

Summary Proceedings and Recommendations

National Seminar on Microbes and Human Welfare

20 & 21 July, 2013

Bharathidasan University,

Tiruchirappalli, Tamil Nadu

Jointly organized
by



National Academy of Biological Sciences

Chennai, India

&



Department of Microbiology
Bharathidasan University

Tiruchirappalli, Tamil Nadu, India

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Tiruchirappalli, Tamil Nadu



Summary Proceedings & Recommendations

1. Preamble

National of Academy of Biological Sciences [NABS] established in 2004 is providing opportunities to young biologists to interact on various aspects of biological sciences through Interactive Workshops organized during its annual meeting ever since the Academy was founded. The present Seminar is 6th in its series of interactive workshops. Taking a cue from the spontaneous response of students and young biologists, the present one is organized as a National Seminar with the theme “Microbes and Human Welfare” as microbes are the key to sustain and preserve the ecosystem of the planet earth.

Microbes are omnipotent and omnipresent. There is ‘No Life’ on planet earth without microbes! Microbes play such important roles in their ecosystems. In spite of being extremely small, the sheer number of microbes living on the planet has large effects on cycling of nutrients and compounds, both essential for the survival of all organisms. To survive in so many types of habitats, microbes have evolved a great number of mechanisms to find energy, digest food and reproduce. Scientists use the skills and potential of microbes in a number of ways in different fields of biological sciences, including agriculture, forestry, animal husbandry, health care, food industries, energy production, medicine and warfare and so on.

The richness of biodiversity in plants and animals by and large depend on type of microbes of the ecosystem in which they dwell and mutually benefitting. The science of agriculture including forestry, animal husbandry, food industry and several other fields have taken advantage of the association of microbes with the ecosystem to utilize them for the benefit of human welfare at large. It is the responsibility of human kind to conserve these microbes to sustain the varied ecosystems of the universe and utilize them most efficiently.

The seminar was aimed to take stock of the present day development in specific field and to provide a platform for the young biologists to share their experiences on specific theme areas identified.

The National Seminar was organized in collaboration with Department of Microbiology, Bharathidasan University, Tiruchirappalli, Tamil Nadu for two days from 20-21 July, 2013 at the University Campus.

2. About the Organizers



A. National Academy of Biological Sciences [NABS]

The Academy was founded on 31 December, 2004 by Prof. Dr. S. Kannaiyan, the then Chairman, National Biodiversity Authority, Ministry of Environment and Forests, Government of India, Chennai, Tamil Nadu, with EC members and Headquarter at Chennai. The Executive Council was constituted at the time of registration with President - Prof. Dr. S. Kannaiyan (Founder President), Vice President-Prof. N. Anand (Founder Vice-President) Secretary-Dr. S. S. Gnanamanickam (Founder Secretary) and Treasurer-Dr. T. L. Baskaran (Founder Treasurer). The founder Executive Council members were Prof. V. Sundararajan, Dr. K. Balaraman and Prof. T. Subramoniam.

The Academy was registered as "National Academy of Biological Sciences" under the TN Societies registration Act 1975 (TN Act 27 of 1975) on 10th March, 2005 at Chennai South, Saidapet, Chennai- 600 015 with Certificate of Registration No. 110/2005.

Vision

- To provide a common platform for the biologists to interact with each other for mutual benefit and to further the knowledge on areas of biological sciences.

Mission

- To foster and promote the new scientific knowledge that has emerged from recent advances in both basic and applied biological sciences in agriculture, animal sciences, forestry and all other disciplines of Biological Sciences.
- To enable interaction between biologists for mutual benefits in academic and /or research, educational or transfer of technology.
- To encourage and facilitate activities that are geared to improve society at large and in particular the under privileged sections of the society.
- To focus on problems of malnutrition in women and children through scientific approach
To address the important issues of conservation of soil and water
- To address the important issues of climate change and global warming
- To focus more on the emerging issues on biotechnology
- To create awareness on environmental issues
- To facilitate technology transfer issues to farmers and other clients
- To further such objectives and goals as the General Body may decide from time to time



B. Bharathidasan University

Bharathidasan University, (BDU) named after the revolutionary Tamil poet Bharathidasan (1891- 1968), was established in 1982. It is situated in the historic city of Tiruchirappalli in Tamil Nadu. “We will create a brave new world”, the motto of the University has been framed from Bharathidasan's poetic words. BDU endeavours to be true to such a vision by creating in the region a brave new world of academic innovation for social change. BDU has been nationally accredited with 'A' grade by NAAC which is one among those recognized by the University Grants Commission for receiving grants as per section 12b of UGC Act. It is a member of the Association of Indian Universities and the Association of Commonwealth Universities. This vibrant institution celebrated its silver jubilee in 2007 with a new vigour and continues in making rapid strides in the field of education and research. The University's affiliating jurisdiction is over eight districts including Tiruchirappalli, Karur, Perambalur, Ariyalur, Thanjavur, Nagapattinam, Tiruvarur and Pudukottai with 104 colleges and 13 approved institutions. The University main campus is located in an area of 1000 acres situated 16 km away from Tiruchirappalli Junction on Tiruchirappalli Pudukottai National Highway. Tiruchirappalli is well connected by air, rail and road with other parts of States of India.

Department of Microbiology

The Department of Microbiology emerged from the parent Department of Botany during 1992. Prof. G. Subramanian (former Head, Dept. of Microbiology) has also established National Facility for Marine Cyanobacteria (NFMC) (sponsored by Department of Biotechnology, Govt. of India), a unique facility dedicated to marine cyanobacterial research. A Post Graduate course on Microbiology was started jointly with NFMC during 1994. Since June 2007, the present Department of Microbiology has been bifurcated into a separate department and M.Phil (Full Time) course was started in the same year. With in the short span of five years, the department has received UGC -NON-SAP and DST-FIST grants and equipped with basic to advance instrumentation facilities for running the M.Sc., M. Phil., Ph.D. and Post Doctoral programs. All the faculties in the department are well recognized by their research contribution at National and International levels. They have received project grants of around Rs. 6 crores from various government funding agencies such as CSIR, DBT, DST, ICMR, IFS, INSA, MoEF, MoES, UGC, *etc.* *Vibrant research activities* on basic and applied aspects of microbiology in areas of biodiversity, ecobiology, molecular taxonomy, DNA fingerprinting and barcoding, establishment of functional microbial repository, development of pharmaceuticals, nutraceuticals, bio-energy from various microbes, microbial nanoparticles, leptospirosis, molecular diagnostics, metagenomics, probiotics, rhizosphere biology, anti-quorum sensing, bioremediation *etc.* are being carried out in the department.

3. Theme Areas

- i. Microbes in Agriculture and Forestry
- ii. Microbes in Human and Animal Health
- iii. Microbes and Biotechnological Innovations
- iv. Diversity and Conservation

4. Chief Patrons

Prof. M.S. Swaminathan

Emeritus Chairman & Chief Mentor
MS Swaminathan Research Foundation
3rd Cross Street, Taramani Institutional
Area, Taramani, Chennai- 600 113
Tamil Nadu

Dr. R.S.Paroda

Chairman, Haryana Farmers' Commission &
Chairman, Trust for Advancement of
Agricultural Sciences (TAAS) & Former
Secretary, DARE & DG, ICAR Avenue II
Indian Agricultural Research Institute
Pusa Campus, New Delhi 110 012

Dr. S. Ayyappan

Secretary, DARE & Director General
Indian Council of Agricultural Research
Krishi Bhavan, New Delhi - 110 001

Dr. K. Meena

Vice-Chancellor, Bharathidasan University
Bharthidasan University
Tiruchirappalli - 620 024
Tamil Nadu

5. National Advisory Committee

Dr. Kirti Singh

Chairperson
World Noni Research Foundation
12, Rajiv Gandhi Road
Perungudi, Chennai - 600 096

Dr. D. P. Ray

Principal Advisor to President
Siksha'O' Anusandhan University &
Former Vice-Chancellor
Orissa University of Agriculture &
Technology, Bhubaneswar
Khandagiri Square
Bhubaneswar - 751 030, Odisha

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Chairman
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Perungudi, Chennai - 600 096

Dr. K.V. Peter

Director
World Noni Research Foundation &
Former Vice-Chancellor, KAU
12, Rajiv Gandhi Road
Perungudi, Chennai - 600 096

Dr. K. Muthuchelian

Vice-Chancellor
Periyar University
Periyar Palkalai Nagar, Salem- 636 011
Tamil Nadu

Dr. P. Gunasekaran

Vice-Chancellor
Thiruvalluvar University
Serkkadu, Vellore - 632 115
Tamil Nadu

Dr. D. J. Bagyaraj

Vice-President, NABS & Chairman
Centre for Natural Biological Resources and Community Development [CNBRCD]
No.41, RBI Colony, Anand nagar, Bangalore 560 024

6. National Organizing Committee

Chairperson**Dr. V. A. Parthasarathy**

President, NABS &
Former Emeritus Scientist & Director
Indian Institute of spices Research
Narmada Nilayam
32/482 C Bharathan Bazar
Chelavoor, Calicut - 673 571, Kerala

Secretary General**Dr. T. Marimuthu**

Secretary, NABS &
Additional Director
World Noni Research Foundation
12, Rajiv Gandhi Road
Perungudi, Chennai 600 096

Coordinator**Dr. N. Thajuddin**

Professor
Department of Microbiology
Bharthidasan University
Tiruchirappalli - 620 024
Tamil Nadu

Organizing Secretary**Dr. G. Muralitharan**

Assistant Professor
Department of Microbiology
Bharthidasan University
Tiruchirappalli - 620 024
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Members**Dr. V. Rajesh Kannan**

Department of Microbiology
Bharthidasan University
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Dr. G. Archunan

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Dr. N. Jayabalan

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Poondi, Thanjavur - 613 503
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Dr. M. V. Rao

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Bharthidasan University
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Dr. M. H. Ilyas

Department of Botany
Jamal Mohammed College
7, Race Course Road, Khajanagar
Tiruchirappalli - 620 020
Tamil Nadu

7. Summary Proceedings

A. Inaugural function



The National Seminar on 'Microbes and Human Welfare', 6th in its series of Interactive Workshop / Seminar was organized in collaboration with Department of Microbiology, Bharathidasan University (BDU), Tiruchirappalli on 20 & 21 July, 2013 at the University Campus.

The Inaugural function commenced with Thamizhthaai Vaazhththu followed by observing two minutes of silence in memory of the departed souls in Uttarakhand tragedy.

Prof. T. Marimuthu, Secretary, NABS welcomed the dignitaries on the dais and delegates.



Prof. T. Marimuthu, Secretary, NABS welcomes



Prof. E. Ram Ganesh, Registrar i/c, BDU inaugurated the National Seminar by lighting the lamp which was followed by other guests on the dais.

The guests on dais were honored by Dr. V. A. Parthasarathy, President, NABS and Dr. N. Thajuddin, Coordinator of the National Seminar.

Dr. D. J. Bagyaraj, Vice-President, NABS gave an overview of NABS.



Dr. M. Anandraj, Editor-in-Chief briefed about NABS News letter.

The President of NABS offered his brief remarks on the National Seminar and the activities of NABS.



A view of delegates

Dr. K. Ramasamy, Vice-Chancellor, Tamil Nadu Agricultural University, Coimbatore released the 'Abstract' of National Seminar which was received by Dr. K. V. Peter, Former Vice-Chancellor, Kerala Agricultural University, Kerala and member of National Advisory Committee. Dr. K. Ramasamy in his key note address paid rich tributes to the Founder of NABS, Prof. S. Kannaiyan. He emphasized that the Academies like NABS should give recommendations / directions to nodal agencies responsible for funding /monitoring research projects including priorities of research need in biological sciences.



Dr. K. Ramasamy releases 'Abstract' and delivers Keynote Address

Dr. P. Gunasekaran, Vice-Chancellor, Thiruvalluvar University, Vellore, Tamil Nadu and the Member of National Advisory Committee released the NABS News Letter and a book on '*Biotechnology in Horticulture Methods and Applications*' edited by Dr. K. V. Peter which was received by Dr. D. P. Ray, Former Vice-Chancellor, Orissa University of Agriculture and Technology and Member of National Advisory Committee.



Dr. P. Gunasekaran releases NABS News Letter and a book edited by NABS Fellow



Dr. P. Gunasekaran offered his felicitation to Dr. Kirti Singh and organizers of National Seminar and pointed out that the microbes regulate the human health and even the economy of a country. Microbes associated within every human regulate the physiological activities and are responsible for ones well being. He further stressed that microbes are the first one to be evolved and are continuously associated with human and other living organisms and they cannot be separated from one another; as the genome sequence of human is completed, the association of microbes in animal and human health need to be explored.

Prof. P. I. Peter, Chairman, Noni BioTech and Corporate Fellow of NABS presented NABS- Best Research Paper Award for 2013 to Dr. D. Prasath, Indian Institute of Spices Research, Calicut, Kerala.



Dr. K. Muthuchelian confers Prof. S. Kannaiyan Memorial Award on Dr. Kirti Singh
20 July, 2013

Dr. K. Muthuchelian, Vice-chancellor, Periyar University, selam, Tamil Nadu conferred Prof. S. Kannaiyan Memorial Award on Dr. Kirti Singh, Chairperson, World Noni Research Foundation and Former Chairman, Agricultural Scientists Recruitment Board (ICAR), New Delhi and Former Vice-Chancellor, NDUAT, Faizabad, HOKV, Palampur (HP), and IGKV, Raipur (Chhattisgarh).



Prof. Muthuchelian felicitated Dr. Kirti Singh for his contribution in the field of Agriculture and Horticulture and congratulated the organizers for having chosen the theme of National Seminar very relevant to today's need.

Dr. Kirti Singh, the recipient of Prof. S. Kannaiyan Memorial Award delivered 'Prof. S. Kannaiyan Memorial Oration, 'Noni (*Morinda citrifolia* L.)- A Treasure for Wellness'.



Dr. Kirti Singh delivers
'Prof. S. Kannaiyan Memorial Oration'



The inaugural function concluded with vote of thanks by Dr. G. Muralitharan, Assistant Professor, Department of Microbiology, BDU & Organizing Secretary of National Seminar.

B. Technical Sessions

Oral Presentations

The deliberations of National Seminar on Microbes and Human Welfare were made in four technical sessions *viz.*, Microbes in Agriculture and Forestry, Microbes in Human and Animal Health, Microbes in Biotechnological Innovations and Diversity and Conservation of Microbes. Each technical session was preceded by lead paper.

Technical Session I: Microbes in Agriculture and Forestry

The session was chaired by Dr. D. J. Bagyaraj, Chairman, Centre for Natural Biological Research and Community Development, Bangalore, Co-chaired by Dr. M. Anandaraj, Director, Indian Institute of Spices Research, Calicut, Kerala. Dr. Syed Jahangir, Coordinator, Department of Microbiology and Biotechnology, Jamal Mohamad College, Tiruchirappalli was the convener.





Dr. George Thomas presented a lead paper on '*Diversity, functional traits and application of PGPR in plantation crops*'. In all seven oral presentations were made out of ten listed.

Technical Sessions II: Microbes in Human and Animal Health

The session was chaired by Dr. Renu Agrawal, Chief Scientist, Central Food Technological Research Institute, Mysore, Karnataka, Dr. R. Thirumurugan, Associate Professor, Department of Animal Sciences, Bharathidasan University, Co-Chaired. Dr. M. Manickavasagam, Assistant Professor, Department of Biotechnology, Bharathidasan University was the convener.



Dr. P. Selvam presented a lead paper on '*HIV-integrase/Lense Epithelial Derived Growth Factor inhibitor (LEDGF)- As novel therapeutic agent for treatment of HIV/AIDS*'.



Dr. Renu Agrawal presented another lead paper on '*The role of probiotics in improving human health*'. In all three papers were presented out of five listed.

Technical Sessions III: Microbes in Biotechnological Innovations

This session was chaired by Dr. M. Vivekanandan, Emeritus Professor, Bharathidasan University and Co-chaired by Dr. P. Selvam, Nova College of Pharmaceutical Education & Research, Andhra Pradesh. Dr. R. Vijayakumar, Assistant Professor, Department of Microbiology, Bharathidasan University Constituent College, Perambalur was the convener.





Dr. P. Chowdappa, Indian Institute of Horticultural Research presented a lead paper on '*Biotechnological approaches for management of fungal diseases of crop plants*'. In all seven papers were presented out of ten listed.

Technical Sessions IV: Diversity and Conservation of Microbes

The technical session was chaired by Dr. M.V. Rao, Coordinator, School of Life Sciences, Co-chaired by Dr. D. Dhanasekaran, Department of Microbiology, Bharathidasan University. Dr. T. Senthilkumar, Assistant Professor, Bharathidasan University was the convener.



Dr. D.J. Bagyaraj presents a Lead Paper- kindled interaction

Dr. D. J. Bagyaraj, Chairman, Centre for Natural Biological Research and Community Development, Bangalore presented a lead paper on '*Mycorrhizal diversity and conservation of microorganisms*'.

In all three papers were presented out of five listed. Best Oral Presentations were awarded with a certificate and a memento.



A view of oral presentations



Students / Delegates interact

A view of oral presentations and delegates at National Seminar

Poster Presentations



Poster Presentations



Poster Presentations



Poster Presentations



Judges evaluate Poster Presentations

Poster Session was also organized.

Many students and young biologists participated.

In all seventeen posters were presented under four technical sessions.

Best Poster Presentations were awarded with a certificate and a memento.

C. Conferment of NABS Fellowship

NABS- Fellowships and Awards were presented during the 7th Annual Meeting. The function was presided over by Dr. V. A. Parthasarathy, President, NABS. Dr. D. J. Bagyaraj, Vice-President, Dr. T. Marimuthu, Secretary, Dr. T. L. Baskaran, Treasurer and Dr. M. Anandaraj, Editor-in-Chief were present.

Prof. T. Marimuthu, Secretary, NABS welcomed the fellows and delegates. Dr. V. A. Parthasarathy conferred the Fellowship and Associate Fellowship on elected members. Thirteen members were conferred with Fellows and one with Associate Fellow. President, NABS congratulated the elected Fellows and Associate Fellows.

Dr. V. A. Parthasarathy in his presidential remarks highlighted the significance and purpose of conferring Fellowship and requested all the members to actively participate in the activities of NABS. Dr. T. L. Baskaran, Treasurer proposed vote of thanks.



A view of Annual Meeting [L to R]
Secretary welcomes & call to order to receive the Fellowship, President offers his remarks,
President confers fellowship, Treasurer proposes Vote of Thanks,
NABS office bearers with Elected Fellows

Life Members who received Fellowship / Associate Fellowship *in person*
[Elected for 2012]

No.	Name of Fellows	No.	Name of Fellows
Fellows		Fellows	
1.	Dr. A. K. Singh Indian Agricultural Research Institute, New Delhi	7.	Dr. Pious Thomas Indian Institute of Horticultural Research, Bangalore, Karnataka
2.	Dr. P. Chowdappa Indian Institute of Horticultural Research, Bangalore, Karnataka	8.	Dr. G. Ganesh Kumar Indian Institute of Chemical Technology, Hyderabad, A.P.
3.	Dr. V. R. Kiresur College of Agriculture, Bijapur University of Agricultural Sciences Dharwad, Karnataka	9.	Dr. R. Prakashkumar Kerala State Council for Science Technology and Environment Kerala
4.	Dr. R.A. Balikai College of Agriculture, University of Agricultural Sciences, Dharwad Karnataka	10.	Dr. P. Selvam Raghavendra Institute of Pharmaceutical Education and Research, Anantapur, A.P.
5.	Dr. R. Basavarajappa College of Agriculture, University of Agricultural Sciences, Dharwad Karnataka	11.	Dr. C. Aswath Indian Institute of Horticultural Research (ICAR), Bangalore Karnataka
6.	Dr. A. R. Alagawadi University of Agricultural Sciences Dharwad, Karnataka		Associate Fellow
		12.	Dr. R. Sandeep Varma The Himalaya Drug Company Kakali, Bangalore, Karnataka

D. Plenary and Valedictory function

Prof. G. Subramanian, Founder Director, National Facility for Marine Cyanobacteria and Former Head, Department of Microbiology, Bharathidasan University was the Chief Guest for Plenary and Valedictory function held on the afternoon of 30 July, 2013. Dr. V. A. Parthasarathy, President, NABS presided. Dr. D. J. Bagyaraj, Vice-President, Dr. T. Marimuthu, Secretary and Dr. T. L. Baskaran, Treasurer, Dr. N. Thajuddin, Professor of Microbiology & Coordinator and Dr. G. Muralitharan, Organizing Secretary were present.

Dr. T. L. Baskaran welcomed the dignitaries on the dais and delegates. Dr. N. Thajuddin, presented the proceedings and recommendations of two day deliberations; Dr. G. Subramanian, Chief Guest delivered valedictory address and presented Best Oral and Poster Presentation Awards; Dr. G. Muralitharan proposed vote of thanks. The two day deliberation was concluded with National Anthem.



Plenary and Valedictory Function

Dr. T. L. Baskaran welcomes, Dr. N. Thajuddin presents summary of two day's proceedings, Dr. D. J. Bagyaraj speaks, Dr. V. A. Parthasarathy speaks,

Dr. G. Muralitharan proposes Vote of Thanks

[Centre]

Dr. G. Subramanian, Chief Guest delivers Valedictory Address



Dr. M. Subramanian announces best oral presentations,
 Dr. T. Marimuthu & Dr. R. Saravanamuthu greets,
 Group Photo with Chief Guest & Members of
 various committees

E. Conferment of Awards

During the National Seminar several awards were presented to recognize and motivate the talents among biologists. The details are listed below:

Recipient of Award

Details of Recipient

a. Prof. S. Kannaiyan Memorial Award-2013



Dr. Kirti Singh
Chairperson, World Noni Research Foundation, Chennai.
Former Chairman, ASRB (ICAR), New Delhi, Former Vice-Chancellor (NDUAT, HPKV, IGKV) Former Secretary, NAAS, New Delhi



b. NABS- Best Research Paper Award-2013



D. Prasath
Indian Institute of Spices Research, Calicut, Kerala for the paper "*Hybrid performance for yield components in cardamom (Elettaria cardamom)*"- *D. Prasth, M. N. Venugopal, R. Sethilkumar and N. K. Leela, published in Euphytica (2009) 168 (1): 49-60*".



c. Best Oral and Poster Presentation Awards

Best Oral Presentation Award

Technical Session I: Microbes in Agriculture and Forestry



B. Meena

Exploitation of biocontrol agents for the management of root rot of medicinal *Coleus*-

B. Meena, SA. Ramyabharathi and R. M. Vijayakumar

Technical Session II: Microbes in Human and Animal Health



S. Latha

Investigation of acid and bile tolerance of resident actinobacteria of chicken by growth and survival-

S. Latha, D. John Dickson Calvin and D. Dhanasekaran

Technical Session III: Microbes in Biotechnological Innovations



F. Lewis-Oscar

Outdoor semi-continuous cultivation of *Chlorella* sp. BUM 11008 for biodiesel production-

R. Praveenkumar, F. Lewis-Oscar and N. Thajuddin

Technical Session IV: Diversity and Conservation of Microbes



N. Reehana

Biodiversity of microalgae in the Puliyanthangal lake of Ranipet of Tamil Nadu, India-

N. Reehana, A. Suresh, A. Parveez Ahamed and N. Thajuddin

Best Poster Presentation Award

Technical Session I: Microbes in Agriculture and Forestry



SA. Ramyabharathi

Bacillus subtilis EPCO16: A potential microbial agent against *Fusarium* wilt of Tomato-

SA. Ramyabharathi, B. Meena and T. Raguchander



P. Priya Dharsini

Allelopathic properties of herbicidal compound from actinobacteria-

P. Priya Dharsini and D. Dhanasekaran

Technical Session II: Microbes in Human and Animal Health



K. Subha

Primary isolation of *Helicobacter pylori* from human saliva and its antibacterial activity of salt pan fungi-

K. Subha, K. Kanimozhi and A. Panneerselvam

Technical Session III: Microbes in Biotechnological Innovations



R. Vijaya Abinaya

Biosynthesis, characterization and evaluation of antimicrobial efficacy of silver nanoparticles using cyanobacterial extract-
R. Vijaya Abinaya, N. Prasanna Balaji, Sathish Kumar and G. Muralitharan

Technical Session IV: Diversity and Conservation of Microbes



S. Deepa

Biodiversity of actinobacteria isolated from mangroves of Vellappalam, Nagapattinam district of Tamil Nadu-
S. Deepa, K. Kanimozhi and A. PanneerSelvam

F. National Seminar covered by Press



National Seminar goes to press

G. Photo Gallery



13th EC Meeting of NABS

Clockwise:

Dr. D. J. Bagyaraj,
Dr. V. A. Parthasarathy,
Dr. T. Marimuthu,
Dr. M. Subramanian,
Dr. M. Chinnadurai,
Dr. M. Anandaraj,
Dr. C. Aswath,
Dr. N. Thajuddin,
Dr. S. Nakkeeran
T. L. Baskaran,
Dr. Renu Agrawal,
Dr. B. Meena



7th Annual Meeting

Elected Fellows and Associate
Fellow of NABS
with office bearers of NABS

L to R:

Dr. T. Marimuthu,
Dr. T. L. Baskaraan,
Dr. V. A. Parthasarathy,
Dr. D. J. Bagyaraj,
Dr. M. Anandaraj



7th Annual Meeting

All Fellows & Associate Fellows
who attended National Seminar
and Annual Meeting of NABS
with office bearers of NABS

L to R:

Dr. T. Marimuthu,
Dr. T. L. Baskaraan,
Dr. V. A. Parthasarathy,
Dr. D. J. Bagyaraj,
Dr. M. Anandaraj



National Seminar
NABSians
with various organizing
committee members



National Seminar
NABSians
with students of
Bharathidasan University



National Seminar
A view of delegates / Students

H. Expressing Gratitude

Inaugural Function



[Left to Right]

Dr. V. A. Parthasarathy, President of NABS and Dr. N. Thajuddin, Coordinator of NABS-National Seminar expresses the Love and Gratitude to the Guests, Dr. Kirti Singh, Dr. E. Ram Ganesh, Dr. K. Ramasamy, Prof. P. I. Peter, Dr. K. Muthuchelian, Dr. P. Gunasekaran, Dr. D. P. Ray and Dr. K.V. Peter by adorning a shawl and presenting a memento.

Valedictory Function



[Left to Right]

Dr. D. J. Bagyaraj, Vice-President, NABS, Dr. T. Mairmuthu, Secretary, NABS,
 Dr. M. Vivekanandan, Fellow of NABS expresses Love and Gratitude to
 Dr. G. Subramanian (Chief Guest), Dr. N. Thajuddin, Dr. G. Muralitharan,
 Dr. A. Panneerselvam, Dr. R. Saravanamuthu, Dr. M.V. Rao,
 Dr. Mohammed Ilyas, Dr. T. Senthilkumar and Dr. M.N. Abubacker
 by adorning a shawl and presenting a memento.

I. Lighter moments



J. Entertainment by Students



8. Recommendations

The National Seminar on Microbes and Human Welfare was held for two days and the following recommendations emanated from the two-day deliberations held in four technical sessions.

- Plant Growth Promoting Rhizobacteria (PGPR) to manage crop pests and diseases including nematodes which have specific ecological niche need to be identified, mass multiplied and appropriate delivery methods developed; Induced systemic resistance, RNA mediated gene silencing are to be exploited for management of virus diseases of crop plants.
- Biological routes to synthesize nanoparticles to be exploited in plant growth promotion and their role in antimicrobial activities should be pursued.
- To mitigate the ill effect of problem soils / soils deficient in nutrients suitable halophiles / micronutrient solubilizing bacteria should be developed.
- In area of micropropagation, microbial sources as hormones should be developed for large scale application.
- Herbal drugs are very promising to manage the viral diseases of human and animals, especially, *Morinda citrifolia*, the Indian Mulberry. The mechanism of viral control needs detailed investigation and suitable delivery methods are to be standardized.
- Specific probiotics are to be identified, developed as food supplement to mitigate diseases of man and animals.
- The potential of microbes for bioremediation of polluted soils, mined soils etc are to be exploited in detail.
- Studies on biodiesel production from microalgae should be strengthened.
- Production of nanoparticles using different metals is to be standardized for production of dyes to color textile products.
- Understanding the survival mechanisms of extremophiles (microbes surviving in extreme conditions) will throw more light on the functions of specific genes that could be exploited in health care industries.
- The actinobacteria from different sources, especially from marine environment should be studied to exploit their antimicrobial properties.
- Diversity of microbes from soil like- mycorrhizal fungi, halophiles, actinobacteria and microalgae should be studied, catalogued and conserved.
- A net work of microbiologists, to begin with in Southern parts of India, may be thought of on specific area, may be on 'Group of Bioconsortium'.

Science without Humane is a SIN

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