DBT- BIRAC Joint Call for Proposal on 'Futuristic Marine Research' for fostering high performance Biomanufacturing under BioE3 Policy

1. Background

The **BioE3** (**Bio**technology for **E**conomy, **E**nvironment & **E**mployment) **Policy** for '*Fostering-High Performance Biomanufacturing*' has been approved by Union Cabinet in August 2024. The Policy lays down the framework for high-performance Biomanufacturing, to accelerate the development and scale up of bio-based products in the country. Biomanufacturing can fundamentally transform the global economy from today's consumptive manufacturing paradigm to the one based on regenerative principles, and will play a pivotal role promoting in '*Green Growth'* while driving country's Bioeconomy.

2. Scope of the Call

Marine environments provide a plethora of ecosystem services besides being home to a variety of biological resources. Various bacteria, fungi and micro- and macro-algae with proven bioprospecting potential have been isolated from marine waters for many years. Marine/aquatic systems are also an abundant source of biomass which feeds into several downstream industries such as food additives, biostimulants, biomaterials etc. The rapid growth of Blue Economy has positioned it as a cornerstone for sustainable development. India is a fortunate nation with a coastline of 11,098 km and an Exclusive Economic Zone (EEZ) of 2.1 million sq. km. However our share of global seaweed production is currently low and there exists significant untapped potential. Hence, DBT and BIRAC envision developing a biomanufacturing ecosystem based on futuristic marine research to tap the oceanic resources and oceanic space for meeting the growing needs of food, energy, chemicals, materials and helping to reduce our continuous dependency on land and terrestrial resources.

In view of this, DBT and BIRAC invite proposals on 'Futuristic Marine Research' under the BioE3 policy under following 2 categories:

(i) Discovery & Application-oriented Integrated Network Research
(ii) Bridging the Gap for scale up

2.1. Discovery & Application-oriented Integrated Network Research (Expected Outcomes –TRL: 3-5)

Under this category, the proposals are expected to advance cutting-edge innovative research with applied knowledge, for accelerating innovations in the area of marine biotechnology. The proposals may be focused on the following:

- *R&D in Seaweed Cultivation*: Breeding for traits such as high yield; disease resistance and climate tolerance; strain improvement through genome assisted approaches for indigenous species of seaweed; novel methods for cultivation & maintenance of germplasm; continuous production and supply of seedlings/ establishment of seed banks; developing land-based cultivation strategies for high-value or edible seaweeds; microbiome associated with seaweeds and exploration for their commercial applications, rapid analytical methods for assessment of seaweed quality for various applications

- *Developing integrated multi -trophic aquaculture system*

- *Developing recombinant thermo- and halostable enzymes* for efficient conversion of algal feedstock or primary biochemical constituents' to diverse value-added products

- *Developing scalable farming techniques* for large scale production of seaweeds/algae in offshore waters and onshore

- *Development of value added products* such as biofuels; animal feed supplements for animal health and methane reduction; agri inputs & fertilizers; pharmaceuticals such as drugs/immunomodulators; nutraceutical products; biodegradable plastics etc. from micro & macro algae.

2.2. Bridging the Gap for Scale-up (Expected Outcomes –TRL: 5-8)

Under this category, proposals should focus on demonstrating scale up of technologies from proof of concept to early/late stage validation/ pre-commercialization in following areas:

- *Ocean Farming*: Sensors for in-situ measurement of seaweed crop health and real time monitoring of farm integrity; depth cycling for harnessing deep sea water nutrients; dewatering of seaweed on site in energy efficient manner

- *Innovative and green process for production* of industrially important polysaccharides

including phycocolloids (agar/agarose, alginates and carrageenan); nutraceuticals, cosmaceuticals; therapeutic molecules; pigments; food additives; plant protection/growth promoter chemicals; bio-crude oil/ microbial oil/ bio-fuel from marine biomass

- *Biomanufacturing of aquatic animal health management products* such as probiotics; immunostimulants/modulators, bio augmenters etc

TRL definitions are available @ https://www.birac.nic.in/desc_new.php?id=443

3. Key requirements for the proposed projects

a. Developed technology (if applicable) should be sustainable from an economic and environmental point of view and the technology should be scalable.

b. Gap in the technology to be addressed and strategies proposed to address the gap should be outlined clearly.

c. Proposals must mention the current TRL level of the technology and the TRL proposed to be attained at the end of project duration

d. The proposal should strictly adhere to the prescribed proforma.

e. The proposals with clear focus and likely execution of deliverables within timelines will be preferred.

f. All proposals must adhere to statutory regulatory requirements.

g. For projects submitted under Bridging the Gap for Scale-up category information should also be provided on product category, USP of product, product registration status, information on toxicological and environmental hazards of product, current market status in the country and globally, business plans, status of regulatory clearance, list of prospective industries interested in the product, IP status.

4. Mode of Submission

Proposals maybe submitted by both Academia and Industry applicants, either independently or as a collaborative project.

a. For proposals from Academia/Research Institutions: Interested applicants should submit the proposals in the prescribed format duly forwarded by the executive

head of the institution through the Department's e-ProMIS portal (www.dbtepromis.nic.in).

b. For proposals from Industry and Industry-Academia collaboration: Interested applicants should submit the proposals in the requisite format duly forwarded by the executive head of the Company/LLP/Institution by logging to the BIRAC website (www.birac.nic.in).

5. Eligible Organizations

5.1 Academic Organisations

a. Proposals may be submitted by interested applicants engaged in research activities at various Institutions/Universities/Societies/Trusts/NGOs/ Foundations/Voluntary Organizations, recognized as a Scientific and Industrial Research Organization (SIRO).

b. The Principal investigator must have at least four years of the employment remaining in the institution at the time of proposal submission.

5.2 Industry

a. Eligibility criteria for the Industries will be as per "Implementation Plan for the Biomanufacturing and Biofoundry Initiative" attached at ANNEXURE I.

b. Pre-requisite documents required to be submitted by the Industry as per the BIRAC norms are as follows:

5.2.1 Companies/Startups

a. Incorporation certificate.

b. CA/CS certified shareholding pattern as per BIRAC format (Companies having a minimum of 51% Indian shareholding / individuals holding Indian passports are only eligible) mentioning UDIN number.

c. Details regarding in-house R&D facility, if any; or Incubation Agreement with recognized Incubator.

d. Audited financial details of latest last three financial years,

e. Copy of passports of the shareholders if required (in support of 51% eligibility criteria).

5.2.2 Limited Liability Partnership

a. Incorporation/Registration Certificate.

b. Partnership deed; CA/CS certified certificate which states that minimum half of the partners are Indian citizens mentioning UDIN number.

c. Copy of passports of Indian partners/subscribers

d. Research mandate/ details regarding in-house R&D facility, if any/Incubation agreement

e. Audited financial details of the last three financial years;

Companies/LLP if recommended have to provide a declaration stating that Company/LLP is not in default of BIRAC OR any other organization. Further there are no Legal Proceedings going against the applicant.

6. Evaluation Criteria

The proposals will be evaluated as per existing norms of DBT and BIRAC.

7. Funding Modalities

a. Projects having only academic partners will be funded by DBT. Projects involving Academia and Industry or only Industry will be supported by BIRAC.

b. Extent of funding will depend on the proposed activities and will be in alignment with the "Implementation Plan for the Biomanufacturing and Biofoundry Initiative" attached at ANNEXURE-1.

c. Project duration will be upto 2 years, extendable upto 5 years based on performance.

8. Scope of Intellectual Property Generated During the Duration of the Project

The Intellectual Property (IP) generated during the duration of the project will be in accordance with the IP Policy of DBT and BIRAC.

9. Discretion

DBT/ BIRAC shall reserve the discretion on determination of sanction of funding and processes as per its standard norms and such determination shall be final. The selection process is not open to review.

10. Contact Information

Any queries may be addressed to Dr. Varshneya Singh, Sc. D, DBT @ varshneya.singh@dbt.nic.in (For Academia applicants only) and Dr. Sonali Tandon, Chief Manager, BIRAC @ inv02.birac@nic.in (for industry applicants only)

Last date for submission of proposals is 14th August 2025

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