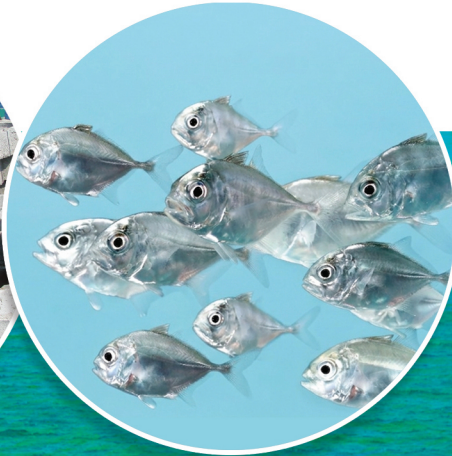


Institute Technology Management Unit Empowering Innovation, Intellectual Property, Technology Transfer and Commercialization



ICAR-CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
(Department of Agricultural Research and Education, Government of India)
PB. No.1603, Ernakulam-North P.O Kochi-682 018
www.cmfri.org.in

Institute Technology Management Unit Empowering Innovation, Intellectual Property, Technology Transfer and Commercialization



ICAR-CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
(Department of Agricultural Research and Education, Government of India)
PB. No.1603, Ernakulam North P.O Kochi-682 018
www.cmfri.org.in



Institute Technology Management Unit (ITMU): Empowering Innovation, Intellectual Property, Technology Transfer and Commercialization

CMFRI Booklet Series No. 49/2026

Published by

Dr. Grinson George
Director
ICAR-CMFRI, Kochi

Edited by

Sanal Ebeneezar, Keerthi Krishna, Silpa K. P., Eldho Varghese, Bobby Ignatius & Kajal Chakraborty

Publication, production and coordination

Mr. Arun Surendran, Library, Documentation Centre, ICAR-CMFRI, Kochi
©2026, ICAR-Central Marine Fisheries Research Institute

All rights reserved. Material contained in this publication may not be reproduced in any form without the permission of the publisher

Design and Layout

Mr. Abhilash P. R. & Ms. Sari K. T., ICAR-CMFRI, Kochi

Citation:

Sanal Ebeneezar, Keerthi Krishna, Silpa K. P., Eldho Varghese, Bobby Ignatius & Kajal Chakraborty (2026). Institute Technology Management Unit (ITMU): Empowering Innovation, Intellectual Property, Technology Transfer and Commercialization, CMFRI Booklet Series No. 49/2026: ICAR-Central Marine Fisheries Research Institute, Kochi, 50p.



Foreword

The Indian Council of Agricultural Research – Central Marine Fisheries Research Institute (ICAR–CMFRI) has, for over seven decades, been at the forefront of advancing marine fisheries science in India, with a steadfast commitment to sustainability, innovation, and societal well-being. As the premier central institute dedicated to tropical marine fisheries research, CMFRI has continuously aligned its scientific pursuits with national priorities, addressing challenges related to food and nutritional security, livelihoods of coastal communities, and sustainable utilization of marine resources.

In an era where knowledge-driven innovation is central to economic growth and global competitiveness, effective management of intellectual property and technology transfer has become indispensable. Recognizing this, ICAR–CMFRI has established a robust institutional mechanism through the Institute Technology Management Unit (ITMU), functioning under the guidance of the Institute Technology Management Committee (ITMC), to protect, manage, and commercialize the valuable intellectual assets generated by our scientists.

The ITMU plays a pivotal role in transforming research outputs into socially relevant and commercially viable technologies. From nutraceuticals, fish feeds, and mariculture innovations to eco-friendly bioconversion systems and health-promoting marine bioactives, CMFRI's technologies reflect the immense potential of marine biodiversity and scientific excellence. Through systematic IP protection, strategic partnerships, and transparent technology transfer processes, the ITMU ensures that these innovations reach industry, entrepreneurs, and end-users, thereby creating tangible impacts beyond the laboratory.

This booklet presents an overview of the mandate, objectives, and achievements of the ITMU at ICAR–CMFRI, highlighting our journey in intellectual property management, technology commercialization, and industry engagement. It also showcases select success stories that exemplify how public-funded research can be effectively translated into products and solutions that benefit society at large.

I am confident that this compilation will serve as a valuable resource for stakeholders, industry partners, startups, policymakers, and researchers seeking collaboration with ICAR–CMFRI. I extend my appreciation to the ITMU team and all scientists whose dedication and innovation continue to strengthen CMFRI's role as a leader in marine fisheries research and technology transfer.

I look forward to meaningful partnerships that will further our shared vision of sustainable marine fisheries, responsible innovation, and inclusive growth.

Dr. Grinson George

Director

ICAR–Central Marine Fisheries Research Institute
Kochi



Preface

Innovation and technology-driven research play a pivotal role in advancing sustainable fisheries and mariculture. The Institute Technology Management Unit (ITMU) of ICAR-Central Marine Fisheries Research Institute has been actively working towards protecting, managing, and commercializing the valuable intellectual assets generated by the institute. Through continuous efforts in intellectual property protection, technology transfer, industry collaborations, and capacity building, ITMU has contributed significantly to translating research outcomes into societal and commercial benefits.

Over the years, the institute has achieved notable milestones in the areas of patents, designs, trademarks, technology commercialization, and ICAR-certified technologies. The successful transfer of several innovative technologies and nutraceutical products to industries reflects the commitment of ICAR-CMFRI towards fostering innovation, entrepreneurship, and sustainable development.

This booklet provides a brief overview of the activities, achievements, and success stories of ITMU, highlighting the institute's journey in strengthening intellectual property management and promoting technology-led growth in the fisheries sector. The accomplishments presented herein are the result of the dedicated efforts of our scientists, technical staff, industry partners, and stakeholders.

ITMU of ICAR-CMFRI acknowledges the noteworthy contributions of Dr. Kajal Chakraborty, Director, ICAR-NBFGR and former In-charge of ITMU, whose vision and sustained efforts greatly contributed to the growth and commercialization initiatives at ICAR-CMFRI.

I sincerely hope that this booklet will serve as an informative resource and encourage greater collaboration, innovation, and utilization of marine fisheries technologies for the benefit of society.

Dr. Sanal Ebeneazar
Scientist-in-Charge, ITMU
ICAR-Central Marine Fisheries Research Institute
Kochi

Contents

01	Foreword	III
02	Preface	IV
03	ICAR-CMFRI IP Portfolio Highlights	01
04	About CMFRI	05
05	Introduction to ITMU	06
06	ITMC & ITMU Committee ICAR-CMFRI	07
07	Achievements/Success Stories	11
08	CMFRI Commercialized Nutraceuticals	12
8.1	Table 1: Patent Filed Database of ICAR-CMFRI	14
8.2	Table 2: Granted Patent Database of ICAR-CMFRI	23
8.3	Table 3: Technology Commercialized, Industry Partnership, and Licensing Fee	27
8.4	Table 4: Designs Database of ICAR-CMFRI	31
8.5	Table 5: Trademark Database of ICAR-CMFRI	31
8.6	Table 6: Technologies/Products Certified by ICAR	32
8.7	CMFRI Developed Nutraceuticals/Fish Feeds/Technologies	39
09	Glimpses of ITMU Milestones and Achievements	46

ICAR-CMFRI IP Portfolio Highlights up to 2025 Dec

Institute Technology Management Unit (ITMU)

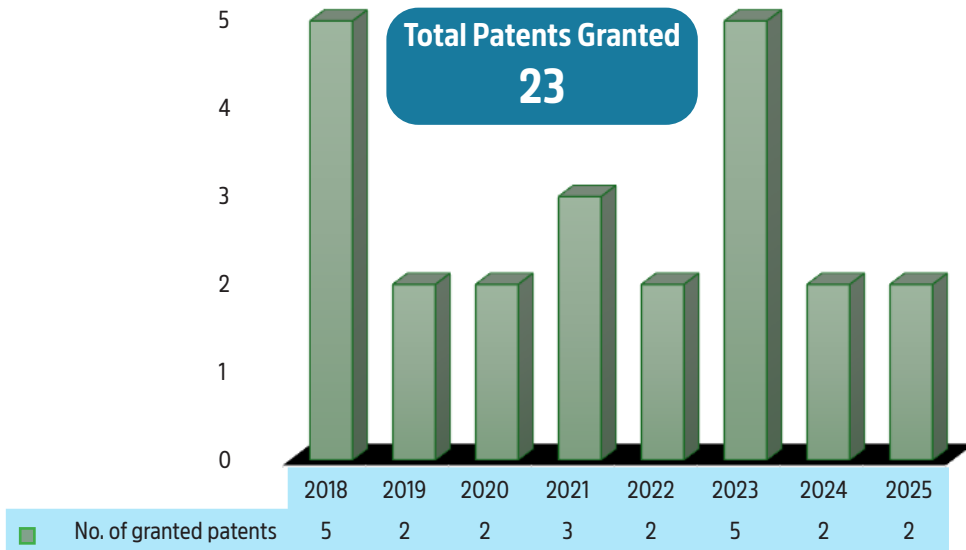


Total Revenue Generated (₹ 77.17 Lakhs)

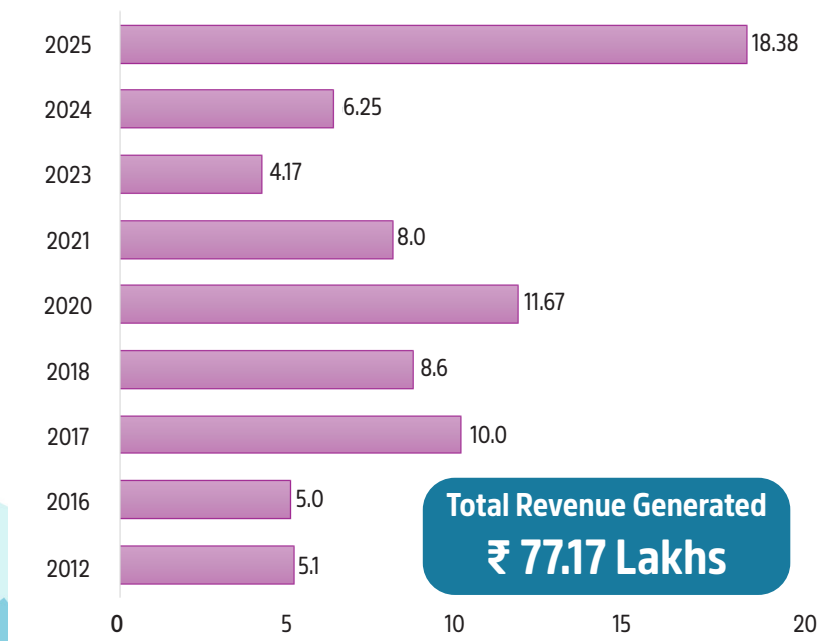
Licence Fee (Jan-Dec)



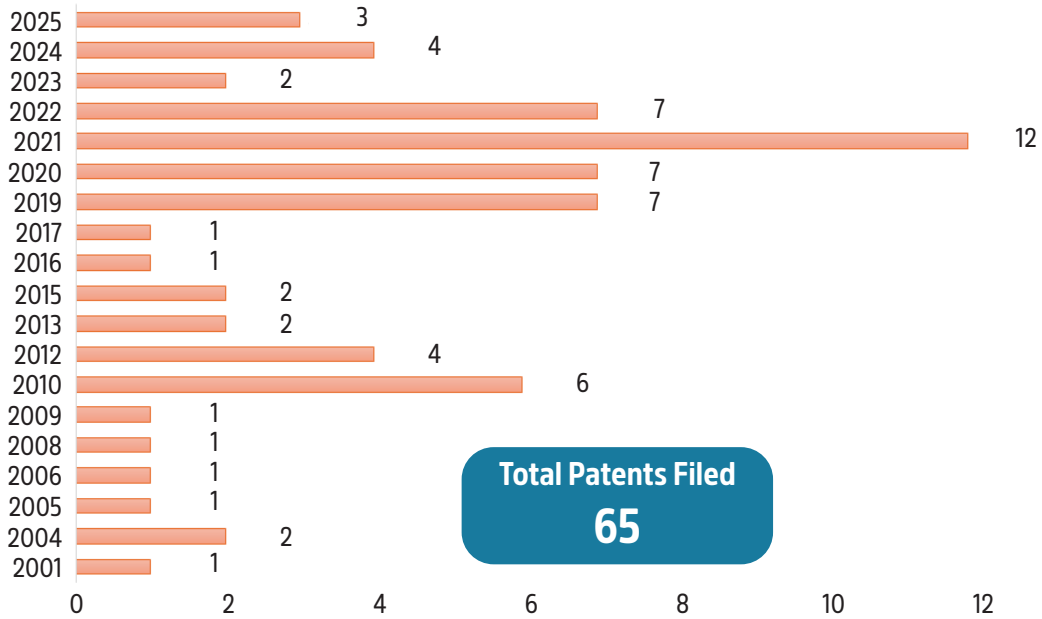
Year-wise Patents Granted



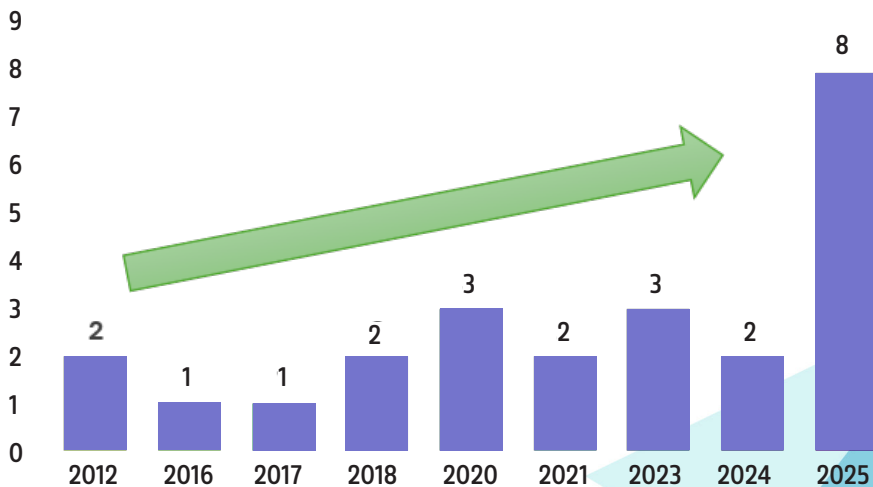
Year-wise Revenue from Commercialized Products – Licence Fee (₹ in Lakhs)



Year-wise Patents Filed



Year-wise Number of Technologies Licensed



About CMFRI

The ICAR-Central Marine Fisheries Research Institute was established by Government of India on February 3rd 1947 under the Ministry of Agriculture and Farmers Welfare and later became a member of the Indian Council of Agricultural Research (ICAR) family in 1967.

The institute has four regional centres located at Mandapam, Visakhapatnam, Manglore and Vizhinjam and seven regional stations at Mumbai, Chennai, Calicut, Karwar, Tuticorin, Veraval and Digha.

During the course of over 75 years the institute has emerged as a leading tropical marine fisheries research institute in the world. During the first half of the five decades of its existence, CMFRI devoted its research attention towards the estimation of marine fisheries landings and effort of marine organisms and the bio-economic characteristics of the exploited stocks of finfish and shellfish.

This research effort contributed significantly to India's marine fisheries development from a predominantly artisanal, sustenance fishery till the early sixties to that of a complex, multi-gear, multispecies fisheries.

Vision and Mission

The vision is to achieve sustainable marine fisheries through effective management interventions and to enhance coastal fish production via mariculture for improving coastal livelihoods.

In line with this, the mission focuses on developing an information-based management system to facilitate the transition from open access to a regulated regime in marine fisheries, augmenting coastal fish production through mariculture and sea ranching, and restoring critical marine habitats.

Importance of Indian Marine Fisheries sector

The Indian marine fisheries sector is of immense importance as it ensures food and nutritional security by providing affordable protein, supports the livelihoods of millions of coastal people, and contributes significantly to the national economy through employment generation and foreign exchange earnings.

With a long coastline of 11,098.81 km and an Exclusive Economic Zone of 2.02 million km², India possesses rich marine biodiversity that sustains both capture fisheries and the growing potential of mariculture and allied activities.

The sector not only drives regional development in coastal states but also strengthens India's position as a leading global seafood exporter, making it a vital pillar for economic growth, social welfare, and sustainable resource utilization.

Introduction to ITMU

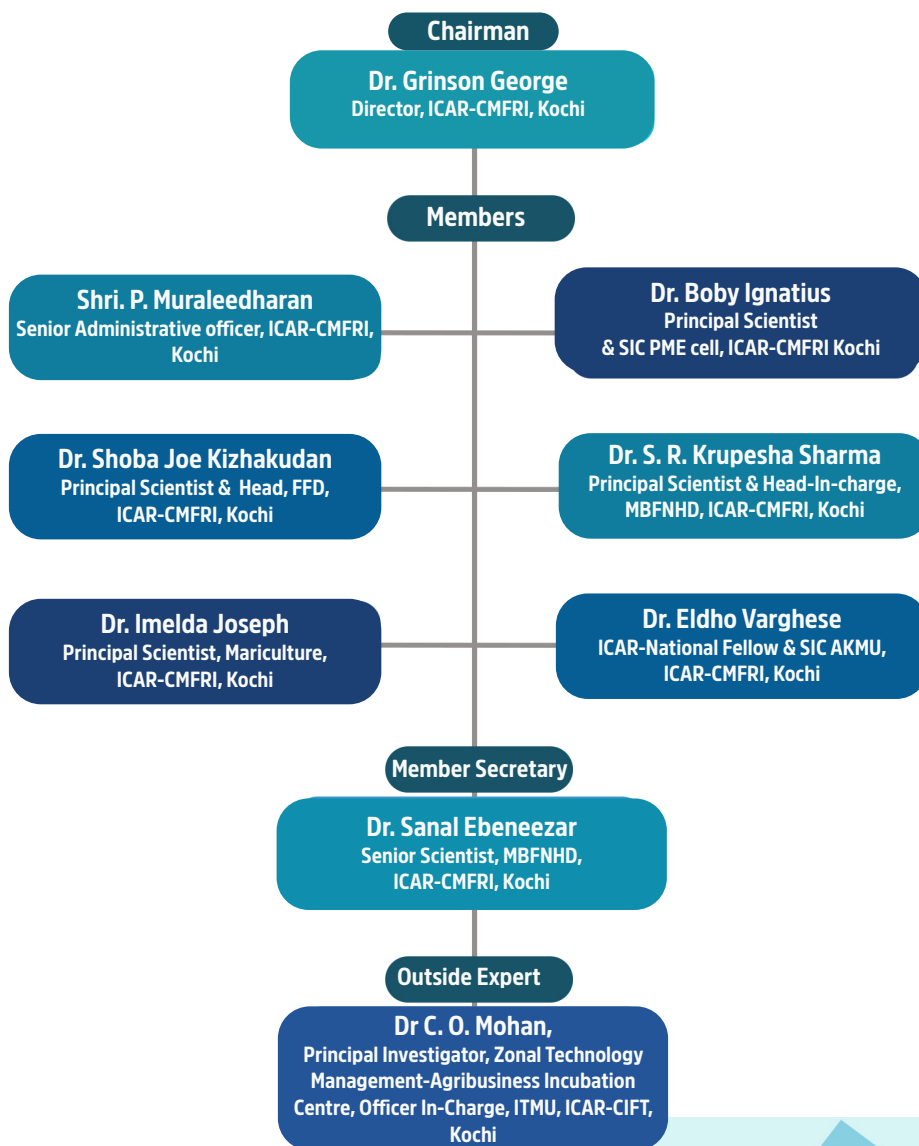
The Institute Technology Management Unit (ITMU) and the Institute Technology Management Committee (ITMC) were established during 2006–2008 under the XI Plan scheme, "Intellectual Property Management and Transfer/Commercialization of Agricultural Technology." Initially conceived as the ITMU project, it later evolved into the National Agricultural Innovation Fund (NAIF) with three components: Component-1 (Innovation Fund) focusing on ITMU activities, Component-2 (Incubation Fund) on Agri-Business Incubation (ABI) activities, and Component-3 on ARYA (Attracting and Retaining Youth in Agriculture) activities. During the XII Plan, it continued as Component-1 of NAIF, supporting IP protection, patent filing, and commercialization in line with ITMC oversight and ICAR policies.

The ITMU serves as the operational unit under the guidance of the ITMC and handles all aspects related to intellectual property protection, maintenance, and transfer/commercialization of technologies at the institute level, adhering to ICAR guidelines and administrative directives issued from time to time. It seeks guidance from the Zonal Technology Management Unit (ZTMU) at the zonal level or the Intellectual Property and Technology Management (IP&TM) Unit at ICAR Headquarters on a case-by-case basis.

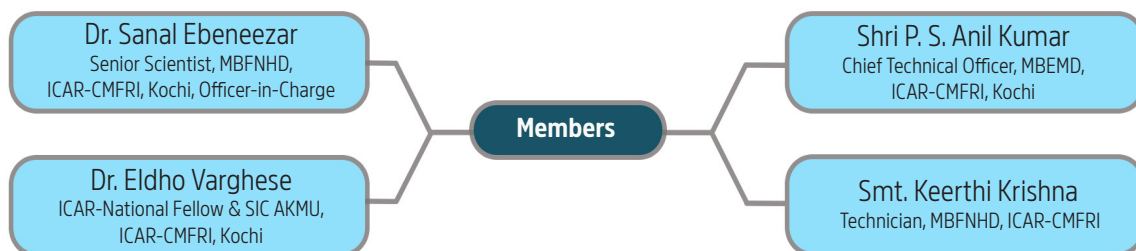
The Institute Technology Management Unit (ITMU), established at CMFRI in 2008, is responsible for protecting and managing innovations and intellectual properties generated within the institute, scrutinizing and processing patent/IP proposals for filing, facilitating commercialization and technology transfer, establishing linkages through MoUs and public-private partnerships, and managing IP assets through the Institute Technology Management Committee (ITMC) in accordance with ICAR policy guidelines. The ITMU of ICAR-CMFRI operates under the ZTMC of CIFT, Kochi, and is part of a three-tier architecture led by the IP&TM Unit at the apex level, followed by the ZTMC (CIFT, Kochi, Kerala), and the institute-level ITMC and ITMU units.

ITMC (Institute Technology Management Committee) & ITMU (Institute Technology Management Unit) Committee ICAR-CMFRI

A. Institute Technology Management Committee (ITMC) composition: -

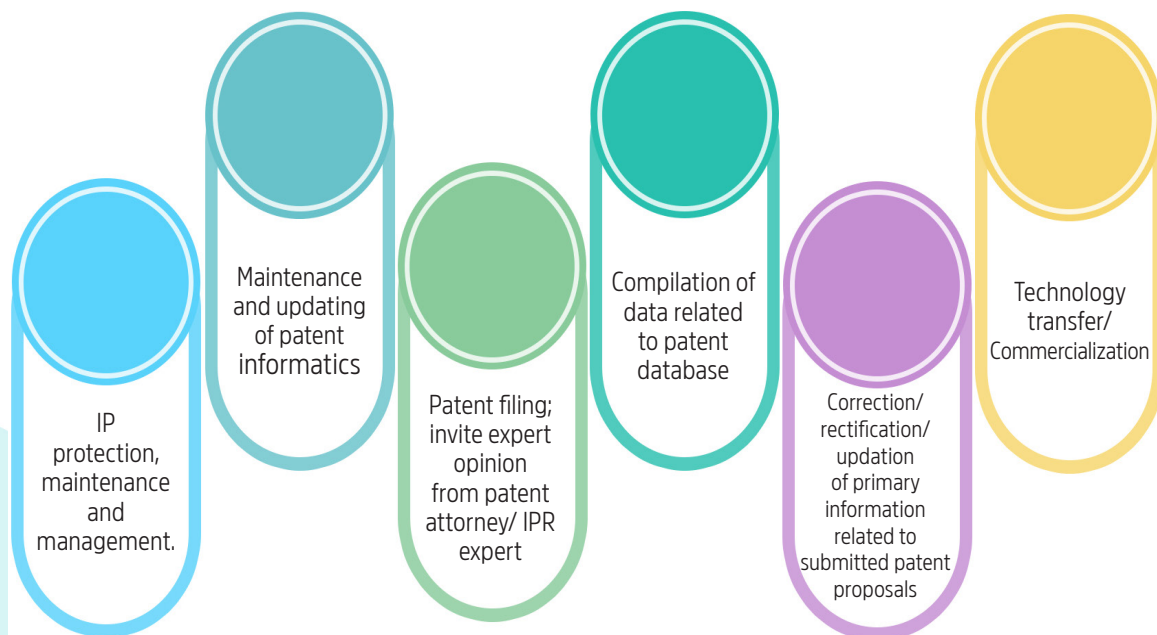


B. ITMU (Institute Technology Management Unit) Committee



Role of ITMU in the Institute

The ITMU of Central Marine Fisheries Research Institute functions according to the ICAR IP guidelines



Objectives of ITMU

- Pursue all matters related to intellectual property (IP) protection, maintenance, technology transfer, and commercialization at the institute level in accordance with ICAR guidelines and subsequent policy or administrative decisions issued by ICAR from time to time.
- Obtain case-specific guidance or support, whenever required, from the Zonal Agro-Technology Management Centres (ZTMCs) or Intellectual Property and Technology Management (IP&TM) Unit at ICAR Headquarters.
- Promote faster technology development, adoption, and utilization by facilitating collaboration between ICAR-CMFRI and entrepreneurs for the commercialization of agricultural technologies.
- Formulate business policies and strategic plans to enable effective commercialization of technologies generated at ICAR-CMFRI.

Key Activities and Functions of ITMU

The Institute Technology Management Unit (ITMU) serves as the nodal centre for managing and safeguarding all intellectual property (IP)-related matters of the institute. It ensures that innovations developed at ICAR-CMFRI are effectively protected, promoted, and transferred for societal and commercial benefit.

1. Identification and documentation of technologies

ITMU identifies potential innovations developed by researchers and industry collaborators, evaluates their novelty and commercial potential, and documents them through invention disclosures, technical notes, and technology briefs for further IP protection and commercialization.

2. Filing and managing intellectual property (Patents, Copyrights, Trademarks)

The unit handles the preparation, filing, prosecution, and maintenance of patents, copyrights, and trademarks. This ensures legal protection, institutional ownership, and long-term safeguarding of CMFRI's scientific and creative outputs.

3. Technology marketing and commercialization

ITMU promotes institute-developed technologies through brochures, exhibitions, websites, and industry outreach. It facilitates discussions with potential licensees, negotiates terms, and oversees technology transfer and licensing to ensure that innovations reach users and contribute to public welfare.

4. Technology valuation and agreement management

The unit carries out valuation of technologies to assess their market potential, scalability, and economic worth. It also drafts, reviews, and manages agreements such as MoUs, technology transfer agreements, confidentiality agreements, consultancy contracts, and collaborative research agreements.

5. Facilitating contract research and consultancy

ITMU oversees contract research and consultancy programs to ensure legal compliance, transparency, and mutual benefits. It monitors project execution and ensures that all agreements serve institutional and industry needs responsibly.

6. Support to startups and entrepreneurs

The unit assists startups and entrepreneurs by offering incubation support, mentoring, regulatory advice, and guidance on funding and commercialization strategies. This helps transform research outputs into viable business ventures.

7. Capacity building and IP awareness

ITMU conducts training, workshops, and awareness programs on intellectual property rights, technology transfer, valuation, licensing, and entrepreneurship to nurture an innovation-driven culture among scientists, students, and stakeholders.

8. Managing copyrights and creative outputs

The unit facilitates copyright registration for research publications, training manuals, software, databases, digital content, and technical reports to ensure recognition of authorship and institutional ownership of creative works.

9. Trademark registration and other IP-related matters

Beyond patents and copyrights, ITMU oversees trademark registration, handles IP disputes, and provides strategic guidance on overall IP management and commercialization to strengthen the institute's innovation ecosystem.

Achievements/Success Stories

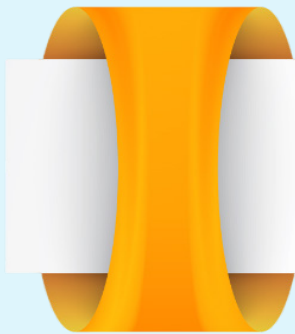
The Institute Technology Management Unit (ITMU) of ICAR-CMFRI serves as the backbone of intellectual property (IP) management and technology transfer at the institute. Its core activities include promoting IPR awareness among researchers and stakeholders, facilitating the filing and maintenance of intellectual property (IP), including patents, trademarks and copyrights, driving technology licensing to bridge the gap between innovation and industry, regularly updating and maintaining patent informatics to keep abreast of the latest developments in the field and ensure accurate and comprehensive data compilation, compilation of data related to patent database, and compiling relevant data on the institute's patent database, enabling efficient access and utilisation of patent information for research and commercial purposes.

Over the years the ITMU has accomplished several milestones, the significant among these are as follows.



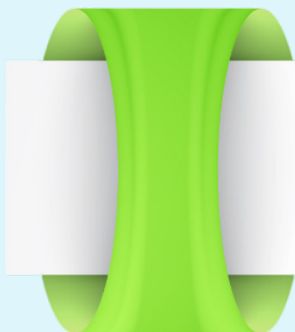
Intellectual property achievements:

Grant of 23 patents, over 60 patents filed, and grant of three trademarks, three designs, and one copyright over the years.



Commercialisation and training:

Facilitating the commercialisation of over 20 technologies, along with conducting extensive IPR awareness programmes, training sessions, and business meets.



Scholarly contributions:

Published over 10 peer-reviewed IPR-related articles and authored a comprehensive book entitled Intellectual Property Rights: A Perspective in Marine Fisheries and Mariculture, ICAR-CMFRI Special Publication No. 108.

CMFRI Commercialized Nutraceuticals

01



**Cadalmin™
Green Mussel extract (GMe)**
To combat joint pain and rheumatoid arthritis

02



**Cadalmin™
Green Algal extract (GAe)**
To combat rheumatic arthritic pains

03



**Cadalmin™
Antidiabetic extract (ADe)**
For use against Type II diabetes

04



**Cadalmin™
Antihypercholesterolemic extract (ACe)**
To combat dyslipidemia

05



**Cadalmin™
Antihypothyroidism extract (ATe)**
To combat hypothyroid disorders

06



**Cadalmin™
Antihypertensive extract (AHe)**
For use against hypertension

07



Cadalmin™
Antiosteoporotic extract (AOe)
To treat osteoporosis

08



Cadalmin™
Immunoboost extract (IBe)
To boost innate immunity

09



Cadalmin™
LivCure extract (LCe)
To combat non-alcoholic fatty liver disease

10



Cadalmin™
Immunalgin extract (IMe)
As antiviral immunity booster

Table 1: Patent Filed Database of ICAR-CMFRI

Sl. No	Patent Application No	Title of the Patent	Lead Inventor	Date of Filing	Granted or not	Grant No. & Date	Licensed or not
1.	458/DEL/2001	On Shore Marine Pearl Culture	Syda Rao G	04/04/2001			
2.	1638/DEL/2004	Hatchery Technology for Production of Damselfish	G Gopakumar	31/08/2004			
3.	1987/DEL/2004	Pearl Production Techniques Through Tissue Culture in the Indian Pearl Oyster (<i>Pinctada fucata</i>) and the Abalone, (<i>Haliotis varia</i> and Other Pearl Producing Mollusks	Dharmaraj S, <i>et al.</i>	12/10/2004			
4.	3455/DEL/05	Hatchery Technology for Production of Clown Fish	G Gopakumar	23/12/2005			
5.	PCT/IB2006/003299	In Vitro Pearl Production Using Marine Organisms	Dharmaraj S	27/11/2006			
6.	203/CHE/2008	A Method of Producing Phytase Extracellularly from Thermophilic Bacterium	Paulraj S	25/01/2008	Patent Granted	302657 31/10/2018	
7.	1543/CHE/2009	A Method and Composition for Land-Based Culturing of Pearl Oyster in Marine Body and Device Therefore	Syda Rao G	30/06/2009	Patent Granted	317443 01/08/2019	
8.	31/CHE/2010	A Device for Breeding and Culturing Marine Fish in Open Sea	Syda Rao G, <i>et al.</i>	06/01/2010	Patent Granted	322166 01/10/2019	

9.	32/CHE/2010	Formulated Feed for Marine Ornamental Fishes and a Process Thereof	Vijayagopal P, <i>et al.</i>	06/01/2010	Patent Granted	415056 21/12/2022
10.	2063/CHE/2010	A Process to Prepare Naturalised <i>Artemia francisciana</i> from Indian Subcontinent with High Docosahexaenoic Acid and Trehalose for Aquaculture Applications	Thomas PC, <i>et al.</i>	20/07/2010	Patent Granted	302802 01/11/2018
11.	2064/CHE/2010	A Process to Prepare Antioxidant and Antiinflammatory Concentrates from Brown and Red Seaweeds and a Product Thereof	Kajal Chakraborty, <i>et al.</i>	20/07/2010	Patent Granted	294451 16/03/2018
12.	2065/CHE/2010	A Process to Concentrate Anti-inflammatory Principles from Green Mussel <i>Perna viridis</i> L. and a Product Incorporating These Ingredients	Kajal Chakraborty, <i>et al.</i>	20/07/2010	Patent Granted	302803 01/11/2018
13.	2066/CHE/2010	A Product Containing Anti-inflammatory Principles from Green Mussel <i>Perna viridis</i> L. and A Process Thereof	Kajal Chakraborty, <i>et al.</i>	20/07/2010	Patent Granted	303813 30/11/2018
14.	5196/CHE/2012	Development of Galvanized Iron Cage for Finfish Culture in Open Sea	Philipose KK, <i>et al.</i>	13/12/2012	Patent Granted	379215 12/10/2021
15.	5197/CHE/2012	Cement & Concrete Moulded Artificial Reef Apparatus to Aggregate Marine Fish	Kasim HM, <i>et al.</i>	13/12/2012	Patent Granted	358869 19/02/2021

16.	5198/CHE/2012	A Process to Isolate Anti-inflammatory Principles from Green Mussel <i>Perna viridis</i> L. to Prepare a Stabilized Nutraceutical Supplement Against Inflammatory Disorders and a Product Thereof	Kajal Chakraborty, <i>et al.</i>	13/12/2012	Patent Granted	387600 27/01/2022	Licensed
17.	5199/CHE/2012	A Product Containing Anti-inflammatory Principles from Brown Seaweeds and a Process Thereof	Kajal Chakraborty, <i>et al.</i>	13/12/2012	Patent Granted	482789 14/12/2023	Licensed
18.	2281/CHE/2013	A Device and Process to Separate Oyster Meat from Shell Using Pressurized Steam	Mohamed KS, <i>et al.</i>	24/05/2013			
19.	2965/CHE/2013	Growout Pellet Feed for Silver Pompano <i>Trachinotus blochii</i> (Lacepede) and a Process Therefore to Incorporate Essential Nutritional Elements in Fish	Jayakumar R, <i>et al.</i>	03/07/2013	Patent Granted	434347 09/06/2023	
20.	3366/DEL/2015	A Process to Prepare Antidiabetic Concentrates from Seaweeds and a Product Thereof	Kajal Chakraborty, <i>et al.</i>	19/10/2015	Patent Granted	346531 11/09/2020	Licensed
21.	4254/DEL/2015	Anti-inflammatory Principles in a Preparation of Brown Seaweeds	Kajal Chakraborty, <i>et al.</i>	23/12/2015	Patent Granted	333392 28/02/2020	Licensed
22.	201611004807	A Process and Formulation to Prepare Vibrio Antagonistic Micro Feed for Finfish and Shell Fish Larvae Using Marine Bacteria and a Product Thereof	Anusree V Nair, <i>et al.</i>	11/02/2016	Patent Granted	558580 23/01/2025	

23.	201711018741	A Process to Prepare Anti-glycolipidemic Concentrate from Seaweed and a Product Thereof	Kajal Chakraborty, <i>et al.</i>	29/05/2017	Patent Granted	376296 02/09/2021	Licensed
24.	201911017798	A Process to Prepare Anti-hypothyroidism Concentrates from Seaweeds and a Product Thereof	Kajal Chakraborty, <i>et al.</i>	03/05/2019	Patent Granted	466695 07/11/2023	Licensed
25.	201911017799	A Process to Prepare Anti-dyslipidemic Concentrate Marine Macroalgae and Coastal Sea Crustacean	Kajal Chakraborty, <i>et al.</i>	03/05/2019	Patent Granted	463645 30/10/2023	Licensed
26.	201911018958	An Oral Drug Delivery System and an Anti-Bacterial Topical Applicant and a Process	Kajal Chakraborty, <i>et al.</i>	13/05/2019			
27.	201911032735	An Antimicrobial Therapeutic Composition and a Process to Prepare an Antimicrobial Therapeutic Concentrate from Seaweed	Kajal Chakraborty, <i>et al.</i>	13/08/2019	Patent Granted	463260 30/10/2023	
28.	201911036205	A Composition and Anti-hypothroidism Product of Seaweeds	Kajal Chakraborty, <i>et al.</i>	09/09/2019	Patent Granted	498920 12/01/2024	
29.	201911038055	A Process to Prepare Antihypertensive Concentrate from Seaweed and a Product Thereof	Kajal Chakraborty, <i>et al.</i>	20/09/2019	Patent Granted	513214 21/02/2024	Licensed

30.	201911053105	A Process to Prepare Anti-osteoporotic Concentrates from Seaweeds and a Product Thereof	Kajal Chakraborty, <i>et al.</i>	20/12/2019	Licensed
31.	202011009121	A Composition and Anti-osteoporotic Product from Seaweeds	Kajal Chakraborty, <i>et al.</i>	03/03/2020	Licensed
32.	202011011489	A Composition and Antihypertensive Product from Marine Algae	Kajal Chakraborty, <i>et al.</i>	17/03/2020	Licensed
33.	202011011490	An Anti-hypothyroidism Composition from Marine Algae	Kajal Chakraborty, <i>et al.</i>	17/03/2020	Licensed
34.	202011029447	Primers for Visual Loop-Mediated Isothermal Amplification (Visual Lamp) as well as a Kit and Method for Detecting Protozoan Parasite <i>Perkinsus</i>	Pradeep MA, <i>et al.</i>	10/07/2020	Licensed
35.	202011042791	A Marine Culturing Method for Enhanced Growth and Survival of Mud Spiny Lobster in Enclosed Net Cage Objects	Divu D, <i>et al.</i>	01/10/2020	Licensed
36.	202011053449	A Living Juvenile Lobster Transportation Method and Apparatus Thereof	Divu D, <i>et al.</i>	08/12/2020	Licensed

37.	202011054632	A Process to Prepare a Stabilized Composition from Seaweed to Improve Innate Immune System and a Product Thereof	Kajal Chakraborty, <i>et al.</i>	15/12/2020	Licensed
38.	20211005290	A Long-Distance Transportation of Live Post Larval Marine Finfish Such as Silver Pompano <i>Trachinotus Blochii</i> and Method Thereof	Divu D, <i>et al.</i>	08/02/2021	
39.	20211005291	An Apparatus and Re-Circulatory Aquaculture Method for Nurturing Live Post Larval Marine Finfish Species Such as Pompano	Divu D, <i>et al.</i>	08/02/2021	
40.	20211005292	A System and Sustainable Improved Method for Integrated Culturing Marine Finfish in a Shrimp Rearing System	Divu D, <i>et al.</i>	08/02/2021	
41.	20211037131	Design and Operation of a System for the Breeding and Initial Larval Rearing of Black Soldier Fly <i>Hermetia illucens</i>	Sanal Ebeneezar, <i>et al.</i>	16/08/2021	
42.	20211037132	A Colour Enhancing Economical Diet for Freshwater Ornamental Fishes and the Process Thereof	Vijayagopal P, <i>et al.</i>	16/08/2021	Licensed
43.	20211037133	A System for Bioconversion Using Black Soldier Fly Larvae (<i>Hermetia illucens</i>) and Its Continuous Production	Sanal Ebeneezar, <i>et al.</i>	16/08/2021	Licensed

44.	202111044313	A Method for Culturing Pearl Oyster Species and Production of Mabe Pearl of Multiple Sculpted Shape and Size Therein	Anil MK, <i>et al.</i>	29/09/2021
45.	202111044314	An Apparatus and Method for Gravity Flow Regulated Re-Circulatory Mariculture System and Rearing Marine Species Therein	Anil MK, <i>et al.</i>	29/09/2021
46.	202111044315	A Closed Aquaculture System Using Upwelling Flow for Broodstocking, Breeding, Nurturing and Rearing Molluscs and Method Thereof	Anil MK, <i>et al.</i>	29/09/2021
47.	202111044316	A Compacted Dampish Air Permeability Transportation Method of Seaweeds Species in Live from One Geographical Location to Other	Reeta Jayasankar, <i>et al.</i>	29/09/2021
48.	202111052892	A Micro Bubble Diffusing Aeration apparatus in Mariculture Pond	Divu D, <i>et al.</i>	17/11/2021
49.	202111054082	A Process to Prepare Polygalactofucopyranose Composition from Brown Seaweed <i>Turbinaria ornata</i> with Apoptotic Effect on Human Liver Cancer and Human Breast Cancer Cell Lines	Kajal Chakraborty, <i>et al.</i>	24/11/2021
50.	202211040788	An Octopus Composite and a Process of Preparing Thereof	Kajal Chakraborty, <i>et al.</i>	16/07/2022
51.	202211052003	A Process of Obtaining Sulphated Polysaccharide from Green Seaweed and a Composition Thereof	Kajal Chakraborty, <i>et al.</i>	12/09/2022

52.	202211075564	A Process for Obtaining a Purified Polysaccharide Fraction and Anti-hyperglycemic Composition Thereof	Kajal Chakraborty, <i>et al.</i>	26/12/2022
53.	202211075565	A Process for Obtaining a Purified Polysaccharide Fraction and Anti-Inflammatory Composition Therefrom	Kajal Chakraborty, <i>et al.</i>	26/12/2022
54.	202211075566	A Process for Obtaining a Purified Polysaccharide Fraction and a UV Protectant Composition Therefrom	Kajal Chakraborty, <i>et al.</i>	26/12/2022
55.	202211075567	A Process for Obtaining a Purified Polysaccharide Fraction and Anti-Inflammatory Composition Therefrom	Kajal Chakraborty, <i>et al.</i>	26/12/2022
56.	202211075568	A Process for Obtaining a Purified Polysaccharide Fraction and a Wound Healing Composition Therefrom	Kajal Chakraborty, <i>et al.</i>	26/12/2022
57.	202311058947	A Process of Obtaining Polysaccharide from Seaweed and a Composition Thereof	Kajal Chakraborty, <i>et al.</i>	02/09/2023 Licensed
58.	202311077977	A System for Microbubble Aeration in a Closed Mariculture Pond	Divu D, <i>et al.</i>	16/11/2023

59.	202411047584	Anti-inflammatory Composition Containing Polysaccharide and an Extraction Process of Polysaccharide from Green Mussel	Kajal Chakraborty, <i>et al.</i>	20/06/2024	
60.	202411051697	Micro-Feed for Tropical Altricial Fish Larvae and a Process of Its Preparation	Sanal Ebenezar, <i>et al.</i>	05/07/2024	
61.	202411077863	Anticoagulant Composition and a Process for Its Preparation	Kajal Chakraborty, <i>et al.</i>	14/10/2024	Patent Granted 574177 20/11/2025
62.	202411085526	Anti-hyperlipidemic Composition and a Process for Its Preparation	Kajal Chakraborty, <i>et al.</i>	07/11/2024	Patent Granted 587821 28/04/2026
63.	202511002971	Antihypertensive Composition and a Process for Its Preparation	Kajal Chakraborty, <i>et al.</i>	13/01/2025	
64.	202511022447	An Anti-Inflammatory Composition and a Process for Its Preparation	Kajal Chakraborty, <i>et al.</i>	12/03/2025	Patent Granted 577850 09/01/2026
65.	202511021868	A Nutraceutical Composition and a Process for Its Preparation	Kajal Chakraborty, <i>et al.</i>	11/03/2025	

Table 2: Granted Patent Database of ICAR-CMFRI

Sl. No.	Patent Application no.	Patent Title	Year of Filing	Grant No.	Granted Date
1	202411077863	Anticoagulant Composition and a Process for Its Preparation	14/10/2024	574177	20/11/2025
2	201611004807	A Process and Formulation to Prepare Vibrio Antagonistic Micro Feed for Finfish and Shell-Fish Larvae Using Marine Bacteria and a Product Thereof	11/02/2016	558580	23/01/2025
3	201911038055	A Process to Prepare Antihypertensive Concentrate from Seaweed and a Product Thereof	20/09/2019	513214	21/02/2024
4	201911036205	An Antioxidant Composition of Seaweeds	09/09/2019	498920	12/01/2024
5	5199/CHE/2012	A Product Containing Anti-Inflammatory Principles from Brown Seaweeds and a Process Thereof	13/12/2012	482789	14/12/2023
6	201911017798	A Process to Prepare Anti-hypothyroidism Concentrates from Seaweeds and a Product Thereof	03/05/2019	466695	07/11/2023

7	201911017799	A Process to Prepare Anti-dyslipidemic Concentrate Marine Macroalgae and Coastal Sea Crustacean	03/05/2019	463645	30/10/2023
8	201911032735	An Antimicrobial Therapeutic Composition and a Process to Prepare an Antimicrobial Therapeutic Concentrate from Seaweed	13/08/2019	463260	30/10/2023
9	2965/CHE/2013	Growout Pellet Feed for Silver Pompano <i>Trachinotus blochii</i> (Lacepede) and a Process Therefore to Incorporate Essential Nutritional Elements in Fish	03/07/2013	434347	09/06/2023
10	32/CHE/2010	Formulated Feed for Marine Ornamental Fishes and a Process Therefore	06/01/2010	415056	21/12/2022
11	5198/CHE/2012	A Process to Isolate Anti-inflammatory Principles from Green Mussel <i>Perna viridis</i> L. To Prepare a Stabilized Nutraceutical Supplement Against Inflammatory Disorders and a Product Thereof	13/12/2012	387600	27/01/2022
12	5196/CHE/2012	Development of Galvanized Iron Cage for Finfish Culture in Open Sea	13/12/2012	379215	12/10/2021
13	201711018741	A Process to Prepare Anti-dyslipidemic Concentrate from Seaweed and a Product Therof	29/05/2017	376296	02/09/2021

14	5197/CHE/2012	Cement & Concrete Moulded Artificial Reef Apparatus to Aggregate Marine Fish	13/12/2012	358869	19/02/2021
15	3366/DEL/2015	A Process to Prepare Antidiabetic Concentrates from Seaweeds and a Product Thereof	19/10/2015	346531	11/09/2020
16	4254/DEL/2015	Anti-inflammatory Principles in A Preparation of Brown Seaweeds	23/12/2015	333392	28/02/2020
17	31/CHE/2010	A Device for Breeding and Culturing Marine Fish in Open Sea	06/01/2010	322166	01/10/2019
18	1543/ CHE/2009	A Method and Composition for Land-Based Culturing of Pearl Oyster in Marine Body and Device Therefore	30/06/2009	317443	01/08/2019
19	2066/ CHE/2010	A Product Containing Anti-inflammatory Principles from Green Mussel <i>Perna viridis</i> L. and a Process Thereof	20/07/2010	303813	30/11/2018
20	2063/ CHE/2010	A Process to Prepare Naturalised <i>Artemia francesciana</i> From Indian Subcontinent With High Docosahexaenoic Acid and Trehalose for Aquaculture Applications	20/07/2010	302802	01/11/2018

21	2065/ CHE/2010	A Process to Concentrate Anti-inflammatory Principles from Green Mussel <i>Perna viridis</i> L. and a Product Incorporating These Ingredients	20/07/2010	302803	01/11/2018
22	203/CHE/2008	A Method of Producing Phytase Extracellularly from Thermophilic Bacterium	25/01/2008	302657	31/10/2018
23	2064/ CHE/2010	A Process to Prepare Antioxidant and Anti-inflammatory Concentrates from Brown and Red Seaweeds and a Product Thereof	20/07/2010	294451	16/03/2018

Table 3: Technology Commercialized, Industry Partnership and Licensing Fee

Sl. No.	Name of Technology	Year of Commercialization	Mode of Partnership	Name of the Industry Partner	Amount of Licensing Fee
1	Nutraceutical: Cadalmin™ Immunoboost extract (IBe)	04 th November, 2025	MoU (Licensing and Royalty)	SNAP Natural and Alginate Products Private Limited, Ranipet, Tamil Nadu	MoU (for 10 years) @ Rs. 10,00,000/- License fee (royalty 5%)
2	Large-scale seed production of Indian pompano (<i>Trachinotus mookalee</i>)	03 rd November, 2025	Technology transfer	Leela Prakash Hatchery, Thirupathi Andhra Pradesh	MoU (for 3 years) @ Rs. 1,50,000/- + 18% GST License fee
3	Artificial reefs module designing & 3D printing technology	03 rd November, 2025	Technology transfer	Tvasta Manufacturing Solutions Pvt. Ltd Chennai, Tamil Nadu	MoU (for 3 years) @ Rs. 25,000/- License fee
4	Technology transfer of Black Soldier Fly larvae-based biowaste valorization technology	03 rd November, 2025	Technology transfer	Agripoint G3 Technologies Pvt Ltd. Alappuzha Kerala	MoU (for 5 years) @ Rs. 1,00,000/- + 18% GST License fee
5	Artificial reef based coastal habitats restoration and sea ranching in the Indian coast for sustainable marine conservation, and community-based coastal development	27 th September 2025	Technology transfer	Global Oceanic Adventures & Environmental Conservation (GOAEC) Andra Pradesh, India	MoU (for 3 years) @ Rs. 1,00,000/- + 18% GST License fee

6	Production and utilization of insect protein to replace fish meal in fish feeds	24 th July 2025	MoU (Licensing and Royalty)	Mekkara Fish Farm, Thrissur Kerala	MoU (for 5 years) @ Rs. 1,00,000/- License fee (royalty 5%)
7	Live holding and marine aquarium husbandry	29 th May 2025	Technology transfer	Pureflow Biofloc Innovations, Mysuru, Karnataka	MoU (for 3 years) @ Rs. 2,00,000/- License fee
8	Cadalmin™ BSF pro aquafeed technology	06 th January 2025	MoU (Licensing and Royalty)	M/s Bhairav renderers, Coimbatore Tamil Nadu	MoU (for 5 years) @ Rs. 1,00,000/- License fee (5% royalty)
9	Nutraceutical: Cadalmin™ LivCure (LCe) Commercialized under Brand name: GreenRex	21 st October 2024	MoU (Licensing and Royalty)	M/s Emineotech Limited Kochi, Kerala	MoU (for 5 years) @ Rs. 5,25,000/- License fee (6.5% royalty)
10	Cadalmin™ BSF-FFF insects protein based fish feed technology	21 st October 2024	MoU (Licensing and Royalty)	M/s Amala ecoclean PVT Ltd., Kerala	MoU (for 5 years) @ Rs. 1,00,000/- License fee (5% royalty)
11	Nutraceutical: Cadalmin™ Anticholesterolemic extract (Cadalmin™ ACe)	18 th December 2023	MoU (Licensing and Royalty)	Pioneer Pharmaceuticals Kochi, Kerala	MoU (for 5 years) @ Rs. 3,67,000/- license fee (Revenue on 5.1% royalty)
12	Nutraceutical: Cadalmin™ Immunalgin extract (IME)	18 th December 2023	MoU (Licensing and Royalty)	Pioneer Pharmaceuticals in Kochi, Kerala	

13	Cadalmin™ SilverGrow Formulated feed for mariculture species	13 th October 2023	MoU and Licensing	M/S Indian Broiler Group (IB Group) Pvt. Ltd., Chhattisgarh	MoU (for 3 years) @ Rs. 50,000/- license fee
14	Nutraceutical Cadalmin™ Immunoboost extract (Cadalmin™ IBe) for boosting innate immunity	7 th September 2021	MoU (Licensing and Royalty)	Chazah Pharmaceuticals Alappuzha, Kerala	MoU (for 5 years) @ Rs. 4,00,000/- License fee (5% royalty)
15	Nutraceutical Cadalmin™ Antiosteoporotic extract (Cadalmin™ AOe) for use against osteoporosis	7 th September 2021	MoU (Licensing and Royalty)	Chazah Pharmaceuticals Alappuzha, Kerala	MoU (for 5 years) @ Rs. 4,00,000/- License fee (5% royalty)
16	Nutraceutical: Cadalmin™ Green Algal extract (Cadalmin™ GAe) Commercialized under Brand name: Algamin-Arthrit-Ease	9 th September 2020	MoU (Licensing and Royalty)	Pioneer Pharmaceuticals Kochi, Kerala	MoU (for 10 years) @ Rs. 3,89,000/- License fee (5.1% royalty)
17	Nutraceutical: Cadalmin™ Antidiabetic extract (Cadalmin™ ADe) Commercialized under Brand name: Algamin-Diabet-Ease	9 th September 2020	MoU (Licensing and Royalty)	Pioneer Pharmaceuticals Kochi, Kerala	MoU (for 10 years) @ Rs. 3,89,000/- License fee (5.1% royalty)
18	Nutraceutical: Cadalmin™ Antihypertensive extract (Cadalmin™ AHe) Commercialized under Brand name: Algamin-Tension-Ease	9 th September 2020	MoU (Licensing and Royalty)	Pioneer Pharmaceuticals Kochi, Kerala	MoU (for 10 years) @ Rs. 3,89,000/- License fee (5.1% royalty)

19	Nutraceutical: Cadalmín™ Anti-hypothyroidism Extract (Cadalmín™ ATe)	29 th November 2018	MoU (Licensing and Royalty)	Vandana Luthra Curls and Curves (VLCC) Healthcare, Gurgaon Haryana	MoU (for 10 years) @ Rs. 7,10,000/- License fee (5% royalty)
20	Varsha-Ornamental fish feed	28 th August 2018	MoU (Licensing and Royalty)	Taiyo Feed Mill Pvt. Ltd., Chennai, Tamil Nadu	MoU (for 10 years) @ Rs. 1,50,000/- License fee (2% royalty)
21	Nutraceutical: Cadalmín™ Antihypercholesterolemic extract (Cadalmín™ ACe) Antihypercholesterolemic extract (Cadalmín™ ACe)	24 th May 2017	MoU (Licensing and Royalty)	Vandana Luthra Curls and Curves (VLCC) Healthcare, Gurgaon, Haryana	MoU (for 5 years) @ Rs. 10,00,000/- License fee (5% royalty)
22	Nutraceutical: Cadalmín™ Antidiabetic extract (Cadalmín™ ADe)	25 th April 2016	MoU (Licensing and Royalty)	Celestial Biolabs limited, Hyderabad, Telangana	MoU (for 5 years) @ Rs. 5,00,000/- License fee (5% royalty)
23	Nutraceutical: Cadalmín™ Green Algal extract (Cadalmín™ GAe)	August 2012	MoU (Licensing and Royalty)	Celestial Biolabs limited, Hyderabad, Telangana	MoU (for 10 years) @ Rs. 5,00,000/- License fee (5% royalty)
24	Nutraceutical: Cadalmín™ Green Mussel extract (Cadalmín™ GMe) Marketed as AFDC MUSSELTONE®	August 2012	MoU (Licensing and Royalty)	Accelerated Freeze-Drying Company Pvt. Ltd, of Amalgam Group of Companies, Cochin, Kerala	MoU (for 10 years) @ Rs. 10,000/- License fee

Table 4: Designs Database of ICAR-CMFRI

Sl. No	Patent Application No	Title of the Patent	Inventors	Date of Filing	Patent Status
1.	329962-001	Cage for Lobster	Divu D <i>et al.</i>	11/06/2020	Granted and in force
2.	421026-001	A Copepod Nauplii Accumulating And Harvesting Device	Anikuttan K K	24/06/2024	Granted and in force 6/01/2025
3.	484898-001	Black Soldier Fly (BSF) Bioconversion Unit	Sanal Ebenezar <i>et al.</i>	23/12/2025	Filed

Table 5: Trademark Database of ICAR-CMFRI

Sl. No	Application / Registration No.	Trademark Class	Application Granted/Registered	Granted date
1.	2811623	05	Granted and in-force	18/09/2024
2.	2811624	31	Granted and in-force	18/09/2024
3.	2811625	35	Granted and in-force	18/09/2024

Table 6: Technologies/ Products Certified by ICAR

Sl. No	Name of the Technology/ Product/ Methodology	ICAR Code	Lead Developer	Co-developer (s)
2024-2025				
1.	Copepod nauplii accumulating & harvesting device	ICAR-FS-CMFRI-Product-2025-026	Anikkuttan K. K.	B. Santhosh, Tamilmani G., P. Rameshkumar, M. Sakthivel, M. Sankar, R. Bavithra, K. Vinod, A. K. Abdul Nazar, R. Jayakumar, Divu D., Suresh Kumar M., P. S. Swathi Lekshmi, V. V. R. Suresh, G. H. Rao, Tinto Thomas, Aneesh U., M. Jayasingh and A. Gopalakrishnan
2.	Application of compensatory growth in marine finfishes: An innovative culture technology for enhanced efficiency and economic returns	ICAR-FS-CMFRI-Technology-2025-028	Suresh Babu P. P.	Anuraj A., Shilta M. T., Sanal Ebeneezar, Shinoj P., Raghu Ramudu K., Bobby I., Anikkuttan K. K., Rajesh N., Biji Xavier, Sekar Megarajan, Ritesh Ranjan, Shubhadeep Ghosh, Abdul Nazar, A.K., Tamilmani G., Sakthivel M., Ramesh Kumar P.
3.	Breeding and seed production of Giant Trevally, <i>Caranx ignobilis</i> - a high value marine fish	ICAR-FS-CMFRI-Technology-2025-027	Ambarish P. Gop	B. Santhosh, Shakthivel M., Anuraj A., Surya S., F. Muhammed Anzeer, K. S. Aneesh, Dispin Das Y., G. Rathi Buvanaehswari, Krishna Sukumaran, V. V. R. Suresh., Bobby Ignatius., A. Gopalakrishnan, Grinson George
4.	Nutraceutical Cadalmin™ Cardioalginol extract (Cadalmin™ CAe) from seaweed as anticoagulant and to combat cardiac hypertrophy	ICAR-FS-CMFRI-Product-2025-025	Kajal Chakraborty	Ans Mariya George, Silpa K. P., Shifa Jalal, Ashwin Ashok Pai, Shubhajit Dhara, A. Gopalakrishnan

5.	Nutraceutical to combat cardiohypertrophy: Cadalmin™ Cardioocto extract (Cadalmin™ COe) from marine mollusk	ICAR-FS-CMFRI-Product-2025-025	Kajal Chakraborty	A. Gopalakrishnan
6.	Biovalorisation of organic wastes into high-value aquafeed ingredients using black soldier fly larvae (<i>Hermetia illucens</i>)	ICAR-FS-CMFRI-Technology-2025-029	Sanal Ebeneezar	D. Linga Prabu, S. Chandrasekar, Adnan H. Gora, Jeena N.S., P. Vijayagopal, Kajal Chakraborty, Grinson George
7.	Methodology to assess the multi-hazard vulnerability of the coastal districts/ states of India and generation of an interactive atlas of Multi Hazard Vulnerability of India	ICAR-FS-CMFRI-Methodology-2025-021	Reshma Gills	Shelton Padua, C. Ramachandran, Eldho Varghese, K. R. Ratheesh, Grinson George, Rose P. Bright, E. Vivekanandan, J. Jayasankar, A. Gopalakrishnan
8.	A novel method for screening polyunsaturated fatty acid-containing bacteria from marine ecosystems	ICAR-FS-CMFRI-Methodology-2025-023	Sumithra T. G.	Vishnu R., Krupesha Sharma S. R., Chandrasekar S., Anusree V. Nair, Sayooj P., Sreenath K. R., Gopalakrishnan A., C. S. Tejpal
9.	Tube-Net based Seaweed Farming on HDPE Floating Rafts for Rough Coastal Waters	ICAR-FS-CMFRI-Technology-2025-022	Sekar Megarajan	Ritesh Ranjan, Joe K. Kizhakudan, Shubhadeep Ghosh, Biji Xavier, Jayasree Loka, Johnson B, Boby Ignatius, V. V. R. Suresh, Grinson George
10.	Technology for the induced spawning and innate diet analysis of the Indian black clam <i>Villorita cyprinoides</i> (Gray, 1825)	ICAR-FS-CMFRI-Technology-2025-030	Jeena N. S.	Summaya Rahuman, M. K. Anil, P. Gomathi, Sanal Ebeneezar, Eldho Varghese, P. Vijayagopal, P. K. Asokan

2023-2024

1.	Coastal pond farming of Indian pompano	ICAR-FS-CMFRI Technology-2024-020	Sekar Megarajan	Sekar Megarajan R. Rajan, B. Xavier, S. Ghosh, B. Ignatius, A. Gopalakrishnan
2.	Sea cage farming of Indian pompano	ICAR-FS-CMFRI Technology-2024-021	Sekar Megarajan	R. Rajan, B. Xavier, S. Ghosh, B. Ignatius, A. Gopalakrishnan
3.	Production of designer clown fishes through captive breeding	ICAR-FS-CMFRI Technology-2024-022	Anikuttan K. K.	Rameshkumar, A.K. Nazar, R. Jayakumar, G. Tamilmani, M. Sakthivel, M. Sankar, R. Bavithra, B. Johnson, I. Joseph, B. Ignatius, K Madhu, K. Vinod, A. Gopalakrishnan
4.	ArcGIS Web Application-An interactive seaweed farming sites along Indian Coast	ICAR-FS-CMFRI Product-2024-023	B. Johnson	D. Divu, R. Jayasankar, L. Ranjith, P. P. Suresh Babu, M. Koya, S. Ghosh, P. Rohit, B. Ignatius, A. Gopalakrishnan Gyanaranjan Dash, Sekar Megarajan, L. Loveson Edward, Ritesh Ranjan, M. Muktha, Biji Xavier, N. Rajesh, R. Ratheesh Kumar, A. Anuraj, S. Ramkumar, A. Chellappan, Nakhawa Ajay Dayaram, Jayasree Loka, R. Jayakumar, A. K. Abdul Nazar, P. K., Asokan, P. Kaladharan, S. K. Mojjada, V. V. Singh.
5.	Integrated Multi-Trophic Aquaculture (IMTA) of seaweed and fish farming in cages	ICAR-FS-CMFRI Technology-2024-024	B. Johnson	G. Tamilmani, M. Sakthivel, P. Ramesh Kumar, K. K. Anikuttan, M. Sankar, Divu D., S. K. Mojjada, S. Ghosh, Sekar M., P. Shinoj, R. Jayakumar, A. K. Nazar, George G., B. Ignatius, A. Gopalakrishnan

6.	A framework for assessing the level of sustainability associated with mariculture	ICAR-FS-CMFRI Methodology-2024-025	Shinoj P.	M. Muktha, B. Johnson, Charles Jeeva, Anuraj A., P. S. Swathi Lekshmi, S. Ghosh, D. Divu, Sekar M., A. P. Gop, R. Geetha, S.V. Vinuja, B. Ignatius, V. V. R. Suresh, B. Santhosh, R. Narayanakumar, Prem Chand and A. Gopalakrishnan
7.	Environmental Performance Index (EPI): A practical metric for evaluating the health of marine fisheries	ICAR-FS-CMFRI Methodology-2024-026	J. Jayasankar	Eldho Varghese, S. Ghosh, Muktha M., P. Rohit, E. M. Abdussamad, A. P. Dineshbabu, P. Laxmilatha, C. Ramachandran, Shinoj P., M. Kavitha, E. Vivekanandan, Sreepriya V., A. Gopalakrishnan
8.	Cadalmin™ Immunalgin extract (Cadalmin™ IMe): A nutraceutical from seaweed for improving immunity and antiviral activities against delta variant of SARS CoV-2 virus	ICAR-FS-CMFRI Product-2024-027	Kajal Chakraborty	A. Gopalakrishnan
9.	Cadalmin™ LivCure extract (Cadalmin™ LCe): A novel seaweed-based nutraceutical for use against non-alcoholic fatty liver disease	ICAR-FS-CMFRI Product-2024-028	Kajal Chakraborty	A. Gopalakrishnan
10.	Cadalmin™ Silvergrow- A Novel Grow-out feed for Silver Pompano	ICAR-FS-CMFRI Product-2024-029	D. Linga Prabu	S. Chandrasekar, S. Ebeneezar, Sayooj P., P. Vijayagopal, K. Chakraborty, A. Gopalakrishnan

11.	A framework using biological reference points for assessing the health status of marine fish stocks	ICAR-FS-CMFRI Methodology-2024-030	A. Gopala-krishnan	G. Sasikumar, U. Ganga, Shoba J. K., G. Dash, Anulekshmi C., Muktha M., S. Bhendekar, Rajan K., S. Sukumaran, Sujitha T, S. Ghosh, E.M. Abdussamad, Prathibha Rohit, Swatipriyanka Sen, Akhilesh K. V., Remya L., Shikha Rahangdale, K. M. Rajesh, Rekha J. Nair, T. M. Najmudeen, G. B. Purushottama, Mohamed Koya, Subal Kumar Roul, V. Mahesh, Livi Wilson, P. Abdul Azeez, S. Surya, H. M. Manas, D. Ajay Nakhawa, R. Vinothkumar, A. Margaret Muthu Rathinam, P. Laxmilatha, Josileen Jose, A.P. Dineshbabu, Lakshmi Pillai, P. T. Sarada, Rekha Devi Chakraborty, V. Venkatesan, Indira Divipala, R. Vidya, F. Jasmine, M. Kavitha, Rajesh Kumar Pradhan, M. Rajkumar, P. Gomathi, Sunil Kumar Ail, J. Jayasankar, Somy Kuriakose, Mini K.G., Eldho Varghese, Vinay Kumar Vase
-----	---	------------------------------------	--------------------	--

12.	Mass production of marine Copepods	ICAR-FS-CMFRI Technology-2024-031	B. Santhosh	R. Ranjan, C. Kalidas, B. Ignatius, J. Loka, A. P. Gop, G. Gopakumar, A. Gopalakrishnan, Muhammed Anzeer F., Aneesh K.S., M. K. Anil, A. Anuraj, P. P. Suresh Babu, K. K. Anikuttan, Shoji Joseph, Imelda Joseph, V. V. R. Suresh, Mijo V. Abraham, Darsana S., Ritty Mariya Thomas, Jess Wilson, Balakrishna C., S. Sonali, H. Jose Kingsly, V. A. Leslie, Greever Yoyak and Akhil A. R.
-----	------------------------------------	-----------------------------------	-------------	---

2022-2023

1.	Indian pompano farming in coastal cage culture system: Technology	ICAR-FS-CMFRI-Technology-2023-003	Sekar Megarajan	Ritesh Ranjan, Shubhadeep Ghosh, Biji Xavier, K. Madhu, A. Gopalakrishnan
2.	John's snapper, <i>Lutjanus johnii</i> seed production technology	ICAR-FS-CMFRI-Technology-2023-003	Ritesh Ranjan	Sekar Megarajan, Biji Xavier, Shubhadeep Ghosh, A. Gopalakrishnan
3.	Breeding and seed production technology for black-bar chromis (<i>Chromis retrofasciata</i> Weber, 1913): Technology	ICAR-FS-CMFRI-Technology-2023-027	Ambarish P Gop	B. Santhosh, Muhammed Anzeer F., K. S. Aneesh, A. R. Akhil, Boby Ignatius, A. Gopalakrishnan
4.	NANN CON (Indigenous micro algal concentrate from <i>Nannochloropsis oculata</i>): Product	ICAR-FS-CMFRI-Technology-2023-028	Biji Xavier	Ritesh Ranjan, Sekar Megarajan, Shubhadeep Ghosh, A. Gopalakrishnan
5.	A spatial data-driven digital layer product for site suitability distribution for seaweed farming: Product	ICAR-FS-CMFRI-Product-2023-029	Divu D.	Suresh K. Mojjada, Johnson B., Boby Ignatius, A. Gopalakrishnan
6.	Technology on orange-spotted grouper farming in marine cages: Technology	ICAR-FS-CMFRI-Product-2023-032	Sekar Megarajan	Ritesh Ranjan, Shubhadeep Ghosh, Biji Xavier, Imelda Joseph, A. Gopalakrishnan
7.	Nursery rearing of Indian Pompano, <i>Trachinotus mookalee</i> in Re-circulating Aquaculture System (RAS): Technology	ICAR-FS-CMFRI-Methodology-2023-030	Ritesh Ranjan	Sekar Megarajan, Biji Xavier, Shubhadeep Ghosh, A. Gopalakrishnan

8.	Standardized protocol for breeding and seed production of black seabream, <i>Acanthopagrus berda</i> in confined hatchery conditions: Technology	ICAR-FS-CMFRI-Technology-2023-031	P. P. Sureshbabu	A. Anuraj, Shilta M. T., Jayasree Loka, B. Santhosh
9.	Technology for seed production of vermiculated spinefoot, <i>Siganus vermiculatus</i> : Technology	ICAR-FS-CMFRI-Technology-2023-033	Anuraj	P. P. Sureshbabu, Jayasree Loka, Boby Ignatius, B. Santhosh
10.	Hatchery production of cultchless spat of <i>Crassostrea madrasensis</i> through hormone-induced settlement: Technology	ICAR-FS-CMFRI-Technology-2023-034	M. K. Anil	P. Gomathi, Raju B., P. M. Krishnapriya, Omana Shalini
11.	Antihypertensive Nutraceutical: Cadalmin™ Antihypertensive Extract (Cadalmin™ AHe) from Seaweeds: Product	ICAR-FS-CMFRI-Technology-2023-035	Kajal Chakraborty	A. Gopalakrishnan
12.	Nutraceutical to improve immune system: Cadalmin™ Immunoboost extract (Cadalmin™ IBe) from seaweed: Product	ICAR-FS-CMFRI-Product-2023-036	Kajal Chakraborty	A. Gopalakrishnan
13.	Antiosteoporotic nutraceutical to combat osteoporesis: Cadalmin™ Anti-osteoporotic extract (Cadalmin™ AOe) from Seaweeds: Product	ICAR-FS-CMFRI-Product-2023-038	Kajal Chakraborty	A. Gopalakrishnan

CMFRI Developed Nutraceuticals/Fish Feeds/ Technologies



Cadalmin™ Green Mussel extract GMe

To combat joint pain and rheumatoid arthritis

Cadalmin™ GMe, commercialized under the brand name "AFDC Musseltone", contains 100% natural, marine bioactive anti-inflammatory principles extracted from the green mussel *Perna viridis*. This product is effective for chronic joint pain/arthritis, improves cardiovascular functioning and is complete nutritional supplement

Cadalmin™ Green Algal extract GAe

To combat rheumatic arthritic pains

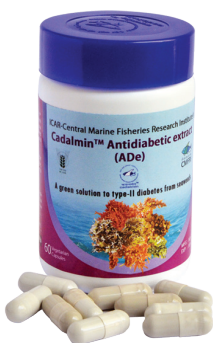
Cadalmin™ Green Algal extract (Cadalmi™ GAe), commercialized under the brand name "Algamin-Arthrit-Ease", contains a unique blend of 100% natural marine bioactive anti-inflammatory ingredients extracted from selected seaweeds with a patented eco-friendly "green technology". The product is effective to combat arthritic pain and inflammatory diseases in human beings.



Cadalmin™ Antidiabetic extract ADe

For use against Type II diabetes

Cadalmin™ Antidiabetic extract (Cadalmi™ ADe), commercialized under the brand name "Algamin-Diabet-Ease", is a nutraceutical product, which provides a unique blend of 100% natural bioactive ingredients extracted from a blend of seaweeds as a natural remedy to type-II diabetes. The bioactive leads with antidiabetic activity were isolated from the seaweeds with an ecofriendly "green" technology.





Cadalmin™
Antihypercholesterolemic extract
ACe

For dyslipidemia

Cadalmin™ ACe is a natural remedy for obesity and dyslipidemia from marine source. Bioactive pharmacophore leads from seaweeds were used to develop Cadalmin™ ACe, which can be administered to regulate clinical indicators leading to dyslipidemia or obesity. The bioactive principles in the nutraceutical inhibit hydroxymethyl glutaryl coenzyme A reductase, various target receptors and other rate limiting enzymes, which are responsible to cause obesity and dyslipidemia.

Cadalmin™
Antihypothyroidism extract
ATe

To combat hypothyroid disorders

Cadalmin™ Antihypothyroidism extract (Cadalmin™ ATe) is a nutraceutical product, which provides a unique blend of 100% natural marine bioactive ingredients with anti-hypothyroidism principles extracted from seaweed, with an ecofriendly "green" technology.



Cadalmin™
Antihypertensive extract
AHe

For use against hypertension

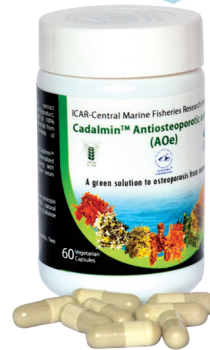
Cadalmin™ Antihypertensive extract (Cadalmin™ AHe), commercialized under the brand name "Algamin-Tension-Ease", is a nutraceutical product, which provides a unique blend of 100% natural bioactives from seaweeds with an ecofriendly "green" technology. Cadalmin™ AHe is a natural remedy for treating hypertension and its related effects from marine source.



Cadalmin™
Antiosteoporotic extract
AOe

To treat osteoporosis

Cadalmin™ Antiosteoporotic extract (Cadalmin™ AOe) is a nutraceutical product, which provides a unique blend of 100% natural bioactive ingredients with anti-osteoporotic principles extracted from seaweeds with an ecofriendly "green" technology.



Cadalmin™
Immunoboost extract
IBe

To combat hypothyroid disorders

Cadalmin™ Immunoboost extract (Cadalmin™ IBe) is a novel nutraceutical product, which provides a unique blend of 100% natural bioactive ingredients extracted from seaweeds with an ecofriendly "green" technology to improve the innate immune system. Cadalmin™ IBe increases innate immune response by regulating nuclear factor κ B along with oxidative stress markers, such as inducible nitric oxide synthetase, pro-inflammatory cyclooxygenases/5-lipoxygenase, bradykinin, inflammatory prostaglandins and leukotrienes.



Cadalmin™
LivCure extract
LCe

To combat non-alcoholic fatty liver disease

Cadalmin™ GreenRex, commercialized under the brand name "GreenRex", is a novel nutraceutical product, which provides a unique blend of 100% natural bioactive ingredients extracted from seaweeds with an ecofriendly "green" technology to improve the liver health and for use against non-alcoholic fatty liver disease (NAFLD). This product showed potential to inhibit hydroxymethyl glutaryl reductase and other pleiotropic target receptors associated with dyslipidemia and physiopathologies leading to NAFLD.





Cadalmin™
Immunalgin extract
IME

As antiviral immunity booster

Cadalmin™ Immunalgin extract (Cadalmin™ IMe) is a green seaweed-based nutraceutical product, which is a 100% natural blend of highly nutritious bioactive ingredients extracted with ecofriendly 'green' technology to boost the innate immunity and has antiviral properties against delta variant of SARS CoV-2 virus. A promising reduction of viral copy formation was observed by administering Cadalmin™ IMe on SARS CoV-2 (delta variant) induced cells in comparison with the infected group.

Cadalmin™
Cardiocto extract
COe

To combat cardio hypertrophy

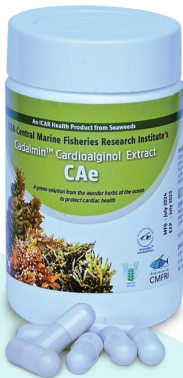
Cadalmin™ Cardiocto extract (Cadalmin™ COe), a nutraceutical product, which is a 100% natural blend of highly nutritious bioactive ingredients extracted from marine mollusk (octopus) with ecofriendly 'green' technology to combat cardiac hypertrophy. Cadalmin™ COe is a blend of bioactive ingredients with promising anti-hypertensive activities by inhibiting angiotensin converting enzyme (ACE) and also combating cardiac hypertrophy via decreasing DNA damage in cardiomyocyte cells and heart failure.



Cadalmin™
Cardioalginol extract
CAe

As anticoagulant and to combat cardiac hypertrophy

Cadalmin™ Cardioalginol (Cadalmin™ CAe) is a 100% natural formulation of algal nutraceutical with a blend of cardioprotective ingredients extracted by green technology from selected seaweeds. The cardioprotective effects of Cadalmin™ CAe involves safeguarding the heart via inhibiting clot formation in blood vessels and improving myocardial functions, such as mitochondrial membrane potential and maintaining calcium homeostasis.



Cadalmin™ **Varsha**

Ornamental fish feed

Scientifically developed color enhancing freshwater ornamental fish feed. Varsha-freshwater ornamental fish feed (FWOFF) is scientifically developed extruded ornamental fish feed containing different natural colour enhancing agents optimally formulated along with marine source ingredients with protein and lipid profile of 45 and 6% respectively.



Cadalmin™ **SilverGrow**

Formulated feed for mariculture species

A novel grow-out feed for silver pompano (*Trachinotus blochii*). Cadalmin™ SilverGrow feed enhances the sustainability and productivity of cage aquaculture of silver pompano. Specifically formulated feed for silver pompano to ensure higher growth with a better feed conversion ratio. Cadalmin™ SilverGrow contains a minimum of 38% protein and 8% fat. Adequately rich in essential nutrients, it is suitable for pompano grow-out in sea cages and pond culture.

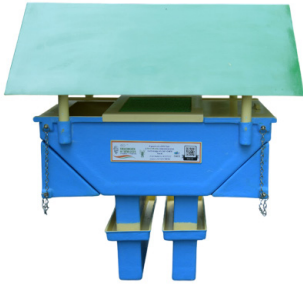


Cadalmin™ **MICROFIN**

Feed for altricial marine finfish larvae

An innovative micro-feed designed for the early-stage rearing of altricial marine finfish larvae of cobia and pompano. A cost-effective indigenous micro-feed for marine fish larvae (suitable for cobia, *Rachycentron canadum* and silver pompano, *Trachinotus blochii*) for sustainable mariculture. Prepared through extrusion, spheronization, fluidized bed processing (drying and spray coating), and precision sieving which delivers the highest quality feed for fish larvae. Tested and evaluated in the marine fish hatcheries of ICAR-CMFRI. Ensures better growth, survival and condition of larvae. Available in particle sizes of 100 to 700 microns according to life-stage/ mouth size of larvae.





Cadalmin™
BSF ZW

A Zero Waste bio-conversion system

A zero-waste black soldier fly larvae-based bio-conversion system. A pilot-scale system for the valorization of organic waste to fish feeds using black soldier fly (BSF) larvae (*Hermetia illucens*). This innovative and eco-friendly bioconversion model efficiently transforms various organic wastes such as food waste, fish waste, and vegetable waste into high-value, sustainable protein- and lipid-rich ingredients for aquafeed production.

Cadalmin™
BSF-FFF

Black soldier fly-larvae-based fish-meal free feed

A fish meal free feed was developed using Black soldier fly larvae meal (BSFLM) for the juveniles of Indian pompano (*Trachinotus mookalee*) and Silver pompano (*Trachinotus blochii*). Feeding trials and evaluation using the standardized feed (having not less than 38% protein & 6% fat) have proven that BSFLM can be used as a total replacer for fish meal in the diets of pompano juveniles without any adverse effects on the growth and condition.



Cadalmin™
BSF-Pro

Black soldier fly-larvae-based aquafeed

Fishmeal free feed for Indian pompano. Cadalmin™ BSF Pro is a novel fish meal-free aquafeed specially formulated for Indian pompano to ensure higher growth with a better feed conversion ratio. It is an insect protein-based fish meal substitute. A fish meal-free feed was developed using Black Soldier Fly Larvae Meal (BSFLM) for the juveniles of Indian pompano (*Trachinotus mookalee*). Feeding trials and evaluations using the standardized feed have proven that BSFLM can be effectively used as a total replacer for fish meal in the diets of pompano juveniles without any adverse effects on their growth and condition.



Cadalmin™

Varna

Ornamental fish feed

Scientifically evaluated, marine ornamental fish feed with 38% protein, 9% fat, 7% minerals and 39% carbohydrates. Capable of maintaining growth, health, colour and vigour of the fishes. Available in different pellet sizes (250, & 750 microns, and 1.0 mm), and coded as CMFRI OFF 25538, CMFRI OFF 7538, and CMFRI OFF 138.



Cadalmin™

Broodmax

Formulated feed for marine ornamental fish broodstock

Scientifically developed feed for brood fish. Contains protein-min. 42%, and fat-8%. Adequately rich in essential nutrients to ensure high fecundity, good egg and larval quality and survival. Enhances the health and condition of broodstock.

Glimpses of ITMU Milestones and Achievements



Market launch of the seaweed-based liver health product GreenRex™ by Shri. P. Rajeeve, Minister for Industries, Government of Kerala, on 21 October 2024 at ICAR-CMFRI, Kochi

Release of Cadalmin™ BSF Pro by Shri. George Kurian, Union Minister of State for Fisheries on 08 November, 2024 at ICAR-CMFRI, Kochi



Release of Cadalmin™ Microfin by Dr. J. K. Jena, DDG (Fisheries Science), ICAR on 27 November, 2024 at ICAR-CMFRI, Kochi



Release of Cadalmin™ Silvergrow by Hon'ble Minister of State for Fisheries, Prof. S.P. Singh Baghel on 24 August 2024 at ICAR-CMFRI, Kochi



Inauguration Of Black Soldier Fly Larva Bioconversion Unit by Shri. George Kurian Hon'ble Minister of State for Fisheries, on 26 September 2024 at ICAR-CMFRI, Kochi

Cadalmin™ AHe from seaweeds is released by The Director-General, Indian Council of Agricultural Research, Dr. Trilochan Mohapatra on 28 May 2019





ICAR-CMFRI transfers innovative insect protein-based fish feed technology to Amala Ecoclean Pvt. Ltd.

Nutraceuticals for use against dyslipidemia and an antiviral immunity booster were commercialized to Pioneer Pharmaceuticals Limited, Kochi for commercial production and marketing.



Nutraceuticals for use against arthritis, type-2 diabetes and hypertension were commercialized to Pioneer Pharmaceuticals Limited, Kochi with a license fee of ₹ 11.67 lakhs and royalty @ 5.1% on net profit for 10 years for commercial production and marketing

ICAR-CMFRI enters into an MoU with Pureflow Biofloc Innovations, Mysuru, Karnataka, for the transfer of technology related to live holding systems and marine aquarium husbandry



ICAR-CMFRI inks an MoU with Global Oceanic Adventures & Environmental Conservation (GOAEC), Andhra Pradesh, for coastal habitat restoration and sea ranching through artificial reef technology

ICAR-CMFRI signs MoU with LAYA, Visakhapatnam, Andhra Pradesh, for transfer of technology in seaweed cultivation



*Celebrating 80 Years of
Marine Fisheries Research, Innovation
and Nation Building*



ICAR-CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
(Department of Agricultural Research and Education, Government of India)
PB. No.1603, Ernakulam North P.O Kochi-682 018
www.cmfri.org.in