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NESA

NATIONAL ENVIRONMENTAL SCIENCE ACADEMY

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May 2019

A REPORT ON
NATIONAL CONFERENCE ON
**GLOBAL WARMING AND CLIMATE CHANGE:
IT'S IMPACT ON HUMAN HEALTH AND BIODIVERSITY (GWCC)**
APRIL 22, 2019



Raj Kumar Goel Institute of Technology (Pharmacy), on the occasion of EARTH DAY organized a National Conference on Global Warming And Climate Change: Its impact on human health and Biodiversity (GWCC) in association with National Environmental Science Academy (NESAC), New Delhi on April 22, 2019.

The conference was sponsored by Emami Healthcare Ltd, Enertia Solar, Tarun Publisher, Scientific E-Resources and CCRUM, Ministry of Ayush, Govt. of India.

Professor **Javed Ahmad**, President NESA, Dr. Laxman Prasad, Group Director (R & D), RKG group & Dr. Monika Sachdeva, Principal Pharmacy welcomed the revered guests , chief guest, Dr. B. Rupini



(Director, School of Environmental science, IGNOU, Delhi) and guest of honour, Prof. Kanchan Kohli,(Head, Dept. Of Pharmaceutics, School of Pharmaceutical Education and Research, Jamia Hamdard, New Delhi) with a lush green saplings.

President, NESA delivered a talk about theme of the conference is relevant to the current quest of human mind which is actively engaged not only in exploring its surroundings but also in resolving the secrets of nature. Nurturing the nature requires deep understanding of all its facets. To provide solutions to some of the major environmental challenges like clean drinking water, smoke free air to breathe, clean energy, safe / healthy food and medicines for the whole population in the country.

Prof Kanchan Kohli delivered a talk on “Biodiversity exploitation & conservation goes hand in hand”, where she also talked about various phytopharmaceuticals, available commercially.



Dr. B. Rupini, Director SOITS, IGNOU, New Delhi is welcome by Dr. Laxman Prasad, Group Director RKG, GZB along with Dr. Javed Ahmad, President, NESA, New Delhi

Dr. B. Rupini in her address talked about Global Atmospheric changes and loss of Biodiversity. She also motivated the young students to protect Mother Earth in sustainable manner. Around 100 students, faculty, staff and guests participated in this conference

All the delegates and participants took a pledge to conserve the resources of the country.

All respective delegates also planted Medicinal Plants in Herbal Garden at the campus.

Technical session 1 started with a talk on “Genomics of finger millet for climate resilient agriculture” by Dr. Amol Kumar U Solanke, Scientist ICAR-National institute for plant biotechnology, New Delhi. Dr. Solanke in his talk stressed upon why the study of finger millet genomics for stress tolerance especially for heat and drought stress is important.

Dr. Aqeel Hassan Rizvi, scientist, International centre for Agriculture Research in Dry areas, Pusa Campus, New Delhi, in his talk on “Role of Pre-Breeding in pulses to combat the effects of climate change” stressed upon how extreme weather instabilities are the most intimidating challenges to agriculture and associated activities and how pre-breeding activities can develop new varieties with a broad genetic license to combat these challenges.

In first scientific session five students gave oral presentations with their different thoughts and ideas to protect the nation from pollution and take preventive measures regarding the same through their presentations on the given themes as below

- **Prashant Kumar** (M.Pharm) on “Global warming & its impact on Aquatic life”,
- **Tushar** (B.Pharm) on “Global warming & its effect on Aquatic ecosystem”,
- **Surya Goel** (M.Pharm) “Suggestive measures for the improvement of air quality in NCR,

- **Abhigya Sexena** (B.Pharm) “Climate change” respectively
- **Manan Bhasin** (B.Pharm) “Impact of climate change on Indian economy: in context of medicinal plants”

All these participants were judged by Prof. Kanchan Kohli, Dr. Viswanath Agrahari and Dr. Aqeel Hassan Rizvi. The technical session was chaired by Mr. Abhinav Agarwal, Associate Professor, RKGIT (Pharmacy).

Following students also participated in Poster Presentation:

- ❖ **Gunjan** (B.Pharm) on “Impact of climate change on Agriculture and soil”,
- ❖ **Km. Seema & Rahul** (M.Pharm) on “Impact of climate change on agriculture and soil”,
- ❖ **Prince Tripathi** (B.Pharm) on “Cannabis & affect of global warming”,
- ❖ **Anshika Niranjana** (B.Pharm) on “Air Pollution as a main cause of Asthma, Cancer and Hypertension,
- ❖ **Arun Rathor** (B.Pharm) on “Impact of global warming on active ingredients among medicinal plants” and
- ❖ **Anjan Bhardwaj** (B.Pharm) on “Impact of air pollution & climate change”

All the participants were excellent on their desk and impressed all the judges with their thoughts and presentation skills. Dr. Dilip Gupta, Dr. Munendra Mohan Varshney and Dr. Aqeel Hassan Rizvi were judges for the poster completion.

Post Lunch Technical Session -2 was chaired by Dr. Javed Ahmad. Dr. Javed introduced the invited speakers Dr. Gauri Srivastava and Yogacharya Antarang Anand Yogi, from Pt. Deendayal Upadhyay Smriti Sansthan. They delivered talks on Save Earth by waste management and plastic waste free mother earth respectively. Yogacharya talked about good & bad plastic and how they can be replaced or reduced. In second round five students also gave oral presentations

- ◆ **Poonam Yadav** (PhD) on “Physiological and Biochemical applications determining sulphur dioxide tolerance & its effect on sulphur nutrition of crops”
- ◆ **Ruchi Singh & Surya Goel** (M.Pharm) on global warming: impacts of climate variability & sustainability of ecosystem”
- ◆ **Priya Goel** (B.Pharm) on “Global warming and its impact on aquatic system”
- ◆ **Chavvi** (B.Pharm) on “Air pollution and human disease”
- ◆ **Aditi Sharma** (M.Pharm) on “Impact of global warming & climate change on medicinal plants”

All the above participants were judged by Ms. Gitika Mehta (Assistant Professor), Mr. Abhinav Agarwal (Associate Professor), and Dr. Viswanath Agrahari (Associate Professor).

Glimpses of Earth Day Celebration 22nd April 2019 at RKG, GzB, U.P.



Winners of 1st, 2nd, & 3rd each for oral and poster presentations were given away prizes of Rs 1000/-, Rs 750/- and Rs 500/- respectively.

Ms. Aditi Sharma, student coordinator was also given a cash prize of Rs 500/- as an award of appreciation. Following students were the winners

- ◆ Prince Tripathi; First prize (poster presentation)
- ◆ Anshika Niranjani; Second prize (poster presentation) and
- ◆ Km. Seema and Rahul; Third prize (poster presentation)
- ◆ Tushar; First prize (oral presentation)

- ◆ Surya and Seema; Second prize (oral presentation)
- ◆ Poonam Yadav; Third prize (oral presentation)
- ◆ Abhigya Sexena; Third prize (oral presentation)

Third prize was given between Poonam Yadav and Abhigya Sexena for oral presentation.

After distributing the prizes to winners, certificates were also distributed to all the participants, volunteers and organizing committee members.

This conference ended with a vote of thanks delivered by Dr. Monika Sachdeva, organizing secretary of the conference.

Office Bearers and the Executive Committee 2019-2022

During the Executive Committee Meeting held on 26th April 2019 at 4.00 pm at NESA Office at 206, Raj Tower-1, Alaknanda Comm. Centre, New Delhi-110019 and after following the due process of election procedure, the committee declared the results for various positions of NESA for the years 2019-2022 which are as follows:

Sl. No.	Designation	Name	State
1.	President	Prof. Javed Ahmad	Delhi
1.	Vice President	Dr. Kshipra Misra	Delhi
2.	Vice President	Prof. Nafees Khan	Aligarh
3.	Vice President	Prof. Ashwani Wanganeo	Bhopal
4.	Vice President	Dr. Mridul Sahani	Patna
5.	Vice President	Dr. Kalpana Bhargava	Pune
1.	Joint Secretary	Dr. Prabhakar Ranjan	Delhi
2.	Joint Secretary	Prof. Altaf Ahmad	Aligarh
3.	Joint Secretary	Dr. Syed S. Hassan	Ludhiana
4.	Joint Secretary	Dr. Sayeed Ahmad	Delhi
1.	General Secretary	Dr. Sushil Kumar Singh	Delhi
2.	Treasurer	Prof. Altaf Ahmad	Aligarh
3.	Executive Secretary	Mr. RK Sinha	New Delhi

EXECUTIVE COMMITTEE – 2016-2019

1.	Mem. Executive Committee	Dr. Shri Prakash	Prayagraj
2.	Mem. Executive Committee	Dr. Ashok Dhakad	Ludhiana
3.	Mem. Executive Committee	Dr. Shefali Gola	Delhi
4.	Mem. Executive Committee	Dr. Balwant Rawat	Dehradun
5.	Mem. Executive Committee	Dr. R.S. Tomar	Delhi
6.	Mem. Executive Committee	Dr. Vaishali Mishra	Delhi
7.	Mem. Executive Committee	Dr. Seema Akbar	Lucknow
8.	Mem. Executive Committee	Mrs. Vandana Sinha	Delhi



President, National Environmental Science Academy meet and wishes new VC of Jamia Millia Islamia at her residence in NCERT Campus. President also introduced the activities of NESA to her and convey best wishes for her journey in the Jamia Millia Islamia, New Delhi.

NESA Award 2019 Notification No. 1
APPLICATIONS ARE INVITED
LAST DATE 30th June 2019



(1) NESA FELLOWSHIP AWARD

AGE 45 and above.

The recipients shall get Citation, Certificate, Memento and a Gold plated medal, and can suffix F.N.E.S.A. after their names.

(2) NESA EMINENT SCIENTIST AWARD

AGE 40 and above.

The recipient shall get Citation, Certificate, Memento and a Gold plated medal.

(3) NESA SCIENTIST OF THE YEAR AWARD

AGE 35 and above.

The recipient shall get Citation, Certificate, Memento and a Gold plated medal.

(4) NESA EDUCATIONIST AWARD

AGE 35 and above.

The recipient shall get Citation, Certificate, Memento and a Gold plated medal.

(5) NESA ENVIRONMENTALIST AWARD

AGE Up to 35 and above

The recipients shall get Citation, Certificate, Memento and a Gold plated medal.

(6) NESA AGRICULTURE INNOVATION AWARD

AGE 35 and above

The recipients shall get Citation, Certificate, Memento and a Gold plated medal.

(7) NESA GREEN TECHNOLOGY INNOVATIVE AWARD

AGE 35 and above

The recipients shall get Citation, Certificate, Memento and a Gold plated medal.

(8) NESA YOUNG SCIENTIST AWARD

AGE : Up to 35.

The recipients shall get Citation, Certificate, Memento and a Gold plated medal.

(9) NESA JUNIOR SCIENTIST AWARD

AGE : Below 35.

The recipients shall get Citation, Certificate, Memento and a Gold plated medal.

PRESCRIBED APPLICATION FORMS

The application forms could be downloaded from www.nesa-india.org

Separate application form should be submitted for separate awards. The application forms are non-transferable and it can also be obtained by sending a bank draft of Rs. 1000-00 only (per form).

Drawn in favour of **NATIONAL ENVIRONMENTAL SCIENCE ACADEMY** payable at NEW DELHI.

GENERAL SECRETARY

NATIONAL ENVIRONMENTAL SCIENCE ACADEMY

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HEALTH BENEFITS OF PROBIOTIC BACTERIA

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Probiotics:

Probiotics are live microorganisms that can be consumed through fermented foods or supplements which beneficially affect the host by improving its intestinal microbial balance. Many studies show that the balance or imbalance of bacteria in our digestive system is linked to overall health and disease. Most of the studies showing benefits used dosages of probiotics is 1 billion to 100 billion live organisms or colony-forming units (CFU) per day. It's important to consume adequate amounts of probiotics which will promote a healthy balance of gut bacteria and have been linked to a wide range of health benefits⁽¹⁾.

Beneficial Probiotic Strains

- ***Bifidobacterium bifidum***: The most dominant probiotic in infants and in the large intestine, supports production of vitamins in gut, inhibits harmful bacteria, supports immune system response and prevents diarrhea.⁽²⁾
- ***Bifidobacterium longum*** : It supports liver function, reduces inflammation, removes lead and heavy metals⁽³⁾
- ***Bifidobacterium breve*** : It helps colonize healthy gut community and crowd out bad bacteria.⁽⁴⁾
- ***Bifidobacterium infantis***: It alleviates diarrhea and constipation.⁽⁵⁾
- ***Lactobacillus casei***: It supports immunity, inhibits *H. pylori* and helps fight infections.⁽⁶⁾
- ***Lactobacillus acidophilus***: It relieves gas, bloating, improves lactose intolerance. Shown to help with a 61 percent reduction in *E. coli*, lower cholesterol levels and creation of vitamin K.⁽⁷⁾
- ***Lactobacillus bulgaricus***: It a powerful probiotic strain that has been shown to fight harmful bacteria that invades your digestive system and is stable enough to withstand the acidic digestive juices of the stomach. It also neutralizes toxins and naturally produces its own antibiotics.⁽⁷⁾
- ***Lactobacillus brevis***: It shown to survive the gastrointestinal tract, boost cellular immunity, enhanced natural T-killer cells and kill *H. pylori* bacteria.⁽⁸⁾
- ***Lactobacillus rhamnosus***: It supports bacterial balance and supports healthy skin, helps fight urinary tract infections, respiratory infections, and reduce anxiety by reducing stress hormones and GABA neurotransmitter receptors.⁽⁹⁾ Also, survives in gastrointestinal tract.
- ***Bacillus subtilis***: It is an endospore probiotic that's heat-resistant. Elicits a potent immune response and supports gut-associated lymphoid tissue (GALT).⁽¹⁰⁾ Suppresses growth of bad bacteria like salmonella and other pathogens.
- ***Bacillus coagulans***: It is an endospore probiotic that's heat-resistant and improves nutrient absorption. Also has been shown to reduce inflammation and symptoms of arthritis⁽¹¹⁾
- ***Saccharomyces boulardii***: The yeast probiotic strain that restores natural flora in the large and small intestine and improves intestinal cell growth. It's proved effective in treating inflammatory bowel disease like crohns

disease. It's been shown to have anti-toxin effects, be antimicrobial and reduce inflammation.⁽¹²⁾

Health benefits of probiotics:

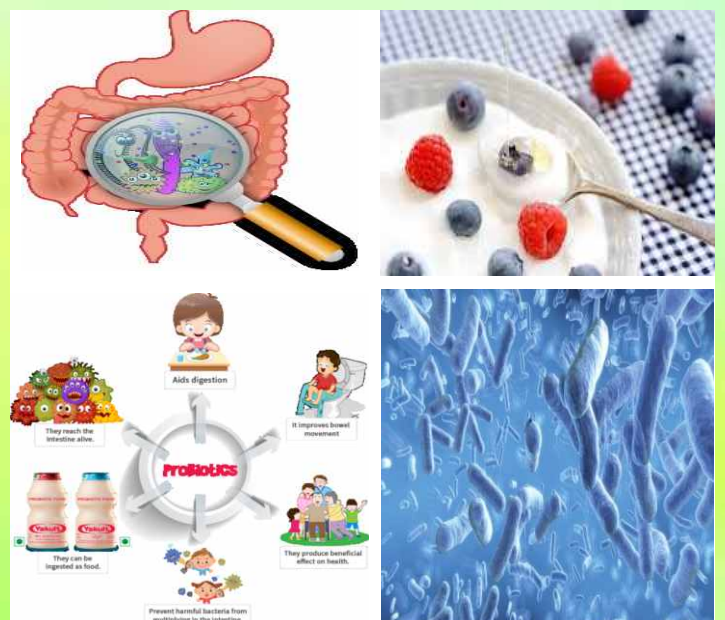
1. Probiotics are live microorganisms. When taken in sufficient amounts, they can help restore the natural balance of gut bacteria. As a result, health benefits may follow.
2. Probiotics can reduce the risk and severity of diarrhea from a number of different causes.
3. Research shows taking probiotics may help improve symptoms of mental health disorders such as depression, anxiety, stress and memory, among others.
4. Probiotics may help protect the heart by reducing "bad" low density level (LDL) cholesterol levels and modestly lowering blood pressure.
5. Probiotics may reduce the risk and severity of certain allergies, such as eczema in infants.
6. Probiotics may help reduce the symptoms of bowel disorders like ulcerative colitis, IBS and necrotizing enterocolitis.
7. Probiotics may help boost your immune system and protect against infections.
8. They may help you lose weight and belly fat. However, other strains have been linked to weight gain.

Conclusion

We can get probiotics from variety of foods or supplements. Live probiotic cultures are often found in fermented dairy products such as yogurts and milk drinks. Fermented foods like pickled vegetables, tempeh, miso, kefir, kimchi, sauerkraut and soy products may also contain some lactic acid bacteria. We can also take probiotics as tablets, capsules and powders that contain the bacteria in dried form. Alternative sources of probiotics, such as non-dairy fermented food products, present an advantage in the search for new probiotic strains. Increasingly, these probiotic sources are being selected for use in people who are lactose intolerant.

Reference

1. **M, Gipson G and nd I.** 2011.Health benefits of probiotics: are mixtures more effective than single strains. *Eur J Nutr.*, 50(1):1-17
2. **Chenolle B, Casinos, Batteller E,Astals P,Echevarría, Roman D and Genovés.**2011.Novel Probiotic *Bifidobacterium*



bifidum CECT 7366 Strain Active against the Pathogenic Bacterium Helicobacter pylori. Appl. environ. microbiol., vol. 77 no. 4 1335-1343.

- Reddy and Rivenson .1993. Inhibitory effect of Bifidobacterium on colon, mammary, and liver carcinogenesis induced by 2-amino-3-methylimidazo [4,5-f] quinoline, a food mutagen. Cancer Res., 1; 53(17):3914-8
- Marik, Satoru N, Asahiro S, Toshiaki S, Ychiro , Yamashiro T, Matsuki Takashi, Sahara and Koji N. Erratum to: Effects of the enteral administration of Bifidobacterium breve on patients undergoing chemotherapy for pediatric malignancies Supportive Care in Cancer, Volume 18(9), pp 1235–1236
- Altriger L, Morel J, Bond Y and Charbonneau, Mahony L, Kiely B, Shanahan Quigley M. 2009. Efficacy of an encapsulated probiotic Bifidobacterium infantis 35624 in women with irritable bowel syndrome . Am J Gastroenterol., Jul; 101(7):1581-90.
- Mcfarland LV. 2009. Evidence-based review of probiotics for antibiotic-associated diarrhea and Clostridium difficile infections . Anaerobe. 15 (6):274-80.
- Anderson JW and Gilliland SE. 1999. Effect of fermented milk (yogurt) containing Lactobacillus acidophilus L1 on serum cholesterol in hypercholesterolemic humans. J Am Coll Nutr., 18(1):43-50.
- Raul Raz and Walter E. Stamm. 1993. A Controlled Trial of Intravaginal Estriol in Postmenopausal Women with Recurrent Urinary Tract Infections. N Engl J Med., 329:753-756.
- Ciprandi G., Scordamaglia A, Venuti D, Caria M and Canonica. In vitro effects of Bacillus subtilis on the immune response. 2011. Proc Natl Acad Sci U S A., 108(38): 16050–16055.
- Javier A, Forsythe P, Marianne V, Escaravage, Helene M, Bienenstock and Cryan F. 1986. Ingestion of Lactobacillus strain regulates emotional behavior and central GABA receptor expression in a mouse via the vagus nerve. Chemioterapia. 5(6):404-7.
- David, R., Mande, K. Eichas and J. Holmes. 2010. Bacillus coagulans: a viable adjunct therapy for relieving symptoms of rheumatoid arthritis according to a randomized, controlled trial. BMC Complementary and Alternative Medicine. The official journal of the International Society for Complementary Medicine Research (ISCMR), 10:1
- Castagliuolo I, Rieger ME, Valenick L, Lamont JT and Pothoulakis. 1999. Saccharomyces boulardii protease inhibits the effects of Clostridium difficile toxins A and B in human colonic mucosa. Infect Immun., 67(1):302-7.

VALUE ADDED FOOD: SINGLE CELL PROTEIN

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The increasing world deficiency of protein is becoming a main problem of humankind. Since the early fifties, intense efforts have been made to explore new, alternate and unconventional protein. For this reason, in 1996, new sources mainly yeast, fungi, bacteria and algae named single cell protein (SCP) as coined to describe the protein production from biomass, originating from different microbial sources. Microbial biomass has been considered an alternative to conventional sources of food or feed.

Table 1. The average compositions of the different microorganisms present in the % dry weight of single cell protein.

Composition	Fungi	Algae	Yeast	Bacteria
Protein	30-45	40-60	45-55	50-65
Fat	2-8	7-20	2-6	1-3
Ash	9-14	8-10	5-10	3-7
Nucleic Acid	7-10	3-8	6-12	8-12

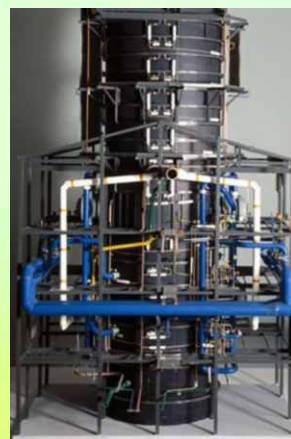
Production process

The production of single cell protein takes place in a fermentation process. This is done by selected strains of microorganisms which are multiplied on suitable raw materials in technical cultivation process directed to the growth of the culture and the cell mass followed by separation processes.

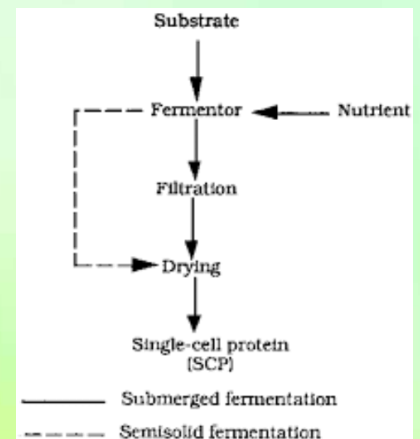
The fermentation methods have needed the following steps

- Purified cultures of the selected organism which should be in the proper physiological state.
- Medium for growth is sterilized and is utilized for the microorganism culturing in that medium.

- A production fermentation tank, which is the major instrument, employed for managing the medium used for culturing in stable condition.
- Isolation of microbial cells from the fermented culture medium is done.
- Cell free supernatant is collected.
- A product is then purified by using purification strategies.



Fermentor Substrates used for the production of SCP



Process involved in single cell protein

Substrates used for the production of SCP

A variety of substrates are used for SCP production. However, the availability of necessary substrates is of considerable biological and economic importance for the production of SCP. Algae which contain chlorophylls do not require organic wastes. They use free energy from sunlight and carbon dioxide from the air, while bacteria (except photoautotrophs) and fungi require organic wastes, as they do not contain chlorophyll. The major components of substrates are the raw materials which contain sugars (sugarcane, sugarbeet and their processed products), starch (grains, tapioca, potato, and their by-products), lignocelluloses from woody plants and herbs having

residues with nitrogen and phosphorous contents and other raw materials (whey and refuses from processed food).

Table 2. Microbes and substrates used in single-cell protein production

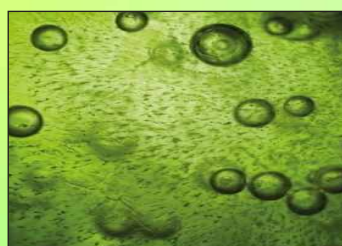
Microorganism	Substrate
Bacteria	
<i>Methylophilus methylotrophus</i>	Methane, methanol
<i>Methylomonas sp.</i>	Methanol
<i>Pseudomonas sp</i>	Alkane
<i>Bravibacterium sp.</i>	C1-C4 hydrocarbon
Yeast	
<i>Saccharomycopsis lipolytica</i>	Alkanes
<i>Candida utilis</i>	Sulphite liquor
<i>Kluyveromyces fragilis</i>	whey
<i>Saccharomyces cerevisiae</i>	Molasses
<i>Lactobacillus bulgaricus</i>	Whey
<i>Tosulopsis sp.</i>	Methanol
Fungi	
<i>Chaetomium cellulolyticum</i>	Cellulosic waste
<i>Paecilomyces varioti</i>	Sulfite liquor
<i>Aspergillus niger</i>	Molasses
<i>Trichoderma viridae</i>	Starch, straw
Algae	
<i>Spirulina maxima</i>	Carbondioxide
<i>Chlorella pyrenoidosa</i>	Carbondioxide
<i>Scendesmus acutus</i>	Carbondioxide
Actinomycetes	
<i>Nocardia</i>	Alkanes
<i>Thermomonospora fusca</i>	Cellulose
Mushrooms (a type of Fungi)	
<i>Agaricus biosporus</i>	Compost, rice straw
<i>Morchella crassipes</i>	Whey, sulfite liquor
<i>Auricularia sp.</i>	Saw dust, rice bran
<i>Lentines edodes</i>	Saw dust, rice bran
<i>Volverella volvacea</i>	Cotton, straw



Bacteria: *Methylomonas sp.*



Fungi: *Aspergillus niger*



Algae: *Spirulina maxima*



Mushrooms: *Agaricus biosporus*

Applications of single cell protein

- Provides instant energy.
- It is extremely good for healthy eyes and skin.
- Provides the best protein supplemented food for undernourished children.
- Serves as a good source of vitamins, amino acids, minerals, crude fibers, etc.

Used in therapeutic and natural medicines for:

- ✓ Controlling obesity
- ✓ Lowers blood sugar level in diabetic patients
- ✓ Reducing body weight, cholesterol and stress
- ✓ Prevents accumulation of cholesterol in the body

Used in cosmetics products for:

- ✓ Maintaining healthy hair
- ✓ Production of different herbal beauty products, like-Biolipstics, herbal face cream, etc

Used in poultry: As it serves as an excellent and convenient source of proteins and other nutrients, it is widely used for feeding cattle, birds, fishes etc.

Advantages of single cell protein

- Single cell protein high protein and low fat content.
- Single cell proteins are a good source of the vitamin.
- It can be produced throughout the year.
- Generation times of microbes are less, ie, they multiply rapidly building up the biomass, more the biomass more the protein source.
- Protein content is very high in dried biomass up to 85%
- During the production of SCP biomass, certain microbes produce useful byproducts such as organic acids.
- Waste (wood waste, food processing waste, hydrocarbons, etc) can be used as a source for carbon for growing microbes thereby having an advantage of environmental clean up also.
- Doesn't require sophisticated lab setup for algae and certain other microbes.
- High efficiency substrate conversion.

Disadvantages of single cell protein

- Many microbes produce various toxic compounds, so consumption of such toxic can have a serious effect on the health of humans, or in animals.
- Single Cell Protein diet supplements can pose an allergic reaction.
- Consuming SCP, in-taking a higher amount of nucleic acids which can lead to gastrointestinal problems.
- Food grade SCP productions are expensive due to the need to maintain high level sterility conditions in the production facility.

Conclusion

Single celled protein production, referring to the fact that most of the microorganisms used as producers grow as single or filamentous individuals rather than as complex multicellular organism such as plants or animals. Use of microbes in the production of proteins gives many advantages over the conventional methods. Microbes have shorter generation time, allow easy transformation and utilize many substrates, have no requirements in arable land or any particular season to grow and have the possibility of continuous production in any of the world. The cell yield varies according to the substrate and type of microorganisms.

BIOVALORIZATION OF POTENTIAL MICROBIAL CONSORTIUM FOR ENVIRONMENTAL SAFETY

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The waste waters released from distilleries and fermentation industries are the major threat to soil and aquatic life due to the

presence of water soluble recalcitrant coloring compounds called melanoidins. The removal of melanoidins before discharging it to the environment is necessary. Hence, these waste waters require pre-treatment before its safe disposal to the environment. Degradation and decolorization of waste waters by several physical and chemical methods are futile as may generate significant amount of sludge, cause secondary pollution, economically unfeasible, formation of hazardous by products and intensive energy consumption. However, in current scenario microbial treatment by using bacteria and fungi is eco-friendly and cost competitive alternative key for environmental safety.



Fig: 1 Sample collection sites



Fig. 2: Degradation of NM and PMDE by bacterial consortium.

In current prospect, pure bacterial or fungal cultures have been studied in order to develop bioprocess for melanoidin decolorization. However, the performance of fungus was limited due to its long life cycle and moderate decolorization rate. In contrast, the bacterial decolorization is usually faster due to its immense potentiality for lignolytic enzymes capable of degradation, environmental adaptability and biochemical versatility but requires a mixed community to decolorize melanoidins through combined metabolic mode. The mixed culture of *Bacillus* Sp. exhibited a two to four fold increase in

melanoidin decolorization over that showed by any individual bacterial isolate. Hence, biological decolorization of melanoidin containing waste water prior to its disposal into the environment and assessment of its toxicity is the need of the hour. Thus, we are inspired to develop potential bacterial consortium to economically, efficiently, cost effectively, eco-friendly and rapidly decolorize melanoidin.

The current focus of the research lies in screening of potential bacterial strains for the decolorization of melanoidins from distillery effluents. The process involves the determination of physico-chemical properties of the waste waters obtained from distillery effluents (Fig. 1). Isolation of pure bacterial strains from the sludge sample collected from the areas near distillery effluents and their identification and characterization by different biochemical and molecular identification methods. The pure bacterial strains after identification are then subjected to the assessment of its decolorization potentiality of the distillery effluents (Fig. 2). The implication of axenic and consortium of bacterial strains for better efficacy is tested. Finally, the efforts are made to enhance the bacterial potentiality for better degradation activity by optimization of several parameters governing the growth and metabolic activities of the bacteria strains and to evaluate different enzymes involved in the process of degradation and decolorization of melanoidins with possible mechanism of action. Thus, the aim of present study is to look forward for the search of novel bacterial strains and their consortium prone to confer enhanced degradation activity which will definitely pave the path towards better environmental safety and well being of human kinds in future.



PLANTATION DRIVE BY THE ACADEMY

The Academy Members are requested that whenever they plant a tree on their birthday or any other event, please send us the photographs with report so we can publish the same in our newsletter. This will inspire and encourage many more life members of the Academy to participate in the "Green drive" of the Academy.

Members are also requested to preferably plant a medicinal plant which can benefit each and every one around us. Also they can form a committee in their RWA for plantation of tree on weekends.

Dr. Shefali Gola, Editor, NESA E-newsletter

NEED FOR COMPREHENSIVE DATA DIGITIZATION IN CONSERVATION BIOLOGY

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Data digitization is an important aspect of biological information storage (archive), retrieval, usage, analysis and application for the purpose of modern conservation practises. How is this useful? It is important in multiple ways. On one hand data digitization significantly contributes towards making data archived and available for use and application at the finger tips; and on the other, it makes identification of various species, analysis of evolutionary and



taxonomic relationships among closely related species and information necessary for conservation purposes comparatively easier, less time and energy consuming as well low cost in information processing and generating outputs. Thus in simple terms, data digitization has now established monumental changes in the realm of modern conservation practices and introduced paradigm changes to global conservation efforts across all the major continents.



Huge amount of conservation related useful data are locked up in our botanical herbarium, vivarium, aviaries, greenhouses and hothouse archives and logbooks, zoological and botanical gardens, museums, archives, museums and libraries of forest and wildlife research institutes, wildlife rehabilitation, introduction and interpretation centers, plant and animal quarantine centers, plant and animal acclimatization and adaptation centers, university and research institute archives,

libraries and museums away from easy access of dedicated academics, researchers, ecologists, conservators, foresters, agronomists, botanists, zoologist, biologists, geneticists, lawyers, journalists, students as well as general public. The treasures include dried and wet specimens, samples of bones, hairs, horns, skins, pelts, skeletons, eggs, larva, pupa, animal body organs and parts, insects, different kind of shells, animal and plant fossils, herbarium sheets, field notes and field diaries, different types of maps, books, journals, magazines, reports, newsletters, proceedings, bulletins, monographs, theses, newspapers, posters and pamphlets, record

books, log books, hand drawn images and plates, invaluable historic photographs and unpublished drafts and notes to mention only a handful.

Such valuable documentary materials as well as sample specimens are stored in inaccessible format in different institutes and organizations. Time has come to make all these resources easily accessible and available to both serious researchers as well as general public to expand and explore our level of knowledge and appreciation for the natural world. Hence data digitization is an important effort to make this trapped or



locked up information easily available through the internet in electronic form. It is therefore necessary to take images of various dry and wet specimens, herbarium sheets, maps, diaries, notes and drafts and bring them to a accessible and efficient digital platform. Modern day primary, secondary and tertiary publications are all easily available and accessible in electronic formats. Hence care must be taken for the rapid digitization of our historic library and museum archives to make them easily accessible to the public. Several western universities, institutes and organizations have taken big step towards data digitization to make biological data and related resources as well as historical collections permanently archived and accessible through international data digitization collaborative efforts. India also needs to actively participant in such data digitization drive to keep up with the progress made by the rest of the world and make her invaluable resources available via the net to the rest of the world.

Deeper insights into our natural resources and invaluable historic documentary materials locked up in these manners will help in easy dissemination and distribution of biological information among target groups as well as the general public. It will help conservation of vulnerable, endangered and critically endangered species much better. More data and information will be available for relatively less known species, taxonomically and evolutionary distant relatives; as well about various exotic and endemic species reported within the political boundaries of a nation like India and within the regional biogeographical zones such Central Asia or South Asia or South East Asia etc. This will help in enriching our knowledge regarding various less known ecosystems, different forest ecotypes and sub types, biological variants among different species, better differentiate between closely related species and genera and advance our limited knowledge regarding sub species, morphological variants, cultivars, genotypes, landraces and different biological forms.

Even biogeographical maps or range or distribution maps for different species of flora and fauna could be better developed based on such integrated online information by compiling them technically using advanced software, computer programs and image platforms. Biological variations and microbial and physiological

disease symptoms of same species across different regions could also be compiled better and help us in understanding their range or distribution in a comprehensive manner. It will also help us in making judicious decision with respect to disease management, forest management, agricultural practices, breeding programs, rehabilitation and reintroduction of species in disturbed habitats

more efficiently. Hence, data digitization can have far reaching impacts in different realms like zoology, botany, taxonomy, ecology, environment, conservation biology, wildlife biology, forestry, agriculture, agronomy, agrology, biogeography, palaeontology, paleobotany, genetics, pathology and related disciplines.

Source: Sikkim Express Photo credit: S. K. Basu

NATIVE STINGLESS BEES: A VIABLE OPTION FOR POLLINATION OF CROPS IN THE YUCATAN PENINSULA, MEXICO

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Pollination plays a very important role in the production biology of both agricultural crops and wild plants. It is estimated that more than 80% of the 250,000 flowering plants require pollination to carry out their sexual reproduction. Currently, there is a heavy dependence on pollination services provided by the honeybees (*Apis mellifera* L.) in case of agricultural crops globally adding about 17,000 million US\$ per annum. It is important to mention that at least 84% of the crops produced in the EU depend on pollination by bees. On the other hand, the meliponiculture is the breeding and management of native stingless bees (NSB), which is practiced in tropical and subtropical regions of the world and has not yet been fully exploited in the field of efficient pollination services. In Mexico, a total of 46 species have been recorded across 11 genera, of which 17 species distributed in the Yucatan Peninsula (YP) region of Mexico. The NSB are producers of honey since the times of the Mayan civilization, however, with the arrival of the Africanized bee (*Apis mellifera* L.) and the increase of anthropogenic activities (livestock and sugar cane cultivation); their populations have reduced in the YP. However, the NSBs are characterized by the absence of a functional stinger with respect to other tribes of the



Apidae family. This feature facilitates its management in crops due to its low defensiveness compared to *A. mellifera*.

The economic impact of the NSB in Mexico has not yet been evaluated in a general way. Only some aspects of pollination in tomato and pepper crops have been shown to increase quality and quantity of honey produced from them. Among the main melliferous species used are *Melipona beecheii* Bennett, *Melipona yucatanica* Camargo, Moure & Roubik, *Nannotrigona perilampoides* Cresson and *Scaptotrigona pectoralis* Dalla Torre. However, there are few producers in the YP who use the benefits of these bees in their greenhouse production. They generally use bumblebees from the Bombini tribe for greenhouse pollination. In this sense, there are few studies on NSB that record their favorable impact on crops that can help to reevaluate the use of NSB in Mexico. The efficiency of bees has been demonstrated in Solanaceae crops like tomato. An increase in the number of seeds and production of fruits has been observed in case of tomatoes pollinated by NSB. It has also been useful in case of habanero pepper (*Capsicum chinense* Jacq.) under greenhouse conditions, as well as in achiote (*Bixa orellana* L.). For this reason, it is necessary to encourage the use of NSB in both open-cut crops and in the greenhouses. It is important to mention that efficiency in pollination depends on many factors such as the size and behavior of bees. For example, *Trigona fulviventris* Guérin-Ménéville can consume the nectar of flowers without any pollination service. The opposite is represented by the bees of the genus *Peponapis*; that specializes in the pollination of Cucurbitaceae members. Research studies on the interactions of the NSB should be carried out in the YP, where there are not many reports of the pollinator crisis as is observed in other parts of the world. **Photo credit:** Authors

APPEAL TO LIFE MEMBERS

NESA Life Members are requested to submit short articles for the NESA e-Newsletter that are consistent with NESA's objectives to improve environment. The articles should focus on topics related to environment and facilitate communication and discussion among researchers, academicians and students. The articles for June edition can be submitted to nesapublications@gmail.com before **25th May, 2019**.

Dr. Shefali Gola, Editor, NESA E-newsletter

Conference / Symposium / Workshop

9th Edition of International conference on Environmental Science & Technology during June 24-25, 2019 at Holiday Inn Moscow Vinogradovite, Moscow, Russia. The theme of the conference is "Lets join hands & go green for Mother Nature".

9th International Conference on Environment Science and Biotechnology (ICESB 2019) will be held during December 28-30, 2019 in Phuket, Thailand. ICESB 2019 brings together innovative academics and industrial experts in the field of Environmental and Agriculture Engineering to a common forum.

Participate in the 16th International Conference on Environmental Science and Technology (CEST2019). The conference will be held in the island of Rhodes, Greece from 4 to 7 September 2019. The conference is organized by the University of the Aegean (Greece) together with the South Aegean Region and is supported by the University of Salerno (Italy) and the Imperial College London (UK). The main organizer is the multi-disciplinary Global NEST (Network of Environmental Science and Technology); an international scientific movement that has been successfully developing for the last 29 years with members from more than 60 countries. Global NEST is an international scientific movement focusing on innovative environmental issues.

5th World Congress on Environmental Science is scheduled in Toronto, Canada during August 19-20, 2019.

Register for the 6th World Conference on "Climate Change" to be held in Berlin, Germany from September 2nd to 3rd, 2019. The theme of the conference is "An Insider's View of Climate Science, Politics, and Solutions".

International Conference on Environment and Natural Science from 16 to 17 December 2019 at Radisson Hotel, JFK Airport, Queens County, USA. The International Conference on Environment and Natural Science conference is to promote research and developmental activities in Environment and Natural Science. And the conference is promote to scientific information interchange between researchers, developers, engineers, students, and practitioners working in and around the world.

8th International Ground Water Conference (IGWC), 2019 is to be held during the period 21st to 24th October, 2019 at IIT, ROORKEE, India. The international conferences in IGWC series are the meeting point for groundwater professionals and researchers, bringing together experts in the various inter-related disciplines in the field of groundwater hydrology. The aim of IGWC 2019 is to provide a common platform for researchers, academicians, water managers, industrialists and technocrats to discuss and present their vision for Sustainable management of soil-water resources to face the growing challenges of the needs of rising population and anticipated impacts of land use and climate change.

11th International Conference on Environmental Science and Development (ICESD 2020) will be held during February 10-12, 2020 in Barcelona, Spain. ICESD 2020 brings together innovative academics and industrial experts in the field of Environmental Science and Development to a common forum.

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