

# **Department of Plant Science**

**National conference on**

## **'Bioprospecting of Algae'**

(Covering aspects of Research Methodology, Intellectual Property Rights (IPR), entrepreneurship and Skill Development)



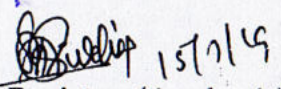
केरल केन्द्रीय विश्वविद्यालय  
CENTRAL UNIVERSITY OF KERALA  
Tejaswini Hills, Periy e PO, Kasaragod -671 316

No.CUK/ACA/Plant Science Dept./714/2019

Dated, 12<sup>th</sup> July, 2019

आदेश / ORDER

1. Administrative approval is hereby accorded to Dr.Arunkumar K, Associate Professor & Head, Department of Plant Science for conducting 2-day National Conference on algae entitled "Bioprospecting of Algae: Resources, conservation and utilization on 01/08/2019 & 02/08/2019 at Department of Plant Science, CUK.
2. Financial sanction is given for a total amount of Rs.2,00,000/- (Rupees Two Lakh only) for the above purpose.
3. Further, approval is also accorded to draw the said amount as advance in favour of Dr.Arunkumar K, Associate Professor & Head, Department of Plant Science subject to the final settlement.
4. This is issued with the approval of the Vice Chancellor and concurrence of Finance Wing.

  
सहायक कुलसचिव/Asst. Registrar (Academic)

No.CUK/ACA/Plant Science Dept./714/2019

Dated, \_\_\_ July, 2019

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2. Dr.Arunkumar K, Associate Professor & Head, Department of Plant Science
3. Asst. Registrar ( Finance) -to release the advance amount
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**Department of Plant Science**  
School of Biological Sciences  
Central University of Kerala  
Priye-672320, Kerala

**CONFERENCE REPORT**

National conference entitled "**Bioprospecting of Algae: Resources, conservation and Utilization**" held during 1-8-2019 & 2-8-2019

**Background for conducting the conference**

Algae are the first evolved plants growing in fresh and marine water bodies. Marine algae support 70 % primary production in ocean. Among the plants, every 2<sup>nd</sup> O<sub>2</sub> we inhale is come from algae that is 50 % of CO<sub>2</sub> we exhale is purified by algae. Among the Malabar region, Kasaragod is bestowed with 7 rivers and number of streams as well as backwaters that can support algae diversity. Compare to rest of Kerala, Northern Malabar regions experience extreme heat during summer and cool during winter. Algae growing in this climatic condition endured with unique features.

Algae are commercially useful and popular as a source of commercially important compounds, pigments, and polymers; considered as third generation energy crops. Rely on food crop and terrestrial plant for bioenergy lead to competition for food and land related issues. Faster growth than any other plants even growing in wastewater nutrients, can support the fuel demand thus to mitigate the global warming.

**Aim of the conference**

To conduct national level gathering of experts, researchers and young students for having deliberations on the diversity and unique features of algae and specially focusing the Northern Malabar algae.

**Conference Report**

Department of plant science in Central University of Kerala is initiated to establish the algae culture collection facility and doing research in algae of Malabar region for aiming energy and commercially important compounds from algae. As a part, national conference on Bioprospecting of algae; resources, conservation and utilization was conducted on 1-8-2019 & 2-8-2019 by Dr.K.Arunkumar, Associate Professor & Head as Organizing Secretary.

On first day(1-8-2019), Honorable Vice Chancellor Prof.(Dr.) G. Gopakumar, Central University of Kerala inaugurated the conference and delivered presidential address. Dr. Radhakrishnan Nair, Registrar and Dean and Head of School of Biological Sciences facilitated the conference.



Research papers were presented in the following themes and all the participants were actively took part in discussion and deliberations.

1. Diversity of Algae (fresh water and marine)
2. Algal cropping
3. Energy from Algae
4. Algal biotechnology
5. Algae- Microbe interaction  
Neutraceutical and pharmaceutical compounds from algae

Nationally acclaimed algae specialists from academic and industrial background like Prof. R. Rengasamy (former director of Madras University present algal industrial person), Prof. Aluwalia(Punjab University), Prof. K. Padmakumar(Kerala University), Prof. Jayashree Raout(Assam University), Prof. G.J Ray were delivered talks.

List of Invited talks

S.No	
1.	<p style="text-align: center;"><b>Key note</b></p> <p style="text-align: center;"><b>Prof. (Dr.) R. RENGASAMY</b> Chief Technical Officer M/s Shibin Nutraceuticals Pvt. Ltd. Chinnamanur, Theni E.Mail: profrrengasamy@yahoo.com</p>
2.	<p><b>Bio-prospecting for Nutraceutically valuable green algae from Kerala</b></p> <p style="text-align: center;">Prof. Dr. J.G Ray Professor School of Biosciences Mahatma Gandhi University Kottayam, Kerala- 686560</p>
3.	<p><b>Prospects of using algae as novel non-conventional fish feed ingredients</b></p> <p style="text-align: center;">Prof.(Dr.) K. Padmakumar Professor &amp; Head Department of Aquatic Biology and Fisheries University of Kerala, Karyavattom, Thiruvananthapuram, Kerala 695581 Phone: 9447794323 Email: k.padmakumar@gmail.com</p>
4.	<p><b>Potential of freshwater photoautotrophic microalgae for providing multiple Resources</b></p> <p style="text-align: center;">Prof. (Dr.) A. S. Ahluwalia Department of Botany, Panjab University Chandigarh 160014, India +91 172 2534002, +91 98159 84489 phykos@pu.ac.in, amrik.s11@gmail.com</p>
5.	<p><b>Bioprospection of algal resources: The storyline from North East India</b></p> <p style="text-align: center;">Prof. (Dr.) Jayashree Rout Professor &amp; Head</p>



	<p>Department of Ecology and Environmental Science  Assam University  Silchar - 788 011, Assam, India  routjaya@rediffmail.com  Mobile: 9435740809 Fax:-91-03842-270802, Phone: 03842-270824</p>
6.	<p><b>PERSPECTIVES AND BIOTECHNOLOGY OF HAEMATOCOCCUS PLUVIALIS FLOTOW</b></p> <p><b>Prof. (Dr.) R. RENGASAMY</b>  Formerly, Chief Operating Officer, Hydrolina Biotech, Tamil Nadu, Chief Scientist, AlgaeTech International, Malaysia, UGC-BSR Faculty Fellow, Professor &amp; Director  CAS in Botany, University of Madras</p> <p><b>Chief Technical Officer</b>  M/s Shibin Nutraceuticals Pvt. Ltd.  Chinnamanur, Theni  E.Mail: profrengasamy@yahoo.com</p>
7.	<p><b>Ultra structural studies on algae</b></p> <p><b>Prof.(Dr.) K. Sivakumar</b>  Professor  Department of Botany  Annamalai University  Annamalai Nagar, Tamil Nadu</p>
8.	<p><b>Biodiversity of Fresh water plantonic algae from Tamil Nadu: Survey, collection, identification and conservation.</b></p> <p>Dr. S. Nagaraj  Assistant Professor  Centre for Advaced studies n Botany,  University of Madras  Chennai-600025  Nagalilly@gmail.com</p>
9.	<p><b>Marine macroalgae diversity, threats and conservation facets in India</b></p> <p>Dr. M. Palanisamy  Scientist C  Southern Regional Centre, Botanical Survey of India  TNAU Campus, Lawley Road (PO)  Coimbatore-641 003 ,T.N.</p>
10.	<p><b>Concluding Remarks on the Conference</b></p> <p>Prof. (Dr.) A. S. Ahluwalia  Department of Botany, Panjab University  Chandigarh 160014, India  +91 172 2534002, +91 98159 84489  phykos@pu.ac.in, amrik.s511@gmail.com</p>

There were 128 registered participants from 8 states( Tamil Nadu, Kerala, Karnataka, Andhra Pradesh, UP, Maharashtra, Punjab, Assam. Out of 44 abstracts received, 25 assigned for oral presentation and 19 were presented in poster forms. Best three presentations among the two categories were selected and given cash price of Rs. 2000, Rs. 1500 and Rs. 750 for first, second and third, respectively with certificates.

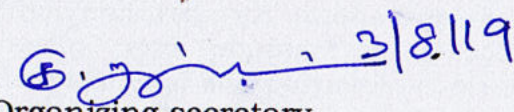


Astaxantin, the king of antioxidants, is present in high amount in the algae *Haematococcus puluvalis* said Prof. Rangasamy, chief technical officer, M/s Shibin pharmaceuticals Pvt. Ltd. 1kg of Astaxantin cost about Rs. 1 crore. Many such precise low volume - high value products are available in algae said Prof. Rangasamy. Research on hydrogen production from algae such as *Clamydamonas reinhardtii*, to meet demands of energy, should be intensified said Prof. A. S. Ahluwalia, Department of Botany, Punjab University. Two-third of our planet is water and since algae promise fulfilling the need of food, pharmaceutical, biofertiliser and biofuel it is the right time to tap algal resources added Prof. A. S. Ahluwalia.

The two-day national conference was concluded after having deliberations on latest research updates in algae with the following recommendations.

1. Establishing northern Malabar algae culture collection in the Central University of Kerala by Organizing secretary of the conference, Arunkumar K, head and Associate prof, Department of Plant Science.
2. Research on exploring/screening the native algae species as source for bioactives and energy.



  
Organizing secretary  
Arunkumar K  
Head and Associate prof.  
Department of Plant Science.

डॉ.के.अरुणकुमार / Dr.K.Arunkumar  
अध्यक्ष, पादप विज्ञान विभाग / Head, Department of Plant Science  
केरल केन्द्रीय विश्वविद्यालय / Central University of Kerala  
पेरिया, कासरगोड, केरला / Periyar, Kasaragod, Kerala 671316





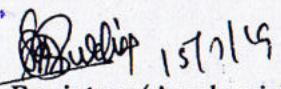
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**CENTRAL UNIVERSITY OF KERALA**  
**Department of Plant Science**

**Tejaswini Hills, Periyar, Kasaragod-671316**

**NATIONAL CONFERENCE ON BIOPROSPECTING OF ALGAE**

**Resources, Conservation and Utilization**

**1<sup>st</sup> and 2<sup>nd</sup> August 2019**

**CERTIFICATE**

This is to certify that Prof./Dr./Mr./Ms./Mrs. **P. Srikanth**

**Central University of Kerala**

has participated/presented (oral/poster)/chaired a session/resource person in the NATIONAL CONFERENCE ON  
“**BIOPROSPECTING OF ALGAE: Resources, Conservation and Utilization**” organized by the Department of  
Plant Science, Central University of Kerala, during 1<sup>st</sup> and 2<sup>nd</sup> August 2019.

Prof. (Dr.) Govinda Rao Duddukuri  
Dean, School of Biological Sciences  
Central University of Kerala

Dr. K. Arunkumar  
Organizing Secretary, NCBPA19  
Associate Professor & Head  
Department of Plant Science, CUK

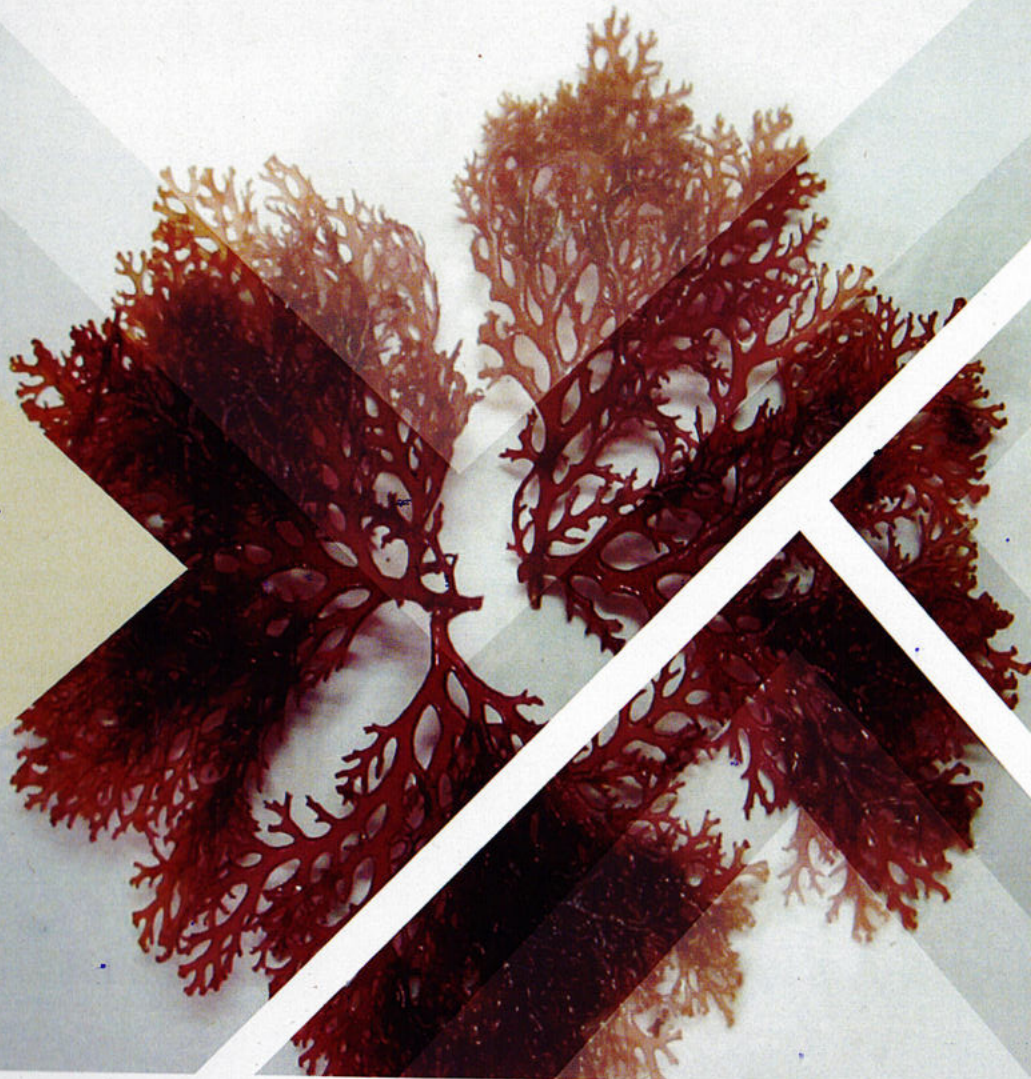


**NATIONAL CONFERENCE**

**BIOPROSPECTING OF ALGAE: Resources  
Conservation and Utilization**

**August 1-2, 2019**

**NCBPA19**



**Department of Plant Science**  
**Central University of Kerala**  
**Periye- 671316**

**Book of Abstracts**



# **BIOPROSPECTING OF ALGAE**

## **Resources Conservation and Utilization**



**Department of Plant Science**  
*Central University of Kerala*  
*Periye, Kasaragod-671316*  
*Kerala*

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**Conference Organised by**  
Department of Plant Science  
Central University of Kerala  
Periyé, Kasaragod- 671316

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#### **DECLIMÉR**

The Abstract published in this book is the collection of Abstracts by the delegates of NCBPA-2019. The editors and publishers are not responsible for the accuracy of the information contained in the published abstracts. The Authors are solely responsible for all the information and contents compiled in this book

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(संसद के अधिनियम 2009 द्वारा स्थापित)

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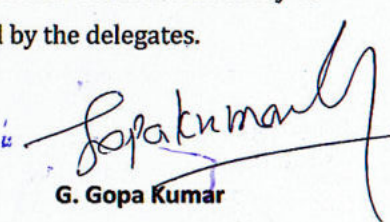
## FOREWORD

I am happy to write this foreword to this compendium which includes the abstracts presented by the delegates who attend the National Conference on "Bioprospecting of Algae: Resources, Conservation and Utilization" (NCBPA19), from August 1<sup>st</sup> to 2<sup>nd</sup> 2019 organized by the Department of Plant Science, Central University of Kerala. It is happy to note that the participants from various states are registered for the conference and theme has great significance in our society.

The conference aims at gathering knowledge on various aspects of Algae. Since the research on the resource, conservation and utilization of these Algae is lacking and it needs to be explored sooner than later in the larger interest for the society, the conference proves its own value in present scenario.

I would like to appreciate the Faculty members and Students of the Department of Plant Science, CUK, for their commitment and involvement in organizing this Conference. I sincerely hope that the research ideas exchanged at the NCBPA-19 will pave the way for establishment of joint research projects between Central University of Kerala and the various institutes represented by the delegates.

Date: 30/07/2019

  
G. Gopa Kumar



## **PREFACE**

We indeed feel happy to compile this book entitled "Bioprospecting of Algae: Resources, Conservation and Utilization" which is the compendium of abstracts presented by renowned scientists and delegates of the "**National conference on Bioprospecting of Algae: Resources, Conservation and Utilization (NCBPA19)**" organized by the Department of Plant Science, Central University of Kerala on 1<sup>st</sup> and 2<sup>nd</sup> August 2019. This book comprises abstracts of 6 Invited Talks, 2 Special Talk from experts, 24 Oral and 19 Poster presentations from young researchers.

This conference mainly focusses to gain knowledge on various fields of Phycology. NCBPA19 covered the topics related to Biotechnology of Algae, Algae- Microbe interactions, Diversity of Algae, Algae cropping, Nutraceuticals and Pharmaceuticals from Algae and Energy from Algae. To encourage young researchers, oral and poster presentations were organized to facilitate open discussions among the researchers from various disciplines. The limitations in the land based cultivation systems and overuse of fossil fuels made the researchers to concentrate on the ocean based products like algae. Apart from the use of algae as food, they are also the source of many secondary metabolites and bioactive compounds. Algae based industries are developing now a days. Further studies show that it can also be used to mitigate global warming and climate change. Use of algal biomass for the production electricity as well as bio diesel is significant now, a days where human lifestyle is totally changed and industries are continuously growing day by day. Anyhow the researches on this field is comparatively less and more and more to be still explored. Thus this conference aims at exploring the knowledge on different aspects of algae.

At this moment we profusely thank the **Vice Chancellor** of Central University of Kerala for having provided adequate funds for organizing this National Conference. We extend our sincere thanks to the organizing committee members & advisory committee members of NCBPA19, Research Scholars of the Department of Plant Science, Non-teaching staffs of Central University of Kerala for extending their unstinted support for the success of the conference. We extend our sincere gratitude to all the speakers of NCBPA19, and all the delegates for their thought provoking scientific discussions. We are sure that this National Conference provided the ideal platform for possible collaboration among the delegates of the event to augment their capacity and to achieve their research goals.

Editors

**Prof. (Dr.) Dennis Thomas**

**Dr. K Arunkumar**



## PROGRAMMES

DAY 1- 01/08/2019

### Session – 1 : Algal Biotechnology and Algae- Microbe Interactions

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3	IT 3	Prof. (Dr.) K. Padmakumar	Prospects of using algae as novel non-conventional fish feed ingredients.	3-4
4	BMOP 1	Gracy A.X	Biofertilizer potential and Antioxidant analysis of <i>Gracilaria corticata</i> J. Agardh and <i>Halimeda gracilis</i> J. Agardh.	5
5	BMOP 2	Praveen Kumar C.S.	Antibacterial and antioxidant properties of the extracts of <i>Planktochlorella nurekis</i> and <i>Chlamydomonas reinhardtii</i> .	6
6	BMOP 3	Sarang N.V	Bioactive extracts of green seaweed, <i>Ulva fasciata</i> with antimicrobial potential.	7
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8	BMOP 5	<b>Roshni T Ramanan</b>	Preliminary phytochemical analysis of three selected seaweeds of Thikkodi coast, Kerala.	9
9	BMOP 6	<b>Vivek S</b>	Significance of seaweed liquid fertilizer (slf) on vegetable crops solanum lycopersicum l. & abelmoschus esculentus (l.) Moench.	10
10	BMOP 7	<b>Kanchan Sambhwani</b>	Metabolite profiling of distinct life phases of industrially important red algae <i>Gracilaria dura</i> .	11
11	BMOP 8	<b>Rajani S Ganga</b>	Variations in fatty acid profile of <i>Isochrysis galbana</i> , a marine microalga under nitrogen limited cultural conditions.	12
12	BMOP 9	<b>Doniya Elze Mathew</b>	Isolation and characterisation of <i>Gracillaria dura</i> associated microbes for the identification of bioactive potential.	13
13	BMOP 10	<b>Mariappan V</b>	Biosorption of cobalt and copper from electroplating effluent by dried marine green macroalga <i>codium fragile</i> .	14
14	BMOP 11	<b>Bodhaguru M</b>	Cobalt biosorption from aqueous solution using dried biomass of brown algae <i>dictyota dichotoma</i> and <i>fucus vesiculosus</i> .	15
15	BMPP 1	<b>Sulakshana Karkala</b>	Bioprospecting locally sourced <i>Chlorella thermophila</i> for crude protein.	16



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18	BMPP 4	<b>Aravind R</b>	Effect of mixed algal diet on population growth and egg productivity in three copepod species.	19
19	BMPP 5	<b>Hareeshma P S</b>	A Computational Approach for Predicting the Interaction of Compounds from <i>Ulva lactuca</i> L. with Low Density Lipoprotein.	20
20	BMPP 6	<b>Sreekala K G</b>	Physico-chemical and biological properties of a novel r-phycoerythrin from red seaweed <i>hypnea musciformis</i> (wulfen) j. V. Lamouroux.	21
21	BMPP7	<b>M. Thillaivasan</b>	Studies on the effect of brown seaweed powder and different biofertilizers on <i>Oryza sativa</i> l. var. (Karunkuruvai)	22



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6	DAOP 13	Sagaya John Paul J	Biodiversity of freshwater microalgae from Theni, Thiruvallur and Tirunelveli districts, Tamil Nadu.	30
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19	DAPP 13	<b>Aron Santhosh Kumar Y</b>	Marine macro algal diversity from northern coastal districts of <i>Andhra pradesh, India.</i>	43



20	DAPP 14	Aranganathan A	Water quality assessment of Vellar river at Sethiyarthope dam, Cuddalore district with special reference to phytoplankton	44
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DAY 2- 02/08/2019

**Session – 3 : Energy from Algae and Nutraceutical and Pharmaceutical compounds from Algae**

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**IT** - Invited Talks, **ST** - Special Talks, **OP** - Oral Presentations, **PP** - Poster Presentations, **BM** - Algal Biotechnology and Algae- Microbe Interactions, **DA** - Diversity of Algae and Algae cropping, **EN** - Energy from Algae and Nutraceutical<sup>™</sup> and Pharmaceutical compounds from Algae.