomass, Rabi crops

OP-38

***In vitro* direct organogenesis from nodal segments of *Commelina benghalensis* L., a traditional medicinal plant**

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Abstract

Commelina benghalensis L. has great significance in traditional systems of medicine. An *in vitro* protocol has been established for large-scale clonal propagation and conservation of *C. benghalensis*. Single nodal segment (NS) was used as an explant source for *in vitro* culture establishment, in which Murashige and Skoog (MS) medium fortified with 1.5 mg l⁻¹ N6-benzyladenine (BA) and 0.5 mg l⁻¹ α-naphthalene acetic acid (NAA) supported rapid axillary bud induction. A very elevated rate of shoot multiplication (~18 shoots per axillary bud) was attained in the same growth medium within 21 days. A highest number of ~15 well-developed roots per shoot were noted in MS medium containing 1.5 mg l⁻¹ indole-3-butyric acid (IBA). In a simple acclimatization process of six weeks, the survival rate of plantlets cultured in a combination of soil, sand, and vermicompost (1:1:2; v/v/v) was ~91%. The sustainable potentiality of multiple shoot culture for over eight months assured the technology towards conservation of genetic resources.

Keywords: *Commelina benghalensis*, micropropagation, sustained culture, acclimatization

OP-39

Water Chestnut: a promising underutilized fruit for poverty alleviation of rural people of West Bengal

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Abstract

Water chestnut (*Eleocharis dulcis*), an underutilized fruit species, is grown in marginal lands of West Bengal. It is commonly known as Panifal and commercially grown in southern zone viz., North 24 Parganas, South 24 Parganas, Paschim Medinipur, Purba Medinipur, Nadia district. Being a highly economical species for the local inhabitants and rural people, it is commercially grown by them in a large scale. Fruit is rich source of Carbohydrates, calcium, magnesium, potassium, Vitamin B complex, energy and dietary fibre, can prevent malnutrition of rural people. Fruits are consumed as fresh as well as boiled and roasted. It has reported to be useful in heart disease, who consume large portion of potassium significantly use for the lower level of stroke and high blood pressure. It helps in digestion and weight loss due to present of dietary fibre. Due to its immense importance, this crop should be given priority so that it can provide the nutritional security and uplift the socio-economic condition of the poor rural peoples. Hence, information of this crop on different aspects viz., medicinal, nutritional, cultivation practices etc. has been done to exploit this underutilized fruit crop to a maximum extent.

Key words: Panifal, underutilized fruit, nutritional security and socio-economic upliftment

Spatiotemporal Analysis And Trend Detection Of Groundwater Levels Using GIS Techniques In Nadia District Of West Bengal State In India

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Abstract

Groundwater (GW) resources are influenced by several factors like over exploitation, geological formation, climate etc. A long-term GW level trend detection is necessary for sustainable groundwater usage planning in future. In the present study, long-term (1990-2013) spatio-temporal analysis of GW levels during pre-monsoon and post-monsoon was done to elucidate the GW level variation trends in Nadia district. Results show that the groundwater levels was dropped more than 2.5 m below ground level (bgl) in the central part of the district, however, this drop was less than 2.5 m (bgl) in the northern and southern part of the district. According to pre- and post-monsoon data, the average annual water level has decreased beyond 3 m (bgl) in blocks of Tehatta II, Chapra and Chakdah. Average GW level of Krishnaganj and Chakdah, in pre-monsoon were respectively 6.84 m (bgl) and 7.55 m (bgl), which was higher than the post-monsoon (4.20 m (bgl) and 4.43 m (bgl)). During post-monsoon except Karimpur-I, Krishnaganj (both negative trend) and Hashkali (no trend) and in pre-monsoon except Krishnaganj (negative trend) and Hashkali (no trend), all the other blocks had positive trend. The study reveals that the groundwater levels in the southeastern and northeastern regions of the district drops by more than 5 m bgl in pre-monsoon and more than 4 m bgl in post-monsoon.

Keywords: Groundwater level, trend analysis, spatiotemporal analysis, GIS, pre-monsoon, post-monsoon

Genetic analysis and selection of terminal heat responsive traits in bread wheat

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Abstract

High temperature (> 30°C) at the time of grain filling is one of the major causes of yield reduction in wheat in different areas of the world, especially in tropical countries. Fifty-One advanced breeding lines of wheat developed by Indian Institute of Wheat and Barley Research (IIWBR), Karnal for North East trial for terminal heat tolerance including five checks were used for the present study. These 51 genotypes were evaluated for yield and yield attributing traits during 2018-19 to find out genetic variability, correlations and direct and indirect effects. Significant genotypic variation was observed for all the traits studied, indicating considerable amount of variation among genotypes. In late sown and heat stressed condition, high heritability with high or moderate value of genetic advance was found in plant height, date of flowering, date of maturity, biomass, grain number per spike, relative water content (RWC) and proline content. This indicates additive gene action and least environmental influence which would result in effective selection for these traits. On the basis of correlation coefficients and path analysis tillers/plant, spike length, spikelets/spike, biomass/plant, RWC and proline content have shown to have a high and significant correlation with yield in stressed conditions. Spike length, biomass per plant, date of heading had direct positive effects on grain yield/plant whereas date of flowering and date of maturity had indirect positive effect. So, while exercising selection in wheat under heat-stress conditions these characters must be given preference.

Key words: Terminal heat tolerance, relative water content (RWC), heritability, genetic advance

Biochemical Basis Of Resistance In Rice Against *Meloidogyne Graminicola* Golden And Birchfield

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Abstract

A pot culture experiment was designed in two factors Completely Randomized Design at the Directorate of Research, Bidhan Chandra Krishi Viswavidyalaya, Kalyani, Nadia, West Bengal to study the biochemical basis of resistance in rice against *Meloidogyne graminicola* Golden and Birchfield. Treatments comprised of *M. graminicola* susceptible and resistant rice genotypes Satabdi and Marichsal, respectively. Three geographic isolates of *M. graminicola* viz., Mg1 (*M. graminicola* geographic isolates from Ashui, West Medinipur), Mg2 (*M. graminicola* geographic isolates from Sumitrapur, West Medinipur) and Mg3 (*M. graminicola* geographic isolates from Gayeshpur, Nadia) from West Bengal were used in the experiment. Result revealed that the production of resistance governing biochemical constituents like PAL, phenol and reducing sugar was more in the root and leaf of resistant rice genotype, Marichsal. Among the isolates, Mg1 triggered the maximum level of phenylalanine ammonia lyase activity and had a high level of total phenols and reducing sugar production. Roots of infected plant, Marichsal produced greater amount of PAL, phenolics and reducing sugar by 20.95, 243.73 and 7.88%, respectively as compared to Satabdi. Similarly, in leaves of Marichsal, concentration of these constituents was enhanced by 35.74, 23.90 and 8.94%, respectively over Satabdi. Total sugar production was also found maximum in roots and leaves of resistant rice genotype Marichsal. The susceptible rice genotype Satabdi registered the lowest value for all the studied biochemical constituents.

Keywords: Biochemical analysis, Rice, *Meloidogyne graminicola*

OP-43

Multiplication of *Psidium guajava* L. through stem cutting

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Abstract

The experiment indicated the scope of clonal multiplication of guava (*Psidium guajava* Linn.) by stem cutting accrued from mature plants. Cuttings have been treated with five treatment viz., control (0%), 0.2%, 0.4%, 0.6% and 0.8% of IBA (Indole-3-butyric acid) solution and rooted within the non-mist chamber. Rooted cuttings have been allowed to grow inside the black polybags with 3 :1 ratio of soil and farm yard manure respectively for four months to evaluate the surviving capability and initial rooting performance. The experiment demonstrates that the mature stem cutting may be used to propagate the species. The highest

rooting percentage (70%) was recorded within in the cuttings treated with 0.6% IBA followed by using 0.4% IBA solution and the lowest was recorded in controlled treatment. The highest number root (36.6) was observed in the cuttings treated with 0.8% IBA solution followed by 0.6% IBA and the lowest in the cuttings without IBA treatment (controlled). The best survival percentage (74.33%) was recorded in the cuttings treated with 0.6% IBA solution and the lowest (32.66%) was recorded in the cuttings without any treatment. But, there was no variation in growth of cuttings due to IBA treatment.

Keywords: Cuttings; guava; plant growth regulator; rooting

OP-44

Impact of Drip Irrigation with Fertigation on Yield and Water Use Efficiency of Major Vegetables in India

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Abstract

Declining available fresh water is a matter of concern as agriculture consumed 80% of available fresh water use in a year. But the crop productivity need to be increased to quench the hunger increasing population. So alternative method of water saving irrigation as well as efficient use of fertilizer is required. In that context, drip irrigation with fertigation system comes into play. The current study was done to evaluate the impact of drip irrigation with fertigation on yield and water use efficiency of five different vegetables (Onion, Chilli, Brinjal, Cauliflower and Cabbage) in India. A numbers of research articles were selected and statistically analysed. Use of fertigation in drip irrigation system, yield is increased by 30, 60, 17, 25 and 16% in Onion, Chilli, Brinjal, Cauliflowe rand Cabbage, respectively compared to conventional cultivation practice. When the Water Use Efficiency was considered, a positive trend was found and 53, 16, 25, 26 and 15% higher Water Use Efficiency was recorded than the conventional practice in Onion, Chilli, Brinjal, Cauliflower and Cabbage, respectively. Saving of water with higher yield can be more beneficial for environmentally as well as economically for the farmers. From this review it can be concluded that drip irrigation with fertigation can enhance yield and Water use Efficiency of the vegetables in Indian condition and this technology should be promoted among the farmers community.

Keyword: Yield, Water use efficiency, Fertigation, Drip irrigation.

OP-45

Influence Of Nutrient Management In Blackgram (*Vigna Mungo L.*) On Yield And Yield Attributes And Nutrient Uptake In Rice Fallow

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Abstract

A field experiment was conducted during rabi 2017-18 with an objective to optimize the nutrient management practice for black gram in rice fallow at Agronomy Main Research Farm, Department of Agronomy, Orissa University of Agriculture and Technology, Bhubaneswar. The experiment was laid out in Randomised Complete Block Design with 12 treatments and replicated thrice. The treatments consisted of soil test-based fertilizer recommendation (STBF), 2 sprays of 2 % urea, 2 sprays of 2 % DAP, 2 sprays of 2 % NPK (18:18:18), STBF + 1 spray of 2 % urea, STBF + 1 spray of 2 % DAP, STBF + 1 spray of 2 % NPK (18:18:18), STBF + 2 sprays of 2 % urea, STBF + 2 sprays of 2 % DAP, STBF + 2 sprays of 2 % NPK (18:18:18), STBF + 1 water spray and control (1 water spray). The result indicated that application of STBF + 2 sprays of 2 % NPK (18:18:18) produced the maximum seed yield (720.4 kg ha⁻¹) which was at same level of production with STBF + 2 sprays of 2 % DAP (685.5 kg ha⁻¹) and STBF + 2 sprays of 2 % urea (674.7 kg ha⁻¹) and was significantly different from other treatments. The crop with STBF + 2 sprays of 2 % NPK (18:18:18) also removed significantly higher amount of N, P and K per ha as compared to other treatments. Those higher productions and uptakes were associated with better growth and development of the crops in terms of more number of podsplant⁻¹, seeds pod⁻¹, plant height, dry matter and leaf area index.

Keywords: Blackgram, nutrient, yield, rice fallow, uptake, growth

OP-46

Effect of Pretilachlor 50% EC on weed control of transplanted rice under alluvial soil of West Bengal

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Abstract

A field experiment was conducted at Regional Research Station of Bidhan Chandra Krishi Viswavidyalaya, Gayeshpur, West Bengal during *boro* season of 2014 and 2015 to evaluate the bio-efficacy and phytotoxicity of pretilachlor 50% EC in transplanted rice. The

experiment was tested under Randomized Block Design where the treatments were weed management practices. Among the herbicide applied plots, the highest weed control efficiency was recorded with Pretilachlor 50% EC @ 2.000 kg a.i. ha⁻¹ which imparted phytotoxicity in rice plants resulting reduction in yield. Highest grain yield (3.59 t ha⁻¹) among the herbicide applied plots was found in Pretilachlor 50% EC @ 1.200 kg a.i. ha⁻¹ which was statistically at par with twice hand weeded plots. From research findings it may be concluded that Pretilachlor 50% EC @ 1.200 kg a.i. ha⁻¹ can be recommended for effective weed management in transplanted rice.

Key words: Pretilachlor, rice, weed management, hand weeding, phytotoxicity

OP-47

Easy and green execution of Graphene oxide coated sand as a low-cost nano-adsorbent for removing pesticide residues and impurities in water purification

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Abstract

Chemical pollution of water is a serious global health concern. While contemporary water filters remove certain significant pollutants, they cannot remove all impurities, including non-point source pesticides. Furthermore, none of these materials are both cost-effective and ecologically beneficial. The purpose of this research is to investigate the efficacy and efficiency of decreased graphene-oxide-coated (GO-C) sand as a water purification agent. The activated graphene-oxide-coated sand was created using beach sand, sugar, and tap water using the green synthesis concept. We have also tested its adsorption capacity using Malachite green dye. Ten parameters were examined after filtering raw pond water with activated graphene-oxide-coated sand; findings revealed a significant decrease in most multi-class pesticides detected by Gas chromatography-mass spectrometry (GC-MS). The Synthetic pyrethroid (SP) pesticide group was found to be the most responsive one. The significant changes of other physico-chemical parameters (pH, chloride, nitrate, TDS, and hardness) of water are also recorded after being treated with GO-C sand. An electron microscope was used to examine the activated GO-coated sand for coating efficiency. This study proposes that a graphene-oxide water filtration system may be made from readily accessible natural components such as beach sand and sugar, making the device both cost-effective and ecologically acceptable.

Keywords: Graphene, Green synthesis, Water purification, Pesticide residue, Gas chromatography-mass spectrometry

Assessment of the allelopathic potential of an invasive alien plant, *Ageratina adenophora* (Spreng.) King & Robinson on germination of agricultural crops in Mizoram, an Indo-Burma Biodiversity hotspot in India

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Abstract

Ageratina adenophora (Spreng.) King & Robinson belonging to the family Asteraceae and indigenous to Mexico and Costa Rica, is a perennial, herbaceous invasive plant that has invaded more than 30 countries and regions in tropical and subtropical zones of the world. This invasive alien plant species is widely spreaded in North-Eastern India including Mizoram and Tripura and has often been recorded as a harmful invasive plant disrupting native plant communities. The present investigation was aimed to evaluate the allelopathic effect of *Ageratina adenophora* on the growth of crop plants like *Brassica nigra* L., *Cicer arietinum* L. and *Oryza sativa* L. The vegetative parts of the plant have been reported to be used as antimicrobial component locally. The leaves are the source of different alkaloids, terpenes and volatile oils having an allelopathic effect. In view of this the present work was carried out with an aim to investigate the allelopathic effect upon germination of common crop plants in Mizoram like *Brassica nigra* L., *Cicer arietinum* L. and *Oryza sativa* L. Aboveground parts of *Ageratina adenophora* (Spreng.) King & H. Rob. in its vegetative stage were collected from agriculture fields & protected areas in Mizoram. Aquoues extract of the plant parts was used as control, 1% solution, 2.5% solution, 5% solution and 10% solution. The result indicated that the higher concentration of the vegetative parts extract could decrease the percentage of germination besides being identified as an established invasive alien plant which is a threat to the natural plant community. Some phytotoxic substances in vegetative parts and exudation from living tissues *Ageratina adenophora* may be released into the soil through the decomposition of the plant residues including its root exudates, which act as allelopathic substances and can inhibit the germination and growth of neighboring plants and may enhance the competitive ability of the plants, make them invasive.

Keywords: Allelopathy, Invasive Alien Plants, *Ageratina adenophora*, Mizoram, Agriculture, Germination.

Study of socio-personal and management factors for technology adaptation of the sericulture farmers, West Bengal, India

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Abstract

The technology adaptation level is assessed in respect to a total of 21 socio-management variables associated with sericulture practices and economy return by the farmers of West Bengal, India using a total of 126 respondents under three districts. The independent 14 societal and 7 management factors were statistically analyzed using correlation coefficient, path analysis, factor analysis and regression models. Consistency and dependency level were assessed and found that the management factors were comparatively higher in consistency than socio-personal factors. Amongst 21 independent socio-personal and management variables, 11 *i.e.*, X₁, X₂, X₃, X₈, X₉, X₁₀, and X₁₁ were found positively correlated in which only X₁₄, X₁₆, X₁₉, X₂₀ showed 1% significant level whereas remaining were found negatively correlated in respect to the dependent variable y. The factor analysis for an intrinsic conglomeration of different 21 independent variables formed a homophyllus group with a total of 7 distinct factors. However, based on the findings of this study, if the identified factors can be addressed in terms of adoption behavior level, the number of sericulture farmers will increase in the future.

Keywords: factor analysis, path analysis, regression analysis, sericulture, socio-management factor, technology adaptation.

OP-50

Regulation of uncontrolled cell growth (cancer) by curcumin and piperine- A Review

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Abstract

Cancer is a hyperproliferative disorder or an abnormal growth of cells which tend to proliferate in an uncontrolled way and, in some cases, to metastasize (spread). Globally, nearly 1 in 6 deaths occurs due to cancer. Currently, the main treatments for cancer are surgery, chemotherapy and radiotherapy. Naturally obtained drugs can minimize the side effects caused due to chemo therapy. India is a country where numerous spices have been used in cooking from ancient past. Turmeric (*Curcuma longa*) and black pepper (*Piper nigrum* L) are very commonly used spices that possess the property of regulation of cell proliferation. Curcumin is the principal curcuminoid found in turmeric whereas piperine an alkaloid found in black pepper. Curcumin and piperine both are safe, affordable, and efficacious. Curcumin

modulates several intracellular signaling pathways and exhibits strong antioxidant and antiproliferative properties. According to literature curcumin is converted into other compounds due to glucuronidation in the liver and made it unavailable and excreted to feces. On the other hand, the alkaloid piperine increases the bioavailability of drugs by inhibition of glucuronidation in the liver and small intestine. So, using both spices together in food and beverages daily can increase the bioavailability of curcumin that can be a boon to a carcinoma patient. In this paper an initiative has been made to illustrate the detail mechanism of action of both curcumin and piperine in inhibition of cell growth proliferation. The knowledge of this paper may be helpful in bio-medical applications and in formulation of new drug development therapy.

Keywords: Curcumin, Piperine, Cancer, Antiproliferative, Antioxidant

OP-51

Relation between Endometriosis and diet: A review

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Abstract

In today's world, the term "endometriosis" is very common among reproductive-aged women and adolescents. Several women suffer from this disease and experience chronic pain. A large number of women with endometriosis experience infertility. Different risk factors are associated with the occurrence of endometriosis among women. The relationship between dietary intake and inflammation occurring due to endometriosis is still not evaluated properly. Various ongoing research works are dealing with to see the effect of dietary substances on pathological and physiological process of this disease. According to different cohort studies, various foods such as high calcium, vitamin D, A, C, omega-3, fish oil containing foods are proved to reduce the risk of endometriosis. Green vegetables were not found to be associated with the formation of chronic inflammation due to endometriosis. Present review work is undertaken to establish a relationship between dietary intake and the occurrence and severity of endometriosis.

Keywords: Endometriosis, Risk factors, Dietary intake, Nutrition

OP-52

Production and application of industrially important microbial xylanase: A review

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Abstract

One of the major constituents of hemicellulose is xylan. Among different natural polymers, xylan can be found more abundantly and is ranked second among them. Four different types of xylans are available, and the physical conformation and solubility of each of them generally depends on the side chains. The side chains of them are also responsible for the occurrence of reactions with other components of hemicelluloses. Xylanase is an enzyme from the hydrolase family that can catalyze the hydrolysis of xylan polysaccharide. Aside from plant and animal sources, several microorganisms can be used to produce xylanase enzyme. Fungi such as *Trichoderma* sp., *Aspergillus* sp., yeast such as *Cryptococcus* sp., and bacteria such as *Streptomyces* sp., are very well-known organisms for the production of microbial xylanase. Microbial enzyme production will boost employment and revenue, allowing for the expedition of certain alternate techniques to preserving foreign exchange reserves. Because industrial enzymes are imported with precious foreign exchange, this endeavour can address national demand while simultaneously benefiting industry and the economy. Xylanase has several applications; it is used in the beverage industry, the bakery industry, the paper industry, etc. They can also be used in poultry as food additives.

Keywords: Xylan, Xylanase, Microorganism, Food applications, Other applications

OP-53

illuminating focus on food to prevent Antibiotic-associated Diarrhoea: A Review

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Abstract

The random use of antibiotics leads to gastrointestinal diseases with complications ranging from mild diarrhoea to *Pseudomembranous colitis*, which are called antibiotic-associated diarrhoea. Outbreaks of antibiotic-associated diarrhoea are generally found in 10% to 30% of patients taking antibiotics, depending on the particular antibiotic used, and are caused by *Clostridium difficile* in general and *Klebsiella oxytoca*, *Staphylococcus aureus*, *Clostridium perfringens* etc. in particular. Functional disturbances of intestinal carbohydrates, allergic and toxic effects of antibiotics on intestinal mucosa are responsible for mild antibiotic-associated diarrhoea. In COVID-19, caused by SARS-CoV-2, patients treated with a variety of antibiotics have been noticed to suffer from severe antibiotic-associated diarrhoea. Probiotics have been shown to play a significant role in preventing antibiotic-associated diarrhoea in both COVID-19 patients and general patients. Prebiotics and dietary approaches also play a vital role in combating antibiotic-associated diarrhoea. Given the increased demand for food associated with the treatment of antibiotic-associated diarrhoea, the current review paper attempted to orchestrate the effect of probiotics such as yogurt, kefir, cheese, probiotic milk, and dietary foods such as ripe papaya, bananas, and other fermented foods in

developing an immune system capable of effectively combating antibiotic-associated diarrhoea.

Keywords: Antibiotic-associated diarrhoea, Probiotics, Prebiotics, Covid-19, Antioxidants

OP-54

An insight into the health promoting effects of fermented foods against cancer

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Abstract

Currently, mortality rates have increased considerably all over the world, with cancer being the leading cause. Death due to cancer accounts for nearly 10 million deaths in 2020. Unhealthy eating habits, genetic composition, colonisation in cities and obesity are the main risk factors for cancer onset and development. More efficacious remedies are needed for the treatment of cancer. Nowadays, fermented foods have gained immense popularity as a result of their advanced health benefits. The fermentation procedure can reduce the number of some pathogenic microorganisms. Various fermentation procedures can also reduce the concentration of some harmful chemicals in food while increasing the concentration of some beneficial bacteria for our health. Fermented food consumption has been shown to be beneficial for cancer patients. Some nutrients present in fermented foods can work against several diseases. In view of the current scenario, the present review paper is orchestrated the anti-carcinogenic properties of various fermented beverages and foods.

Keywords: Cancer, Risk factors, Beneficial bacteria, Fermented food, Nutrition

OP-55

Role of Nutrition in Stress Management: An interesting nexus to explore

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Abstract

Stress has become an integral part of our daily life in different forms for longer or shorter duration. Stress arises from numerous sources has limited positive influences and mostly having negative effects on multiples systems of our body and causing various adverse health outcomes. Depression, anxiety, irritability are the psychological issues whereas migraine, ache in different muscles, diabetes, cardio vascular disorders, respiratory problems, reproductive dysfunctions etc are physiological attributes. Such stress and their negative outcomes have been proven to be prevented and mitigated by providing balanced nutrition

and functional nutrient components. Nutritional elements classified in various classes including anti oxidant, anti inflammatory agents, neuro-endocrine protective components. The combined effects of the substances are essentially involved in stress management. This practices are cost effective, easy to adopt, and beneficial in various aspects. This review has focused on the interesting relationship between stress and nutrition.

Keywords: Stress, Health, Diseases, Nutrition, Antioxidants

OP-56

Microbial pectinase and its application in several food industries: A review

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Abstract

Nowadays the demand of microbial enzyme has increased due to its utilization in different industries such as food, detergent, lather, textile, pharmaceuticals etc. Enzymes are vitally imperative biomolecules. Enzymes can be extracted from different sources. Among them, microorganisms have gained significant importance for enzyme production. Various previous studies have reported on various microbial sources. But continuous screening is required to isolate novel microorganisms for enzyme production. Pectinase catalyzes the hydrolysis reaction and acts on the ester bond present between the methyl and carboxyl groups of pectin. Pectinase is used enormously for the clarification of fruit juice in the beverage industry. Pectinolytic enzymes also have imperative applications in the treatment of waste water, paper bleaching, beverage fermentation, extraction of vegetable oil, cotton scouring, etc. Various bacteria, yeast, and fungi are used to extract intracellular and extracellular pectinase. In view of this, the current review paper is aimed at summing up various sources for pectinase production and their vital contributions to various industries.

Keywords: Pectinase, Microbial Source, Fruit juice clarification, Industrial application

OP-57

A Review on Fermentation Enhanced Nutritional Quality Of Food

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Abstract

Among the earliest processed food products, fermented foods are those ingested by humans. Poorly digested, reactive meals can be converted into health-beneficial functional foods by fermenting them. Fermentation helps to eliminate numerous unwanted microbes and toxins from food particles while also introducing helpful microbes. To help with digestion, these bacteria also help to develop new enzymes. Fermentation also enhances the nutritional quality of the various food products such as- soybeans, dairy products, cereals etc. Improving intestinal tract health, enhancing the immune system, synthesizing and enhancing the bioavailability of nutrients, reducing lactose intolerance symptoms, decreasing the prevalence of allergy in susceptible individuals, and reducing the risk of certain cancers are all the beneficial effects of fermented foods containing probiotic micro-organisms. This article gives an overview of the beneficial effects of fermented food products in human health.

Keywords: Probiotic. Mycotoxin. Lactose intolerance, Biofortification.

OP-58

Chia Seeds- Is it a “Superfood” Or “Superfad”: A Conflict

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Abstract

Chia seed (*Salvia hispanica*) was cultivated since 5500 years ago and used as a staple food for Aztecs in Mexico has now become one of the world's popular 'SUPERFOODS'. It is the richest source of Poly Unsaturated Fatty Acid in plant origin. Now many of us incorporating Chia seeds to make a food diversity such as breads, breakfast cereals, yogurts, smoothie etc. It may represent more sustainable source of omega -3 fatty acids than fish liver oil. Proper intake of Chia seeds provides protective action against Cardiovascular disease, Obesity etc. So people consider it as 'SUPERFOOD.' But excess consumption of Chia seed causes gastrointestinal disturbances and interacts with some medication and possess a choking risk. That means the phenomena of 'SUPERFOOD' become a 'SUPERFAD'. Though it has a very bright future anticipation so moderate amount of chia seeds consumption may be favourable to combat the disadvantages of chia seeds. Thus it can be claimed that daily proper intake of Chia seeds with balanced diet and moderate exercise help to maintain our body weight, prevent obesity and sustain proper well-being.

Keywords: *Salvia hispanica*/Chia seed, Omega-3 fatty acid, Polyunsaturated fatty acids, Super food, Superfad

OP-59

Microbial Population in Mangroves

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Abstract

Mangroves are situated as forests and marshlands in between the tidal flat of black waters, deltas, estuaries or waterway, lagoons, creeks, swamp of sub-tropical and tropical and tropical areas. Its distribution include 1/4 part of the coastline of the whole world with a huge area. Mangroves secured the second largest aquatic ecosystem dominion. Mangroves plants are analytically conversant with different nature barriers. Mangroves produce natural wastes which produce a suitable environment for different dependent microflora. In this mangrove a huge number of fungi population propagated in every year that's why it's deliberated as the 2nd largest fungi population. The different monsoons help to produce new microbes which have very important role for the entire ecosystem. Leaves, root and trunks of mangrove plant comprises of endophytic fungi, anamorphic fungi and other microbes. There are different gas fixation microbes which help in fixation of different essential gasses. Phosphorus is very essential micronutrient which convert from insoluble state to accessible state by the microbes for plant growth are largely present in the mangrove soil. The unknown microbes which play an important role for developing the ecosystem depend on the Mangroves. But the excess interference of human and different issues prevents destruction of valuable microbes' sources. The main aim is to secure those valuable and essential microbes and their resources.

Keywords: Ecosystem, Fungi, Gas fixation, Mangrove & its soil, Unknown valuable microbes

OP-60

A review on preventive and therapeutic role of functional food

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Abstract

When ingested at fruitful levels as part of a nutrient dense diet on a daily basis, functional foods are those whole, enriched, fortified, or improved foods that provide therapeutic benefits beyond the provision of basic elements (e.g., vitamins and minerals). The "gold standard" for linking the use of functional foods or dietary constituents with health claims should be randomized, repeatable, placebo-controlled, intervention trials in human subjects. However, not all foods labelled as functional foods on the market today are backed up by enough evidence to substantiate such claims. Fruits and vegetables, as well as fortified or enhanced foods, are examples of functional food. Functional foods contain biologically active components that provide health advantages or desirable physiological consequences. Many traditional foods are being studied for their functional properties, and new food

products with beneficial ingredients are being developed. Functional foods are currently one of the most heavily researched and promoted fields in the food and nutrition sciences. The current review study is an effort to integrate the preventive and therapeutic role of functional food.

Keywords: Biologically active components, fortified food, health benefits, Medicinal value, traditional food

OP-61

Relationship between malnutrition and immunity in infant and preschool children

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Abstract

Malnutrition is the sweeping condition effecting the health of a children. It effects the child's growth and development. There is a great relationship between nutritional status and immunity. Now research study has shown that malnutrition has a higher impact on infants and preschool children due to their greater susceptibility. Malnutrition can cause by lack of food intake during the childhood period. Researchers have shown 45 percent children died before the age of 5 years. Malnutrition makes the child more susceptible to infection, disease. Undernourished children are potential risk for physical growth and mental abilities. Nutritionally Acquired Immune Deficiency Syndromes are immune system dysfunctions caused by starvation (NAIDS). Because their immune systems have not matured owing to starvation, infants and children are at risk. This current review article describes the relationship between malnutrition and immunity in infant and preschool children.

Keywords: Immunological dysfunctions, infection, disease, Nutritionally Acquired Immune Deficiency Syndromes, infant, preschool children

OP-62

Postbiotics: Potential Applications in Early Life Nutrition and Beyond

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Abstract

Postbiotics are bioactive molecules that are produced in a matrix after fermentation and can be used to improve health. Because of microbial imbalance in the gut, can contribute to the onset of a variety of diseases (including cancer and diabetes: type-1), prebiotics, probiotics, and postbiotics are all used to change the gut microbiome has piqued interest recently. Any material released by the metabolic activities of the microbe that has a direct or indirect positive impact on the host is considered a postbiotic. By altering the gut microbiome, probiotics have a number of health benefits; nevertheless, technological restrictions such as viability controls have restricted their full potential usage in the pharmaceutical and food industries. As a result, the focus is changing away from viable probiotic bacteria and towards non-viable paraprobiotics and/or biomolecules produced from probiotics, also known as postbiotics. Because they impart a variety of health-promoting properties, paraprobiotics and postbiotics are developing idea in the functional foods sector. Although these concepts are not fully defined, they have been defined as follows for the time being. Secreted proteins, secreted biosurfactants, peptides, organic acids, short chain fatty acids, vitamins, Enzymes, amino acids, and other metabolic products produced by probiotics in cell-free supernatants are examples of postbiotics. The current review summarises and discusses a variety of postbiotic molecules as well as their impact on human health.

Keywords: Biomolecules, Biosurfactants, Fermentation, Gut microbiota, Organic acids, Short chain fatty acids

OP-63

Evaluating the anti-diabetic health effects of fermented beverage: Kombucha

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Abstract

Diabetes mellitus is a chronic, progressive metabolic disorder characterized by impaired nutrient metabolism and hyperglycemia. It is associated with impaired insulin production and/or insulin resistance. The alarming rise in the incidence of diabetes worldwide, has necessitated the World Health Organization (WHO) to set up guidelines to deal with the emergent epidemic and reduce the risk of mortality and morbidity. Kombucha tea is a fermented, non-alcoholic, slightly effervescent beverage produced by using a symbiotic starter culture of yeast and bacteria. Over the several years, multitude of studies have reported several health benefits associated with kombucha tea. Research findings corroborate the protective effects of kombucha tea against numerous diseases such as cancer, cardiovascular disease, diabetes, by exerting anti-microbial, anti-inflammatory, anti-cholesterol, and anti-hepatotoxicity effects. This review article discusses the applicability of kombucha tea as an anti-hyperglycemic beverage and its use as an adjuvant therapy in the treatment of diabetes. Kombucha administration to streptozotocin-induced diabetic animals have been reported to demonstrate significant improvement in their blood glucose levels, lipid profile, oxidative and histopathological indices, in comparison to the control animals. The bioactive postbiotics formed as a result of fermentation can be credited for the health benefits associated with kombucha. A well-prepared Kombucha has been reported to be safe for consumption by the US Food and Drug Administration

Keywords: kombucha, diabetes, post-biotics, adjuvant therapy, fermented beverage.

OP-64

An evidence-based study for assessment of the effects of Vitamin D in the treatment of vitiligo.

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Abstract

The active form of vitamin D, namely— 1,25-dihydroxy vitamin D acts a steroid hormone that regulates myriad of biological responses through its nuclear receptor (VDR). The VDR occupies 2,776 positions in the human genome; making up about 10% of the human genes directly and/or indirectly responsive to vitamin D. Similarly, a wide range of human cells like that of muscle, bone, skin, blood vessels, brain, colon, breast, prostate, and immune cells encode for the enzyme 25-hydroxyvitamin D-1 α -hydroxylase suggesting that the extra-renal intracrine and paracrine 1,25(OH)₂D₃ synthesis may critically affect the activities of many tissues and organs. Cumulative data originating from several in-vivo as well as clinical studies have associated low vitamin D status (as assessed by the levels of circulating 25-hydroxyvitamin D₃ or 25(OH)D₃) not only with bone related disorders such as rickets and osteoporosis, but also with several infectious diseases as well as cancer, secondary hyperparathyroidism and autoimmune diseases like multiple sclerosis, systemic lupus erythematosus, psoriasis, rheumatoid arthritis, and type 1 diabetes. Vitiligo is a pigmentary disorder of autoimmune origin that is characterised by anomalous loss of functional melanocytes from the epidermis. Although the exact etiological causes of vitiligo are yet to be known, numerous studies over the years have indicated an interrelationship of vitamin D with vitiligo. Vitamin D, influences skin pigmentation, by increasing tyrosinase activity and melanogenesis, in addition to its immunoregulatory functions, thereby exerting a positive response in the treatment of vitiligo. This review article therefore, aims to discuss the various interventional studies that have been carried out so far to observe the effect of oral and topical administration of Vit D in the management and treatment of vitiligo. Understanding its mechanisms will facilitate integration of genomic information into the workup of individualized patient care and make better clinical and nutritional decisions.

Keywords: Vitamin D, Vitiligo, Auto-immune disorder, Oral administration, Clinical studies

OP-65

Studies on preparation and analysis of anti-cholesterolemic edible oil from sunflower oil by method development and validation through GCMS

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Abstract

Today's world is well known about anti-obesity effect of diacylglycerol (DAG) rich oil. Addition of phytosterol(PS) with diacylglycerol oil may act as a super-nutraceutical that can show lower cholesterolemic effect. Phytosterol(PS) enriched diacylglycerol can be used as an anti-cholesterolemic edible oil in food processing, bio-medical and cosmetics industry. In this study phytosterol enriched diacylglycerol rich sunflower oil was prepared enzymatically and PS solubility was determined in different DAG-rich sunflower oil(181.4 to 598.0 g kg⁻¹) at 10°C -60°C and PS composition was determined from unsaponifiables of the respective oils through GCMS. Standard of β -sitosterol, γ -sitosterol, campesterol, stigmasterol, Δ^5 avenasterol, Δ^7 stigmasterol each of with six different concentrations (2, 5, 10, 20, 50 and 100 ppm) were used, prepared from 1 g kg⁻¹ stock solution. Calibration was prepared and method was validated. Experimental data revealed that sunflower oil (SFO), phytosterol enriched sunflower oil (PS-SFO), diacylglycerol rich sunflower oil (SFDAG) and phytosterol enriched diacylglycerol rich sunflower oil (PS-SFDAG) contained 7.05 g kg⁻¹, 19.31 g kg⁻¹, 5.6 g kg⁻¹, 59.4 g kg⁻¹ of PS in unsaponifiable respectively. GCMS data interprets that PS-SFDAG contains 59.4 g kg⁻¹ sterol that consists of ergosterol-0.34g kg⁻¹, ethylcholesterol-0.24g kg⁻¹, campesterol-12.4g kg⁻¹, stigmasterol-7.69 g kg⁻¹, β -Sitosterol-18.79 g kg⁻¹, γ -Sitosterol-13.12 g kg⁻¹, Δ^5 -avenasterol- 0.26 g kg⁻¹ and Δ^7 stigmasterol- 0.48 g kg⁻¹. We hope, in recent future application of PS enriched edible oil will get significance as an emerging area of research.

Keywords: Diacylglycerol (DAG), Phytosterol (PS), Sunflower oil (SFO), Gas chromatography mass spectrometry (GCMS), β -sitosterol, γ -sitosterol

OP-66

Insights on the origin of Nanofluidics and their various applications

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Abstract

Nano dimensional fluidics studies and their various types have emerged as a promising means for the various small and miniaturized level areas. The component of devices or devices themselves is responsible for optimizing the bad impact on environmental pollution and many human diseases. Nano and microfluidics like positive and negative lithography techniques etc. found in various electrical, chemical, mechanical, and other domains. In this

paper, the capability of nanofluidics in the various domains is discussed in detail. Nano materials and micron level materials ranged from zero dimensional to one dimensional via two, three and four dimensional. Starting from the lithographic approach, the design may extend up to positive and negative methods for the fabrication of nano/micro level channel as well as component and or its devices. These kinds of structures may be best suitable for various electrical, mechanical, chemical, biomedical, and aeronautical applications. Few examples are LoC, PoC, NoC, SoC, and HoC etc. (L, o, C, N, S and H stands for Lab, of, Chip, Point, Neural Network, System and Hospital respectively). Due to the reason of less sampling intake, and fast encapsulation of the materials and fast delivery at the targeted position, such kind of device or components of devices may be best suitable for various applications, which may help a lot in social economical domains on large and personal level.

Keywords: Miniaturization, Microfluidics, Nanofluidics.

OP-67

The gut microbiome as key modulator of the gut-brain axis and its role in the prognosis of neuro-degenerative diseases.

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Abstract

The gastrointestinal system with its intricate neuronal network, collectively known as the enteric nervous system serves as our 'second brain'. In addition, the gastrointestinal tract harbours a wide range of bacteria that form the gut microbiome. Recent findings corroborate the immense role of the gut microbiota in regulating gut-brain function, leading to emergence of the gut-brain-gut microbiome trinomial. Undesirable alteration in the gut microbes has been found to be associated with several gastro-intestinal as well as extra-intestinal diseases, including neurodegenerative diseases. The bi-directional communication with microbiota and the brain involves multiple modes such as nervous, endocrine and immune signalling pathways. Additionally, gut-microbiota derived metabolites such as short-chain fatty acids, branched chain amino acids, and peptidoglycans, facilitate this communication. The gut microbiome regulates the various functions of the brain which can in turn modulate the composition of microbiota through the neurotransmitter production. The decayed interaction of this crosstalk connects neurodegenerative diseases including Parkinson's disease, Alzheimer's disease, and Huntington's disease. Patients with these diseases have been reported to have a high rate of gastrointestinal comorbidities and gastro-intestinal dysbiosis as well. The focus of this review will be to discuss the role of microbes as key modulators of gut-brain axis, and how it is related with the development of neurodegenerative diseases.

Keywords: Gut-brain axis, Gut microbiome, Dysbiosis, Neurodegenerative diseases, metabolites

Assessment of the probability of cardio-vascular diseases in adult women with PCOS.

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Abstract

The study explores the probability of co-relation between Polycystic- ovary syndrome (PCOS) and cardiovascular disease(CVD). It is cross-sectional study with participants including 50 women aged >30 years with PCOS and 50 age-matched controls. Data are recorded with SGA for malnutrition followed by anthropometrics, biochemical, insulin levels, lipid levels, the prevalence of metabolic syndrome, and type II diabetes clinical signs and symptoms and Dietary Recall. Thus the Interpretation and calculation was done for the cardiovascular health score. Results are derived as cardio vascular health for CVD risk is not much different in women with PCOS and controls, thereby calculated that in middle-aged women, polycystic ovary syndrome (PCOS) is not the major contributor to CVD. It only exhibits as lightly undesirable cardio-metabolic profile.

Keywords: cardio-vascular disease, data, exercise, polycystic-ovary, syndrome, women

Structural Adjustment And Development Concerning Food, Nutrition And Health: A Systematic Review And Meta-Analysis

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Abstract

Food is one of the basic necessities for sustenance of life. It is no wonder to say that community health is national wealth. Over the centuries of human existence on planet Earth, food, clothing and shelter have emerged as the three basic necessities. While clothing and shelter have emerged as basic needs in the due course of human evolution, right from the beginning of life, food has been the major source of energy and existence. The dependence on food grew manifold with the rapid rise in the global population and today it is one of the major concerns for many of the countries, especially the developing and under developed countries to meet the food demand of its population. The Foods, living habits and environment create an imbalance that manifested on the physical level and later affects the mind. Thus, there is a direct connection between diet, habits, environment and emotional disorder. A nutritious diet provides the basis for health promotion and disease prevention, making it an important part of public health policy. Good nutrition and optimal nutrition is achieved when a person eats a varied diet containing all nutrients in sufficient amounts as

determined by dietary reference values. Essentially this enables a person to develop, to grow or to maintain the body and its stores for later use and thus allow for natural variation for health and disease prevention. Under-nutrition occurs when individual consume fewer nutrients than the body requires, resulting in a nutritional deficit. It is most common in poverty and those with increased nutritional requirements. In contrast over-nutritional occurs when a person consumes an excessive amount of nutrients. Significant levels of illness and mortality have been linked to dietary habits such as a low intake of fresh food and vegetables, fibre and the consumption of excessive amount of energy. A framework of various facets for health is that adhering to human rights laws and minimum core rights and the impact of progressive realization from the perspective of food and health is discussed. An analytical study of International Conventions/ Declarations, Constitutional and Statutory aspects with ground realities, is undertaken to find suitable amendments. This study is a mixture of data collected from the WHO and other websites and from secondary sources. The study of various international documents relating to human rights and health, books, legislations, reports, articles, has been critically analyzed.

Keywords: Health, Food, Nutrition, Global Concern, Legal Aspects

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A Study on the Effects of Mycotoxins on Kidney Health

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Abstract

Mycotoxins are harmful chemicals and secondary metabolic products produced mostly by *Aspergillus*, *Penicillium*, and *Fusarium* fungi. Mold produces some mycotoxins. Toxins can form during the growing, harvesting, or storing of grains, nuts, and other crops. Human exposure to this toxin, which occurs mostly through the consumption of contaminated cereal-derived foods and beverages, could be nephrotoxic. Mycotoxins are small, stable molecules that are difficult to remove or eradicate and penetrate the food chain while maintaining their harmful qualities. Ochratoxin A (OTA) is a nephrotoxic toxin generated by various *Aspergillus* and *Penicillium* species. This study was done to highlight the negative impact of various mycotoxins on kidney health. Ochratoxin A has been shown to cause acute tubular necrosis and renal failure in animal studies. Because of the vast amount of blood it gets and the 20–25 percent of blood that flows in at rest, as well as the large amounts of circulating toxicants that reach the kidneys, the kidneys are vulnerable to numerous toxic chemicals. The kidneys filter one-third of the blood that goes through them and reabsorb 98-99 percent of the salt and water due to their high activity. Aflatoxins, particularly AFB1 and its metabolites, are exposed to different regions of the nephron, causing nephrotoxicity before being eliminated in the urine. This study was undertaken to draw attention to the negative consequences of various mycotoxins (aflatoxin, ochratoxin, and their combinations) on kidney.

Keywords: Contamination, Mycotoxins, Health impact, Kidney

Prevalence of anaemia in Indian population among different age groups.

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Abstract

Anaemia (insufficient Hb concentrations in the blood) with hypochromic and microcytic type of peripheral blood smear as the most common type of laboratory findings. The most common cause is the nutritional deficiency of iron and folic acid prevalent among Indian females. It affects people of all ages but the target group remains the adolescent girls and pregnant women. It is a cause of maternal mortality and morbidity in India. The conditions are severe due to lack of proper diet and food insecurity in the rural parts of India. To study the prevalence of anemia in Indian population among women of reproductive age groups. We have collected the prevalence rate of anemia from Google scholar, PubMed, Scopus and Web of Science(WOS). Anaemia is one of the important public health problems in rural parts of India. Assam has the highest(69.0%)and Kerala has the lowest(22.4%) prevalence of anemia. Studies showed that the prevalence of anemia is more in females between the age group of 15 to 30 and intrahousehold activities as one of the main reasons. This review concentrates on the high prevalence rate of anemia in the rural parts of India between the age groups of 15 to 30.

Keywords: Anemia, iron and folic acid, lactoferrin, prevalence, mortality, morbidity.

Comparative in-silico Study of The Major Prolamine Protein of Wheat and Rice In Relation To Celiac Disease

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Abstract

Celiac disease is an autoimmune disease which is practically an immune response to consuming gluten protein popularly found in wheat, rye and barley , resulting “ leaky gut “ an inflammation of small intestine inner lining. Since wheat is enough infamous for being responsible for either celiac disease or gluten sensitivity, rice has become the only reliable source of staple around the world among people with gluten sensitivity. Glutenin and gliadin are thought to be responsible for the problem and glutenin is thought to be non-toxic. Rice

proteins is in rich glutelin (oryzenin) and prolamins . The most common type of glutelin is glutenin and more recent studies reveal that in primary amino acid structure , there's great similarities and homogenesities between glutelin and gliadin. Not only that the comparison between the prolamin structure can be an indicator how it is related to even avenin sensitivity. Hence, having celiac disease can be triggered by consuming rice. With the help of CLUSTAL-OMEGA, multiple sequence alignment has been done using FASTA sequence format extracted from UNIPROT-KB/ Genbank . Sequence alignment of proteins and phylogenetic tree has been done with these proteins to understand their homology. Since, protein structure is important , and every 3D structure wasn't present in PDB, protein structure prediction has been done using SWISS MODEL. The superimposed structures of the proteins revealed the structural similarities and deviations as well as other enigmatic links with other allergens like cocosin.

Keywords : CLUSTAL-OMEGA, Glutenin, Gliadin, Leaky-gut, SWISS-MODEL, UNIPROT-KB.