SEAFOOD EXPO BHARAT 2025

MPEDA

SOUVENIR

1 - 3 July 2025

Chennai Trade Centre,
Nandambakkam,
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SEAFOOD EXPO BHARAT 2025

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CHAIRMAN'S MESSAGE

Dear Friends,

I am pleased to invite you to the inaugural edition of the Seafood Expo Bharat, taking place at the Chennai Trade Centre. This expo adopts a new format compared to previous events organised by MPEDA. Its primary focus is on showcasing technologies, facilitating business interactions, and promoting business matchmaking. We will also provide technical sessions to share knowledge with stakeholders and encourage networking through a blend of activities.

Although MPEDA planned for a modest beginning, emphasising business and technical sessions, the response to our call for exhibitors has been overwhelming. We had to share limited space with the exhibitors, leaving many unable to participate. As this going to be an annual event in Chennai, I am confident that we will be able to accommodate more exhibitors in the next edition.

Having successfully conducted two rounds of the Reverse Buyer Seller Meets as part of World Food India, MPEDA has this time engaged many more buyers from diverse markets to participate in the meet scheduled during the Seafood Expo Bharat.

The Grand Finale of the Skill Olympiad on value addition is being held alongside the Seafood Expo Bharat. We organised two preliminary rounds in May and June 2025 for participants from the West Coast and East Coast, respectively, in Cochin and Vizakhapatnam. The winners selected from these rounds will participate in the Grand Finale, showcasing their skills in value addition for finfish and shellfish to the invited audience.

MPEDA has developed a new website for Seafood Expo Bharat, featuring an interactive floor plan and a digital interface for stall booking and delegate registration. Show publications and souvenirs are also available online as part of our "Go Green" initiative. Furthermore, delegate passes, and exposition kits are designed to align with our commitment to greener solutions. Even the business matchmaking for the Reverse Buyer Seller Meet is supported by a mobile app for smooth operations.

I am optimistic that everyone will have successful interactions with clients during Seafood Expo Bharat, returning with valuable business opportunities and improved technical knowledge.

Thank you,

(D V SWAMY, IAS)





राष्ट्रपति
भारत गणतंत्र
PRESIDENT
REPUBLIC OF INDIA

MESSAGE

I am happy to know that the Marine Products Export Development Authority (MPEDA) is organising the first edition of Seafood Expo Bharat (SEB) 2025 at Chennai from 1st to 3rd July 2025. A souvenir is being released to commemorate the occasion.

Since its inception, the MPEDA has been dedicated to advancing the export of marine products, including seafood. Seafood Expo Bharat 2025 aims to showcase India's extensive diversity of marine products, advanced processing technologies, and India's dedication to sustainable fisheries management. This significant event will bring together exporters, importers, processors, policy makers and researchers on an integrated platform. Such events strengthen India's position in the global seafood arena by fostering trade relations and promoting quality enhancement and value chain development.

I extend my greetings and felicitations to the organizers and participants and wish the Expo every success.

(Droupadi Murmu)

New Delhi
June 11, 2025



सत्यमेव जयते

प्रधान मंत्री
Prime Minister



MESSAGE

It is a pleasure to learn about the 1st edition of Seafood Expo Bharat (SEB) organised by the Marine Export Development Authority – MPEDA, at Chennai. This first step marks the beginning of a journey that promises endless possibilities.

The geographical identity of Bharat itself has been mentioned with reference to the seas in our earliest scriptures. उत्तरं यत समुद्रस्य – 'the land that lies to the north of the seas' is one such instance.

Seas support marine life, aqua biodiversity and are a vital source of seafood and livelihood. India has a long-standing tradition of pisciculture, with communities practicing fish farming for centuries. Today, the marine and fisheries sector provides employment to millions.

The convergence of stakeholders such as seafood exporters, importers, aqua farmers, scientists, experts, and policymakers creates a dynamic platform for meaningful dialogue. This collaboration fosters the adoption of advanced technologies and global best practices, further cementing India's growing influence in the global seafood industry.

At a pivotal juncture in its quest to expand its global footprint, India is working to position itself as a leader in exporting value-added, sustainable seafood products.

Among the largest exporters of marine products globally, India's marine exports in FY 2023-24 stood at an all-time high of about 18 lakh Metric Tonne (MT) and were valued at more than Rs. 60,000 crore. Through a series of initiatives including market promotion, value addition for exports, improvement in fisheries and aquaculture, every effort is being made to enhance the quality of marine products and boost their exports.

Through innovation in processing, packaging, and emphasis on seamless development of cold-chain storage facilities, modern fishing harbours, fish landing centres and traceability, the marine sector is forging lasting partnerships with international markets and consumers.

May this 1st edition of Seafood Expo Bharat showcase India's strengths - high-quality seafood products, cutting-edge technology and a strong commitment to set new benchmarks in global seafood trade.

Best wishes to MPEDA for making the Expo a resounding success. May the souvenir being published capture the spirit and essence of the occasion.

(Narendra Modi)

New Delhi
आषाढ 06, शक संवत् 1947
27 June, 2025



पीयूष गोयल
PIYUSH GOYAL

सत्यमेव जयते

वाणिज्य एवं उद्योग मंत्री
भारत सरकार
MINISTER OF COMMERCE & INDUSTRY
GOVERNMENT OF INDIA



MESSAGE

I am happy to note that Marine Products Export Development Authority (MPEDA) has taken a great initiative of organizing the 1st edition of Seafood Expo Bharat (SEB) at Chennai from 1-3rd July, 2025.

In the recent years, the seafood export from India has shown exemplary growth. India is now the fourth largest seafood exporter in the world. India achieved all time high seafood exports of USD 7.40 billion in 2024-25. This indicates the consistent efforts of MPEDA and other concerned authorities towards exploring new possibilities for the industry and guide them for the benefits of fisher folks, aqua-farmers and exporters alike.

With this ongoing vision to continue this growth trend and expand our seafood market, I am confident that Seafood Expo Bharat (SEB), 2025 will open new avenues for trade diversification in the sector and provide exposure to emerging trade dynamics, best aquaculture practices and technology and will emerge as a flagship event of India in the seafood sector. .

I extend my heartfelt greetings for grand success of the event.

Piyush Goyal

Ministry of Commerce & Industry, Vanijya Bhawan, Akbar Road, New Delhi-110001
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M.K. STALIN
CHIEF MINISTER OF TAMIL NADU

SECRETARIAT
CHENNAI - 600 009.

19 June, 2025

MESSAGE

I am pleased that the Marine Products Export Development Authority (MPEDA) has chosen Chennai to host the inaugural **Seafood Expo Bharat (SEB) 2025**, from 1st to 3rd July 2025. With its state-of-the-art infrastructure, robust port facilities, and skilled workforce, the city offers an ideal setting to host SEB 2025.

This event aims to highlight our marine resources, recent progress in sustainable fishing and aquaculture, and the important role seafood plays in nutrition, livelihoods, and trade.

I extend a warm welcome to all delegates and invite them to experience Tamil Nadu's rich cultural heritage, thriving culinary landscape, and investor-friendly environment. I hope that this Expo will foster meaningful dialogue and forge lasting collaborations for building a sustainable and prosperous future for the seafood industry.

I wish SEB 2025 every success and am confident it will further strengthen partnerships across the seafood sector.

(M.K. STALIN)



राजीव रंजन सिंह उर्फ ललन सिंह
RAJIV RANJAN SINGH ALIAS LALAN SINGH

सत्यमेव जयते

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Minister of Panchayati Raj and
Minister of Fisheries, Animal Husbandry and Dairying
Government of India

DO. No. 696 MIN PR&FAHD/2025

11 JUN 2025



Message

India stands among the world's top producers and exporters of seafood, providing livelihoods to millions and contributing significantly to rural economies. I am pleased that Marine Products Export Development Authority (MPEDA) is launching the first Seafood Expo Bharat (SEB), 2025 in Chennai from 1st to 3rd July 2025.

This Expo will serve as an excellent platform for fishermen, processors, exporters, researchers and policymakers to interact, exchange knowledge on sustainable practices, and adopt innovations in aquaculture, traceability and quality assurance. I am confident that **SEB 2025** will pave the way for a more resilient, Inclusive and environmentally responsible seafood sector. I extend my warm greetings to all stakeholders and wish the event great success.

(Rajiv Ranjan Singh)

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ANITHA R. RADHAKRISHNAN
MINISTER FOR FISHERIES -
FISHERMEN WELFARE AND ANIMAL HUSBANDRY

SECRETARIAT
CHENNAI - 600 009.

Date 17.6.2025

Messsage

The Tamil Nadu Government under the vibrant leadership of Honorable Chief Minister Thiru. M.K. Stalin has shown impressive growth in the fisheries sector during the last four years.

Tamil Nadu, with its extensive coastline and progressive fisheries policies, has consistently played a key role in advancing marine exports, sustainable aquaculture and fisherfolk welfare.

It gives me immense pleasure to learn that the MPEDA is organizing the first edition of Seafood Expo Bharat (SEB) 2025 in Chennai from 1st to 3rd July 2025. This international event marks a significant step in promoting India's and Tamil Nadu's potential in the seafood sector.

SEB 2025 will offer a unique platform for our fishermen, entrepreneurs and innovators to engage with global markets and explore new opportunities in value addition, quality enhancement and trade collaboration.

I congratulate MPEDA for this timely initiative and extend my best wishes for a successful and impactful Expo.

Anitha R. Radhakrishnan



सुनील बड़थ्वाल
SUNIL BARTHWAL

सत्यमेव जयते

वाणिज्य सचिव
भारत सरकार
नई दिल्ली–110011
COMMERCE SECRETARY
GOVERNMENT OF INDIA
NEW DELHI-110011



MESSAGE

It is a pleasure to learn that Marine Products Export Development Authority (MPEDA) is organizing the 1st edition of Seafood Expo Bharat (SEB) at Chennai from 1-3rd July, 2025, an umbrella event for various stakeholders of the sector to assemble on an international platform and contribute towards the progress of seafood exports from the country.

MPEDA has come a long way organizing 23 editions of the previous India International Seafood Show (IISS), the biennial International Seafood Expo and 4 editions of the Aqua Aquaria India Show and has finally merged both the events into Seafood Expo Bharat (SEB). I congratulate MPEDA for taking such a pathbreaking initiative in the marine export sector.

I am sure that this show will be a great forum to share best practices being followed globally and promote new technology in the industry. This would also prove to be a catalyst for our value added seafood exports given the exemplary growth it has witnessed in past few years.

I wish the Seafood Expo Bharat (SEB) 2025 a grand success.

[Sunil Barthwal]

Place : New Delhi

Date : 13 June, 2025

Room No. 426, Vanijya Bhawan, Akbar Road, New Delhi-110 011, Tel.: 011-23039251-55 / E-mail : csoffice@nic.in
Website : www.commerce.gov.in



Dr. Abhilaksh Likhi, IAS
Secretary
डॉ. अभिलक्ष लिखी, भा.प्र.से.
सचिव



सत्यमेव जयते

भारत सरकार
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मत्स्यपालन विभाग
कृषि भवन, नई दिल्ली–110001
Government of India
Ministry of Fisheries,
Animal Husbandry & Dairying
Department of Fisheries
Krishi Bhawan, New Delhi-110001

MESSAGE

It is heartening to know that the Marine Products Export Development Authority (MPEDA) is organising the first Seafood Expo Bharat (SEB) 2025 in Chennai from 1st to 3rd July 2025. The SEB aims to underscore our collective commitment to quality, sustainability and value addition.

I am confident that interactions among national and international scientists, technologists, entrepreneurs and policymakers at SEB 2025 will yield actionable insights and chart a roadmap to elevate India's seafood exports to new heights. I extend my best wishes to the organizers and participants for a fruitful and successful Expo.

(Abhilaksh Likhi)

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अजय भादू, भा.प्र.से.
महानिदेशक
AJAY BHADOO, IAS
Director General

सत्यमेव जयते

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विदेश व्यापार महानिदेशालय
वाणिज्य भवन, नई दिल्ली-110011
Government of India
Ministry of Commerce & Industry
Directorate General of Foreign Trade
Vanijya Bhawan, New Delhi - 110011

MESSAGE

I am pleased to note that the Marine Products Export Development Authority (MPEDA) is organising the inaugural Seafood Expo Bharat (SEB) 2025 in Chennai from 1st to 3rd July 2025. This significant event aligns with India's vision of enhancing global trade partnerships through innovation, sustainability, and quality assurance in seafood exports.

SEB 2025 will offer Indian exporters a unique opportunity to connect with international buyers, adopt global best practices, and explore value-added and high-margin segments in marine trade. I am confident this Expo will contribute meaningfully to India's goal of expanding its export horizons and reinforcing its reputation as a reliable source of high-quality marine products.

I extend my best wishes to MPEDA and all stakeholders for a successful and impactful Expo.

(Ajay Bhadoo)

19th May, 2025
New Delhi

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International conclave on NextGen technologies in **seafood sector**

The Marine Products Export Development Authority (MPEDA) has consistently led the comprehensive development of the seafood sector through proactive and timely interventions in both capture and culture fisheries. In the year 2023-24, India's seafood export sector achieved a remarkable milestone by exporting 17,81,602 metric tons of seafood, valued at ₹60,523.89 crore (US$ 7.38 billion). Looking ahead, the target for marine products exports is set at US$ 18 billion by 2030. Achieving this ambitious goal will require cutting-edge interventions to support the entire value chain, enhancing production and productivity while ensuring profitability and sustainability.

To introduce and integrate modern technologies into the seafood sector, MPEDA organized the International Conclave on NextGen Technologies in the Seafood Sector on 30th August 2024 at the Hotel Grand Hyatt, Kochi. The event aimed to showcase established technologies that could be seamlessly integrated into the seafood value chain with minimal modifications. An international call for expressions of interest was extended to innovators and professionals, resulting in 44 proposals. These were rigorously evaluated by expert committees consisting of professionals from relevant fields. Based on the practicality of their innovations for industry application, 11 proposals were shortlisted for presentation at the conclave.

MPEDA invited stakeholders from across the seafood value chain, including farmers, hatchery operators, seafood exporters, researchers, academicians, bankers and fishery administrators to participate in the conclave. Based on the invitation, a total of 144 participants attended the conclave, representing research institutes, academic organizations, fisheries departments, stakeholders, bankers, and MPEDA officials.

The event was inaugurated by Mr. Loknath Behera IPS (Rtd.), Managing Director of Kochi Metro Rail Ltd., who, in his address, emphasized the critical role of advanced technology and AI in enhancing the production and delivery of high-quality seafood for both domestic and international markets. Dr. M. Karthikeyan, Director of MPEDA, welcomed the chief guest, dignitaries, speakers and participants from various institutes, departments, organizations and associations across the country. He also provided an overview of the conclave's objectives. Felicitations were offered by Dr. K. Inkarasal, Chief General Manager, NABARD, Mumbai and Mr. Alex Ninan, Vice President, SEAI. Dr. S. Kandan, Joint Director (Training), MPEDA proposed the Vote of Thanks.

Following the inaugural session, the presentations commenced, organized into three thematic sessions. A report on all the 11 presentations is made into separate papers in this Souvenir. The panelists for each session were carefully chosen based on their areas of expertise. The session wise panelists are given below:

Session: 1

1. Dr. M. Neelakandan, Chief Instructor, CIFNET
2. Dr. Radhika Rajasree S.R., Professor, Faculty of Fisheries Science, KUFOS
3. Mr. Alex K. Ninan, Vice President, SEAI

Session: 2

1. Dr. T. Ravisankar, Principal Scientist, Social Science Division, ICAR – CIBA
2. Dr. P. Suresh, Deputy Director, Department of Fisheries, Andhra Pradesh
3. Mr. Madhusudhan Reddy, President, Society of Aquaculture professionals

Session: 3

1. Dr. A. Kathirvelpandian, Principal Scientist, ICAR-NBFGR
2. Dr. Sandhya Sukumaran, Principal Scientist, ICAR-CMFRI
3. Mr. Calraj, President, AISHA- Tamil Nadu chapter

Following the 11 presentations, Mr. Anil Kumar P., Joint Director (Marketing) at MPEDA, provided a summary of the conclave. Dr. K. Inkarsal, Chief General Manager at NABARD, Mumbai, delivered the valedictory remarks. The conclave concluded with the vote of thanks by Dr. Ram Mohan M. K., Joint Director (Quality Control) at MPEDA.



Lighting of lamp by Hon'ble Chief Guest, Mr. Loknath Behera IPS (Rtd.), Managing Director, Kochi Metro Rail Ltd.



Inaugural Speech by Hon'ble Chief Guest Mr. Loknath Behera IPS (Rtd.), Managing Director, Kochi Metro Rail Ltd.



Welcome address by
Dr. M. Karthikeyan, Director, MPEDA



Felicitation speech by Dr. K. Inkarsal,
Chief General Manager, NABARD, Mumbai



Felicitation speech by Mr. Alex Ninan,
Vice President, SEAI



Dr. S. Kandan, Joint Director (Trg.) delivering
vote of thanks during the inaugural session



Summing up of the conclave by
Mr. Anil Kumar P., Joint Director (Marketing),
MPEDA



Valedictory remarks by Dr. K. Inkarsal,
Chief General Manager, NABARD, Mumbai



Vote of thanks by Dr. Ram Mohan M. K., Joint Director (QC), MPEDA







Participants during conclave

Installation of solar powered chiller plant onboard a fishing trawler



Mr. Larson D'Sa
Proprietor, M/s. Goa Solar Power House,
infogoasolarpowerhouse@yahoo.com

Mr. Larson D'Sa, an ex-Merchant Navy Marine Chief Engineer with 18 years of sailing experience, transitioned ashore in 2016. He spent 7 years as Tech Superintendent with Casino Pride before founding M/s. Goa Solar Power House, specializing in solar installations for homes, industries, and agriculture, including on-grid/off-grid, hybrid systems, and solar water heaters. Under his leadership, the company pioneered Goa's first solar-powered chiller plant on a fishing trawler and launched the state's first solar ferry. Mr. Larson holds a Class 1 MEO certification from the UK and currently serves as Chairman of IMEI Goa Branch, Hon. Secretary of the Solar Power Association of Goa, and the Goa Maritime Officers Association.

1. Introduction

The fishing industry is increasingly adopting sustainable practices to reduce environmental impacts and improve economic efficiency. One promising innovation is the integration of solar power technology to enhance the energy efficiency of on-board operations. This concept note proposes the installation of a solar power chiller plant for Fishold, a fishing trawler, to address the challenges associated with refrigeration and energy consumption at sea.

2. Background

Fishing trawlers often rely on diesel-powered generators for refrigeration, which can be costly and environmentally harmful. The need for reliable and energy-efficient cooling solutions is critical for preserving fish quality and reducing operational costs. Solar power offers a renewable energy source that can mitigate fuel dependency, lower emissions, and enhance the sustainability of fishing operations.

3. Project objectives

» **Reduce fuel consumption:** Decrease reliance on diesel generators by utilizing solar energy for chiller operations.

» **Lower operational costs:** Cut down on fuel expenses and maintenance costs associated with traditional cooling systems.

» **Enhance sustainability:** Minimize the carbon footprint of the fishing trawler by using clean, renewable energy.

» **Improve fish preservation:** Ensure better quality of fish through consistent and reliable refrigeration.

4. Proposed solution

4.1. Solar power system:

» **Solar panels:** Install high-efficiency photovoltaic (PV) panels on the trawler's deck or roof. These panels will capture sunlight and convert it into electricity.

» **Inverters:** Use inverters to convert the DC power generated by the solar panels into AC power suitable for the chiller system.

» **Battery storage:** Incorporate a battery storage system to store excess solar energy for use during periods of low sunlight or high energy demand.

4.2. Chiller system:

» **Solar-powered chiller:** Install a solar-powered chiller unit designed for marine applications. This system will operate primarily using solar-generated electricity.

» **Energy efficiency:** Choose a chiller with high energy efficiency ratings to maximize the benefits of the solar power system.

4.3. Integration and Control:

» **Energy management system:** Implement an energy management system to optimize the use of solar power and manage energy storage effectively.

» **Monitoring and control:** Equip the system with monitoring tools to track energy production, consumption, and chiller performance, ensuring efficient operation.

5. Benefits

» **Economic savings:** Reduction in fuel costs can lead to significant financial savings over time.

» **Environmental impact:** Lower greenhouse gas emissions and reduced environmental footprint.

» **Operational efficiency:** Enhanced reliability and performance of refrigeration systems, leading to better fish preservation.

» **Compliance:** Aligns with global sustainability trends and regulations in the fishing industry.

6. Implementation Plan

Feasibility study: Conduct a detailed feasibility study to assess the trawler's structural capacity, solar potential, and system requirements.

Design and engineering: Develop a detailed design for the solar power system and chiller plant, including specifications and integration plans.

Installation: Procure and install solar panels, inverters, battery storage, and chiller units, and perform necessary modifications to the trawler to accommodate the new equipment.

Testing and commissioning: Test the system to ensure all components are functioning

correctly and efficiently, followed by training of the crew members on the operation and maintenance of the new system.

Monitoring and maintenance:

Implement a monitoring system to track performance and conduct regular maintenance to ensure optimal operation.

7. Budget and funding

Cost estimates: Provide a detailed budget covering equipment, installation, and maintenance costs.

Funding sources: Explore potential funding sources, including government grants, environmental subsidies, and private investments.

Conclusion

The installation of a solar power chiller plant on the Fishold fishing trawler represents a forward-thinking approach to sustainable fishing practices. By leveraging solar energy, Fishold can achieve significant cost savings, reduce its environmental impact, and enhance the quality of its catch. This initiative aligns with broader industry trends towards sustainability and innovation, positioning Fishold as a leader in environmentally responsible fishing operations.



Solar panel installed on the roof of deck

BAP

Bismi Aquatic Products



STEAM DRIED FISHMEAL

	LIMITS	PRIME GRADE	STANDARD
PROTEIN	MIN	67%	67%
MOISTURE	MAX	10%	10%
FAT	MAX	10%	10%
ASH	MAX	18%	20%
SALT & SAND	MAX	4%	4%
SAND ALONE	MAX	1%	1%
FFA	MAX	10%	10%
HISTAMINE	MAX	500 PPM	500 PPM
TVN	MAX	120MG/100GM	120MG/100GM
ANTIOXIDANT	MIN	150PPM	150PPM



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	LIMITS	GRADE A	GRADE A
FFA	MAX	3%	4%
MOISTURE & IMPURITIES	MAX	1%	1%
PEROXIDE VALUE	MAX	10 MEQ/KG	10 MEQ/KG
IODINE VALUE	MIN	140	140
EPA + DHA (OMEGA3)	MIN	25%	25%
ANISIDINE	MAX	25	25
ANTIOXIDANT (AT THE TIME OF LOADING)	MIN	250 PPM	250 PPM

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Prof. Sumit Saxena is Professor at the Department of Metallurgical Engineering and Materials Science at IIT Bombay. He is a fellow of the Royal Society of Chemistry (RSC), UK, Institute of Materials, Minerals and Mining (IOM3), UK and National Environmental Science Academy (NESA), India. He has published papers in various high impact journals and holds several patents to his credit. He obtained his PhD from New Jersey Institute of Technology, USA. Subsequently he pursued his postdoctoral research at University of Illinois at Urbana Champaign, USA and Harvard University, USA. His current research interests include water remediation, sensors and energy storage.

Fish and seafood not only forms staple food for a large number of the human population but also finds place in the form of delicacies across humanity. Mercury contamination in water and seafood is a serious health concern. Fish and shellfish concentrate mercury in their bodies, often in the form of methylmercury, a highly toxic organomercury compound. Mercury is known to bioaccumulate in humans, thus bioaccumulation in seafood carries over to humans, resulting in mercury poisoning.

Nanomaterials show unique properties such as high surface area, enhanced reactivity along with tunable physical and chemical characteristics and have shown great potential in detection of heavy metals. Specifically functionalized quantum dots which bind to a particular analyte. The specific binding ability induces changes in the electronic properties and hence the chemiresistive response of the sensor matrix. In this perspective a sensor matrix was developed to bind with mercury ions. This sensor matrix was then printed on a strip to be able to measure the change in resistivity of the strip when exposed to the analyte (methyl mercury). The change in resistivity could be measured using a palmtop device which displays the level of mercury contamination in the water samples. The contamination levels were tested in real water samples spiked with methylmercury as well as on fish blood samples.



Handheld mercury sensor

A novel molecular approach for combating seafood fraud in crustaceans

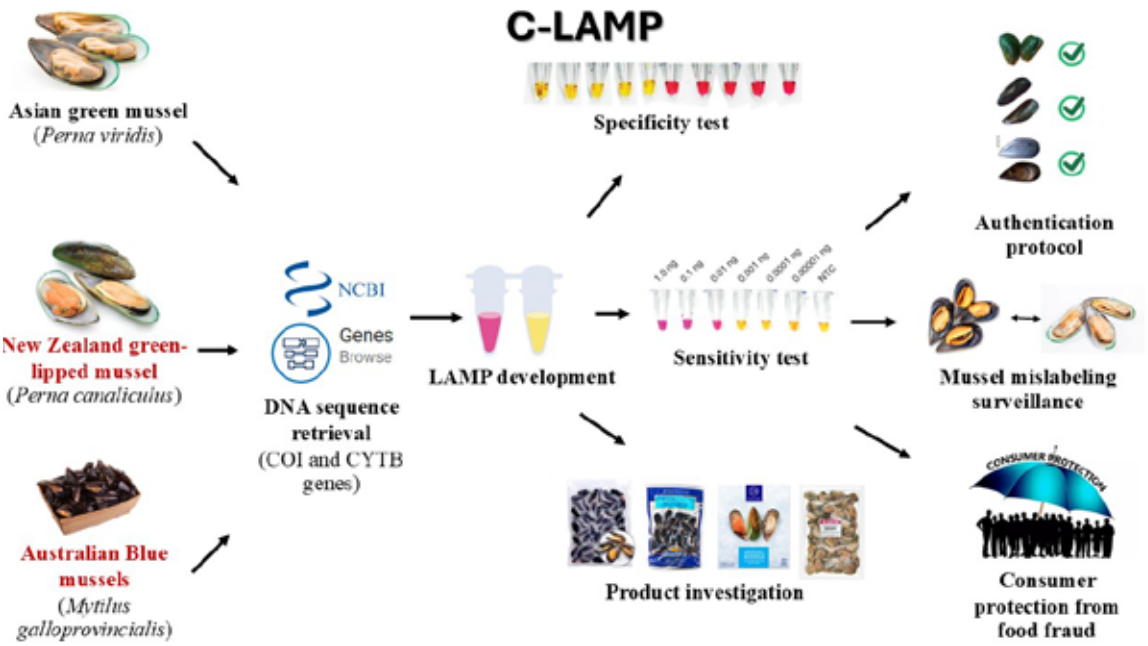


Mr. Gururaj Moorthy, Ph.D Student
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Mr. Gururaj Moorthy is a researcher specializing in seafood science and technology. With a strong background in fisheries science from TNFU, India, he is currently pursuing a Ph.D. at the International Centre of Excellence in Seafood Science and Innovation (ICE-SSI) at Prince of Songkla University, Thailand. His research focuses on developing rapid and novel molecular approaches for shellfish food safety, including species substitutions, allergens, and seafood-related pathogens, while ensuring compliance with food safety standards. His work significantly contributes to the global food industry by maintaining the quality and integrity of seafood products and supporting sustainable aquaculture.

Seafood fraud, including species substitution and adulteration, poses a significant threat to public health and consumer confidence. Crustaceans, particularly in processed formats, are vulnerable to fraudulent activities due to their similar appearances, high consumer demand, and market value. To address this issue, we have developed novel molecular techniques to accurately and rapidly authenticate crustacean and Mollusc species, such as mussels and crabs.

Colorimetric Loop-mediated isothermal amplification (C-LAMP) is a nucleic acid amplification technique that can be operated under isothermal conditions. This technique has significant use



Pictorial representation of the technology

in the field of food authenticity, with a relatively short operation time and no need for costly instruments. The developed C-LAMP assays can be designed for portable equipment, making them suitable for testing at many points along the supply chain, such as processing facilities and border control. It provides a quick, reliable, low-hands-on-time, and cost-effective method of identifying the mussel species.

Multiplex PCR combined with lateral flow dipstick assay (mPCR-LFD) is a high throughput method that amplifies DNA sequences of numerous target species within a short period of time. This considerably increases efficiency and enables the detection of several species in a single test with easy result interpretation. There have been limited studies on the development of mPCR-LFD assay for identifying different species of fish products. PCR amplifies target DNA sequences, which are then detected by LFD strips for rapid and on-site results. The LFD dipstick allows staff to do simple on-site tests within a short time period. This approach would be effective even with processed seafood samples (boiled, steamed, etc.), making it useful in real-world circumstances. The combined strategy provides results quickly, allowing for prompt action against fraudulent practices.

In conclusion, these novel technologies present a promising solution to the issue of seafood fraud. The speed, precision, user-friendliness, and environmental benefits of this molecular tech position them as valuable tools for assuring the integrity and safety of the seafood supply chain. These technologies are a promising alternative for routine fishery examination that enables a wide range of stakeholders, from regulatory authorities to industry people, to contribute to the safety of the seafood industry. By implementing these innovative molecular approaches, we can significantly reduce the prevalence of seafood fraud in crustaceans, protect consumers from health risks, safeguard the reputation of the seafood industry, and promote fair trade practices.

Fully automated patented off-ground waste-water treatment technology



Mr. Assalam,
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Mr. Assalam is having 10 years of experience in wastewater treatment industry, BE in Mechanical Engineering with knowledge of Plant Design, Manufacturing and Automation.

Almighty Engineering, with over 15 years of expertise in wastewater technology, has introduced a groundbreaking, patented system that promises to transform the way wastewater is treated. Their cutting-edge technology, approved by the Department of Scientific and Industrial Research (DSIR) and developed in collaboration with the Ministry of Environment, Forestry and Climate Science, positions them as a leader in sustainable solutions.

At the heart of their innovation is the Almighty Effluent Treatment Machine (AETM), a fully automated vehicle designed for efficient wastewater treatment. The process begins with the selection of the treatment type via an HMI screen. It proceeds with the neutralization of the water's pH level, followed by the removal of colour and odour through the Colour Odour Parameters Removal (COPR) system. Advanced contaminants are then filtered using sand and carbon filters, and the process culminates in ultra-filtration, delivering clean, treated water.



Almighty – Effluent Treatment & Recycling Machine (AETM)

Compared to conventional Effluent Treatment Plants (ETP), Almighty Engineering's technology requires significantly less space, operates quietly, and is free from unpleasant odours. This advanced system is highly efficient, requiring minimal manpower and offering a lifetime warranty—a testament to its durability and reliability.

With nearly 100 successful installations across industries like textiles, dairy, and silk, Almighty Engineering is setting a new standard for wastewater management. Their commitment to sustainability and innovation makes them a trusted partner for industries seeking eco-friendly, efficient wastewater treatment solutions.

Innovations for traceability: Safer products for people & the planet



Mr. Jayan Nallacherry
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With over 28 years of expertise in digital and AI transformation, Jayan Nallacherry, Founder and CEO of TRALEXHO, is pioneering AI-driven solutions to revolutionize food safety, sustainability, and authenticity in the supply chain. Prior to founding TRALEXHO, Jayan spent 15+ years at IBM, where he held senior leadership roles and led cutting-edge interdisciplinary research in AI, cloud computing, and data science, earning him numerous patents and prestigious awards, including the Lou Gerstner Award and IBM Outstanding Technical Achievement Award.

Jayan's academic credentials include a master's in quality management and a bachelor's in information systems from BITS Pilani, along with an Executive Management Program in "Leadership with AI" from ISB, Hyderabad. His career, marked by a blend of strategic foresight and operational excellence, positions him as a leading innovator in the digital and AI landscape.

TRALEXHO, founded in 2021, is a trailblazing company dedicated to revolutionizing food safety and sustainability through advanced AI-driven digital solutions. Established by a team of seasoned technologists and innovators with deep expertise in food safety, traceability and regulatory standards, TRALEXHO is committed to developing practical, affordable, and accessible technologies that empower producers to achieve safe and sustainable food production. The company's flagship offering, the Traceability as a Service (TaaS) platform, is meticulously designed to enhance transparency across the entire food supply chain, while meeting and exceeding global regulatory compliance standards.

Traceability as a Service (TaaS) Platform

TRALEXHO'S patented, award winning (from DPIIT & Startup India) TaaS platform is a highly flexible, self-orchestrated, cloud-based solution that provides comprehensive item-level traceability. It is built based on the GS1 framework to meet and exceed various regulatory standards, including the USFDA FSMA, EUFCR and EUDR, making it ideal for businesses of all sizes, from small enterprises to large-scale operations be it domestic or export oriented. The platform integrates seamlessly with external systems through its robust APIs, supporting IoT devices, blockchain, ERP systems, and more. This adaptability ensures that enterprises can easily implement the platform to meet compliance requirements while optimizing business processes and productivity improvements.



Key features and innovations

TRALEXHO'S TaaS platform stands out due to its innovative features:

» **QR code-based traceability:** Enables detailed item level tracing at both in-process and end-consumer. It allows Capture Once, Share as needed with enhanced data sharing controls.

» **Designed in India, designed for the world:** The platform is designed for easy use, requiring minimal technical knowledge, making it accessible to producers in both rural and urban settings world-wide using simple smart phones.

» **Self-orchestrated:** The platform simplifies the complexities of GS1 and various regulatory standards, offering an admin module that adapts to dynamic business processes across various product categories and compliance requirements and interoperability.

» **Patented AI technologies:** The platform utilizes AI/ML technologies for enhanced food safety and sustainability, ensuring that products are not only traceable but also meet ethical and legal standards apart from data driven productivity improvements

» **Enhanced consumer trust:** By ensuring transparency and authenticity, the platform helps build trust with consumers, which can lead to increased sales and customer retention.

» **Easy to implement, use and adopt -** Can be implemented in couple of weeks

» **It's a cloud-based service,** at a price point that won't be a burden for the business

TRALEXHO'S TaaS platform is more than just a digital traceability solution; it's a comprehensive tool for ensuring the safety, sustainability, and transparency of the food we consume. By empowering stakeholders across the supply chain, TRALEXHO is driving a transformative movement towards a more trustworthy and sustainable food future.

TRALEXHO is eager to collaborate with the seafood export community and its stakeholders to initiate adoption pilots that will help businesses to progressively build necessary capabilities to meet upcoming regulatory requirements. With the mandatory compliance deadlines coming up in January 2026 (such as USFDA FSMA and EUFCR), TRALEXHO'S Traceability as a Service (TaaS) platform offers an ideal solution for ensuring your operations are fully compliant and ahead of the curve.

API based blockchain system for traceability and data storage in seafood supply chain



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Stafan holds a degree in Electronics and Communication Engineering from Kerala University, earned in 2011. Although he is an electronics engineer by education, he acquired skills in software development over the years and evolved as an engineer with both software and hardware skills. In 2013 he also completed his PGDM, specializing in marketing. He started his entrepreneurial journey in 2013 right after he completed his education. Like many other Indian entrepreneurs, he dreamt and pursued the journey with grit and eventually found his home at Nextler Innovations Private Limited, which he co-founded with his younger brother, Jeswin Alex in 2018. Nextler Innovations offers software and IoT solutions to clients in India and abroad, both private and government. Currently, Nextler is building Nextler GSN - A blockchain-based traceability platform for the seafood supply chain.

The ever-evolving seafood export market qualifies seafood exports based on different parameters. Among those parameters, traceability data is becoming important because some importing countries such as the US have made it part of their import mandate. Moreover, countries that can export seafood with reliable traceability data will get a competitive edge in the global market and can thus attract more importers. India as a seafood exporter can boost its brand image in the global market thus increasing demand for seafood overtime, helping us to achieve the targets set for 2030.

What are we offering?

The company offers APIs for different participants in the seafood supply chain to easily integrate blockchain technology into their existing systems, so that they can start publishing their data to the block chain network. This blockchain data can be accessed by relevant participants of the seafood supply chain as required using a web-based application.

Relevance of proposed technology

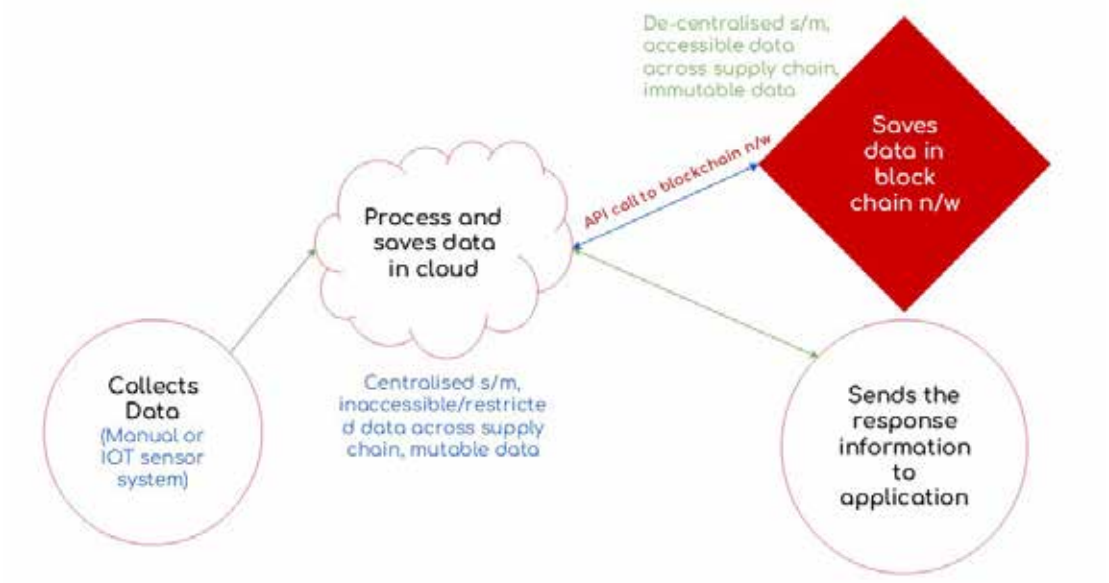
» Different participants in the supply chain use different software, vendors, agreements to take care of important data. While the data is lost over time, it is also to be noted that the centralized method makes data unreliable as they can be manipulated if required. In addition to this more and more IOT based sensors come into the market, making the data more centralized, inaccessible and mutable if required. This is where blockchain technology-based traceability systems come into play.

» But the challenge to adopt blockchain technology is that its difficult for these participants to switch from their existing systems, vendors etc. to a new platform.

» The solution - API based blockchain system will help the adoption better as participants need not to switch but only integrate the proposed technology to existing systems for which technology support will be provided.

Use-case Scenarios / Examples

1. MPEDA issues catch certificates and post-harvest testing certificates for exporters. While issuing the certificates using the current system, MPEDA can integrate the proposed technology to make a post request using the API to store the certificates in the blockchain network. This certificate in the block chain network can be accessed by exporter, MPEDA, importer and any other relevant stakeholder as required. On successful completion of this step, all exporters in India will be automatically onboarded to the blockchain platform.
2. While transporting the seafood for export, the transport vehicles use temperature sensors to record temperature and save it locally in storage devices that can be later accessed for documentation purposes. An IOT based temperature sensor system can use the proposed technology to save the data to the blockchain network so that the data is more secure, immutable and more credible for importers.



Workflow of IoT Based data storage system

How will technology evolve over time?

The immediate objective is to onboard most critical participants (such as the regulatory bodies) in the supply chain to make use of the proposed technology. With more and more participants using the technology, a unified web platform is possible that covers all areas of the supply chain. It will enable stakeholders to garner insights from data and make more informed decisions that will help to increase production, quality, ensure food safety, prevent fraud, etc. among many other use cases.

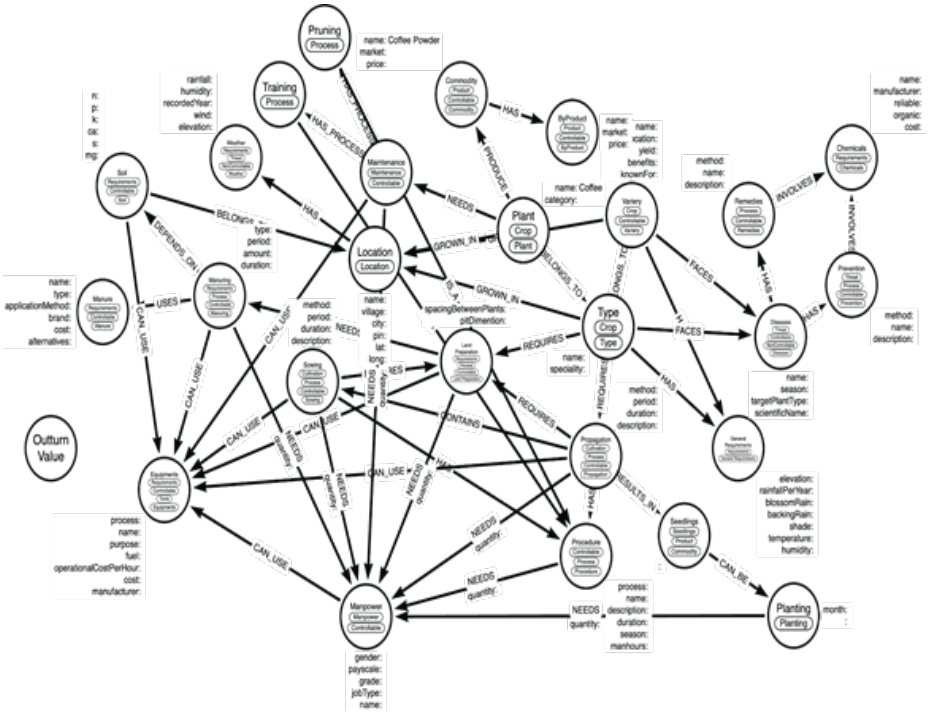
AquaScope: Knowledge graph based human centric generative AI tools for aquaculture



Mr. Sooraj K. Babu
Founder
M/s. NeuBiom Labs Pvt. Ltd.
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Sooraj K. Babu, the founder and CEO of NeuBiom Labs, brings in the experience from his agricultural upbringing in Wayanad, Kerala inspiring his work with a profound comprehension of the challenges faced in the agricultural sector. Presently, he serves as a Ph.D. research scholar affiliated with the Games Engineering Research Group at the University of Würzburg in Germany. In addition, he serves as a scientist at the BIRAC BioNest (Dr Moopen's iNEST) leading the Digital Health research wing.

NeuBiom Labs is an impact-driven AgTech startup focused on empowering farmers through the development of human-centric AI tools that help optimize aquaculture and agriculture practices and improve yields. Their flagship platform, AquaScope, offers a user-friendly, multilingual interface that provides personalized recommendations for farm management, water quality monitoring, and species health management. The AI system integrates knowledge from traditional, scientific, and data-driven sources, utilizing large language models and knowledge graphs to offer actionable insights. By addressing challenges like climate change, digital divides, and knowledge gaps, NeuBiom Labs aims to promote sustainable aquaculture and support farmers in making data-driven decisions.



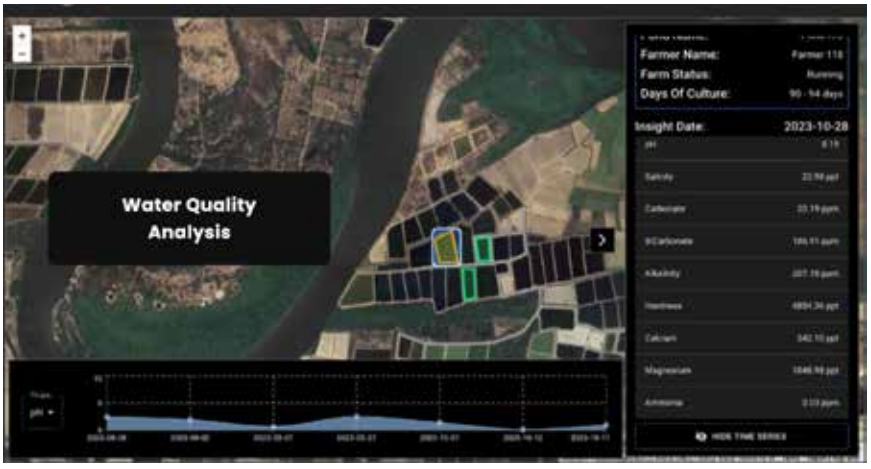
Realtime Geo-spatial analysis for aquaculture



Mr. Pranit Mehta
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Pranit Mehta is the Co-Founder & VP, Business Development at GalaxEye Space, a DeepTech startup building India's first private constellation of Earth Imaging Satellites. An IIT Madras alumnus, he leads GalaxEye's efforts in the aquaculture industry through their brand, GalaxEye Blue. GalaxEye Blue utilizes advanced remote sensing and satellite imagery to monitor and predict stocking and harvesting activities, assess water quality parameters, and more, without the need for physical pond samples. Under Pranit's leadership, GalaxEye is revolutionizing aquaculture, providing innovative solutions for more efficient and sustainable farming practices, having signed up a couple of marquee clients in India, and currently experimenting its tech across 6 countries.

GalaxEye Blue, developed by GalaxEye Space, is the world's most advanced Geospatial AI Software for Aquaculture, harnessing satellite imagery and advanced analytics to transform India's shrimp farming industry.



Despite being a global leader, the industry faces challenges such as fragmented data sources, inconsistent product quality, and environmental sustainability issues. GalaxEye Blue addresses these challenges by providing a comprehensive, real-time geospatial platform that maps aquaculture ponds, monitors culture status, forecasts markets, and optimizes water quality assessments. With over 3 lakh ponds already mapped across India, GalaxEye Blue is pioneering the first geospatial atlas of aquaculture ponds in India, offering unprecedented insights and tools to enhance productivity, ensure product quality, and support sustainability.

Automated shrimp larvae counting in hatcheries and ponds (bayline) and real time and sustainable monitoring of water quality in aquaculture ponds (baylink)



Mr. Sunkaranam Venkata Narayana Rao
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9959380345

S.V. Narayanarao is an experienced professional with over 30 years in shrimp hatchery and farming. He specializes in both P. Monodon and L. vannamei shrimp farming, with expertise in farm management, biosecurity, and technical operations. His career spans roles from Farm Technician to Technical and Sales Manager, showcasing his comprehensive knowledge of the shrimp industry.

Sree Harinarayana Shrimp Technologies Pvt. Ltd. (SHNSTPL) is at the forefront of transforming the shrimp farming industry through cutting-edge technology and innovation. By integrating artificial intelligence, IoT, and mobile applications, SHNSTPL is addressing the challenges faced by shrimp farmers and revolutionizing aquaculture practices. Their solutions promise to enhance efficiency, reduce costs, and promote sustainability in an industry that is crucial for global food security.





Innovative Solutions

BAYLINE Mobile App

This sophisticated app leverages AI and IoT to automate tasks and enhance precision in shrimp farming. Key features include advanced computer vision algorithms that detect and count shrimp post-larvae with 95% accuracy in under 20 seconds, providing a critical tool for inventory management and stocking decisions.

BAYLINK Water Monitoring System

This IoT-based system continuously monitors vital water parameters to ensure optimal conditions for shrimp health and growth. The system offers real-time data and alerts, enabling farmers to respond promptly to any changes, thus preventing potential losses.

TeOra's SOLAQ platform for aquaculture disease management



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Harish is a leader in Biotechnology who is spearheading transformative solutions for aquaculture and agriculture at TeOra. With a robust background working with Fortune 500 healthcare and life sciences companies, Harish brings strategic vision and data-driven decision-making to the forefront of research and business building.

At TeOra, Harish leads the India business, overseeing key functions including R&D, Sales & Marketing, Operations, HR, and Finance. Their leadership extends to nurturing strategic partnerships and managing and driving fundraising and investor relations to align TeOra's vision with impactful investments. Passionate about leveraging technology for social good, Harish is committed to delivering innovative and sustainable solutions that shape the future of biotech and beyond.

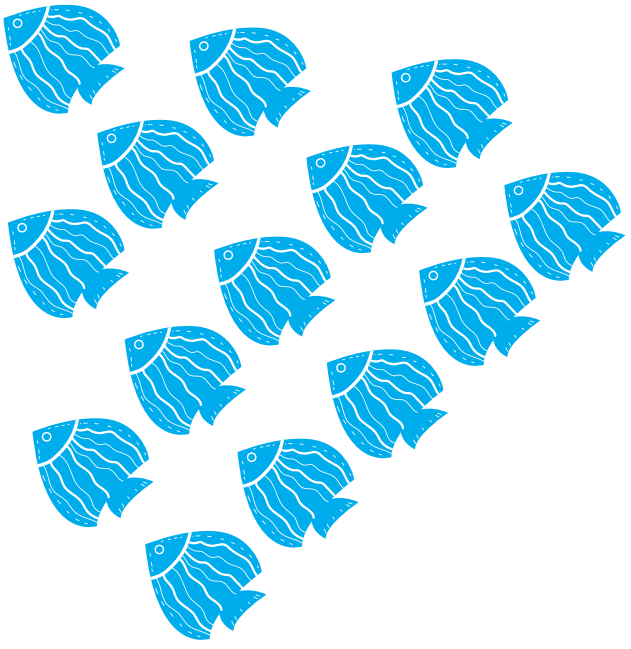
TeOra is committed to solving the challenges of disease management in aquaculture through innovative solutions grounded in synthetic biology and material science. The company focuses on the rapidly expanding aquaculture sector, particularly tropical species, which is crucial for satisfying the growing global demand for sustainable seafood.

Aquaculture, especially in the Asia-Pacific region, is undergoing significant growth but faces severe challenges from disease outbreaks. Traditional methods, such as antibiotics, present risks to both human health and environmental sustainability. TeOra's SOLAQ platform offers a transformative solution by combining bioinformatics, synthetic biology, and precision fermentation to develop customizable, orally delivered vaccines and therapeutics.

SOLAQ's efficacy has been validated in shrimp and fish. In trials against the White Spot Syndrome Virus, showed a remarkable increase in survival rates from 0% in untreated shrimp to 83% in treated shrimp. Similarly efficient solutions have been tested out in fish for Streptococcus iniae and scale drop disease virus thus proving the platform's capabilities to target a variety of disease-causing pathogens. The platform's products are designed to be easily stored, cost-effective, and compatible with existing farming practices.



TeOra is poised to revolutionize disease management in aquaculture by providing natural, sustainable, and safe alternatives to harmful chemicals, ultimately enhancing productivity and reducing losses across the industry.



Moving Intelligent Autofeeder-Mila Feeder



Mr. Vanka Sai Naga Lokesh
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Mr. Lokesh Vanka hails from a small village in southern India, Bantumilli, Andhra Pradesh. His parents have been involved in shrimp aquaculture for over 25 years, and he grew up witnessing the struggles faced by them and other farmers in the region.

While studying for a Diploma in Electronics and Communication Engineering (ECE) in 2015, Mr. Vanka entered the aquaculture sector and personally experienced the challenges it posed. Later, he pursued a B.Tech in ECE, and at the age of 20, he started his own firm to provide innovative solutions to farmers.

His entrepreneurial spirit and contributions to the sector earned him several prestigious honors and awards, including a recognition award from the Hon'ble Chief Minister of Andhra Pradesh, Sri Nara Chandrababu Naidu, in 2019, from the Hon'ble Vice President of India, Sri M. Venkaiah Naidu, in 2018, and from the Hon'ble Prime Minister of India, Sri Narendra Modi, in 2022. In 2019, he was also awarded a national prize of ₹3 lakh by 3M-CII in the Rural Innovation category.



Moving Intelligent Auto Feeder

In 2019, we developed the first moving feeder in India - MILA FEEDER Moving Intelligent Auto Feeder. It broadcasts feed into the pond, similar to a traditional method of feeding. This feeder is unique in that it uses Artificial Intelligence and Machine Learning (AI/ML) to detect when the shrimps are hungry and automatically feed them as well as monitor water parameters and control aeration motors system in real time with sensors and automation systems. This feeder has the potential to revolutionize the shrimp farming industry in India. It is also eco-friendly and has a low energy consumption. We are hopeful that this product will provide a better future for shrimp farmers and their families.

BISMI GROUP OF COMPANIES

We guarantee the traceability through vertical Integration















"Through Our value based vertically integrated chain of Shrimp Hatchery, Shrimp Feed & Fish meal manufacturing units BISMI ensures protein enriched quality happy shrimp for the global populace"

BISMI FISHERIES FISHMEAL & OIL

BISMI FEEDS TRIGGER

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NIFPHATT launched Tilapia, Seaweed and Tuna Based Value added products

Dr. Shine Kumar C.S.
Director, NIFPHATT, Dept. of Fisheries, Govt. of India

Integrated Fisheries Project, the forerunner of NIFPHATT was established in the year 1952 at Quilon as Indo-Norwegian Project as the offspring of a tripartite agreement between Governments of India, Norway and the UNDP. National Institute of Fisheries Post Harvest Technology and Training (NIFPHATT) is focused on value addition, product development, test marketing and capacity building in these areas. As part of this the National Institute of Fisheries Post Harvest Technology and Training (NIFPHATT) unveiled seven pioneering value-added products at the World Food India 2024 Exhibition. These products are based on Tilapia, seaweed and Tuna which are the important resources contributing to the national economy and supported by the Govt. of India under the Pradhan Mantri Matsya Sampada Yojana (PMMSY). The product range includes five Tilapia based ready-to-eat or ready-to-cook items, a nutrient-rich Seaweed 'Kheer', and a sustainable dog feed named 'Happy Puppy'. Collectively, these launches are designed to enhance consumer health, empower coastal communities, and increase the commercial viability of underexploited marine resources. The products were launched by Prof. S.P. Singh Baghel, Hon'ble Union Minister of State for Fisheries, Animal Husbandry & Dairying, Mr. Sagar Mehra, Joint Secretary (Inland Fisheries & Administration) and Ms. Neetu Kumari Prasad, Joint Secretary (Marine Fisheries), during the World Food India 2024 organised by the Ministry of Food Processing Industries from 19.09.2024 to 22.09.2024 at Bharat Mandapam, New Delhi.



Prof. S.P. Singh Baghel, Hon'ble Union Minister of State for Fisheries, Animal Husbandry & Dairying, Mr. Sagar Mehra Joint Secretary (Inland Fisheries & Administration) and Ms. Neetu Kumari Prasad, Joint Secretary (Marine Fisheries), and other officials launching the products in World Food India 2024.

Unlocking the potential of Tilapia: A nutritional powerhouse

This was an attempt to popularize the tilapia based fish products to the consumers and get reasonable prices to the farmers. Even though tilapia farming and its production has increased, the marketing of Tilapia is still a challenge to the farmers. NIFPHATT's five Tilapia based value added products aim to change this scenario by offering high-protein, low-fat alternatives that are both flavourful and appealing. These products cater to the modern consumer's need for convenience, nutrition, and taste, while supporting livelihoods across the fisheries value chain.



1. Tilapia fish curry

A North Indian-style, ready-to-eat delicacy, this curry is prepared using aromatic Indian spices and tender Tilapia meat. Packed in retort pouches, with an extended shelf life, offering a nutritious, protein-rich option for busy consumers seeking authentic flavours.



2. Tilapia Kheema (Minced Meat)

Frozen minced Tilapia offers culinary versatility for dishes like fish cutlets, meatballs, and much more. Its neutral flavour and adaptable texture make it ideal for both Indian and international cuisines.



3. Tilapia Fish Cutlet

This ready-to-fry product uses minced Tilapia, vegetables, and Indian spices, coated in crispy breadcrumbs. With a shelf life of up to eight months, they offer a protein-rich snack option that combines convenience with health benefits.



4. Tilapia Fish Momo

This product reinvents the traditional momo with a healthy twist, stuffed with a flavorful mix of Tilapia, cabbage, carrot, and spring onion. Designed for health conscious consumers, it provides a balanced, ready-to-cook snack solution.

5. Tilapia Fish Nugget



Ready-to-fry and packed with taste, these breaded nuggets combine crispiness with the succulence of Tilapia meat, enhanced with spices and oregano. With a six-month shelf life, they cater to quality-conscious snack lovers.

6. Seaweed Kheer: A nutrient-dense dessert for the future



In addition to Tilapia-based innovations, NIFPHATT launched Seaweed Kheer, an innovative and health conscious dessert that blends jaggery, coconut milk, and seaweed. This product not only addresses nutritional deficiencies but also promotes marine sustainability and supports India's seaweed farming communities. This initiative was mainly to popularize usage of edible seaweeds in the country. Unlike conventional sweets, Seaweed Kheer is naturally sweetened with jaggery and is rich in antioxidants, fiber, and omega-3 fatty acids. It supports heart health, improves digestion, and contributes to better weight management. Its ingredients jaggery and coconut milk further enhance its nutritional profile, making it suitable for people with lactose intolerance.

7. Happy Puppy: Dog nutrition with a marine touch



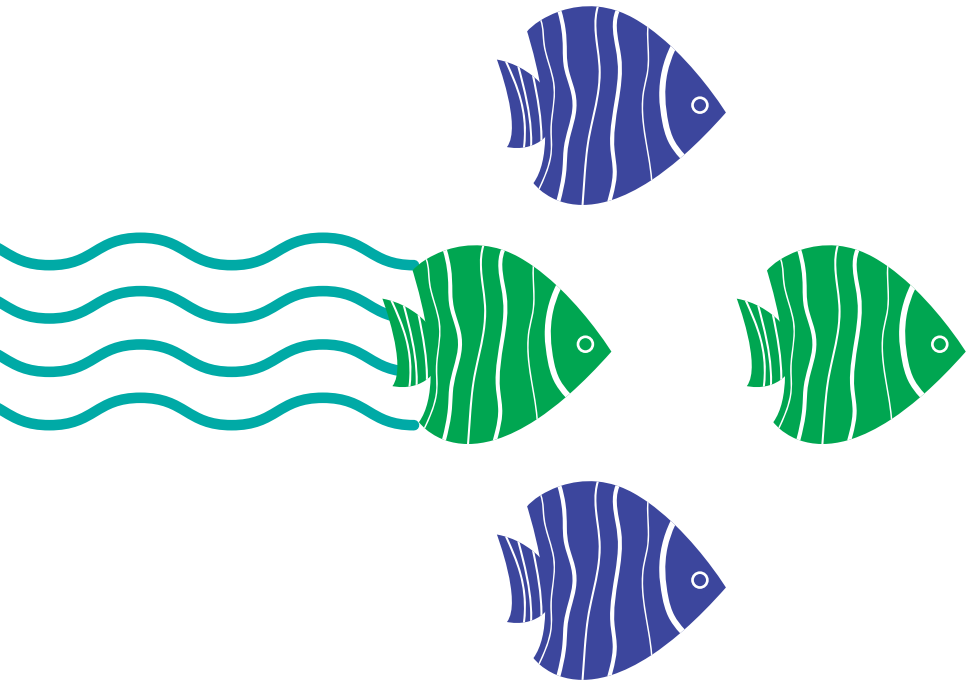
Demonstrating its commitment to waste reduction and circular economy principles, NIFPHATT launched Happy Puppy, a Dog Feed, an innovative pet food made from tuna meat trimmings obtained from canning operation, combined with carrot and pumpkin. This initiative aligns with the government's mission to reduce waste and maximize value across all stages of the seafood supply chain. This ready to eat preparation for pets meets the growing demand for long-lasting, high-quality, eco-conscious pet food. The product confirmed its acceptance among pet owners, positioning it as a frontrunner in the sustainable pet food market.

Transforming livelihoods through training and entrepreneurship

NIFPHATT is offering capacity building programmes in Post-harvest technology, value addition and allied subjects. The programmes are oriented towards fishers/fish farmers, students, entrepreneurs and self-help groups. These programs empower rural women, youth, and entrepreneurs to participate meaningfully in the blue economy. By improving fish utilization and reducing post-harvest losses, the development of value-added products increases the profitability for fishers and processors. The unveiling of seven products from Tilapia, Seaweed, and tuna meat trimmings will further strengthen the capacity building programmes of NIFPHATT.

Looking Ahead: aligning with national goals

These initiatives strongly align with the Government of India's vision for a self-reliant, inclusive, and environmentally sustainable fisheries sector. Whether it's nutritional security, employment creation, women empowerment, or export promotion, NIFPHATT's innovations contribute directly to the core objectives of the PMMSY, Atmanirbhar Bharat, and Blue Economy missions. Through value-added product development, sustainable practices, and strategic training, NIFPHATT is shaping the future of India's fisheries and food sectors.



Dyes of concern in aquaculture

Merlin Mathew, Dr. Biji K.B. and Dr. Ram Mohan M.K.
The Marine Products Export Development Authority, Kochi - 682036

Malachite green (MG) and Crystal violet (CV) are important water-soluble basic dyes belonging to the triphenylmethane (TPM) family, which are widely used in the leather, wool, cotton, silk, jute, paper, and other fibre industries. In addition, Malachite green has been used as antifungal and antiprotozoal agent in aquaculture since the 1930s and it has been registered as a veterinary product for the treatment of ornamental fish. During 1990s, Malachite green has been used as an inexpensive yet effective preservative by fishermen for safeguarding aquaculture products from contamination of fungus growth during storage and travel (Med India content team, 2005). When administered to fishes, Malachite green is absorbed, metabolized, and reduced to Leucomalachite green (LMG), a non-polar and colourless compound. Leucomalachite green residues are lipophilic and so easily accumulated in the adipose tissues of fish, and therefore fatty fish tend to present a higher Leucomalachite green concentration in their tissues than lean fish, and the compound is known to have a long, persistent residence time in fish tissues[6,9].

Crystal Violet or gentian violet is also a triphenylmethane dye that is widely used as hair dye. In addition, Crystal Violet is used in industrial processes during the manufacturing of wood, leather, silk, nylon, paper, and as biological contrast for microscopy. Furthermore, Crystal Violet has been used as an animal, and particularly bird feed additive to inhibit the growth of fungi since the 1990s. As Crystal Violet is inexpensive and readily available, it is used for fungus and parasite control in fish farms. Crystal Violet is readily absorbed in fish tissues via exposure to water, and is subsequently metabolized and reduced to Leucocrystal violet (LCV), a persistent metabolite[8]. Both Malachite green and Crystal Violet are known or suspected as carcinogens, mutagens, and teratogens, hence not permitted for the use in food-producing animals. Its genotoxic study has suggested that any carcinogenic activity or antithyroid activity may be attributed to the formation of primary aromatic amine species derived from the oxidation metabolism of Malachite green and Crystal Violet [6]. In mammalian cells, it shows marked cytotoxicity and the ability to induce cell transformation and lipid peroxidation. The toxicity of this dye increases with exposure time, temperature and concentration. It has been reported to cause chromosomal fractures, and respiratory toxicity along with negative effects on the immune system and reproductive system[7,9]. Although Malachite green and Crystal Violet are not approved worldwide as veterinary drugs for fish due to carcinogenicity and mutagenicity, they are still used illegally due to low cost and high efficiency.

Regulations/Bans

In the EU, the concept of the Minimum Required Performance Limit (MRPL) has been established for several substances which have been expressly prohibited from use in food producing animals, including the most important illegal dye, Malachite Green. The MRPL for Malachite Green and Leucomalachite Green is 2 ppb, as per Commission Decision 2004/25/EC[2], which is now revised to RPA as 0.5ppb (EU 2019/1871)[1]. The US Food and Drug Administration explicitly banned the use of Malachite green in fish farming in 1991 due to its suspected carcinogenic properties [12]. The use of Malachite green in food fishes has been banned worldwide since the 2000s due to its possible carcinogenicity in mammals[2]. In India both Malachite green and Crystal violet are not permitted to be used at any stage of processing of sea foods including shrimps, prawns or any variety of fish and fishery products. The

Extraneous Maximum Residue Limit permitted is of 0.001 ppm as per Food Safety and Standards (Contaminants, toxins and Residues) Regulations, 2011[3].

Use of Malachite green and Crystal Violet in aquaculture

a. Finfishes

Malachite green is the most effective antifungal treatment used in aquaculture. Both Malachite green and Crystal Violet are being used illegally as an inexpensive disinfectant, topical fungicide and acaricide in the aquaculture industry. Dips are used to treat topical fungal infections in fish. They are used to treat diseases caused by fungi *(Achlya, Aphanomyces, or Saprolegnia)*, to treat bacterial infections caused by *Flexibacter spp.*, and to control parasitic protozoa (*Ichthyophthirius multifiliis, Ichthyobodo necator, Trichodina spp., Trichodinella spp., or Chilodonella spp.)*. Exposure bath treatments are effective for the control of the external protozoan *Ichthyophthirius multifiliis* in fish, and treatments of fish eggs with dilute Malachite green effectively reduce fungal growth (e.g., *Saprolegnia*) and ensure viability of live eggs. Malachite green and Crystal Violet are easily absorbed during waterborne exposure. Similarly, both substances are reduced metabolically by fish to form Leuco crystal violet and Leucomalachite green, which are able to persist in fatty fish tissue for a long time. The dye has a potentially high level of abuse due its efficacy and the lack of equally effective alternatives. Malachite green is believed to bind strongly with the internal cytoplasmic structures of parasites and interfere in normal metabolism[5] In solution, the dye exists as a mixture of the cation (chromatic malachite green) and its carbinol base, with the ratio depending on the pH of the solution. Malachite green intercalates with DNA, with a preference for A:T-rich regions[7].

b. Crustaceans

Occurrence of diseases have been reducing the farmed shrimp production and have forced farmers to introduce zootechnical practices and treatments to combat these diseases. In contrast to the large therapeutic arsenal to fight against mammalian diseases, the use of pharmaceutical substances is rather limited in scope in shrimp farming, and it has always been basically limited to some anaesthetic substances and to anti-infective and antimicrobial agents against parasitic and microbial diseases. Consequently, the unregulated use of dye chemicals from the family of the triphenylmethane dyes, Malachite green, a common and inexpensive fabric dye, is being used as a therapeutic multi-usage drug to globally reduce parasitic, microbial, and fungal diseases found in shrimp farming also. Malachite green has, for instance, been used both prophylactically and in the treatment of fungal infections in eggs and as disinfectant in hatchery practices[11].

During 2002 to 2016, the rejection of crustacean consignments due to presence of dyes were far less when compared to fin fish. As one report based on RASFF says, the alerts for dye residues accounted for more than 50% of the 247 fin-fish alerts in the EU (imports and domestic production altogether). According to the same report, very few of the 672 alerts derived from shrimp and prawn aquaculture were tied to the presence of Malachite green residues. No alerts for molluscan shellfish/cephalopod seafood imports/ production were derived from the presence of dye residues[11].

But the current statistics show a boom in detection of dye residues from crustaceans as well. Overall, the major dye substance found is Malachite green. This is perhaps not unexpected because Malachite green was the first dye to be used for antifungal and antimicrobial treatments in fish farms. It was also the first dye to be controlled in aquaculture production,

whereas the official monitoring of CV started after the mid-2000s[11]. Indian aquaculture shrimp consignments were also detected with the presence of Malachite green in the Japanese market (2023) and EU market (2024). Total of 6 consignments were also rejected by the USA (2024) due to detection of such dyes, in which 4 were due to Malachite green detection and 2 were Crystal Violet/Gentian Violet detection.

Sources of Malachite green pollution in aquatic environment

One of the possible reasons for the high positive ratio of Malachite green contamination in aquatic products is the illegal use of this substance as a therapeutic agent in aquaculture. Although its application in food fishes is illegal, Malachite green is a multiple-use substance with several legal applications. For example, using it as a therapeutic agent for ornamental fish is still legal[4]. In aquarium and ornamental fish rearing, dips, short-term baths and long-term baths are used. Dips are of 10 to 30 sec in duration, and the recommended concentration is within the range of 66.7–100 mg/L.Short-term malachite green baths are treatments of 1 to 1.5 h in duration at the bath concentration of 6.7 mg/L[10].

In addition, Malachite green is also a dye widely used in industrial fields such as textiles and lab research areas such as microbial staining. Industrial waste waters from these legal applications, with the addition of the production sites of Malachite green, are potential sources of Malachite green contamination in the aquaculture environment[4]. Moreover, the dyes are persistent in the sediment of water sources for aquaculture and will be absorbed and bioaccumulated in aquaculture tissues over time.

Commercial names of Malachite green and Crystal Violet

Malachite green is supplied under various commercial names such as Acryl Brilliant Green, Aniline Green, China Green, Fast Green, Victoria Green, Basic Green, and ISOCHEM Malachite Green, Malachite F. Malachite green is also found in combination with formalin in products like Ich-X, Rid-Ich Plus, White Spot Remedy, and Mardel Quick Cure. Ich-X contains 22 ppm of formalin and 0.13 ppm of Malachite green. Commercial names of Crystal Violet are Hexamethyl pararosaniline Chloride, Gentian Violet, Basic Violet, Methyl Violet, Pyoctanin.

Conclusion

As discussed, these compounds are considered toxic for consumer health and are banned for use in aquaculture systems. The hatchery operators and farmers may take a note of their commercial names and refrain from the use of compounds containing Malachite green and Crystal Violet. Based on the request from MPEDA, the Coastal Aquaculture Authority (CAA) has started monitoring the inputs for presence of these dyes, Farmers are advised to use only inputs that are approved by the CAA and keep a vigilant eye for the presence of these compounds in the inputs intended for use. Community vigilance will help to prevent the falsified introduction and usage of these compounds in aquaculture systems.



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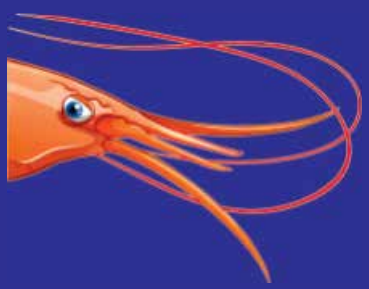
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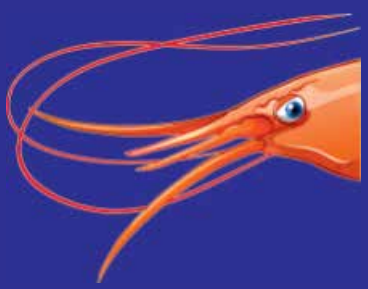


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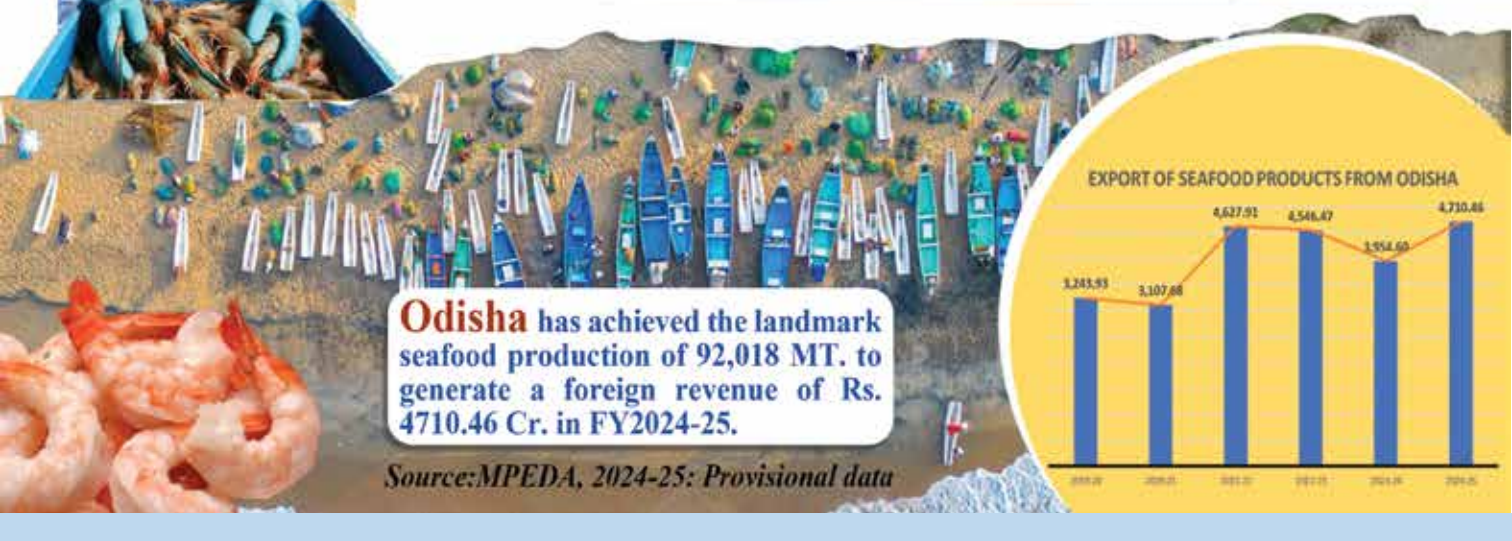
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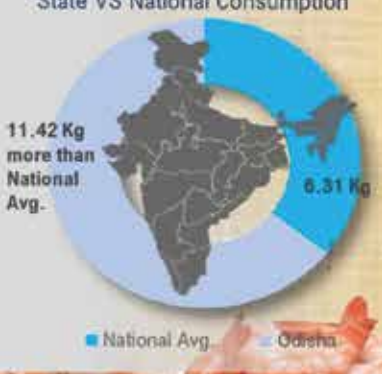
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- **COAST Web/App** – Shrimp farming regulation
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The National Fisheries Development Board (NFDB), established in 2006, aims to enhance fish production, develop sustainable aquaculture and strengthen fisheries infrastructure across the country. NFDB contributes significantly to food security, nutritional growth and empowering women in the fisheries sector, while also fostering the growth of the country's fish exports and tourism. It also promotes capacity building, innovation and entrepreneurship in the fisheries sector.

1. **Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana (PM-MKSSY):** PM-MKSSY, a Central Sector Sub-scheme under PMMSY, focuses on enhancing the earnings and incomes of fishermen, fish vendors, and micro & small enterprises engaged in the fisheries sector. It aims to formalize the unorganized fisheries sector, facilitate access to institutional financing, and promote digital inclusion. **Point 1-A** involves creating a **National Fisheries Digital Platform (NFDP)** to register stakeholders and facilitate access to financial programs. **Point 1-B** aims to promote aquaculture insurance adoption by offering incentives. **Point 2** supports fisheries microenterprises with performance grants to improve value chain efficiencies. **Point 3** incentivizes the adoption of fish safety and quality assurance systems. **Point 4** ensures effective project management, monitoring, and reporting through Project Management Units (PMUs). **Website:** pmmkssy.dof.gov.in

Steps for Registration in NFDP Portal:



2. **Group Accident Insurance Scheme (GAIS):** Provides insurance coverage @ **Rs.5 lakh**- Death/Permanent disability, **Rs.2.5 Lakh**-Permanent partial disability & **Rs. 25,000**-Accidental hospitalization for registered fishers and fish farmers under the PMMSY. For more information or to access application forms and brochures in multiple languages, please visit the official GAIS portal: https://gaispmmsy.com

3. **Aquaculture Insurance:** This scheme provides insurance coverage to fish farmers against losses due to natural calamities, diseases and other risks in aquaculture [**40%** of the premium amount for General category and **additional 10% of 40%** for SC/ST/Women]. For more information or to access online application, please visit the official NFDP portal: https://nfdp.dof.gov.in/nfdp/

4. **Fisheries and Aquaculture Infrastructure Development Fund (FIDF):** Encourages private entrepreneurs and fish farmers to strengthen infrastructure for sustainable fisheries growth. https://www.fidf.in/

5. **Entrepreneurship Model:** A comprehensive model under PMMSY to foster private investment, innovation and sustainable growth in India's fisheries and aquaculture sectors. It is designed to support a wide range of stakeholders, including fishers, farmers, startups, small & medium enterprises (SMEs). Government assistance up to 40% (General) and 30% (SC/ST/Women); balance through beneficiary contribution and bank loan. Funds will be released in 3 instalments as back-end subsidy (20:50:30) https://nfdb.gov.in/welcome/entremodel

6. **Training:** Various training and capacity-building initiatives of NFDB under PMMSY aim to enhance the skills and knowledge of individuals involved in the fisheries sector, including farmers, entrepreneurs and government officials providing 100% funding for training programs. https://nfdp.dof.gov.in/nfdp/

7. **Cooperatives:** NFDB incorporates Cooperatives as a key component in its initiatives, particularly for empowering fish farmers and promoting sustainable fisheries development & also play a substantial part in various aspects of fisheries management and development, such as input supply, credit access, marketing and social welfare. https://nfdp.dof.gov.in/nfdp/

For more details on **NFDB programs** and **financial assistance**, please visit:

Website: www.nfdb.gov.in **Toll-Free Number:** 1800-425-1660; Twitter: **@nfdbindia**, Facebook: National Fisheries Development Board -Instagram: **nfdbindia**

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ANDHRA PRADESH, INDIA - 534330.

GVR

M/S. SAGAR GRANDHI EXPORTS PVT LTD.



WHO WE ARE?

GVR Group established in 1965, with its ground work and vast experience, has developed great strength in sourcing raw material and in turn achieved its position in domestic and international markets. Located in the enriched region of aquaculture in Andhra Pradesh, India.

We have grown over the years to become one of India's leading establishments in the seafood industry. Being in the seafood industry we have adapted to the changing demands, trends and processes, and in turn helped us provide our customers with highquality service and products. It has made us to anticipate, grasp and respond to the needs of various global markets. In our business, trust needs to be earned through perseverance, commitment and performance which is adapted by our group.

OUR FACILITIES ARE



UNIT-I
M/s. Sagar Grandhi Exports Pvt Ltd. (SKM)
- BAP Registration No: P10163
- Production Capacity: 47MT/Day
- FDA Registration No: 11762004922

Total production capacity: 141 MT/Day

M/s. Sagar Grandhi Exports Pvt Ltd has own and Associated Aquaculture farms of 1000 Hectors and produces more than 20000MT/ Year.

From the above 350 Hectors with the Capacity of 7000MT/Year are Certified Under BAP.

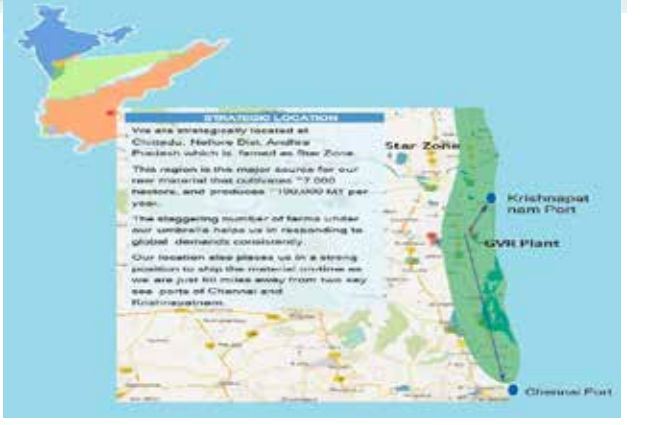


UNIT-II
M/s. Sagar Grandhi Exports Pvt Ltd. Unit-II (Kota)
- BAP Registration No: P10366
- Production Capacity: 94MT/Day
- FDA Registration No: 10550265950

Corporate office:
53, Venkatesan Street, Chintadripet Chennai - 600 002.Ph: +91-44-2845 5559 / 3897

Unit - I
GVR Food Park", NH5, Singarayakonda Prakasam (Dt) - 523101. (A.P.) Ph: +91-8598-236797 /98
Fax:+91-8598-236902

Unit - II
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- SHIRMP RING WITH COCKTAIL SAUCE
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NOBASHI



SHRIMP RING WITH COCKTAIL SAUCE



COOKED BUTTERFLY GRALIC & HERB



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GVR is globally recognized for its commitment to quality and excellence in execution. Our products comply with international standards recognized and respected world-over.

DIRECTOR'S MESSAGE:

Sagar Grandhi Exports Pvt Ltd, we take pride in our commitment to delivering the finest seafood products, crafted with precision and care to meet the highest standards of quality and freshness. With state-of-the-art facilities and a team of expert professionals, we specialized in producing a wide range of value-added seafood products that cater to diverse tastes and preferences. We foster long-term relationships with our clients, built on trust, transparency, and exceptional service.

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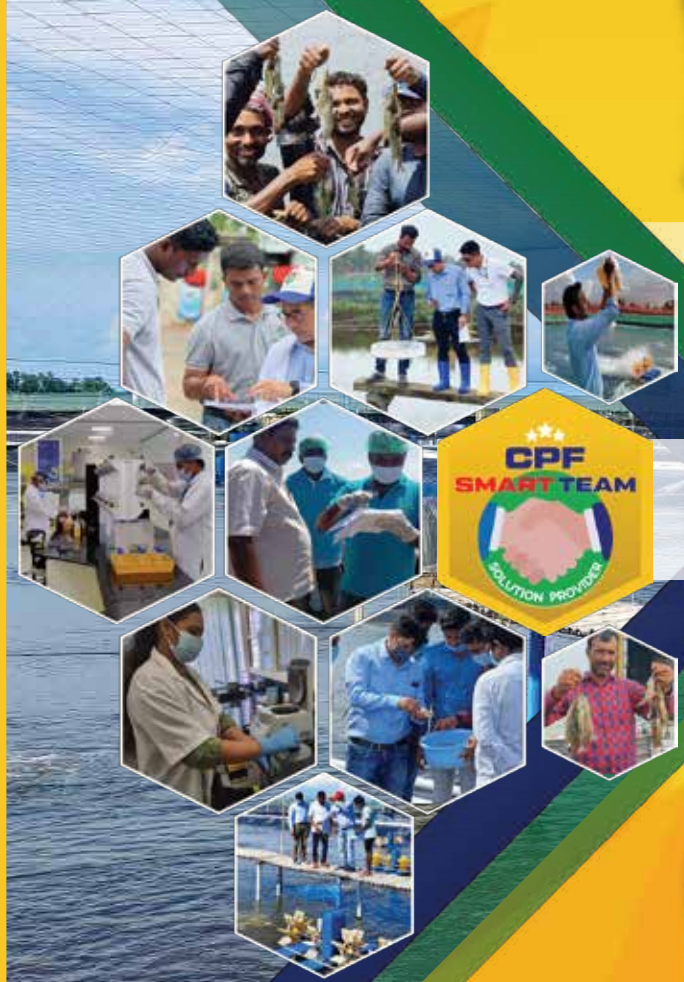
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The Marine Stewardship Council

Getting to know the MSC

Global champions for sustainable fisheries



The MSC Standard is widely recognized as the world's most credible standard for sustainable seafood.

The Marine Stewardship Council (MSC) is a global nonprofit organization established to protect the last major food resource that is truly wild: seafood. The MSC works with fisheries, grocery stores, restaurants, and other companies to change the way the oceans are fished, address food fraud, and make it simple for consumers to purchase sustainable, traceable, wild seafood. To accomplish this, the MSC sets standards for fisheries and supply chains.

The MSC Fishery Standard was developed and continues to be updated in collaboration with scientists, academics, and other international stakeholders. The program is voluntary and open to all wild-capture fisheries.

As agents of change, MSC certified sustainable fisheries are contributing to the long-term health of the world's oceans. These fisheries ensure that fish are caught in a way that allows fish populations and the ecosystems on which they depend to remain healthy and productive.

Only seafood from fisheries that meet the MSC's strict standard for sustainability can be sold with the blue MSC label. To ensure that MSC labeled seafood can be traced through the full supply chain from ocean to plate, MSC also sets a standard for Chain of Custody (CoC).



Vision

Our vision is of the world's oceans teeming with life and seafood supplies safeguarded for this and future generations.

Impact

Choose MSC to:

1. Combat food fraud and ensure full traceability
2. Support fishermen and fishing communities
3. Promote transparency in supply chains
4. Protect fish populations and keep our oceans healthy
5. Ensure a robust supply of seafood for the future

MSC is also helping more fisheries move towards sustainability with tools and grants through our Ocean Stewardship Fund.

MSC is engaged with a number of fisheries in India, mainly Kerala, including the deep-sea shrimps, squid and octopus, blue swimming crab, threadfin bream and others.

In 2014 the Ashtamudi Lake clam fishery became the first fishery in India to achieve MSC certification.

Marine Stewardship Council (MSC)
Marine House, 1 Snow Hill. London, EC1A 2DH
Registered Company number: 3322023
www.msc.org | @MSCecolabel

Contact: Dr Ranjit Suseelan
MSC head in India
ranjit.suseelan@msc.org | +91 98462 68609





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