

Souvenir



National Conference on **Algal Technologies**

4th January 2016

Venue
Andhra University
Platinum Jubilee Guest
House, Andhra University,
Visakhapatnam,
Andhra Pradesh
India



NCAT-2016

Organized By

Department of Biotechnology
Andhra University, Visakhapatnam,
Andhra Pradesh

Sevas Educational Society
Komatipalli Post, Bobbili Mandal
Vizianagaram (Dt), Andhra Pradesh
India

Gugly Centre for Biological Research.
Bhubaneswar, Odisha

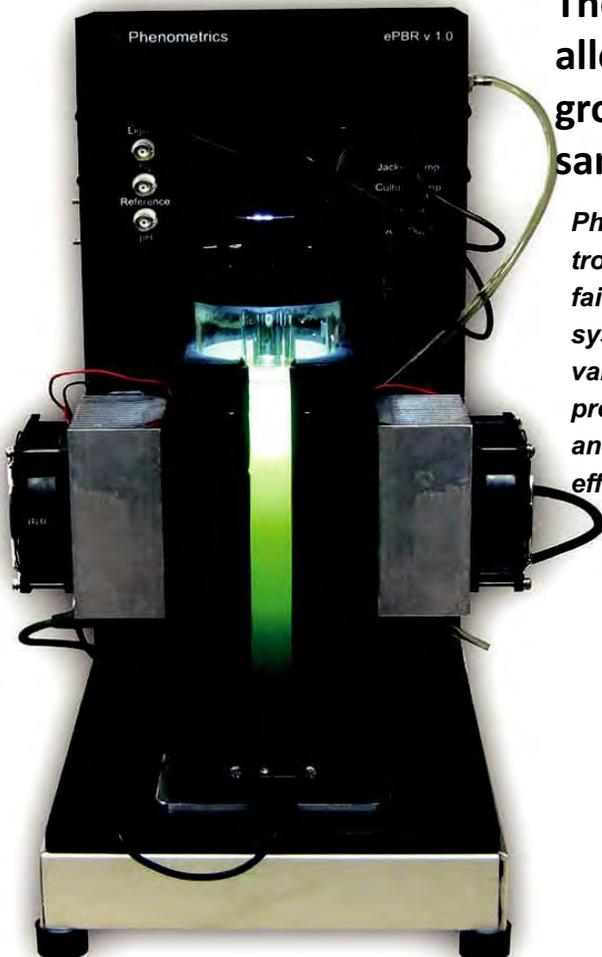
Phenometrics Photobioreactor:



Put a High-Power Matrix to Work for You.... and Open the Door to a World of New Possibilities

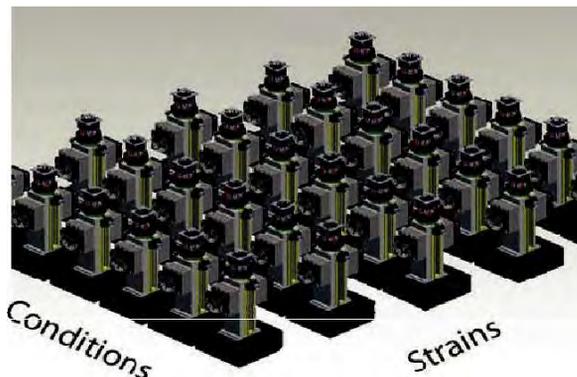
Specifications :

Culture Volume:	100—520 mL
Control Temperature:	5—40° C
Dimensions:	H-482mm, W-241mm, D-317.5mm, (H-19", W-9.5", D-12.5")
Weight:	7 kg (15lbs)
Power Consumption:	2.4A/1.2A
Voltage:	110-120V/220-240V 50/60 Hz
Heat output:	470 BTU/hr peak



The Phenometrics Photobioreactor ePBR allows you to control conditions and monitor growth in a matrix of up to 250 units—at the same time!

Photosynthetic microorganisms can now be cultured in a controlled and highly reproducible manner on the lab bench, while faithfully reproducing native environmental conditions, open-system, or closed-system scaled production conditions. A wide variety of applications include strain selection, yield and process optimization, directed evolution, compound expression, and many others. Achieving results faster and more cost-effectively is now possible.



NCAT-2016



National Conference on Algal Technologies

4th January 2016

Organized by



Department of Biotechnology
College of Science & Technology
Andhra University, Visakhapatnam
Andhra Pradesh, India
www.andhrauniversity.edu.in



Sevas Educational Society
Komatipalli Post, Bobbili Mandal,
Vizianagaram (Dt), Andhra
Pradesh, India
www.sevas.org.in



**Gugly Centre for Biological
Research**
Samapur, Khandagiri,
Bhubaneswar Odisha, India
www.gcbr.in



Contents

Committees.....	.....
Patrons.....	.....
Organizing Committee.....	.....
Scientific Advisory Committee.....	.....
Advisory Committee.....	.....
About Department of Biotechnology, Andhra University.....	.....
About Sevashiksha Educational Society.....	.....
About Gugly Centre for Biological Research.....	.....
About National Conference on Algal Technologies.....	.....
Programme Schedule.....	.....
Messages and Plenary Talks.....	.....
Abstracts.....	.....

NCAT-2016



Chief Patrons

Prof. G.S.N. Raju, Vice Chancellor, Andhra University, Visakhapatnam - 530 003, Andhra Pradesh, India,

Dr. Sailabala Padhi, Director, Centre for Environmental Studies, Forest & Environment Department, Govt. of Odisha

Ms. RNL Naidu, Hon Secretary, Sevas Educational Society

Mr. S. S. Jiban Dash, Chairman, Gugly Centre for Biological Research, Odisha, India

Patrons

Prof. E. A. Narayana, Rector, Andhra University

Prof. V. Uma Maheswara Rao, Registrar, Andhra University,

Prof. C.V.Raman, Principal, College of Science and Technology, Andhra University, Visakhapatnam

Sri. Appa Rao, Vice President, Sevas Educational Society

Mr. Rajeshkumar Kansagara CEO, Himani Shipping Services Pvt. Ltd. Surat, Gujarat.

Chairperson

Prof. B.V. Sandeep, Head of the Department, Department of Biotechnology, Andhra University

Organizing Secretary

Mr. R R Siva Kiran, Organizing Secretary, National Conference on Algal Technologies, Komatipalli Post, Bobbili Mandal, Vizianagaram (Dt), Andhra Pradesh, India.

Mob: + 91 9986795754; Email: [sevaseducationsociety@gmail.com](mailto:sevaseducationalsociety@gmail.com)

Joint Secretary

Dr. P. Sudhakara Rao, Department of Biotechnology, Andhra University, Visakhapatnam

Dr. P. Bindiya, College of Science and Technology, Andhra University, Visakhapatnam, Andhra Pradesh

Dr. M. Rajeswari, Department of Food, Nutrition and Dietetics, Andhra University

Mr. Santosh B, Advisory Member, Sevas Educational Society, Hyderabad, Andhra Pradesh



Scientific Committee Members

Dr Sue Ellen Levkoff, Professor and Endowed Chair, College of Social Work DeSaussure College- Room 133 University of South Carolina Columbia, South Carolina USA

Dr. Kishore R Iyer, Associate Professor of Surgery & Pediatrics, Director, Intestinal Transplantation & Rehab Program, Surgical Director, Pediatric Liver Transplant Program, Mount Sinai Medical Center, One Gustve Levy Place, Box 1104, New York 10029

Dr Sanjay Gupta, Carter Kissell Associate Professor & Research Director Department of Urology Case Western Reserve University 10900 Euclid Avenue Cleveland, Ohio-44106 USA

Dr Zaida Cordero-MacIntyre, Nutrition Dept. School of Public Health and Center for Health Care Disparities and Molecular Medicine School of Medicine Loma Linda University Loma Linda, CA 92350 USA

Dr Subhash C. Chauhan, Scientist/Associate Professor, Cancer Biology Research Center, Sanford Research/USD2301E 60th Street, NorthSioux Falls, SD 57104

Dr Vivek Hande. Senior Advisor - Gastroenterology, Department of Gastroenterology, INHS, Asuini, Mumbai

Dr. Alex Georgakilas. DNA Damage and Repair Laboratory, Biology Department, Howell Science Complex, East Carolina University Greenville NC 27858 USA.

Dr. Syed Hasnain Ali Shah, Professor and Gastroenterology Head, Department of Medicine, The Aga Khan University Hospital, Karachi. Pakistan

Advisory Members and Entrepreneurs

Dr. Kazuhisa OHTAGUCHI, 1973BS, Department of Chemical Engineering, Tokyo Institute of Technology, Japan

Dr. Alex Angerhofer, Dept. of Chemistry, University of Florida, Box 117200, Gainesville, FL 32611, USA

Sri. Koushik Chatterjee, Regional Officer, Kolkata Regional Centre, The Society for Clinical Nutrition and Metabolism.

Sri. A Kailash Reddy, Sevas Andhra Regional Centre, Maddur, Panyam, Kurnool, Andhra Pradesh

Sri. Santosh B, Sevas Telangana Regional Centre, Hyderabad, Telangalna

Sri. Ratnaraja Singam, Sevas Tamilnadu Regional Centre, 2/378, Nehru Street, Naththam , Navalur, Chennai

Sri. Prateen Rohatgi, Sevas Delhi Regional Centre, Mall apartments, Mall Road, Delhi, Pin: 110054,

Dr. Rajnish R Singla, Sevas Uttarakhand Regional Centre, B-11, Lane-3, Model Colony, Rudrapur, Uttarakhand.

Sri. Jyoti Ranjan Parhi, Sevas Odisha Regional Centre, Vikash Dhara, Jajpur, Odisha. Pin: 755045;

Sri. Asthma Naaz, Sevas Rajasthan Regional Centre, Suraj Colony, Jaipur Road, Bikaner, Rajasthan.

Sri. Jwalant Desai, Sevas Gujarat Regional Centre, Keshavbaug, Shreyas Tekra, Manekbaug, Ahmedabad, Gujarat.

Sri. Muzafar Gul, Sevas Jammu and Kashmir Regional Centre, Saraf Mohalla, Bijbehara, Anantnag, Kashmir,

Dr. Tripuresh Singh, Sevas Uttar Pradesh Regional Centre, Lucknow, Uttar Pradesh.

Sri. D. J. Baruah, Sevas Assam Regional Centre, Dr. B. Baruah Road, Ulubari Guwahati, Assam. Pin: 781007.

Sri. Mohammeduvais Pulisseri, Sevas Kerala Regional Centre, Malappuram, Kerala.

Sri. Koushik Chatterjee, Sevas West Bengal Regional Centre, Subhaas Palli Road, Bahir Sarbamongala Para, Burdwan,

Sri Bipin Mishra, Sevas Jharkhand Regional Centre, Kachkesar, Seetal Mallick Road, Bilasi Town, B. Deoghar, Jharkhand;

NCAT-2016



About Department of Biotechnology, Andhra University



The Department of Biotechnology of Andhra University College of Science & Technology was established in 1996. The department offers M.Sc. and Ph.D. courses in Biotechnology. All the basic infrastructural facilities needed for conducting teaching and research programmes in different areas of Biotechnology have been developed in the department. The department is housed in a newly constructed permanent building of 20,563 sft consisting of class rooms with audio visual facilities, well equipped student laboratories, research laboratories, special labs for molecular biology, genetic engineering, plant tissue culture and microbial technology. A separate instrumentation room consisting of sophisticated equipment, a reading room with 500 latest text books, a seminar hall with public address system, a conference hall and a systems biology lab with internet connection are also available. Prof. T.M. Radhakrishnan served as the founder coordinator.

So far 12 batches of students have completed their M.Sc. degree course and several of them qualified in CSIR/UGC national level eligibility tests and are working in several prestigious institutions and industries. Ph.D. programme has been initiated from 2002 and ten students obtained their Ph.D. degrees in Biotechnology. The areas of research specialization in the department include microbial technology, enzyme technology, plant biotechnology and bioprocess development. Biotechnology department has successfully organized 15 refresher courses and a training programme in Biotechnology and trained about 350 teachers from different affiliated colleges and university departments. Biotechnology Department have MOU with University of Pisa, Italy. Under IRSES, European commission.



Research Activities:

Thrust areas of Research include Algal Technologies, Enzyme Technology, Bioactive compounds from Medicinal Plants and Marine Bacteria, Bioprocess Development, Plant Biotechnology, Plant Physiology and Crop Biotechnology. Several Research Papers have been published in National and International Journals from the Department of Biotechnology. Faculty members and Research scholars actively participated in various National and International Conferences/ Symposia and Presented Research papers.

Supporting Organizations



www.labquipasia.com

Contact : Mr. Sunil Pandey

E-mail : sunil@labquipasia.com

Mob : +91-9967647288

About Sevas Educational Society



Sevas Educational Society is established for developing villages and making them self sufficient. The society aspires to create an ideal village with the help of modern technology.

Our aim is to create interactive atmosphere among researchers, organizations, faculties, students, employees, merchants and farmers to develop villages.

Gandhi's Concept of Ideal Village

"India does not need to be industrialized in the modern sense of the term. It has 7,50,000 villages scattered over the vast area 1900 miles long 1500 broad. The people are rooted to the soil and the vast majority is living a hand to mouth life."

Reference: Gandhiji wrote to Sir Danial Hamilton in a letter on 15-2-1922 from Bardoli

Sevas Educational Society encourages advanced technologies but mainly concentrates on employment generations. We strongly believe that Gandhi's concept of Ideal village or Gram Swaraj can be achieved by establishing more small scale industries/small scale services with advanced technologies.

With this aim, Sevas Educational Society, promoted many small scale *Spirulina* industries throughout India with the help of OfERR organization since 2006.

Many entrepreneurs joined in Sevas society will be participating in the event and interacting with the faculty, academia and students, researchers etc..

This conference is a platform for academicians, students, faculty, entrepreneurs, corporate houses, multilateral and bilateral partners from all

over the world to come, learn, share, network and learn from progress and become better in what they do.

About Gugly Centre for Biological Research

The Gugly Centre for Biological Research (GCBR) is a premier and leading Autonomous Organization in Biological Sciences in the country. The organization was established in 2008 with a view to finding single window with turn-key solutions to problems of basic and applied aspects. The Gugly Centre for Biological Research (GCBR) is determined to promote scientific temper through innovative technologies and empower scientific communities to benefit the society.

A team of scholars endowed with appropriate expertise work in multi-facet faculties like Basic and Applied Biological Sciences such as Animal Sciences, Aquaculture Sciences, Plant Sciences, Environmental Sciences and Agricultural Sciences. An in-house empanelled team of Advisors with adequate research credibility render counseling while for specific focus areas, service of experts is hired to expedite the mission mode activities. The Gugly Centre for Biological Research envisages to undertake specific projects and programs for human welfare and to enhance scientific social developmental activities in our country

Our Mission

To ensure research par excellence in developing sustainable and meaningful Basic and Applied Biological research and related societal issues pertinent to Environment. GCBR endeavors to promote and enrich a center of excellence in which scientific research, education and outreach public domains are joined to strengthen and improve our understanding of environmental science and prioritize adoptable mitigation options to prevent deterioration of ambience through individual and collaborative research

NCAT-2016



About National Conference on Algal Technologies

The First National Conference on Algal Technologies and Entrepreneurs meet is hosted and organized by the Department of Biotechnology, Andhra University, Sevas Educational Society and Gugly Centre for Biological Research, Bhubaneswar, Odisha. This conference is a platform for academicians, entrepreneurs, corporate houses, multilateral and bilateral partners from all over the world to come, learn, share, network and learn from progress and become better in what they do. Gugly Centre for Biological Research, Bhubaneswar.



Sevas Educational Society invites expert faculty members, scientists, consultants to present technological advances in *Spirulina* and other algal industries.

The conference will present content in a wide array of teaching styles such as didactic lectures, extensive question and answer and group discussion sessions, group workshops, and ample networking opportunities. Through this variety of teaching/learning styles, the faculty will enhance the knowledge of algal technologies. A nationally renowned faculty will provide the latest and most relevant approaches to algal technologies.

The National Conference on Algal Technologies will provide an up to-date, informative insight into core areas of algal nutrition supplements, biofuels and other advanced technologies. This National Conference will help researchers, industries, nutritionists, students, scholars and faculty to independently excel and advance in this very specialized field of algal technologies.

Advancing Algal Technologies - Challenges and Solutions

NCAT-2016



Program Schedule 4th January 2016

- 09:00 am - 09:30 am : Registration
- 09:30 am - 09:45 am : Welcome Address
- 09:45 am - 10:10 am : Inauguration - Lighting of Lamp
Presidential Address
- 10:10 am - 10:45 am : Key Note Address by
Dr. V. Sivasubramanian, Director
Phycospectrum Environmental Research Centre
Chennai, Tamilnadu
- 10:45 am - 11:00 am : Tea Break
- 11:00 am - 11:30 am : Session 1: Effect of Seaweed extracts and CO₂ concentration on growth and biochemical composition of *Spirulina platensis* in culture media
Prof.(Mrs.) Sailabala Padhi, Director,
Centre for Environmental Studies Forest & Environment
Department, Govt.of Odisha
- 11:30 am - 12:00 pm : Session II: *Spirulina* and its advanced applications in India
Dr. S. Nagaraj
Centre for Advanced Studies in Botany
University of Madras, Guindy Campus, Chennai - 600 025
- 12:00 pm - 12:20 pm : Session III: Effect of fresh extracts and seaweed liquid fertilizers on some cereals
Prof. Dr. S. Rajkumar Immanuel
Department of Botany, The American College Madurai
- 12:20 pm - 12:40 pm : Session IV: Applications of *Spirulina* in Aqua Culture
Mr. S. S. Jiban Dash, Chairman
Gugly Centre for Biological Research, Odisha, India
- 12.40 pm - 01:30 pm : Session V: Paper Presentations
- 01.30 pm - 02:00 pm : Lunch
- 02:00 pm – 03:00 pm : Workshop on Advanced Nutraceuticals, Functional Foods and Dietary Supplements from Algae and Cyanobacteria
- 03.00 pm - 04.30 pm : Session VI: Paper and poster presentations
- 04.30 pm - 05:00 pm : Valedictory and Certificate Distribution

NCAT-2016



Messages & Plenary Talks

NCAT-2016



Message

From Prof. G.S.N. Raju, Vice Chancellor, Andhra University

Dear Staff and Students,

I am happy to know that Department of Biotechnology, College of Science and Technology, Andhra University, Sevas Educational Society and Gugly Centre for Biological Research are organizing a National Conference on Algal Technologies to be held on 4th January 2016 at Andhra University Platinum Jubilee Guest House, Andhra University.



Algae have attracted a considerable interest globally as a potential feedstock for a bio-based economy. The industrial and research communities in the India have much to offer in this space. Our successive governments have taken many noteworthy steps to promote algal research in India, yet our achievements in this direction are far from satisfactory. Hence I feel that this conference has been rightly planned at an appropriate time. I am happy that professionals from different sectors are sharing the platform to discuss and deliberate on the advances in algal technologies and such efforts should culminate in deriving at a multipronged strategy to develop a framework for bringing various advanced algal technologies to farm level in India. I wish the conference every success.

With best wishes,

Prof. G.S.N. Raju

B.E (ECE), M.E., Ph.D (IIT-KGP), FIE, FIETE,
MIEEE (USA), FSEMCE, LMISTE, FDAAD (Germany)

Vice Chancellor, Andhra University

Visakhapatnam - 530 003

Andhra Pradesh, India

Phone: 91-891-2844222, 2844333,
2755547 (O)

Fax : 91-891-2525611

E-Mail: vicechancellor@andhrauniversity.edu.in

NCAT-2016



Message

From Prof. E. A. Narayana, Rector, Andhra University

Dear Staff and Students,

I am profoundly happy to learn that Department of Biotechnology, College of Science and Technology, Andhra University, Sevas Educational Society and Gugly Centre for Biological Research are organizing a National Conference on Algal Technologies to be held on 4th January 2016 at Andhra University Platinum Jubilee Guest House, Andhra University. Extensive development of various applications using macroalgae will also help in changing the socioeconomical demograph of agriculture sector in India. Policy



makers and professionals from botany and allied sectors should come together to solve this issue and this conference provides an excellent opportunity for that. I hope that this conference would provide valuable, useful and informative ideas to the participant students, researchers and other experts. I convey my best wishes for the success of the event.

Prof. E. A. Narayana

Rector, Andhra University

Rector

Andhra University

Visakhapatnam - 530 003

Andhra Pradesh, India.

Email : narayanaea@gmail.com

Phone: 91-891-2844411, 2844422, 2704100 (O)

Fax : 91-891-2704100

E-Mail: vicechancellor@andhrauniversity.edu.in

NCAT-2016



Message

From Prof. Velagapudi Uma Maheswara Rao, Registrar, Andhra University

Dear Staff and Students,

I am pleased to know that Department of Biotechnology, College of Science and Technology, Andhra University, Sevas Educational Society and Gugly Centre for Biological Research are organizing a National Conference on Algal Technologies to be held on 4th January 2016 at Andhra University Platinum Jubilee Guest House, Andhra University.



Algal Technologies have tremendous applications in nutraceuticals, water treatment and biofuel. I strongly believe that professionals from various disciplines including, botany, biotechnology, chemical engineering and agriculture should collaborate and help promote advanced algal technologies in India. This conference will provide a platform for interdisciplinary interactions among researchers, scientists and industries.

I wish to convey my felicitations to organizers and to all the participating delegates and wish the National Conference all success.

Prof. Velagapudi Uma Maheswara Rao

Registrar

Andhra University

Visakhapatnam - 530 003

Andhra Pradesh, India.

E-mail: auregistrarvsp@gmail.com

registrar@andhrauniversity.edu.in

Phone: +91-891 - 2844555 (O)

Fax: 91-891 - 2755324

NCAT-2016



Message

From Prof. C.V. Raman, Principal, College of Science and Technology, Andhra University
Dear Staff and Students,

I am pleased to learn about the organization of National Conference on “Algal Technologies” at Andhra University by the Department of Biotechnology under the guidance of Prof. B.V. Sandeep. I believe that the Department of Biotechnology is one of the productive departments of Andhra University and many students are fascinated to join the Biotechnology course at Andhra University. The students of Biotechnology are very good in their academic aspects and they will be highly useful to the growth of the society.



The National Conference on Algal Technologies would focus on the frontiers of knowledge update mechanisms. The conference should motivate the young students in the field of Biotechnology to think in a creative manner and motivate them to learn more and more information so that young students are enriched with knowledge. Acquiring knowledge through the interaction of eminent personalities at the conference would be beneficial for the research scholars and students.

I am optimistic that the conference would be highly successful and I believe that Biotechnology Department has all the strength to organize many more events in future. I wish the organizers good luck in all their efforts for the organizing this conference.

Prof. C.V.Raman

Principal

College of Science and Technology

Andhra University

Visakhapatnam - 530 003

Andhra Pradesh, INDIA.

Email : principal_science@andhrauniversity.edu.in

Fax : 91-891-2550158 & 2755547

Office: 91-891-2844888, 2754615

NCAT-2016



Message

From Prof. B. V. Sandeep, Chairperson, National Conference on Algal Technologies
Dear Staff and Students,

It gives me immense pleasure to be associated with Sevas Educational Society, Andhra Pradesh and Gugly Center for Biological research -Bhubaneswar in organising a " National Conference on Algal Technologies (NCAT-2016) on 4th January-2016. The theme of the conference is most appropriate and has contemporary relevance for the sustainable development of aquaculture in India.



India is known for its rich shrimp culture practice and is ranked the best among many countries in south east Asia. India ranked 2nd in the Aqua exports in the world and algal culture is the need of the hour. The aquaculture activity has established as one of the major industry in Andhra Pradesh and has high potential for employment and trade.

Though Andhra Pradesh in India has achieved a top position due to its successful entrepreneurship by farmers, the practicalities and possibilities are hindered due to lack of know how transfer. The commitment and the relentless effort by our Honourable Chief Minister Sri. Nara Chandrababu Naidu garu in involving scientific communities are trying to strengthen the industry for better prospects. The Government and the Scientific community are always trying to integrate and interact to sustain and develop the Industry. The focus demands for excellent ancillary units for the growth for the industry.

The Department of Biotechnology, Andhra University, has made significant contributions to the aquaculture industry in research and extension since its inception. I as Head of the department congratulate all the members who worked hard to make this conference possible by their relentless hard work and commitment .

I wish the conference all success.

Prof. B. V. Sandeep

Head, Department of Biotechnology
College of Science and Technology
Andhra University, Visakhapatnam
Phone: 0891-2844543(O)
0891-2844544(Head)
Mobile No:91+9440592344
Email:bvsandeep@yahoo.co.in

NCAT-2016



Message

From Prof. (Dr.) Sailabala Padhi, D.Sc., Director Centre for Environmental Studies (C.E.S.)

Dear Staff and Students,

The recognition of potential of algal bio-resources at National level Conference and the effort of Sevas Educational Society organization poised to host National conference on Algal technology at Visakhapatnam deserves a rightful place in a map of algal-rich zones. The conference is also expected to address the urgent need for training human resources, capacity building, measures for algal bio-resource utilization in addition to providing a unique platform for meaningful deliberation and interaction among the scientists, young researchers, NGOS and rural poors.



Mankind today is facing new challenges for a sustainable future and I firmly believe that with the collective sincere and wisdom of the practicing scientists, scholars and public with Seva organization would definitely overcome the challenges.

Prof. (Dr.) SAILABALA PADHI, D.Sc.

Director Centre for Environmental Studies (C.E.S.)

Dept. of Forest & Environment, Govt. of Odisha

Message

From Mr. S. S. Jiban Dash, Chairperson, National Conference on Algal Technologies
Dear Staff and Students,

Algae have attracted considerable interest globally as an emerging area with tremendous potential to address potential feedstock for a bio-based economy. Algae have multiple uses across different fields. It is being used in the bioremediation of waste water. Its use as nutraceuticals, cosmetic products, pharmaceuticals and vaccines is also increasingly being explored and used. Algae has also great potential to be used as food and feed for livestock, poultry and aquaculture. research is also being done for its use in high value chemicals, bioenergy and biofuels. Moreover, there is a great scope of it being integrated with value chain and in the carbon capture to address the issues related to climate change. Microalgae is being used to derive nutraceuticals like omega 3 fatty acid DHA and EPA, and has been used as an expression platform for pharmaceutical terpenoids. Macroalgae is used as premium sea vegetable and condiments in many places. Algal biomass holds the promise to be used as animal feed. The promise of algae is immense and this emerging field also hold great potential for entrepreneurship which will lead to improved livelihood of small scale farmers growing algae.



I am happy that the National Conference on Algal Technologies is being organized by Sevas Educational Society, Andhra Pradesh, in collaboration with Department of Biotechnology, Andhra University and Gugly Centre for Biological Research, Odisha. This conference is to provide a platform to the researchers, entrepreneurs, and all stakeholders to deliberate upon the various issues related to widespread use of algal technologies for the giving nutritional security to the Nation. Algae have attracted considerable interest globally as an emerging area with tremendous potential to address potential feedstock for a bio-based economy.

Mr. S. S. Jiban Dash

Chairman (Bio-Researcher)
Gugly Centre for Biological Research,
Samapur, Khandagiri, Bhubaneswar, Odisha,
India - 751020
Phone: 0674-6574493; Mobile: 09853091200
Email: guglycbr@gmail.com
Website: <http://www.gcbr.in>

NCAT-2016



Message

From Mr. R R Siva Kiran, Organizing Secretary, National Conference on Algal Technologies
Dear Staff and Students,

In recent years, the price of fossil fuels has risen sharply due to increased demand in developing countries and political instability in those fuel-producing countries. In addition, it is estimated that the supply of fossil fuels can only last in a recent several decades, making it essential that we will have to obtain new forms of renewable energies to replace fossil fuels in order to sustain human life. It is thought that one of the causes of global warming or extraordinary weather in recent years has been the increase in the amount of carbon dioxide (CO₂) in the atmosphere, due to the result of mass consumption of the fossil fuels. Various renewable energy sources are currently being developed and considered. These include hydraulic, wind, solar, solar thermal, wave, tidal, geothermal, and biomass energy. Biomass is the only energy source among these that is able to supply liquid fuel; the other energy sources are limited to supplying electricity.



Algae biomass is a general term used to describe organic matter that is produced by photosynthetic organisms such as algae: organisms that absorb CO₂ during the process of photosynthesis by sunlight energy. Algal Biomass is therefore described as a carbon neutral energy source: its use does not increase the concentration of CO₂ in the atmosphere. Algae biomass has many applications in development of nutraceutical, wastewater treatment and bioremediation.

The present activity focus on various advanced technologies for development of algal fuels, biofertilizers, bioremediation and nutraceuticals. In this context it is appropriate that this National Conference on Algal TEchnologies is being organized by the Department of Biotechnology, College of Science and Technology, Andhra University, Sevas Educational Society and Gugly Centre for Biological Research are organizing a National Conference on Algal Technologies to be held on 4th January 2016. In capacity of the Organizing Secretary, I wish to extend my heartfelt gratitude to all who have made the conduct of this conference a reality.

With Best Wishes

Mr. R R Siva Kiran

Director

Sevas Educational Society

Komatipalli Post, Bobbili Mandal, Vizianagaram (Dt), Andhra Pradesh, India

Mob: 9986795754; email: sevaseducationalssociety@gmail.com

NCAT-2016



Organizing Committee



Dr. Pola Sudhakar
Joint Organizing Secretary
NCAT-2016

Assistant Professor (c)
Department Of Biotechnology
College Of Science & Technology
Andhra University, Visakhapatnam - 530 003
E-mail: sudhakarpol@gmail.com
Phone: (O) 0891 – 2844543, (R) 0891 - 2754252



Dr. P. Bindiya
Joint Organizing Secretary
NCAT-2016

Assistant Professor (c)
Department Of Biotechnology
College Of Science & Technology
Andhra University, Visakhapatnam - 530 003
E-mail : bindiyavsp@yahoo.co.in
Phone : 0891 – 2561676, (Cell) 99661 76065



Dr. M. Rajeswari
Joint Organizing Secretary
NCAT-2016

Assistant Professor (c)
Department of Foods, Nutrition & Dietetics
Andhra University,
Visakhapatnam - 530 003



Mr. Santosh B
Joint Organizing Secretary
NCAT-2016

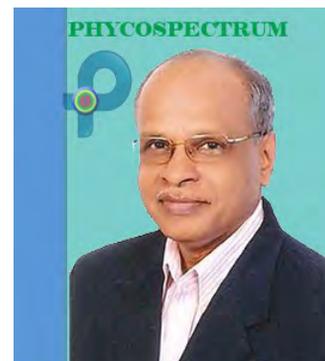
Advisory Member
Sevas Educational Society
Telangana Regional Centre
Hyderabad, India
Email: santoshbrungi@gmail.com

Key Note Address

From Dr V Sivasubramanian, Director, Phycospectrum Environmental Research Centre

Algal Biomass Production – Challenges

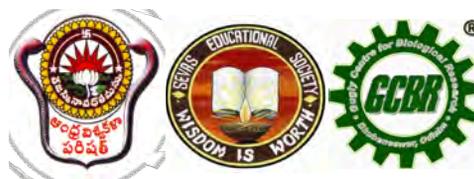
Algal biomass has become an important feedstock for the production of a variety of valuable compounds for human welfare. Nutraceuticals, pharmaceuticals, pigments, food colours, cosmetics and bio-fuels are some of the important applications of algal biomass. Seaweed cultivation for phycocolloids like agar, algininate, agarose and carrageenan are well known. CSMCRI, Bhavnagar has been involved in developing indigenous technologies for cultivation, harvesting and production of these phycocolloids and fertilizers from seaweeds and transferring the technologies to industries. Cultivation systems for seaweeds are well established and out of thousand and odd seaweed species in India only a few species are cultivated and there is a need to develop cultivation technologies for rest of the seaweeds.



With regards to micro algae production there are challenges and issues which should be addressed at every phase of technology development. Right from species collection, identification, isolation, cultivation in lab scale and at industrial scale we have several issues and bottlenecks which Indian scientists are trying to address to make the process commercially viable. The cost of algal biomass production is the major factor which determines viability. Nutrients costs constitute 30% of production cost apart from harvesting and processing costs. One of the suggestions provided by PERC, Chennai, which has been working on micro algae technology to treat industrial wastes for the last 15 years, is to integrate algal biomass production with wastewater treatment to cut down 30% cost. Production systems include photobioreactors, raceway ponds and hybridized systems. PERC recommends a vertical system which it has implemented with great success in industries in India and abroad which addresses the problem of CAPEX and OPEX, space restriction and many other drawbacks we find in other systems. Productivity issue could be addressed by improvement of algal strains through selection, metabolic and genetic manipulations, optimized designs of tanks, PBRs etc, growth engineering which involves nutrient input management and harvesting schedule and pond management practices.

V. Sivasubramanian

Phycospectrum Environmental Research Centre (PERC),
52A, AK Block, 7th Main Road,
Anna Nagar, Chennai 600040, India



Plenary Talk

From Dr. Sailabala Padhi, Director, Centre for Environmental Studies, Odisha

Effect of Seaweed extracts and CO₂ concentration on growth and biochemical composition of *Spirulina platensis* in culture media

Rajesh Mohanta¹ Chita Ranjan Sahoo² Sailabala Padhi³

¹Centre For Environmental Studies, Forest and Environment Department, Government of Odisha, rajeshmohanta09@gmail.com.

²Regional Plant Resource Centre , Forest and Environment Department, Government of Odisha, chitaranjan.biotech@gmail.com.

³Centre For Environmental Studies, Forest and Environment Department, Government of Odisha, sailabalapadhi@gmail.com.

Abstract

Growth, biomass and biochemical composition of the protein rich blue green alga *Spirulina platensis* was regulated by the addition of seaweed extracts in the culture medium. Water soluble extracts of four red algae *Grateloupia filicina*, *Ceramium elegans*, *Polysiphonia sertularioides* & *Gracilaria verrucosa* of Chilika lake showed growth activation in culture medium with various CO₂ concentrations (0.036%, 6%, 8%, 10%, and 12% CO₂) on biomass and specific growth rate. The chemical constituents were analysed in terms of total protein and its amino acid, total lipid, fatty acid profile, phycocyanin and β -carotene. None of the seaweeds showed growth inhibition. From results of growth activation of extracts on *Spirulina platensis* the water extracts of *Grateloupia filicina* was the most effective. Maximum biomass was obtained with 6% CO₂ and addition of 1 mg l⁻¹ red seaweed extracts of *Grateloupia filicina*. Two-fold increase in cell density was evidenced with the addition of 1 mg L⁻¹ of extracts to the medium. The results suggest the importance of seaweed extracts for large scale cultivation of *Spirulina platensis* in improved culture medium.

Plenary Talk

From Dr. Nagaraj, Centre for Advanced Studies in Botany

CULTURE AND CULTIVATION OF SPIRULINA (BLUE GREEN ALGA)

S. Nagaraj

Centre for Advanced Studies in Botany
University of Madras, Guindy Campus
Chennai – 600025, Tamil Nadu
Email: nagalilly@gmail.com

Progress has been made in the past decade in developing appropriate technology for microalgal mass cultivation. The basic requirements are essential in order to achieve high productivity and low cost of production. There is a need for a wide variety of algal species and strains that will favorably respond to the varying environmental conditions existing outdoors. Most of them concern mainly mass culture in open air conditions, problems and remedies and the essential biochemicals which make it so much valuable as a nutritive supplement.

At present, Spirulina is commercially cultivated in several countries, with a total annual production of a few hundred tonnes. Spirulina products in the form of pills and spray-dried powder are produced in India, Mexico, Taiwan, USA, Thailand, Japan and Israel for the health food and pharmaceutical market. Little amounts of Spirulina are extracted for the production of phycocyanin, known commercially as 'lima blue', used as a blue colorant for food and cosmetics.

For the scale-up process, cultures are grown in large carboys or plastic basins, which are kept in partially open conditions in diffuse light for initial adaptation with manual stirring and/or aeration, with or without CO₂ supply, before shifting to open air ponds. In laboratory cultures, optimal light for growth is far less than in open air cultures and ranges from 50 – 100 $\mu\text{mol photons m}^{-2} \text{s}^{-1}$ (2500 – 5000 lux). Temperature also is maintained from 20 – 25°C. In a majority of cases cultures are maintained in batch mode so that other nutrients do not become limiting if cultures are kept bubbled with air either with or without CO₂ enrichment. The future of this industry is greatly dependent on developments that should result in increased yields with a corresponding decrease in cost of production. To achieve this end, the limiting factors of growth and of net output in large-scale mass cultures must be better understood.

To a great extent has been made in the past three decades in developing the biotechnology for algal mass culture. Improvements have been mainly in the management of outdoor cultures. There is a need to identify, understand, popularize and develop algal biotechnological processes leading to establishment of algal based industries and algal entrepreneurship.



Plenary Talk

From S. Rajkumar Immanuel, The American College, Tamil Nadu

Effect of fresh extracts and seaweed liquid fertilizers on some cereals

S.Rajkumar Immanuel
Centre for research and P.G. studies, Department of Botany,
The American college, Madurai-625020, India.

ABSTRACT

Seaweeds are marine macro algae which form an important component of the marine living resources of the world. Seaweeds contains considerable amount of micronutrients and some plant growth hormones which helps plant growth and also in germination. Seaweeds represent an alternative to the conventional chemical fertilizers. The seaweeds *Ulva reticulata* and *Sargassum duplicatum* were selected from Pudumadam coastal region of Gulf of Mannar. Fresh extracts and seaweed liquid fertilizers (SLF) were prepared from the above two algae and their effects on the germination of maize (G-5) and cholam (CSH-9) seeds were studied. SLF was found to be more effective than fresh extracts to induce germination in all the seeds.

Keywords: Seaweed extract, seaweed liquid fertilizer, germination.

Plenary Talk

From S S Jiban Dash, Gugly Centre for Biological Research

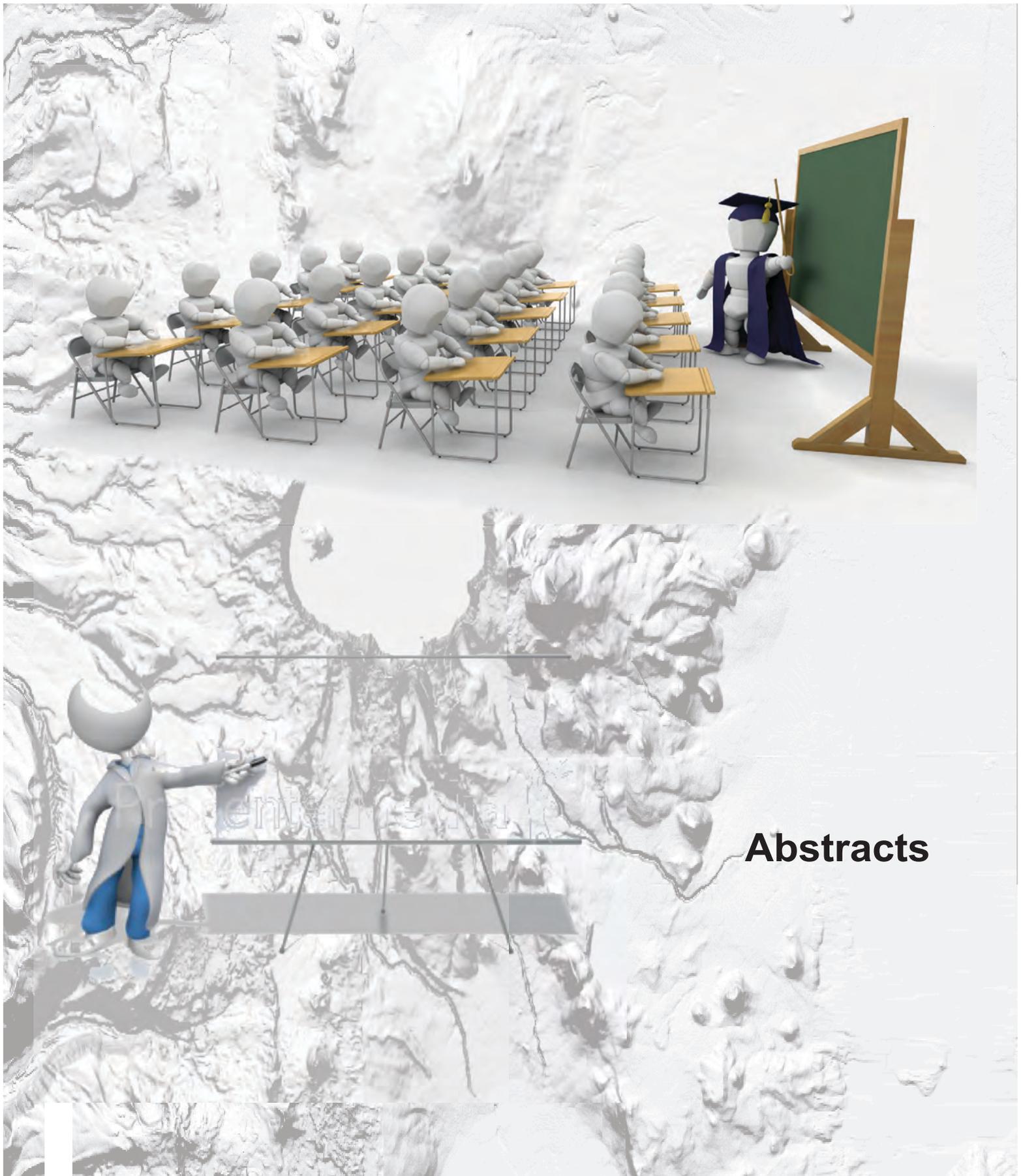
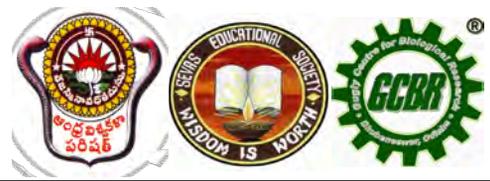
Applications of Algae in Aqua Culture

Mr. S. S. Jiban Dash
Gugly Centre for Biological Research
Samapur, Khandagiri, Bhubaneswar Odisha, India
Phone: 0674-6574493; Mobile: 09853091200

ABSTRACT

Algae have attracted considerable interest globally as an emerging area with tremendous potential to address potential feedstock for a bio-based economy. Algae have multiple uses across different fields. Its use as nutraceuticals, cosmetic products, pharmaceuticals and vaccines is also increasingly being explored and used. Algae has also great potential to be used as food and feed for livestock, poultry and aquaculture. Microalgae is being used to derive nutraceuticals like omega 3 fatty acid DHA and EPA, and has been used as an expression platform for pharmaceutical terpenoids. *Spirulina* can be used as feed for aqua culture. Macroalgae is used as premium sea vegetable and condiments in many places. The promise of algae is immense and this emerging field also hold great potential for entrepreneurship which will lead to improved livelihood of small scale farmers growing algae.

NCAT-2016



Abstracts



Pharmaceutical applications of bioactive compounds of the marine microalgae

M. Kiran Kumar, Pola Sudhakar and B.V.Sandeep

Department of Biotechnology, Andhra University, Visakhapatnam, Andhra Pradesh, India.
kiranbiotech65@gmail.com; Tel.: 0091-9494158641.

ABSTRACT

Marine organisms are potentially prolific sources of highly bioactive secondary metabolites that might represent useful leads in the development of new pharmaceutical agents. Microalgae are microscopic photosynthetic autotrophs and are the major producers of both marine and freshwater environments. The microalgae phyla have been recognized to provide chemical and pharmacological novelty and diversity. Moreover, microalgae are considered as the actual producers of some bioactive compounds found in marine resources. Microalgae have been explored for their bioactive compounds with promising applications encompassing antibacterial, antiviral, antifungal and antialgal activities. Microalgae synthesize bioactive molecules such as pigments and lipids that exhibit health properties. In addition, abiotic stresses, such as high irradiance, nutrient starvation, UV irradiation, trigger metabolic reorientations ending with the production of other bioactive compounds such as ω -3 fatty acids or Carotenoids. Microalgae used as food and Therapeutic supplements such as β -carotene, astaxanthin, polyunsaturated fatty acid (PUFA) such as DHA and EPA and polysaccharides such as β -glucan dominate. The dominating species of microalgae in commercial production includes *Isochrysis*, *Chaetoceros*, *Chlorella*, *Arthrospira* (*Spirulina*) and *Dunaliella*. Microalgae also useful for bioremediation of agro-industrial wastewater, and as a biological tool for assessment and monitoring of environmental toxicants such as heavy metals, pesticides and pharmaceuticals. In recent years, microalgae have attracted much interest due to their potential use as feedstock for biodiesel production.

Marine algae as a potential source of bioactive compounds for the treatment of septic arthritis

Angela E. Peter, G. Swarajya Lakshmi, P. Bindiya, B. V. Sandeep and Pola Sudhakar
Department of Biotechnology, College of Science and Technology, Andhra University,
Visakhapatnam

ABSTRACT

Septic arthritis is a condition wherein one or more joint in the body is affected with a microbial infection. This microbial infection causes inflammation of joint, severe pain, redness around the joint area, fever and makes movement immensely difficult. Septic arthritis can be very painful and affect the quality of life of the affected individual. For treatment, broad spectrum antibiotics are administered at first. So, currently, there is accelerated research to identify new potentially active biomolecules for the treatment of those infections caused by multiple-drug resistant microorganisms. Marine algae are a rich store house of various phytochemicals. These phytochemicals have excellent antioxidant activity, antimicrobial activity, anti-inflammation activity, anti-cancer activity etc. Sometimes, they show higher therapeutic activity than terrestrial plants! The coast of Visakhapatnam has several different types of algae. Ulvaceae, Chlorophyceae, Caulerphyceae, Rhodophyceae, Gelidicaeae, Hypneaceae etc. are the different families of algae found near the coast of Visakhapatnam. The present study deals with selection and screening of marine algae for their antimicrobial, antioxidant and anti-inflammatory activities and isolation of active phytoconstituents.

Isolation, screening and optimisation of L-glutaminase from marine seaweeds

S. Sridevi, B.V. Sandeep, P. Bindiya and Pola Sudhakar
Department of Biotechnology, Andhra University, Visakhapatnam.

ABSTRACT

L-glutaminase (L-glutamine amidohydrolase E.C 3.5.1.2) is a hydrolytic enzyme, that deaminates L- glutamine to L-glutamic acid and ammonia. The action of L-glutaminase plays an important role in the nitrogen metabolism of both Prokaryotes and Eukaryotes. Seaweeds are marine microalgae forming an integral part of marine coastal ecosystems. Fungi both parasitic and saprobes have been reported from marine algae (living on the tissue, as epiphytes). The marine-derived endophytic fungi of many species of algae (red, green and brown) have yielded bioactive metabolites of novel chemical structures, with an array of bioactive properties, such as, antimicrobial, antifungal and insecticidal, as well as cytotoxic effects on tumor cells. Some of the algal species such as *Codium sp.*, *Halimedagracilis*, *Halimedamacroloba*, *Caulerparacemosa*, *Gelidiellaacerosa*, *Gracilariacorticata*, *Gracilariaedulis* and *Gracilariacrassa*, *Ulvafasciata* and *Chaetomorphaantennina* are used in the production of L-Glutaminase. For qualitative assay of L-Glutaminase Czapeck'sDox Medium was used by plate method. Positive plates are identified by appearance of pink colour around the plate. The production of L-Glutaminase is carried out industrially by using Submerged Fermentation (SMF) technique and Solid State Fermentation (SSF) technique using natural substrates or agricultural bi-products like sugarcane straw, dry husk, rice brans, oilcakes, and teadust. The conditions for production of Glutaminase were optimized by studying the effect of incubation period and different carbon and nitrogen sources. The effect of temperature, pH and substrate concentration on L-Glutaminase activity was studied.

Studies on the impact of thermal ash on the productivity of algae (cyanobacterium): *Spirulina platensis*

Sugnanam. Sai Durga Prasad*, Kunjam. Mallikarjuna
Department of Botany, DNR College(A), Bhimavaram-534202, India.
*Email: jayasreeprasad18@gmail.com

ABSTRACT

In the present investigation various concentrations of ash produced from thermal power stations by burning coal were used to study the impact on the growth and productivity of cyanobacterium, *Spirulina platensis* by measuring the photosynthetic activity. The results clearly indicated the decrease in the growth and productivity. The electron transport measurements studies done with the cells grown in the presence of different ash concentration revealed the inhibited the photosystem II catalyzed transport activity by 50% and 10% the Photosystem II. The ash caused the inhibition in the whole chain electron transport activity at very low concentrations. Between the two photosystems I and II the photosystem II seems to be more susceptible towards the ash concentrations. The possible reasons for the decrease in the electron transport activity in the investigated algae, cyanobacterium, *Spirulina platensis* is due to the presence of heavy metals in the ash content coming out from the thermal power plants and may be changes in the phycobili proteins.



Rice Field Cyanobacteria as a potential Source of Nutrition

*Shantanu Bhattacharyya**, *Pratibha Rani Deep*, *Binata Nayak*
Cyanolab, School of Life Sciences, Sambalpur University, Odisha, india-768019
*bioshantanu@gmail.com

ABSTRACT

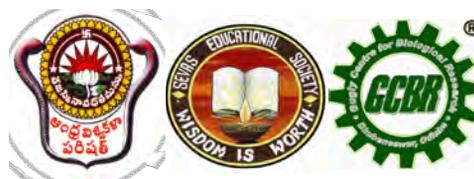
Searching of effective food supplement to meet the food demand of busy society is a major concern to modern nutritionist. In this study 20 purified cyanobacterial strains were taken to find out the nutritional status in terms of carbohydrates, lipid, proteins, vitamins, antioxidant etc, and compared with commonly used health drinks, Horlicks, Complan and Boost. Results show that few species of Nostoc, Anabaena and Spirulina have good food value. These are protein and carbohydrate rich with more antioxidant activity. Few species are rich source of vitamins. In future common rice field cyanobacteria can be used as a major source of nutrition to mankind.

Phenthoate prompts the promotion of oxidative damage in the ricefield Cyanobacteria of western Odisha: Response of the antioxidant system

*Shantanu Bhattacharyya**, *Pratibha Rani Deep*, *Binata Nayak*
Cyanolab, School of Life Sciences, Sambalpur University, Odisha, india-768019
*bioshantanu@gmail.com

ABSTRACT

Rice fields are frequently exposed to environmental contamination by pesticides and cyanobacteria, as primary producers of these aquatic ecosystems, are adversely affected. *Nostoc carneum*, *Nostoc punctiforme*, *Anabaena variabilis*, *Aulosira fertilissima* and *Nostocopsis lobatus* are cyanobacteria with a significantly widespread occurrence in rice fields of Western Odisha. This strain was studied throughout 16 days in laboratory conditions for its stress responses to sublethal concentrations of Phenthoate, a selective pesticide recommended for integrated weed management in rice of western Odisha, with special reference to oxidative stress, role of proline and intracellular antioxidant enzymes in herbicide-induced free radicals detoxification. Activities of antioxidant enzymes such as superoxide dismutase (SOD), catalase (CAT), ascorbate peroxidase (APX) increased in a time- and herbicide dose-response manner. A time- and concentration-dependent increase of malondialdehyde (MDA) levels and the enhanced cell membrane leakage following Phenthoate exposure are indicative of lipid peroxidation, free radicals formation, and oxidative damage, while increased amounts of SOD, CAT, APX, and proline indicated their involvement in free radical scavenging mechanisms. The obtained results suggested that the alterations of antioxidant systems in cyanobacteria might be useful biomarkers of phenthoate exposure. As the toxic mechanism of phenthoate is a complex phenomenon, this study also adds relevant findings to explain the oxidative stress pathways of phenthoate promoting oxidative stress in cyanobacteria.



Antidandruff Potentiality of Cyanobacteria

Sangeeta Mahakud, Shantanu Bhattacharyya, Binata Nayak*
Cyanolab, School Of Life Sciences, Sambalpur University, Odisha, India.-768019
Email: binata.bga@gmail.com

ABSTRACT

Dandruff is a common disorder of scalp caused by a fungus known as *Malassezia furfur*. It is a major problem which is faced by people all over the globe. So to control dandruff these days people are using various types of chemical shampoos that have a lot of side effect. So natural products, which are considered less toxic and cost effective are to be investigated and used. Cyanobacteria earlier know as blue green algae, one of the fascinating groups of primitive phototrophic prokaryotic organisms, whose long history date backs to the Proterozoic era. These are distributed in all possible biotypes of the world. Cyanobacteria produce a variety of secondary metabolites that exhibited as antibiotics, allelochemicals, hormones and toxin etc. Although they have specific feature of nitrogen fixation, toxic behaviour has attracted biologist and various strains have been extensively studied by several workers and advocated their antimicrobial nature such as antibacterial, antifungal, anti-algal as well as allelopathic and antagonistic properties. The aim of my study is to assess the antidandruff activity of water and organic extracts of cyanobacteria.

Enhancing growth of local alga using farmwaste formulated media for biofuel production

Alifha Severes¹, Shashi Kiran Nivas¹, L D'Souza¹, Smitha Hegde²
¹Laboratory of Applied Biology, St Aloysius College, Mangalore, Karnataka, India
²Dept of PG studies and Research in Biotechnology, St Aloysius College, Mangalore, Karnataka, India
Email: labens.sac@gmail.com

ABSTRACT

In a developing country like India, where depletion of fuel reserves has led to a national stress, microalgae are widely recognized as a potential source for bio-fuel production as a renewable source of energy. However, for a cost effective bio-fuel production, strategies for mass culturing of algae remain to be the bottleneck of the concept. In the present study, the ability of a locally isolated green alga, *Chlorella conglomerata* was tested by using cattle dung waste extract (CWE) as low cost supplement. *Chlorella* was grown in Bold's Basal Medium supplemented with varied concentrations (20-70%) of cattle waste extract at variable pH for 28 days under natural illumination. The biomass, chlorophyll and lipid content were determined. Media formulations of 40% and 70% showed 95-96% increase in biomass content. Also 40% and 60% formulations could generate lipid productivity of above 10% (w/w) at pH 7.5. The results suggest that CWE could be a highly potential, cost effective supplement for biomass increase and lipid productivity in algae with pH as a salient factor.



Mathematical modelling of microalgal growth in open ponds of NIT Rourkela

*Nazimdhine Aly, P. Balasubramanian**

Agricultural and Environmental Biotechnology Group, Department of Biotechnology and Medical Engineering, National Institute of Technology Rourkela, India.

*Corresponding author: biobala@nitrkl.ac.in

ABSTRACT

The aim of wastewater treatment should think beyond water purification to minimize the waste generation as well as the use of non-renewable resources to make the treatment process as sustainable. Currently, microalgae have been utilized in tertiary treatment methods to address water-energy nexus through biofuel production. The present paper focus on the mathematical modelling of microalgal lipid production along with carbon dioxide sequestration potential of National Institute of Technology Rourkela (NITRKL). The model incorporates the site specific data of solar radiation to derive the bioenergy content of microalgal biomass by photon energy balance. NITRKL has the average microalgal biomass production potential as 72.58 g/m²/day and the maximum growth has been predicted in the month of April. Scalability of microalgae and their introduction as wastewater treatment tools necessitate these studies to be a pre-study for a better comprehension of the effect of climate on the microalgal growth rate.

A brief review on bioremediation of wastewater using microalgae

*Jikku Mary John, Bunushree Behera, P Balasubramanian**

Department of Biotechnology & Medical Engineering, National Institute of Technology Rourkela; Email: biobala@nitrkl.ac.in

ABSTRACT

The rising issues of resource scarcity and population growth has resulted in an ever increasing demand for basic resources. Recently, microalgae based biotechnologies has grabbed the central attention of researchers for attaining efficient resource recovery in addition to the routine wastewater treatment. Eco-friendliness and high potential of microalgal growth concomitant with carbon sequestration has inspired the development of algal based technologies for simultaneous wastewater treatment along with production of bioactive compounds for its applications in energy, environment and food sectors. The sustainable utilization of wastewater as a nutrient medium for microalgal growth could recuperate the energy intensive conventional wastewater technologies. The present review covers the characteristics of different wastewaters as the source nutrients for algal growth and highlights the present scenario of algal based technologies at national and international levels.

Diversity of Cyanobacterial (Epilithic and Cryptoendolithic) Flora on Temples & Caves of Western Odisha

**J.K.Sahu¹, B.Nayak², P.Pradhan³ and S.Bhattacharyya²*

¹Department of Botany, Trust Fund Degree College, Bargarh, ²School of Life Sciences, Sambalpur University, Burla, ³Department of Botany, Womens College, Bargarh

ABSTRACT

A floristic account of epilithic and cryptoendolithic cyanobacteria in different archaeologically important temples and caves of western Odisha have been studied. Among all lithobiont species of unicellular cyanoprokaryotes, Chroococcus and Chroococcidiopsis along with filamentous forms like Arthrospira, Phormidium, Nostoc, Calothrix, Microchaeteare found most abundant. From the interstices of sandstone rock Chroococcidiopsis, the sole cryptoendolithic form was reported. Microenvironment on the rock and other building blocks of monuments alongwith physical characteristics like texture, porosity and permeability of rock plays a key role in harbouring specific cyanobacterial flora.



Role of algae in sustainable development of society

N.Peetabas^{1}, & R.P.Panda²*

¹Department of Botany, Science College, Kukudakhandi

²Department of Zoology, Anchalik Science College, Kshetriyabarapur

*E-Mail: npeetabas@gmail.com

ABSTRACT

Since from the ancient time algae are intimately connected with a source of food, medicine, and other uses but still now considered less important than fungi & Bacteria. These organisms ranges from unicellular to multicellular complex form, found in fresh & marine ecosystem as a producers in a food chain. Therapeutic supplements compounds such as - carotene unsaturated fatty acid, -glucan obtained from chlorella, spirulina, dunaliella etc. Renewable and carbon neutral biofuels are necessary for environment and economic sustainability. The viability of first generation fuel production is however questionable because of the conflict with food supply, algae biofuels are a viable alternatives to avoid pollution & production of reusable biomass in industrial application for human society. This paper aims to promote integration approaches for sustainable micro-algal, biomass, biofuel to meet the energy and environmental needs of the society.

Conservations of resources for the mass production of *Spirulina* isolated from estuary region of southeastern India

*Sugumar Ramasamy*and Preethy Chandran*

School of Chemical & Biotechnology, SASTRA University, Thanjavur

*Email: vnrsugumar@gmail.com.

ABSTRACT

Cyanobacteria are primitive autotrophic eukaryotes, which almost covers most of the moisture regions in our globe. Size ranges from micrometer to macro meter, but visible as clear mat while forming colonies with diatoms and bacteria. They perform different adaptations according to their locations and able to survive in extreme environment such as marine, saltpan, desert regions exhibiting high alkaline and temperature conditions. They are said to be first food and act as important functional asset to that ecosystem. They possess various potentials such as energy fuel, food, medicine and also in bioremediation process. Conservation of resources for the mass productions of *Spirulina* is the best strategy of development. Estuaries are transitional ecosystems, where cyanobacteria periodically can alter their adaptation against biotic succession, competition and environment condition. The biodiversity of cyanobacteria were investigated in Periyasamipuram estuary regions in Ramanathapuram district, Tamil Nadu, India. From the cyanobacterial mats collected in different seasons, 36 cyanobacterial species were observed belongs to common genera such as *Oscillatoria*, *Lyngbya*, *Microcystis*, *Spirulina*, *Chroococcus* and *Calothrix*. *Spirulina platensis* were observed in them were identified, isolated and cultivated in different media such as sea water, ground water and ASNIII broth. Among the different medium, this species slender variation in productions but adapts the environment and ensures mass productions. By proper designing to utilize the excess rainwater harvesting in household pilot productions and sea water management in mass production ensures entrepreneurship with high profit.



Simple Microscopic studies for identification and characterization of algae of IIT Kharagpur campus.

Ashok kumarYadav
Department of Biotech, KV IIT Kharagpur
Email: akpk_bt@rediffmail.com

ABSTRACT

Algae is a potential source of food, energy (bio-diesel), medicine and cosmetics. Algae has chlorophyll and other accessory pigment. They are characterized on basis of shape, size, structure and their arrangement. In my experiment I have collected greenery mass pigments present on soil from different source place during rainy season and just after rainy season. I have cultured different possible sample in eight different test tube at room temperature with media. Prepared different glass slide along with distilled water and cover slip. I have observed each and every slide in compound microscope and documented the slide with nichon camera. I have classified four different type of algae on basis of their common characteristics in 40x, 100x objective lens and 15x eyepiece lens with compound microscope. Cynobacteria (blue-green algae), *spirogyra*, *chlorella* and *spirullina* was easily distinguishable.

Growth responses of *Solanum nigrum* and *Andrographis paniculata* to liquid extracts of marine macro algae

S. Rathinavel* and V. Uthira pandi
Centre for Research in Botany, Saraswathi Narayanan college(Autonomous), Perungudi-
Madurai-625022, Tamilnadu;
*Email: rathinavel_sn@yahoo.com

ABSTRACT

A comparative study was made to assess the efficiency of liquid extracts of marine macro algae on growth of two medicinal plants. The aqueous extracts of *Caulerpa* sp, *Sargassum* sp, *Turbinaria* sp and the mixture of their extracts were given as foliar spray at five days intervals for 75 days. The medicinal plants treated with *Turbinaria* sp extract had maximum total plant height, root length, shoot length, fresh weight, dry weight and leaf area. In *Solanum nigrum* the growth parameters also increased by the treatment with the extract of *Sargassum* sp. and mixture of marine algal extracts. Similarly in *Andrographis paniculata* the growth responses were maximized when the plants were treated with *Caulerpa* sp and *Sargassum* sp. following extract of *Turbinaria* sp. The extract of *Caulerpa* sp. found to show less efficiency in *Solanum nigrum* but it was true when *Andrographis paniculata* treated with mixture of extracts. In both medicinal plants, plant height, root and shoot length, fresh and dry weight and leaf area were increased by liquid extract of macro algae as compared to control. It was observed that the growth of *Solanum nigrum* was two fold enhanced by liquid extracts of marine algae against control plants. The results evidence that the liquid extracts of macro algae can be used as suitable biofertilizer for organic cultivation of selected medicinal plants.

Extraction and Spectral analysis of Astaxanthin separated using different methods from the green alga *Hematococcus pluvialis*

*D.Nallusamy, K.Kathiravan**

Department of Biotechnology, University of Madras, Guindy, Chennai

ABSTRACT

Astaxanthin, one of the main xanthophyll carotenoid pigments, possesses 500-fold stronger free radical antioxidant activity than vitamin E while 38 times more activity than beta-carotene. Owing to its strong antioxidant properties, astaxanthin plays an important role in protection against inflammation, UV-light photooxidation, aging and age-related muscular degeneration and cancer and in enhancement of immune response, liver function, heart health, etc. Hence, astaxanthin has widespread applications in the pharmaceutical, cosmetic, food, and feed industries. Nowadays, astaxanthin are available commercially in two formations: chemical synthesis and natural resources from microalgae, yeast and crustacean byproducts. As one of the potent organisms for production of astaxanthin, *Haematococcus pluvialis*, a freshwater unicellular alga, has two distinct morphological phase, a green motile vegetative phase and the red non-motile carotenoid accumulating encysted phase (aplanospore). *H. pluvialis* varies from 2–5% in the dry biomass. In this present study, the components of the cells were separated using different methods like physical, mechanical, alkali and acid. The active compound was subjected to fractionation and purification using TLC, Column Chromatography and HPLC. The cells of *Haematococcus pluvialis* treated using alkali in combination with/without heat, sonication and acid treatment. High extractability of astaxanthin pigment was observed especially in the organic solvent, acetone.

Lipid production from algal culture under different growth conditions and its quality analysis

Paramjeet S*, Manasa P, K. Narasimhulu
National Institute of Technology, Warangal, Telangana
*E-mail: param@nitw.ac.in

ABSTRACT

Microalgae cells have the potential to rapidly accumulate lipids that contain fatty acids important for high value fatty acids. There is currently no standard extraction method for the determination of the fatty acid content of microalgae. This has caused a few problems in microalgal biofuel research due to the bias derived from different extraction methods. Therefore, this study aims to evaluate three different methods for lipid extraction. Significant differences were observed among all the three methods in regards to extract yield and fatty acid composition. The Modified Bligh & Dyer extraction technique stood out best for effective extraction of microalgal lipids for long chain saturated fatty acids. Different strains consumed different nitrate sources at different concentrations. As a result of which the nitrogen stress induction is not uniform for all the strains. *Chlorella vulgaris* yielded better biomass when NaNO_3 was used as nitrogen source compared to other strains and nitrogen sources i.e. KNO_3 and Urea in BG11 media. *Chlorella vulgaris* also produced highest lipid content while *Scenedesmus obliquus* being least productive. *Chlorella vulgaris* showed the best combination with NaNO_3 as a nitrogen sources with BG11 broth media for biomass and lipid productivity. The study also indicated that optimal biomass yield is obtained at pH 7. However, the maximum lipid output obtained at pH 8. This clearly indicates that higher pH leading to stress in the culture & inducing lipid production.



Cytotoxic Activity of Cyanobacterial Extract using *Allium sativum* Root Tip Assay

Abhipsa Mishra, Shantanu Bhattacharyya, Pratibha Rani Deep, Binata Nayak*
Cyanolab, School of Life Sciences, Sambalpur University, Odisha, India-768019

*Email: binata.bga@gmail.com

ABSTRACT

Cyanobacteria, the pioneer oxygenic autotrophs are the potential source of food or medicinal purposes in different parts of the world for centuries. Cyanobacteria are the oldest organism on earth and, it has a good reputation as noble therapeutic and nutritious agent along but dangerous for its toxins. In the present polluted environment, cancer has become a great problem in our country for the last five years. Cytotoxicity is a most important subject nowadays in the present oncological research fields. Many of the chemotherapeutic drugs are aimed in minimal cytotoxicity to normal cells and higher cytotoxicity to cancerous cells. Two common blooming *Anabaena* strains were studied to evaluate the cytotoxic activity of different Extracts, using *Allium Test*. *Allium sativum* root tips treated with each extracts were used for cytology study. Mitotic index (M.I.), and chromosomal abnormalities index (C.B.I.) were studied. Present study chromosomal abnormalities were observed in the form of fragments, chromosomal bridges and clumped metaphases, and apoptotic nuclei in different extracts of both the alga. Mitotic index decreased and mitotic abnormalities increased in extract treated samples than colchicine and normal. Microscopic parameter of cytological studies were significantly differ in different extracts, aquatic extracts has much better cytotoxic effect than others. The mitotic index was found 65 to 85%. At 9 AM the mitotic index was found maximum about 85%. About 5 to 15% abnormality index was observed. With the treatment of spindle inhibitor colchicine the mitotic index was found about 55 to 70% and the abnormality index was 45 to 30%. No anaphase and telophase were seen because the chromosome could not go to the next phase. The cyanobacterial aqueous extract was found more effective having very less amount of mitotic index i.e. 0 to 2 % and 98 to 100% of abnormality index. The cyanobacterial organic extract like methanol, chloroform and hexane were also found very effective. Cyanobacterial methanol extract was found having 3 to 5% of mitotic index and 94 to 97% of abnormality index. Cyanobacterial chloroform extract was found having 4 to 6% of mitotic index and 92 to 94% of abnormality index. Cyanobacterial methanol extract was found having 5 to 7% of mitotic index and 93 to 95% of abnormality index.

Molecular Phylogenetic analysis of two T branched Stigonematalean Species (Blue-green algae/Cyanophyta) using 16S r RNA Gene Sequence

Jayanata Kumar Sahu

Faculty of Science, University of South Bohemia, Ceske Budejovice, Czech Republic

ABSTRACT

Molecular phylogenetic study of two T branched Stigonematalean species, *Fischerella musicola* and *Hapalosiphon hibernicus* was conducted using Maximum Parsimony and Neighbor Joining tree inference methods with small subunit ribosomal RNA sequence data to ascertain the evolutionary relationships among branching filamentous cyanobacteria. Phylogenetic analysis of nucleotide sequence of the 16S r RNA gene from two different Stigonematalean species along with other members of cyanobacteria under subsection IV and V showed monophyletic origin of heterocystous taxa. Further the taxa showing lateral T- branching character form a monophyletic cluster along with other T- branching filamentous cyanobacteria. Hence, for grouping Stigonematalean genera with broader subgroup the branching type can be used as an important criterion.

SevasETS
INDIA **L**ife
Long
Learning
Initiative

Three months
**Certificate
Course**
On Research Methodology
(Distance Mode)

www.sevasets.com/rm

Course Details

Course Modules: 3
International Experts
Online Learning
Management System

Course Includes

Project Work
Manuscript Preparation
Journal Submission
Examination
Many More

Eligibility: Any candidate, who is pursuing or completed undergraduate, post graduate or PhD degree and has genuine interest in research and development are eligible for this unique course.

Course Fee
INR 2500/-

(Not for Profit Course Fee)

Course outcomes

1. Learning array of advanced research methodologies.
2. Research manuscript preparation and project writing with the help from international experts and journal copy editors.
3. Guaranteed journal publication*.
4. Basic as well as advanced techniques present in word processor, latex and other tools.
5. Statistical techniques, design of experiments and other software tools.

Important Dates

The course will be open throughout the year. Applications will be received from 2nd to 14th of every month and the course will begin from 1st of the next month.



Contacts

SEVAS EDUCATIONAL TESTING SERVICES
Sevas Educational Society
Komatipalli Post, Bobbili Mandal - 535558
Andhra Pradesh, India.
E-mail: sevaseducationalsociety@gmail.com
Phone: +91-998-6795754; +91-8944-255595

Sevas Educational Society



Website Designing

Website Designing | Web Development | Corporate Branding
Content Management System | Web Portal Development

Affordable & Professional
Website design and development

**PROFESSIONAL WEBSITE
ORGANIZATIONS - INR. 5000/- per year
FACULTY - INR 800/- per year**



Meeting the needs of our
community today and the
expectations for future
generations.

Package Includes

Web hosting for one year
Free Domain Name (.in ONLY)
Unlimited Server Space
Separate website for all departments
Free web designing with flash animations, SQL Databases etc
Student information system will also be provided on request
Free international trading (online marketing)
Free Advertisement, email marketing, search engine optimization etc.....



**STUDENT
MANAGEMENT
SYSTEM**

@ INR 5000/- per year
Includes Library Management
and Event Management Systems
*Unlimited Students



Terms and Conditions

Only 10 registrations per month
First come First Serve
The rate structure is only for Hospitals,
Academic Institutes, Industries and
Professionals for academic institutes,
industries, NGOs and hospitals

No hidden charges - No extra payments - Price Includes Tax

Contact: +91-9986795754 or mail to sevaseducationalsociety@gmail.com