



केन्द्रीय नमक व समुद्री रसायन अनुसंधान संस्थान  
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद, भारत)  
गिजूभाई बधेका मार्ग, भावनगर 364002 (गुजरात)  
**CSIR- Central Salt & Marine Chemicals Research Institute**  
(Council of Scientific & Industrial Research, India)  
Gijubhai Badheka Marg, Bhavnagar – 364 002 (Gujarat)  
[www.csmcri.res.in](http://www.csmcri.res.in)



**CSIR Integrated Skill Initiative Training Program**  
on  
**“Microalgal diversity and their biotechnological potentials”**  
**Date: 8 – 10 February, 2023**

**Faculty / Experts**



Dr. S. Bhattacharya,  
CSIR-CSMCRI



Dr. D Ramalingam,  
CSIR-CSMCRI



Dr. (Mrs.) Moutusi Manna  
CSIR-CSMCRI



Dr. Avinash Mishra,  
CSIR-CSMCRI



Dr. Arup Ghosh,  
CSIR-CSMCRI



Dr. S. K. Mandal,  
CSIR-CSMCRI

**Venue :**  
**CSIR-Central Salt & Marine Chemicals Research Institute**  
**Bhavnagar, Gujarat**

## PREFACE

Microalgae are tiny single / multicellular photosynthetic cells that can increase rapidly and generate colossal biomass. They are classified based on their various sizes, structures and forms. Microalgae, in general, consist of several essential metabolites, such as sugars, protein, lipids, bio-silica etc. Microalgae have gradually drawn the attention of scientists and entrepreneurs for their high-value products, feed supplements for humans and animals, transport fuels, industrial chemicals, pharmaceuticals etc. The past decades have witnessed continued and substantial progress to establish microalgae as a unique source of high-value compounds and therapeutic substances as a promising biofuel feed stock in response to the uprising energy crisis, climate change and depletion of natural sources.

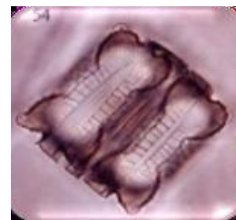
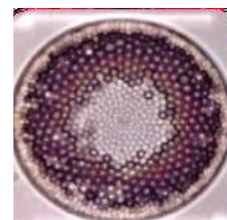
Microalgae being an excellent source of various pigments like carotenoids and phycobiliproteins, proteins, vitamins, enzymes, minerals, amino acids, lipids,  $\gamma$ -linolenic acid and biopolymer have received attention in the integrated processes for industrial applications including food, feed, fuel and pharmaceuticals, considering its unique chemical composition, if exploited efficiently through optimized upstream and downstream processing. Due to their potential high-value applications, these intracellular and extracellular compounds are a pure culture of a possible strain required to develop to produce large-scale biomass. Downstream processes for extracting valuable products also need skills to handle such microorganisms for large-scale biotechnological applications. Through digital and practical demonstrations, this program will generate awareness of the importance of microalgae, the downstream and upstream processes, and the products. This program will generate awareness towards the importance of microalgae, downstream and upstream process and the products through digital and practical demonstrations.

## PROGRAM DETAILS

- Avenues of Products from Microalgae
- Morphology and Diversity of Microalgae
- Methods of Molecular identification
- Mass cultivation techniques of Microalgae
- Downstream processing of Microalgae

## Experts:

- Dr. Subir Kumar Mandal, Senior Scientist, working on microalgae diversity, harmful algal blooms (HABs) formation and mitigation and high-value products from marine microalgae, primarily diatoms through the bio-refinery approach.
- Dr. Avinash Mishra works as Principal Scientist in CSIR-CSMCRI, Bhavnagar, Gujarat, India. He has expertise in plant molecular biology and also seaweed metabolomics. He is also working on Molecular Systematics and Molecular Phylogeny.
- Dr. Sourish Bhattacharya is working as a Senior Scientist at CSIR-CSMCRI, Bhavnagar, Gujarat, India. He has strong background in microalgal biotechnology, micro algal biofuel, bio polymers and nutraceuticals for therapeutic applications.
- Dr. Dineshkumar R. is working as a Senior Scientist in CSIR–CSMCRI, Bhavnagar, India. His work focuses on designing and optimizing upstream and downstream processes for improved bio-products manufacturing that benefits society in the healthcare, energy and environment sectors.
- Dr. Arup Ghosh is working as a Senior Principal Scientist and Co-Chair of DAPB in CSIR–CSMCRI, Bhavnagar, India. He has vast experience in microalgal aspects including cultivation and stress tolerance. He also has expertise in the value addition of microalgae for biofuel, fertilizer and environmental remediation applications.
- Dr. Moutusi Manna, Senior Scientist working in the field of “Theoretical and computational Biophysical Chemistry”. Her major research interest is centred on understanding the structure, dynamics and function of biological membranes, membrane proteins and a large variety of bio-macromolecules using state-of-the-art computational approaches such as molecular dynamics simulation, multi scale modelling and enhanced sampling techniques.





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CSIR Integrated Skill Initiative

**TRAINEE ENROLLMENT FORM**

TITLE OF SKILL DEVELOPMENT PROGRAM	:	INTEGRATED SKILL INITIATIVE (PHASE-II)
DATE(S), TIME AND VENUE	:	<b>8 – 10 February, 2023</b> Venue : CSIR- Central Salt & Marine Chemicals Research Institute, Gijubhai Badheka Marg, Bhavnagar – 364 002 (Gujarat)
FULL NAME OF TRAINEE	:	
FATHER'S / HUSBAND'S NAME	:	
DATE OF BIRTH (DD/MM/YYYY)	:	
GENDER (MALE / FEMALE / OTHERS)	:	
CATEGORY (SC / ST / OBC / EWS / GENERAL)	:	
PHYSICALLY DISABLED (YES / NO)	:	
CURRENT STATUS (working/ entrepreneur/ student/ unemployed/ school dropout)	:	
QUALIFICATIONS	:	
PHOTO ID NUMBER (Aadhaar/ PAN/ Voter ID/ Passport)	:	
MOBILE NUMBER	:	
ALTERNATE MOBILE NUMBER	:	
EMAIL ADDRESS	:	
TRAINEE'S DOMICILE (RURAL / URBAN)	:	
FEE PAYMENT DETAILS	:	
DATE:		SIGNATURE OF APPLICANT

Kindly submit completed form on or before **25<sup>th</sup> January 2023** to  
**Dr. Subir Kumar Mandal** at email : [skmandal@csmcri.res.in](mailto:skmandal@csmcri.res.in), +91-9426284820

## Training Program Fee

₹ 1000/- + ₹ 180/- GST = ₹ 1180/-	Category I : Self-sponsored [Students, Individual (other than student) and Entrepreneur (as an individual)]
₹ 5000/- + ₹ 900/- GST = ₹ 5900/-	Category II : Any sponsored candidate (Government, Industry and sponsored by Entrepreneur)

**DIGITAL PAYMENT ONLY WILL BE ACCEPTED and NO CASH TRANSACTION.**

### Details of Fee Deposit

(Payment through RTGS/ NEFT only)

Amount (₹)	:	
Bank Name	:	
Branch Name	:	
Account No.	:	
Transaction ID and Date	:	
Signature of Depositor/ Candidate		
Name: _____		

Kindly submit completed form on or before **25<sup>th</sup> January 2023** to **Dr. Subir Kumar Mandal** at email : [skmandal@csmcri.res.in](mailto:skmandal@csmcri.res.in), +91-9426284820

**NOTE: Candidates with all required information and fees deposited through digital mode only will be accepted and will be selected based on their CV in the said training program.** Please submit a printed copy of fees receipt and a xerox copy of the AADHAR Card during training program, if selected.

**Accommodation for staying has to be arranged by Candidates only. The candidate has to produce their double dose completion certificate for introducing COVID-19 protective vaccines during joining to the training program. No accommodation will be provided by the Institute.**

## Bank details of CSIR-CSMCRI for Trainee Program Fee



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गिजुभाई बधेका मार्ग, भावनगर- ३६४ ००२

CSIR-CSMCRI CSIR-CENTRAL SALT & MARINE CHEMICALS RESEARCH INSTITUTE

Gijubhai Badheka Marg, Bhavnagar 364 002, Gujarat, India

Phone No. (O) 0278, 2471792 E-mail: [fao@csmcri.org](mailto:fao@csmcri.org)

### Electronic Fund Transfer Account Details

1	Name of account holder	DIRECTOR, C.S.M.C.R.I.
2	Address	GIJUBHAI BADHEKA MARG, BHAVNAGAR 364002
3	e-mail address	<a href="mailto:fao@csmcri.org">fao@csmcri.org</a>
4	Phone No./Mobile No.	0278-2471792
5	Fax No.	0278-2567562
6	Permanent Account Number (PAN)	AACCC1313P
7	Particulars of Bank Account	
	A. Name of the Bank	STATE BANK OF INDIA
	B. Name of the Branch	WAGHAWADI ROAD BRANCH
	C. Branch Code	10863
	D. Address	Shubham Shop No.G2/3, Plot No.2569 E1/2, Waghawadi Road Opp. Gulista Ground, Bhavnagar-364002 e-mail: <a href="mailto:sbi.10863@sbi.co.in">sbi.10863@sbi.co.in</a>
	E. Telephone No	0278- 2569884
	F. Account No.	30267310153
	G. Type of Account	SAVINGS BANK ACCOUNT
	H. IFSC Code ( RTGS/NEFT)	SBIN0010863
	I. MICR code	364002023

**Council of Scientific and Industrial Research (CSIR)**  
**CSIR Integrated Skills Initiative (Phase-II 2020-25)**  
**Training Effectiveness Feedback Form**

Name of CSIR Lab with location	CSIR-Central Salt & Marine Chemicals Research Institute, G.B.Marg, Bhavnagar, Gujarat, India			
Title of the Skill Training/ SDP				
<b>CSIR Integrated Skill Initiative Training Program on</b> <b>“Microalgal diversity and their biotechnological potentials”</b> <b>Date: 8 – 10 February, 2023</b>				
Date(s), Time & Venue		CSIR-CSMCRI, Bhavnagar, Gujarat		
Name(s) of Trainer(s)				
	5	4	3	2
1. How would you rate the overall quality of the program? आप कार्यक्रम की समग्र गुणवत्ता का मूल्यांकन कैसे करेंगे?	Excellent	Very Good	Good	Poor
2. How well did the Trainer state the objectives? प्रशिक्षक ने उद्देश्यों को कितनी अच्छी तरह बताया?	Excellent	Very Good	Good	Poor
3. How well did the Trainer keep the session alive and interesting? ट्रेनर ने सत्र को कितनी अच्छी तरह जीवंत और दिलचस्प रखा?	Excellent	Very Good	Good	Poor
4. What is your overall rating of the Trainer? ट्रेनर की आपकी समग्र रेटिंग क्या है?	Excellent	Very Good	Good	Poor
5. How well did the program accommodate your background and needs? कार्यक्रम ने आपकी पृष्ठभूमि और जरूरतों को कितनी अच्छी तरह समायोजित किया?	Excellent	Very Good	Good	Poor
6. How effective were the handouts? लिखित सामग्री कितनी प्रभावी थी?	Excellent	Very Good	Good	Poor
7. How convenient was the location? प्रशिक्षण कार्यक्रम का स्थान कितना सुविधाजनक था?	Excellent	Very Good	Good	Poor
What was the most interesting thing you learned in this training? इस प्रशिक्षण में आपने सबसे दिलचस्प बात क्या सीखी?				

What was the least interesting thing you learned in this training?

इस प्रशिक्षण में आपने सबसे कम दिलचस्प क्या सीखा?

Was the length of the presentation sufficient for the training?

YES

NO

क्या प्रस्तुतिकरण की अवधि प्रशिक्षण के लिए पर्याप्त थी?

The skill I learned in this program will be useful in my job

YES

NO

इस कार्यक्रम में मैंने जो कौशल सीखा है वह मेरे काम में काम आएगा

If YES, list the skills that you would be implementing when you return to work/ get a job

यदि हां, तो उन कौशलों की सूची बनाएं जिन्हें आप काम पर लौटने/नौकरी पाने पर लागू करेंगे

Would you like to recommend this program to others? If NO why?

क्या आप दूसरों को इस कार्यक्रम की सिफारिश करना चाहेंगे? यदि नहीं तो क्यों?

Anything else you want to mention regarding Skill Trainings.

कौशल प्रशिक्षण के संबंध में आप कुछ और उल्लेख करना चाहते हैं.

SIGNATURE OF TRAINEE

NAME OF TRAINEE (optional)

Overall Rating (%)

Signature of Coordinator/ Nodal

Date:

{Overall Rating = [(Marks scored against Items 1 to 7)/35] \*100}