



MPEDA

Newsletter

VOL. XII



NO. 4



JULY 2024



www.mpeda.gov.in



/MPEDAIndia



/MPEDACOCHIN



/mpedaindia



/mpedaofficial



@mpeda





CPF (INDIA) PRIVATE LIMITED



APPROACH FOR AQUACULTURE



PREMIUM SHRIMP FEED



PREMIUM FISH FEED



PREMIUM PROBIOTIC PRODUCTS



PREMIUM MINERAL PRODUCTS

Contact Us at: +91 98401 31913
Email Us at: customercare@cp-india.com

CONTENTS



SOFIA 2024 highlights

9



Marine landing report - April 2024

14



Monthly outlook forecast report

16



Application of *Sous vide* technique
in preparation of healthy and quality
aquatic food products

18



Rainbow in a bowl :
Tympanopleura

26



Better Management Practices
in scientific shrimp farming

29



PERFECTED
TO PERFORM

PERFECTED TO PERFORM

MACHINES FOR SUSTAINABLE AND
ENERGY EFFICIENT FOOD PROCESSING

VISIT US @

HALL 2 BOOTH #G12

#Anugafoodtecindia2024

Bombay Exhibition Centre, Mumbai



COOKING LINE

Energy efficient **steam cooker** with
advanced moisturized steam
recirculation technology

IQF LINE

MultiJet Nxt

Innovative **IQF Freezer** for
energy efficient and
reliable freezing with
superior quality product output



cross jet

SPIRAL IMPINGEMENT IQF FREEZER

Unique double **impingement
technology** for faster and more
effective freezing in compact space

Cochin Food Tech Pvt Ltd

Udayamperoor Thrippunithura, Kochi, Kerala 682307, India

+91 75938 10090 | 0484 2794140 | sales@cftech.in | www.cftech.in

f i t i n /cochinfoodtech





On the Platter

D.V. Swamy IAS
Chairman

Dear friends,

Market promotion is one of the key mandates of MPEDA. Initiatives of MPEDA for market promotion of marine products from India include participation in international seafood and food exhibitions, organizing Buyer Seller Meets and reverse Buyer Seller Meets, organizing trade delegations to targeted markets and bringing delegations from importing countries to India to understand the production and processing system here. Besides, publicity campaigns through print and social media platforms also serve the purpose of effectively propagating the highlights of Indian seafood among importers and customers.

China is one of the major markets of Indian seafood. It is the second largest destination for Indian seafood after the USA with a share of around 19% in US\$ earnings. China tops the table as the largest importer of Indian seafood in quantity, with more than 25 % share. The Indian marine product exports to China in 2023-24 was 4,15,363 MT worth US\$1.38 billion. The exports to China in 2023-24 have shown a positive trend in quantity compared to the previous year. The major revenue share from China came through the export of frozen shrimp, which accounted for more than 55% of the total earnings. To give impetus to our seafood trade with China, MPEDA participated in the 13th China International Shrimp Industry Development Forum held from 19th to 21st June 2024 at Guangzhou and further in the industrial survey in Zhanjiang from 22nd to 23rd June 2024. The information exchange is expected to increase the export of frozen shrimp to China, where the supply is dominated by Ecuador.

The India Missions abroad play a very critical role in the trade promotion of marine products. They are also offering support to MPEDA on regulatory updates, organizing the importers for Buyer Seller Meets, and seafood tasting events, participating in trade fairs, and in coordinating trade delegation visits. With the support of the Indian Mission in Brazil and the Dominican Republic, MPEDA has organized two Buyer Seller Meets during the month. In addition, another Virtual Buyer Seller Meet was also organized with the support of Embassy of India in Doha, Qatar.

MPEDA is also gearing up to organise its participation along with co-exhibitor exporters in Japan International Seafood Technology Expo scheduled for August 2024 and the World Food India scheduled at New Delhi in September 2024.

MPEDA has organized an awareness workshop on the implementation of Turtle Excluder Device (TED) in shrimp trawlers in Mumbai wherein the stakeholders were sensitized on the need for TED in shrimp trawlers not only to conserve the turtle population, but also to get our shrimp trawl fishery certified by the USA and earn market access. Mumbai also hosted the first seafood HACCP programme of MPEDA of the year from 25th to 28th June 2024, which was attended by 25 participants from the trade.

Thank you

Disclaimer: Readers are requested to verify & make appropriate enquiries to satisfy themselves about the veracity of an advertisement before responding to any published in this magazine. The Marine Products Export Development Authority, the Publisher & Owner of this magazine, does not vouch for the authenticity of any advertisement or advertiser or for any of the advertiser's products and/or services. In no event can the Owner, Publisher, Printer, Editor, Director/s, Employees of this magazine/organization be held responsible/liable in any manner whatsoever for any claims and/or damages for advertisement in this. MPEDA is not responsible for the content of external Internet sites.



MPEDA
VOL.XII NO.4 2024 JULY Newsletter

EDITORIAL BOARD

Dr. M. Karthikeyan
DIRECTOR

Dr. M. K. Ram Mohan
JOINT DIRECTOR (QUALITY CONTROL)

Mr. Anil Kumar P.
JOINT DIRECTOR (MARKETING)

Dr. T. R. Gibinkumar
DEPUTY DIRECTOR (MPEDA MUMBAI)

Dr. P. Jayagopal
DEPUTY DIRECTOR (AQUACULTURE)

Mrs. Anju
ASSISTANT DIRECTOR
(REGISTRATION & OFFICIAL LANGUAGE (I/C))

EDITOR
Mr. S. Asok Kumar
DEPUTY DIRECTOR
(PUBLICITY & MARKET PROMOTION)



EDITORIAL SUPPORT
Bworld Corporate Solutions Pvt Ltd
166, Jawahar Nagar, Kadavanthra
Kochi, Kerala, India 682 020
Phone: 0484 2206666
www.bworld.in, life@bworld.in

LAYOUT
Mr. Amil M. S.

Printed and Published by
Mr. K. S. Pradeep IFS, Secretary

On behalf of The Marine Products
Export Development Authority
(Ministry of Commerce & Industry,
Govt. of India)
MPEDA House, Panampilly Avenue
Kochi, Kerala - 682 036, Tel: +91 2311901

www.mpeda.gov.in
support@mpeda.gov.in

Published by
MPEDA House
Panampilly Avenue
Kochi, Kerala - 682 036

Printed at
Print Express
44/1469A, Asoka Road
Kaloor, Kochi, Kerala - 682 017



Your search for a **reliable, safe, efficient** and **environment friendly** refrigeration system ends here

Kelton

Refrigeration

First CO₂ subcritical cascade refrigeration system in India!

CO₂ Subcritical Cascade Refrigeration

- ◀ Lower operating costs
- ◀ 35% higher COP than R404a
- ◀ Ammonia charge reduction
- ◀ Constant positive pressure
- ◀ Consistent temperature



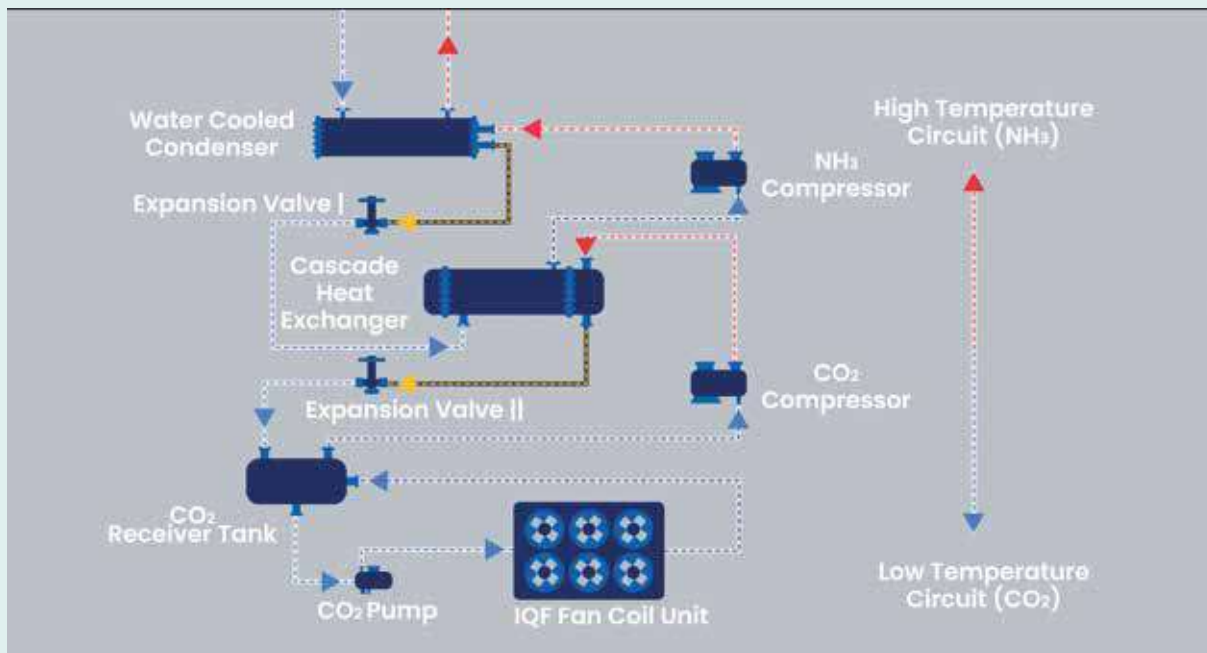
📍 Cochin Food Tech Pvt. Ltd.
Udayamperoor, Ernakulam
Kerala 682307, India
☎ +91 9840636246

Schedule a meeting with experts

www.cftech.in | sales@cftech.in



KELTON REFRIGERATION | CO₂ Subcritical Cascade Refrigeration System



Running a factory processing frozen food, dairy, beverages, pharma or operating a cold chain for the above industries is no easy task. You want your refrigeration plant to perform safely at maximum efficiency, without worrying about energy costs and environmental impact. It can be quite a headache dealing with

fluctuating temperatures, rising energy expenses, and other operating issues with traditional refrigerants like Freon and Ammonia.

But what if there was a better way? One that didn't force you to choose between efficiency, sustainability, and your bottom line?

Well, the future is here with Kelton Refrigeration, which brings innovative refrigeration technology from Europe. CO₂ subcritical cascade refrigeration system runs on natural refrigerant CO₂ on the low side and NH₃ or Glycol in the high side, providing improved efficiency, steady temperature control and complete safety all in one compact unit. Subcritical cascade systems are highly efficient especially in low temperature applications offering a high COP .

Implemented in developed markets a few decades back, it is now available in India through Kelton Refrigeration. As part of the INDEE+ initiative by NTNU, Norway and few reputed technical institutes in India, CFTech successfully integrated CO₂ refrigeration projects in seafood processing factories in Kerala. With successful installations at NAS Fisheries, Kochi Kerala and Bell Foods, Kochi Kerala they're proving it every day.

KEY ADVANTAGES

Low charging and storage of NH₃

Very safe to operate since CO₂ gas is non toxic and non flammable.

Constant positive pressure ensuring consistent evaporative suction temperature.

Compact space saving CO₂ Compressor racks



Customer Testimonial:

With Kelton System, our operating costs are down by 10%. The CO₂ refrigeration system eliminates the need for Oil and Gas purging and there is no risk of toxic gas leakage.

Mr. Hashmin K A,
Director, NAS Fisheries

Customer Testimonial:

Consistent Temperature at the freezer gives better product output and improves overall energy efficiency. Kelton is leading the charge towards

Mr. Viju Puthusseril,
CEO, Bell Foods Group

If you are in the process of setting up a new refrigeration plant or expanding capacity for the existing plant, contact us for a free consultation wherein a detailed technical review and project evaluation process will be done by our CO₂ refrigeration experts with global expertise and exposure.

With decades of experience and innovation, Cochin Food Tech Pvt Ltd with its industrial refrigeration brand KELTON Refrigeration, has taken the lead to drive the Indian food processing and cold chain industries forward. Natural refrigerants such as CO₂ are not just the future; they are already shaping the present reality. It's time to make the switch.



**Kelton Refrigeration -
Innovation that matters!**

For more information please contact us @

sales@cftech.in or +919656404300, <https://keltonref.eu/about.html>, www.cftech.in

SOFIA 2024 highlights

MPEDA Regional Division



FAO published The State of World Fisheries and Aquaculture 2024 with the theme "Blue Transformation in Action," to support improved aquatic food value chains, sustainable aquaculture intensification and expansion, and efficient fisheries management.

Total fisheries and aquaculture production

During 2022, global fisheries and aquaculture production reached an all-time high mark of 223.2 million tons (Mt), with 185.4 Mt of aquatic animals and 37.8 Mt of algae. Aquaculture production including algae is 130.9 Mt. For the first time, the aquaculture production excluding algae has exceeded capture fisheries. Aquaculture production achieved 94.4 Mt surpassing the capture fisheries production of 92.3 Mt. It is observed that global aquaculture production continued its increasing trend in 2020, 2021, and 2022, undisrupted by the COVID-19 pandemic. Algal production is 37.8 Mt with 36.5 Mt from aquaculture and 1.3 Mt from wild.

75% of the total production was from Asian nations, followed by Europe, Latin America, and the Caribbean (8% each), Africa (6%), Northern America (3%), and Oceania (1%). With a 40% share of the total, China strengthened its position as the world's largest producer, ahead of Indonesia (10%) and India (7%). In 2022, the combined value of the fisheries and aquaculture sectors' output was USD 472 billion. At the species level, white-leg shrimp (*Penaeus vannamei*), with 6.8 Mt, was the top species produced in 2022.

Aquaculture production

World aquaculture production in 2022 achieved a record of 130.9 Mt. It comprised 94.4 Mt of aquatic animals and 36.5 Mt of seaweed and micro-algae, plus 2700 tons of shells and pearls. Growth in aquaculture production was due mainly to Asia, whose contribution (87.9%) was far higher than that of Latin America and the Caribbean (7.3%), Europe (3.5%), Africa (0.8%), Northern America (0.4%) and Oceania (0.2%).

Finfish contributed (58.1%), followed by crustaceans (24.6%), molluscs (15.6%) and other aquatic animal species (1.8%). Global production of farmed algae reached 36.5 Mt in 2022,

an increase of 1.4 Mt (4.1%) from the 2020 production. This increase was the result of production expansions led by China, followed by Malaysia, the Philippines, the United Republic of Tanzania, the Russian Federation, and a few others.

Asia harvested 83.4 Mt of farmed aquatic animals in 2022. China remained the major contributor 55.4% followed by India (27.1%), Vietnam, Bangladesh & Indonesia (14.1% each), Thailand (5.8%), and Philippines (1%).

Capture fisheries production

In 2022, global capture fisheries production reached 92.3 Mt, comprising 91.0 Mt of aquatic animals and 1.3 Mt of algae. In addition, about 7,700 tons of other aquatic products such as corals, pearls, shells, and sponges also landed. The top seven producers in 2022 accounted for 50% of total marine captures. China alone accounted for 14.8% of the world total, followed by Indonesia (8.6%), Peru (6.6%), the Russian Federation (5.9%), the United States of America (5.3%), India (4.5%) and Viet Nam (4.3%).

Marine capture production

In 2022, the total production of aquatic animals in marine areas was 79.7 Mt. China remains the world's top producer of marine captures and Asian countries were responsible for 50% of global marine captures in 2022, followed by Latin America and the Caribbean (15.6%), Europe (16.7%), Africa (9.2%), Northern America (6.5%) and Oceania (2.0%).

In 2022, anchoveta ranked first at almost 4.9 Mt, Alaska Pollock (*Gadus chalcogrammus*) was second at 3.4 Mt, and skipjack tuna (*Katsuwonus pelamis*) third at 3.1 Mt. Total tuna reached 8.3 Mt in 2022, the highest level recorded. Catches of other highly valuable groups such as cephalopods (3.9 Mt), shrimps, and lobsters (3.3 Mt) also maintained their highest levels in 2022.

Inland water capture production

Global catches in inland waters were 11.3 Mt, harvested mainly in Asia (63.4%) and Africa (29.4%). Lead producers were India (1.9 Mt), Bangladesh (1.3 Mt), China (1.2 Mt), Myanmar (0.9 Mt) and Indonesia (0.5 Mt). Inland fisheries figures are likely underestimated due to the difficulties most countries face in collecting these data.

Global fishing fleet

The world fishing fleet was estimated at 4.9 million vessels in 2022. Indonesia with an estimated total of 1.1 million fishing vessels reported in 2022, making it the largest fleet in the world. Asia hosts the world's largest fishing fleet, estimated at 3.5 million vessels or 71% of the global total in 2022 followed by Africa's (19%), Latin America and the Caribbean (5%), Northern America, Europe (2% each) and Oceania (<1%). There are approximately 3.3 million motorized vessels and 1.6 million non-motorized vessels were operated in 2022.

FOCUS AREA

Employment in fisheries and aquaculture

In 2022, an estimated 61.8 million people were engaged as full-time, part-time, occasional, or unspecified workers in the primary sector of commercial fisheries and aquaculture with a slight decrease from 62.8 million in 2020. The aquaculture sectors accounted for 36% of this global workforce, 54% were employed in capture fisheries, while it was not possible to break down the remaining 10% between fisheries and aquaculture.

Asia accounted for 85%, followed by Africa (3%) and Latin America and the Caribbean (2%). In fisheries, 77% of the global workforce was in Asia, 16% in Africa, and 5 % in Latin America and the Caribbean.

Utilization and processing

Of the 185.4 Mt of aquatic animals harvested globally in 2022, about 89% (164.6 Mt) was used for direct human consumption. The remaining 11% (20.8 Mt) was destined for non-food purposes, of which about 83% (17 Mt) was reduced to fishmeal and fish oil, while the rest (about 4 Mt) was largely utilized as ornamental fish, as bait, in pharmaceutical applications, for pet food, or for direct feeding in aquaculture and for the raising of livestock and fur animals.

Consumption of aquatic foods

Historically, Europe, Japan, and the United States of America have accounted for a significant portion of the global amount of aquatic animal foods available for human consumption. In 1961, their collective share was 47 percent of the world supply. However, by 2021, their combined share had dropped to 18 percent. Meanwhile, China, Indonesia, and India experienced significant increases in their shares of global consumption of aquatic animal foods. While collectively representing only 17 percent in 1961, their combined share had surged to 51 percent by 2021, with China alone representing 36 percent.

Trade of aquatic products

Globally, the trade of aquatic animal products represented more than 9.1% of total agricultural trade (excluding forest products) and about 1% of total merchandise trade in value terms in 2022. In countries and territories such as the Faroe Islands, Maldives, and Seychelles it accounted for over 30% of total merchandise trade. World trade in aquatic animal products has grown significantly in value terms; a record high of USD 192 billion was seen in 2022. Exports of algae contributed an additional USD 1.6 billion and exports of other aquatic products such as sponges, corals, shells and inedible by-products added an extra USD 0.9 billion in 2022. The total export value of all aquatic products reached a record high of USD 195 billion in 2022.

China remains the main exporter of aquatic animal products (12% in value), followed by Norway (8%), Viet Nam (6%), Ecuador (5%) and Chile (4%). The European Union was the largest single market importing USD 62.7 billion of aquatic animal products, including USD 29.5 billion of intra-European Union trade. The largest single importing country was the United States of America (17%), followed by China (12%), Japan (8%), Spain (5%) and France (4%).

The most traded aquatic animal products in 2022 were finfish (65% of the total value), crustaceans (23%), molluscs, and other aquatic invertebrates (11%). By species groups, salmonids remain the most valuable (20% in value), followed by shrimps and prawns (17%), cods, hakes, and haddocks (9%), tunas, bonitos and billfishes (9%), and cephalopods (7%).

Fisheries and aquaculture projections, 2022–2032

The FAO outlook for fisheries and aquaculture foresees an increase in world production, apparent consumption, and trade for the period up to 2032, although at slower rates compared with previous decades. World production of aquatic animals is projected to reach 205 Mt in 2032, 111 Mt from aquaculture, and 94 Mt from capture fisheries, increasing respectively by 17% and 3%. Aquaculture will account for 54% of the total production of aquatic animals and 60% of total aquatic food for human consumption. Apparent consumption of aquatic animal foods will increase by 12% to supply on average 21.3 kg per capita in 2032. Aquatic product exports will increase further, although in 2032 they will only account for 34% of overall production, down from 38% in 2022. It is anticipated that until 2025–2027, prices will continue to fall marginally in both nominal and real terms before rising on.

Aquaculture is expected to continue to be the main driver of fish production growth. India has immense potential for aquaculture, but it's not fully utilized yet. The country is the third-largest fish producer and second-largest aquaculture nation globally. However, despite growth in inland fisheries and aquaculture, the development of its potential is still pending.

There are various areas where India can improve its aquaculture and Inland Aquaculture has got great prospects. Even though India has around 2.36 million hectares of tanks and ponds, the current production is only 8.5 million Mt. In the case of brackish and saline aquaculture, out of 1.42 million hectares only 13% is utilized. Cold water fisheries and Ornamental fisheries also has immense export potential.

To tap into this potential, the Indian government has initiated various programs, including the Pradhan Mantri Matsya Sampada Yojana (PMMSY), which aims to enhance fish production, improve productivity, and increase exports. If production is increased, India already has a robust processing sector that directly catering to exports. In the current situation exporters also started pondering intently into value addition ventures with tactical progression. The government is also need to focus on sustainable fishing practices, conservation of indigenous fisheries resources, and restoration of natural productivity.

References

FAO. 2024. *The State of World Fisheries and Aquaculture 2024. Blue Transformation in action.* Rome. <https://doi.org/10.4060/cd0683en>.

Prepared by:

Shreya Mayekar, Junior Technical Officer and
Dr. T. R. Gibinkumar, Deputy Director, MPEDA Regional
Division, Mumbai



BlueLine Group
Since 1968

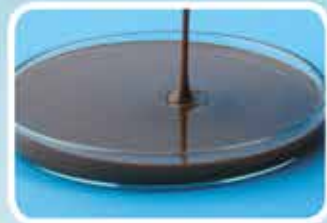
BlueLine
Foods (India) Pvt Ltd

FISHERIES • AGRI • CONSTRUCTION • REAL ESTATE

AN ISO 9001:2015, ISO 14001:2015, ISO 22000:2018, ISO 45001:2018, HALAL, GMP+, HACCP & EU CERTIFIED COMPANY

Manufacturers & Exporters Of

**FISH MEAL, FISH OIL, FISH SOLUBLE PASTE
& OTHER MARINE PRODUCTS**



★★★THREE STAR EXPORT HOUSE★★★



4th Floor, Suite No 406, Crystal Arc, Balmatta Road, Mangalore - 575 001, Karnataka, India

Ph: +91-824-2427744 / 2441466

Email: info@bluelinefoods.in

www.bluelinefoods.in

Corporate Video



E-Brochure



Stakeholders' workshop on the implementation of TED in trawl gears of Maharashtra



Inaugural session of TED Workshop



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

MPEDA Regional Division, Mumbai in association with the Network for Fish Quality Management and Sustainable Fishing (NETFISH); ICAR-Central Institute of Fisheries Education (ICAR-CIFE), ICAR-Central Institute of Fisheries Technology (ICAR-CIFT) and Department of Fisheries, Government of Maharashtra organized a State Level Stakeholders' Workshop on Implementation of TED in Trawl gears of Maharashtra. The workshop was organized on 14th June 2024 at ICAR- Central Institute of Fisheries Education, Panch Marg, Off. Yari Road, Versova, Andheri (West), Mumbai.

The US Department of State has not certified India for exporting wild-caught shrimp to the USA because of the non-implementation of TED in Mechanized Trawlers in India. India can be certified only if the trawl net is fitted with TED as per the specifications of NOAA along with effective implementation and strict enforcement including penal action. MPEDA and ICAR- CIFT Kochi has taken the initiative and developed

the CIFT-MPEDA-TED model as per NOAA specifications. After the dive evaluation programme in the USA, US NOAA officials evaluated the TED via field trials and conducted a physical workshop on the fabrication of TED at Kochi in February 2024. The workshop was organized to sensitize the major stakeholders in the sector towards implementing TED.

Dr. Girija Behere, SCo, NETFISH Maharashtra North welcomed the guests to the dais. The workshop began with lamp lighting by the guests followed by a welcome address by Dr. T. R. Gibinkumar, Deputy Director, MPEDA RD, Mumbai. During the inaugural ceremony, Dr. B. B. Nayak, Principal Scientist and Head, FRHPHM Division, ICAR-CIFE, Mumbai and Mr. N. B. Patil, Regional President of the Seafood Exporters Association of India addressed the stakeholders on the need for implementation of TED in Maharashtra. Mr. Abhay Deshpande, Regional Deputy Commissioner of Fisheries and Nodal Officer for TED implementation in Maharashtra stressed the need for TED usage in trawl nets. He also shared his experience on TED trials at Kochi.



Lamp lighting ceremony by dignitaries



Presentation by Dr. Joice V. Thomas

FOCUS AREA



View of the participants of the workshop

Dr. M. Karthikeyan, Director, MPEDA during his presidential address illustrated the impact of the US ban on sea-caught shrimp both in export value as well as in the raw material price realization by fishers. He stressed the need for the implementation of TED in trawl nets not only for enhancing exports but also for reducing the bycatch to address the sustainability issues and at the same time realizing better prices for sea-caught shrimps. He also expressed his concern that the existing ban will continue if we fail to demonstrate the implementation of TED and the US may impose an additional ban on the entire marine catch based on the upcoming Marine Mammal Protection Act (MMPA). Dr. Joice V. Thomas, Chief Executive, MPEDA-NETFISH gave a presentation on the US ban, MPEDA initiatives, and CIFT-MPEDA-TED. The TED model was also demonstrated to the participants. Dr. Girija Behere, SCo gave the interpretation services in Marathi. Mr. Subray Pavar, Assistant Director, MPEDA Regional Division, Mumbai offered a formal vote of thanks for the inaugural function.

A total of 160 Stakeholders participated in the workshop including officials from the State Department of Fisheries, Govt of Maharashtra, ICAR-CIFT, ICAR-CIFE, ICAR-CMFRI, Export Inspection Agency, Fishery Survey of India, Seafood Exporters Association of India, PG students of ICAR-CIFE, Mangrove Foundation of Maharashtra, Trawl boat owners' society representatives from Sindhudurg, Ratnagiri, Raigad, Mumbai and Mumbai Suburban districts of Maharashtra, officials of MPEDA RD Mumbai, State Coordinator of NETFISH Maharashtra South and Harbour Data Collectors. During the open discussion, the stakeholders raised questions regarding the mesh size of webbings and bar spacing in TED. They also suggested pair trawling with standard nets to compare the field trials scheduled in August and September of this year. Questions raised by participants were answered by dignitaries to their satisfaction.



Marine landing report - April 2024

Dr. Afsal V.V. & Dr. Joice V. Thomas, MPEDA-NETFISH



Real-time data on marine landings is being recorded by MPEDA-NETFISH from nearly 100 major fishing harbours and landing centres in India in order to facilitate the Catch Certification Program of MPEDA. Data on fishing vessel arrivals and species-wise approximate catch landed by these vessels are recorded on a real time basis through the Harbour Data Collectors stationed at the selected landing sites. The highlights on the trends in marine landings observed during April 2024 is presented in this report.

1. Observations on catch landings

The marine catch landings reported from the 83 fish landing sites during April 2024 totalled to 46752.72 tons. The pelagic finfishes contributed a significant 56% share to the total catch, weighing in at 26004.95 tons. Demersal finfish resources followed with a contribution of 10097.96 tons (22%). Crustacean with 5796.58 tons (12%) and molluscs with 4853.23 tons (10%) made up the remaining catch (Fig. 1).

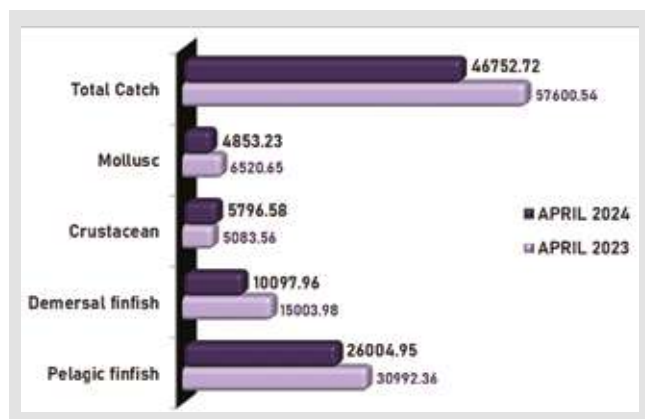


Fig.1: Catch composition of marine landings (in tons) in April

The marine landings during the month comprised of 210 species, encompassing both marine finfishes and shellfishes. The five dominant species of the month were *Sardinella longiceps*, *Lepturacanthus savala*, *Rastrelliger kanagurta*, *Uroteuthis duvaucelii* and *Nemipterus japonicus* (Table 1).

Sl. No.	Common name	Scientific name	Quantity (tons)
1	Indian oil sardine	<i>Sardinella longiceps</i>	7979.22
2	Ribbon fish	<i>Lepturacanthus savala</i>	3803.99
3	Indian mackerel	<i>Rastrelliger kanagurta</i>	3575.51
4	Indian squid	<i>Uroteuthis duvaucelii</i>	2882.65
5	Japanese threadfin bream	<i>Nemipterus japonicus</i>	2060.61

Table 1: Top five species landed during April 2024

On analysing the group-wise landing data, it is found that Oil sardines, Ribbon fish, Coastal shrimps, Mackerels and Squids have dominated the landing during the month (Fig. 2). These top five fishery items collectively accounted for over half (54%) of the total catch. Other notable items landed included Croakers, Tunas and Threadfin breams.

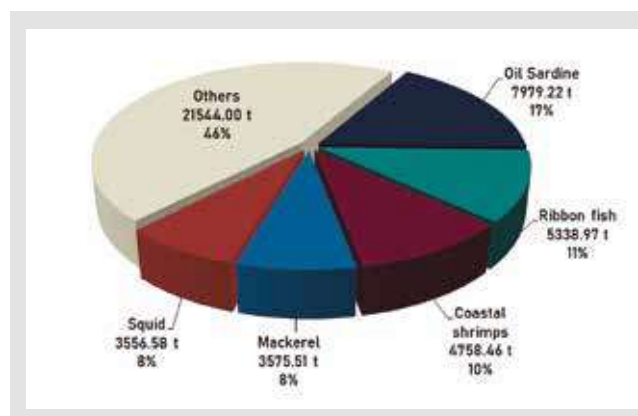


Fig. 2: Major five fishery items landed in April 2024

Oil sardine, Ribbon fishes and Mackerels dominated the pelagic finfish landings, while Croakers and Threadfin breams were the major demersal catches. Coastal shrimps constituted over 82% of the total crustacean catch, with Jawala shrimp being the dominant species. Squid and cuttlefish were the major molluscs landed during the month.

State-wise landings: The north-western states of Maharashtra and Gujarat recorded the highest marine fish landings in April 2024 (Fig. 3). Maharashtra topped the list with 14,667.75 tons, accounting for 31% of the total catch, closely followed by Gujarat with 14,572.90 tons (31%). Kerala in the South West coast stood at the third position with a contribution of

FOCUS AREA

5,105.45 tons (11%) to the total catch. Together, the western coastal states accounted for 86% of the total marine fish landings for the month.



Fig. 3: State-wise marine landings (in tons) in April

Harbour-wise landings: Ratnagiri-Mirkarwada harbour in Maharashtra recorded the highest landings in April 2024 among the 83 selected fish landing sites. Table 2 lists the top ten harbours in terms of total catch quantity landed.

Sl. No.	Harbour	Quantity (tons)
1	Mirkarwada	6394.30
2	Vanakbara	3820.92
3	Porbandar	3641.52
4	Mangrol	3430.38
5	Veraval	3333.78
6	New Ferry Wharf	2758.56
7	Sakharinate	1924.76
8	Sasoon Dock	1364.92
9	Munambam	1287.85
10	Beypore	1116.75

Table 2: Top ten harbours based on catch landings

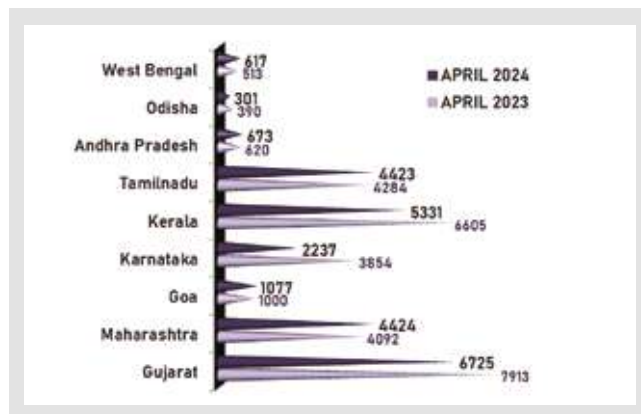


Fig. 4: State-wise boat arrivals (nos.) in April

2. Observations on boat arrivals

The number of fishing vessel arrivals recorded from the 83 designated fish landing sites totalled to 25,808. Gujarat and Kerala have topped the list with 6,725 & 5,331 number of boat arrivals respectively (Fig. 4). Considering the harbour-wise boat arrivals, the Mangrol and Porbandar harbours in Gujarat were in the top, with 1,815 and 1,649 boat arrivals, respectively.



Summary

During April 2024, marine landings and boat arrivals from the 83 major fish landing sites in India totalled to 46,752.72 tons and 25,808 vessels, respectively. A decrease of about 5965 tons in catch landings and 2203 vessels in boat arrivals was noted when compared to that of March 2024, which may be due to the commencement of fishing ban along the East coast during the month.

Pelagic finfish resources continued to be the mainstay of marine landings in April 2024. The Indian mackerel (*Rastrelliger kanagurta*) remained as the most landed species of the month. Maharashtra attained the top position in terms of catch landing whereas Gujarat remained in the top position in terms of the number of boat arrivals.

Among the various landing sites, Mirkarwada harbor continued in the top position in terms of catch landings, while Mangrol harbor continued having the highest number of boat arrivals.



Monthly outlook forecast report

Ritish Victor – Co-founder & Country Head – Myforexeye Fintech Pvt. Ltd.
Email-id: sales@myforexeye.com

USD INR

The April month saw a decent range of 42.5 paise for the USDINR pair. Entering the month at 83.37, the pair initially dropped to make a monthly low of 83.15(10 Apr '24) but then reversed its trajectory to make a new all-time high of 83.575(19 Apr'24) and finally ended the month slightly down at 83.425.

As per the USD INR daily frame chart, the bullish momentum in the USDINR pair still remains intact as the pair continues to trade above the 100-day EMA. This level is also seen as the initial short-term support for the pair. However, the initial support level stands around the previous low level of 83.26 whereas the next key support remains unchanged around 83.00. Both the support levels are in line with the 50-day EMA(blue line) and 150-day EMA(white line). On the contrary, the initial resistance lies around the all-time high level of 83.575. Given the current high levels of USDINR trading, it is strongly advised for exporters to enhance their hedge ratios to ensure a more secure position.

Maintaining large unhedged positions at all-time highs points towards speculative behavior, especially considering that the internal business benchmarks and costing rates are at lower levels. Therefore, hedging is recommended to mitigate risks associated with market fluctuations. Conversely, importers holding substantial unhedged positions may consider implementing stop-loss hedges as a risk management strategy. This measure can help protect against adverse movements in the exchange rate and can resume hedging activities if the USDINR rate falls below 83.15 levels.



more confidence in inflation moving towards the 2% target. The Euro could experience additional downward pressure as the Eurozone is considering initiating rate cuts in its June meeting due to signs of cooling inflation.

The EURUSD pair exhibited volatility over the past month, fluctuating between highs and lows. Initially, it began near a significant psychological support level at 1.08, aligned with the 50-week Exponential Moving Average (EMA). Following the release of US CPI data, the euro swiftly reversed its gains within just three trading sessions, reaching a low of 1.0601, marking a five-month low for the month. Sustaining levels above 1.07 may confine the pair within a range-bound movement spanning between 1.0650 and 1.08. Currently, trading below 1.07, the pair has shown support at this level previously. The relatively modest movement of around 100 pips suggests a period of consolidation. A continuation of the downtrend may see the pair targeting support levels at 1.0600 (S1) and potentially further down to 1.0500 (S2). Conversely, a reversal and upward rally above the 1.0750 mark could prompt a retest of the 50-week EMA positioned at 1.08, as depicted in the chart.



GBP USD

This month has been quite a ride for the British pound. It started with a drop against the US dollar, hitting 1.2538 due to cautious comments from the governor of the Bank of England. Then, things turned around mid-month, with the GBPUSD reaching 1.2711. This was mainly because of a weaker US dollar and strong UK retail sales data, though the recovery wasn't very strong. However, the pound didn't continue its upward trend for long as the dollar index strengthened to its five month high of 106.50 level, pushing the GBPUSD to its 5-month low at 1.2298. The factors contributing to the GBPUSD downward move are the positive US CPI data which reduce the chances of the fed rate cuts, expectations of a rate cut from BOE also dropped and tensions in the Middle East increased. Even though there was a brief recovery after some positive UK CPI data and BOE chief Economist Phill Hue remarks stating that rate cuts are still far off. Now, all eyes are on Powell's statement after the interest rate announcement, expected to remain unchanged. If Powell hints at a rate cut later in the year, the US dollar may continue to dominate, keeping the GBPUSD under pressure. But if he suggests a rate cut in September, the pair could see a stronger recovery.

The pound sterling has been on a continuous downtrend for the 4th straight month in April. The cable entered the month high at 1.2617, also made a monthly high at 1.2709 but

EUR USD

The EUR USD pair was seen quite volatile making a significant range of 300 pips in the April month. Initially it gained to reach a monthly high of 1.0885(09 Apr 24) following the stronger than expected German manufacturing PMI numbers and light trading ahead of US labor market data. EURUSD reversed all its gains and fell tremendously following the strong US labour market data which boosted the dollar index to its 5-month high level of 106.50 and shifted the expectation of a Fed rate cut beyond its June meeting to September meeting. But US data continues to print in green throughout the month which has even further reduced the rate cut expectation to 48% which was 70% a week ago, which has even supported the US 2-year & 10- year treasury yield to gain around 5.0% and 4.65%. On the contrary, the April month dollar rally has pushed the EURUSD pair to test its 5-month low level at 1.0601. On the EURO front, the ECB may maintain the current stance for rate cuts and data dependent approach for

FOCUS AREA

ultimately fell to close the month down at 1.2491 after testing its 5-month low of 1.2299. The dollar index is up 1.7% for April and is expected to see its largest monthly gain since January and on the other hand, the value of sterling is down 1.02% and is expected to have its most monthly decline since September. The short-term resistance for the pair stands around the 1.2550 level in line with the 200-day EMA (white line) and a move above will take the pair close to its next resistance which stands at 1.2650. On the other hand, the initial support lies at 1.2450 from where we have seen the pair bouncing back twice in recent times. Indecisiveness among market participants is shown by the 14-period Relative Strength Index (RSI), which oscillates in the 40.00–60.00 range.

JPY USD

On Tuesday, the Japanese yen maintained its gains against the US dollar, following a significant surge triggered by alleged Japanese government intervention. At the time of writing, the yen was trading about 156 against the US dollar, up from 160.1 at one point on Monday. USDJPY reached a 34-year high of 160.32 on Monday before reversing and falling following a suspected currency intervention by Japanese officials, who have been warning about the Yen's excessive weakness since USDJPY soared over 150.00 in March. On the last day of the month, the Japanese Yen suffered significant losses versus the US dollar, reversing a large portion of the previous day's high gains, which were fueled by a likely intervention by Japanese authorities. The fundamental driver of the JPY's weakening is the interest rate disparity between Japan and the United States, which is projected to remain wide for some time. Meanwhile, the attention remains on the critical FOMC policy decision & Powell statement, which is expected to be announced later during the US session and will influence the USD and provide a new directional push to the USDJPY pair.



The trading month for USDJPY kicked off at 151.24, witnessing a yen depreciation that drove it to a monthly peak of 160.20. The pair surged to a 34-year high of 160.32 on Monday but later declined amid rumors of Japanese intervention to curb the yen's excessive weakening, a concern raised since USDJPY surpassed 150.00 in March. Supported by the Bank of Japan (BoJ), the pair managed to recover some losses, gaining 3% and reaching 155. However, the yen quickly reversed these gains, closing the month at 157.89. Despite efforts, the pair struggled to maintain levels above 155, with visible attempts to breach the significant resistance zone at 160 yen. Achieving a breakthrough above 160 appears challenging given the BoJ's efforts to bolster the currency. Short-term pullbacks are expected to find support around

155 yen, with strong support below 150 yen. Traders should closely monitor price movements within this range and heed statements from Japanese corporate entities for market direction. Persistent buyer interest at these levels suggests perceived value.



WORLD

U.S. stocks experienced a significant decline on Tuesday, mirroring global market trend of monthly loss as investors await crucial economic data and the Federal Reserve's two-day policy meeting. All three major indices, the S&P 500, Nasdaq, and Dow Jones Industrial Average, ended the month in negative territory, with the S&P 500 and Nasdaq losing more than 4%, while the Dow dropped 5%, marking its worst monthly performance since September 2022. European markets also closed lower on Tuesday, marking their first negative month since October, as earnings reports and data impacted investor sentiment. The Stoxx 600 lost 1.49% in April, closing the month in the red for the first time since October. Gold prices fell, the U.S. dollar strengthened, and benchmark U.S. Treasury yields edged higher after the Labor Department reported stronger-than-expected first-quarter employment cost increases, which are unlikely to change the Fed's restrictive stance. The Federal Reserve Open Market Committee met yesterday for its monetary policy meeting, expected to end today with a decision to keep the Fed funds target rate between 5.25% and 5.50%. Emerging market stocks fell 0.61%, while the MSCI's Asia-Pacific shares outside Japan closed down 0.41%, and Japan's Nikkei jumped 1.24%. The dollar index gained 0.57%, and the euro fell 0.37% to \$1.0679.



MAIN STORY

Application of *Sous vide* technique in preparation of healthy and quality aquatic food products

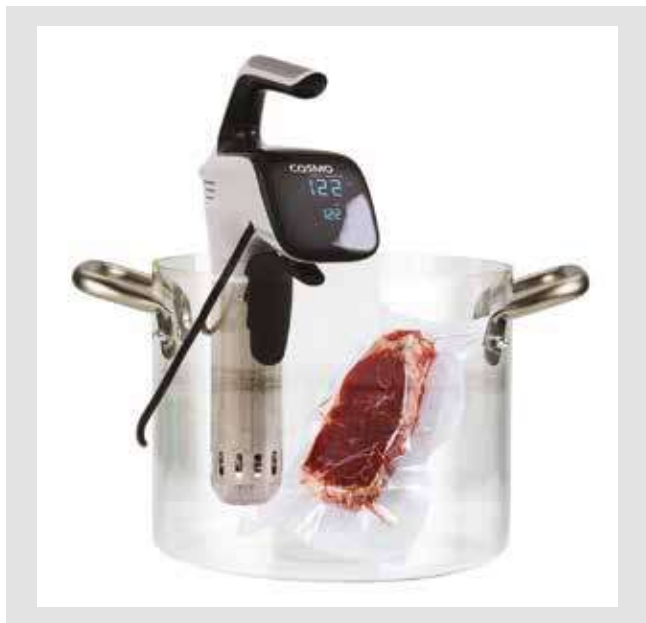
Dr. Girija Behere¹, Dr. T. R. Gibinkumar² and Dr. M. Karthikeyan³
^{1 & 2} MPEDA Regional Division - Mumbai; ³ MPEDA Head Office – Kochi

In recent years, there has been a growing demand for protein-rich and nutritionally rich foods, leading to an increased emphasis on the preservation and processing of aquatic products (Mohan *et al.*, 2017). Consumers all around the world have an increasing appetite for high-quality foods, particularly high-quality ready-to-eat meals that can be kept in the refrigerator for a long time and swiftly chilled. Today's population is very interested in seafood due to its high nutritional value and therapeutic properties. The properties of fish preserved in the past have not greatly improved. It is possible to increase the shelf life of seafood by using the *sous vide* cooking technique in conjunction with carefully regulated refrigerated storage. Aquatic foods offer a distinct flavour, little fat, a lot of vitamins, and protein. In particular, fish flesh is delicate, made up of readily absorbed protein and one of the primary sources of sustenance for people. Consumers are now more interested in ready-to-eat aquatic items as a way to get nourishing, practical, and secure meals. *Sous vide* (/su: 'vi:d/) cooking is a technique that has gained popularity in recent years for its ability to cook food to perfection while preserving its natural flavour and nutrients. *Sous vide*, which is French for "under vacuum," is a cooking method where food is vacuum-sealed in a food grade hoover bag which is heat stable and cooked at a precise temperature in a water bath. Hoover bags will have the provision to remove air inside usually by connecting it to a vacuum pump. The principle behind *sous vide* cooking lies in precise temperature control

and even heat distribution (Ravishankar, 2019). By definition, *sous vide* cooking relies on the idea of low-temperature, long-time (LTLT) cooking.



Sous vide-machine @indiamart



Cosmo sous vide Precision Cooker Kit @Ubuy.co.in

The employment of traditional cooking techniques, such as deep-frying baking and using high temperatures for cooking and stewing, might be linked to the obsessive pursuit of shape and colour in food. The quality of aquatic goods degrades as a result of warming, and nutrient loss may cause the creation of poisonous and dangerous chemicals such heterocyclic amines and benzopyrenes (Cui *et al.*, 2022). The development of *sous vide* cooking technique partially resolves these issues and improves the nutritional value and quality of aquatic foods while lowering the generation of potentially dangerous compounds to assure food safety. As a result, families, single persons, and seniors readily accept the easy and healthful SV-prepared items. While *sous vide* is commonly used for preparing meats, it is also a great technique for preparing aquatic food products like fish and shellfish. The processing and preservation techniques for aquatic products are constantly improving, with the aim of improving nutrition, taste, and convenience (Yin and Shi, 2023). By using *sous vide* technology in fish processing, the industry can achieve consistent and high-quality results, minimize nutrient loss, and extend the shelf life of fish products. *Sous vide* technology also reduces the risk of overcooking or undercooking, which is common in traditional

MAIN STORY

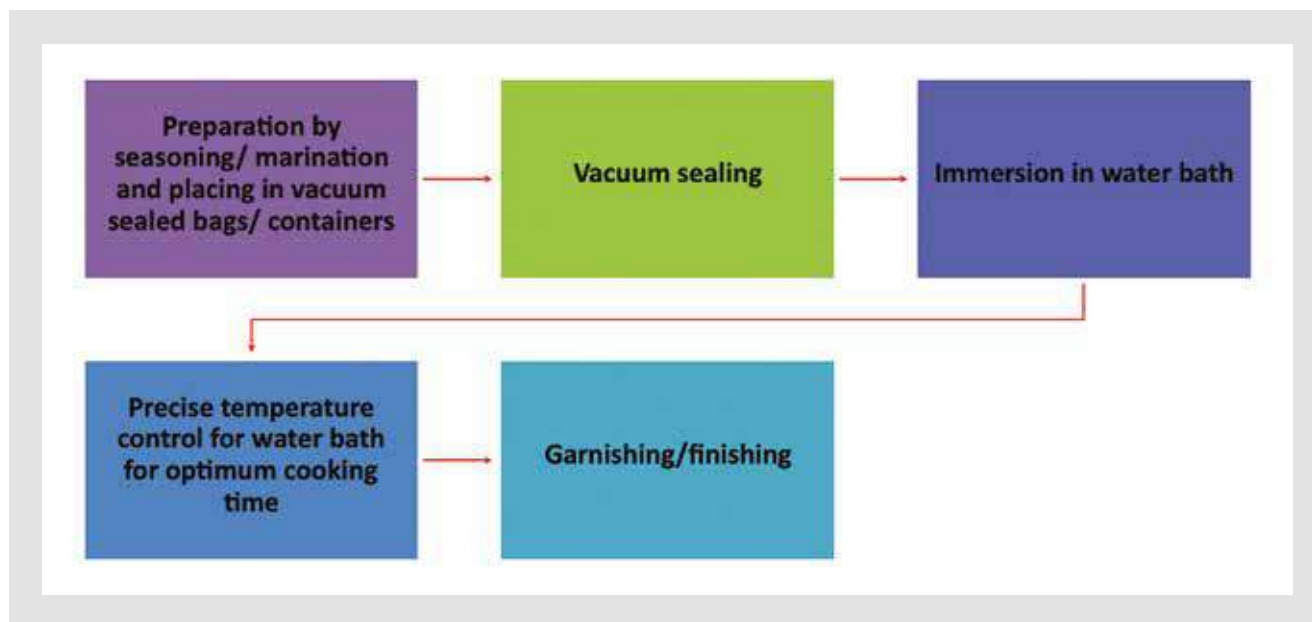


Fig. 1: General steps in sous vide processing of fish/seafood

cooking methods. Additionally, the vacuum-sealed packaging helps to lock in the moisture and flavours, resulting in a more succulent and flavourful end product.

It makes it possible for heat to be delivered to food effectively. It prolongs the food's shelf life by removing the possibility of recontamination while being stored. It stops flavours from oxidizing, stops flavour volatiles and moisture from evaporating during cooking, and lowers the development of aerobic microorganisms. Compared to fish cooked in the conventional manner, sous vide fish preserves more minerals and healthy omega-3 fatty acids (Cui *et al.*, 2022; Baldwin, 2012; Ravishankar, 2019).

Sous vide technology

First developed in France in the 1970's by Chef Georges Pralus, *sous vide* has long been the secret of top chefs around the world, but has only recently been available to home cooks. Driven by the passion and innovation of people demanding more from their food cooked at home, *sous vide* has become the go-to secret weapon of great home cooks and TV cooking show competitors alike (Cui *et al.*, 2022).

Three principles serve as the process' major pillars. 1) Using heat-resistant laminated plastic packaging to stop food contamination and food component leakage. 2) Removing air from a space with a Hoover to stop food from oxidising. 3) Cooking at a low temperature to prevent food components from breaking down.

Sous vide technique: Process

In the *sous vide* technique food is vacuum-sealed in a cooking pouch and heated at a precise temperature in a water bath. Instead of relying on perfect timing, *sous vide* relies on precise temperature control. Products cooked *sous*

vide are kept at 55–95 degree Celsius (typically around 55°C to 60°C or 131°F to 140°F for meat & higher for vegetables) for an extended amount of time typically 1 to 7 hours, but sometimes up to 48 hours or more. The goal of cooking anything evenly is to maintain moisture, make sure the interior is done through without overcooking the outside. The items are cooled and stored in chilled storage after cooking. The primary determinants of the microbiological safety of *sous vide* goods are the level of heat and duration of cooking, temperature of cooling, and the regulation of chilled storage temperature. General steps in *sous vide* processing of fish/seafood are indicated in fig. 1.

Health benefits of sous vide cooking

One of the key advantages of *sous vide* cooking is its ability to preserve the natural nutrients and flavours of food. When food is cooked at a precise temperature for a longer period, it retains more of its vitamins and minerals compared to traditional cooking methods like boiling or frying. This makes *sous vide* cooking an ideal choice for preparing healthy and nutritious aquatic food products. One of the key advantages of using *sous vide* for aquatic fare is the ability to cook without added fats or oils, leading to healthier meal options. The precise temperature control also helps in retaining essential nutrients in the seafood, making it a nutritious choice for health-conscious individuals.

Quality of aquatic food products cooked by sous vide technique

Sous vide cooking allows for precise control over the cooking temperature, resulting in perfectly cooked seafood every time. Fish and shellfish cooked *sous vide* are tender, juicy, and full of flavour. The gentle cooking process ensures that the natural textures and flavours of the seafood are preserved,

MAIN STORY



Stages of sous vide shrimp preparation ©40aprons.com

resulting in a higher quality dish. In terms of food safety, *sous vide* technology ensures that the fish is cooked to the ideal temperature, effectively eliminating any harmful bacteria or pathogens. This is especially crucial in fish processing, where maintaining the highest standards of food safety is paramount.

Enhancing flavours with *sous vide*

In addition to preserving the natural flavours of aquatic food products, *sous vide* cooking can also enhance their flavours by infusing them with herbs, spices, and other aromatics.

Coarse sea salt, smoked paprika, garlic powder, black pepper are commonly used flavouring agents. Fresh herbs such as rosemary, thyme, and oregano are used for infusing aromas. By sealing the food in a bag with these flavouring agents, the seafood absorbs the aromatic qualities during the cooking process, resulting in a more flavourful dish.

Shelf life of *sous vide* products

The shelf lives of *sous vide* food depends on how it's stored and whether it's been opened. Under refrigerated conditions at 41°F (5°C), *sous vide* food can be kept for up to 7 days and



Sous vide squid rings ©blog.suvie.com



Sous vide Red Snapper ©tomsnotebook.com

MAIN STORY

Table 1: Few advantages of using *sous vide* technique in fish processing

Fish	Advantage of using <i>sous vide</i> technique	Reference
European sea bass (<i>Dicentrarchus labrax</i>)	Prolonged shelf life, and quality retention	Bolat <i>et al.</i> (2019)
Tilapia fillets (<i>Oreochromis niloticus</i>)	Maintained microbiological standards, addition of plant extracts as natural antioxidants prolonged shelf life of <i>sous-vide</i> treated tilapia fillets	Alves <i>et al.</i> (2020)
Largemouth bass (<i>Micropterus salmoides</i>)	Desirable quality, stable secondary protein structure and lower levels of lipid oxidation	Wan <i>et al.</i> (2019)
Pangasius steaks	Enhanced shelf life	Namita Kumari <i>et al.</i> (2016)

if the food is kept unopened, it can last up to 10 days. Once opened, the food has the same shelf life as conventionally cooked leftovers. Under frozen conditions it can last up to 18 months at below -18°C. If stored at 34°F (1°C) or less, the shelf life will be up to 30 days.

The quality and shelf life of *sous vide* food depends on several factors, including quality of raw materials, cleanliness of packaging and vacuum packaging.

Sous vide seafood

There are a variety of delicious seafood recipes that can be prepared using the *sous vide* technique. From perfectly cooked salmon fillets to tender shrimp and scallops, the possibilities are endless. *Sous vide* also allows for easy meal prep, as the seafood can be cooked in advance and stored in the refrigerator until ready to serve (Cui *et al.*, 2022).

Conclusion

In conclusion, the applications of *sous vide* technique in the preparation of aquatic food products is a game-changer for discerning food enthusiasts looking to enjoy healthier, high-quality meals. By harnessing the power of controlled cooking temperatures and precise timing, chefs can unlock a realm of culinary possibilities that elevate aquatic cuisine to a whole new level of excellence. The *sous vide* technique is a valuable tool for preparing healthy and quality aquatic food products. By preserving the natural nutrients and flavours of seafood, enhancing its taste with herbs and spices, and ensuring precise cooking temperatures, *sous vide* cooking offers a superior culinary experience. Furthermore, the extended shelf life of fish products processed using *sous vide* technology not only reduces food waste but also provides consumers with a longer window of opportunity to enjoy the freshness of the fish.

References

1. Alves L.F.S.; Corrêa S.S.; Rocha J.D.M.; Amado D.A.V.; Cottica S.M.; Souza M.L.R. 2020. Use of natural antioxidants in *Sous vide* tilapia fillet. *Bol. De Indústria Anim.*, 77.

2. Baldwin D. E., 2012. *Sous vide cooking: A review*, *International Journal of Gastronomy and Food Science*, 1(1): 15-30, <https://doi.org/10.1016/j.ijgfs.2011.11.002>.

3. Bolat Y.; GenÇ İ.Y.; Tunca Y.; Demirayak M. Effect of laurel (*Laurus nobilis*) and curcuma (*Curcuma longa*) on microbiological, chemical and sensory changes in vacuum packed *sous-vide* European sea bass (*Dicentrarchus labrax*) under chilled conditions. *Food Sci. Technol.* 2019, 39, 159–165.

4. Cui Z., Zhang N., Lou W., Manoli T., 2022. Application of *Sous vide* cooking to aquatic food products: A review. *Food Sci. Technol, Campinas*, 42, e108021, 1-6.

5. Mohan C. O., Ravishankar C. N., & Srinivasa Gopal T. K., 2017. Effect of vacuum packaging and *sous vide* Processing on the quality of Indian White Shrimp (*Fenneropenaeus indicus*) during chilled storage. *Journal of Aquatic Food Product Technology*, 26(10), 1280–1292. <https://doi.org/10.1080/10498850.2016.1236869>.

6. Namita K., Singh C. B., Raushak K., Martin Xavier K. A., Lekshmi M., Venkateshwarlu G., Balange A. K., 2016. Development of Pangasius steaks by improved *sous-vide* technology and its process optimization. *J Food Sci Technol*, 53(11):4007–4013, DOI 10.1007/s13197-016-2401-y.

7. Ravishankar C. N., 2019. Advances in Processing and Packaging of Fish and Fishery Products. *Advanced Agricultural Research & Technology Journal*, 3(2): 168-181.

8. Wan J.; Cao A.; Cai L., 2019. Effects of vacuum or *sous-vide* cooking methods on the quality of largemouth bass (*Micropterus salmoides*). *Int. J. Gastron. Food Sci.*, 18(4): 100, 181.

9. Yin T. and Shi L. 2023. Processing and Preservation of Aquatic Products, *Foods*, 12(10): 2061; <https://doi.org/10.3390/foods12102061>.



Possible pathways for entry of Salmonella in seafood industry and its control measures

Greeshma S. S.¹, Rehana Raj¹, Asha K. K.¹, Vishnu Vinayagam² & Toms. C. Joseph²

¹ Mumbai Research Centre of ICAR-CIFT, Mumbai

² Central Institute of Fisheries Technology, Cochin

Email: greeshma.ambadi@gmail.com

International fish and fishery markets face challenges such as rejections and detentions due to microbial contamination by food-borne pathogens. Salmonella is one such pathogen which ranked first in causing infections with single bacterial etiology. According to epidemiological studies by CDC, fish and fishery products were reported as major contributors (6% to 8%) of foodborne outbreaks with Salmonella when compared to chicken (3.6%) and beef (1.9%) (CDC, 2018). Recently, there are growing concerns about Salmonella contamination in fresh seafood and aquaculture products especially from importing developing countries ever since Salmonella was isolated from seafood (Billah and Rahman, 2024). Recall of fish and fishery products due to Salmonella contamination results in huge economic losses in seafood trade and their occurrence in seafood threatens to be a potential barrier in international seafood trade. The prevalence of Salmonella in fish and fish products greatly varies with geographical locations and is also influenced by the different fish species, sampling stages (fish farm vs retail stores), sampling parts (skin vs intestine), sources (imported vs domestic), and fish product types (raw vs Ready to eat (RTE)).

well as packaging. In India, hand processed shrimp either from in-house or outsourced from other preprocessing areas remain as the key raw material for the seafood trade and thus pose an enhanced risk for Salmonella contamination from infected/carrier persons. The non-potable water, unhygienic ice, processing equipment, and packaging material may also act as the cause of Salmonella contamination in seafood chains. But in aquaculture production chains, Salmonella contamination can occur either during culture or by post-harvest handling. Wild animals, feed, runoff, soil, water, infected persons etc. can be the source of Salmonella contamination in aquatic environments. Once they enter the aquatic environment, they survive for long periods. The exchange of water, inputs, fish/shrimp between ponds and to nearby water bodies also results in cross contamination with Salmonella.

Salmonella detection in seafood

Salmonella can be isolated from seafood by standard microbiology procedures such as Bacteriological Analytical

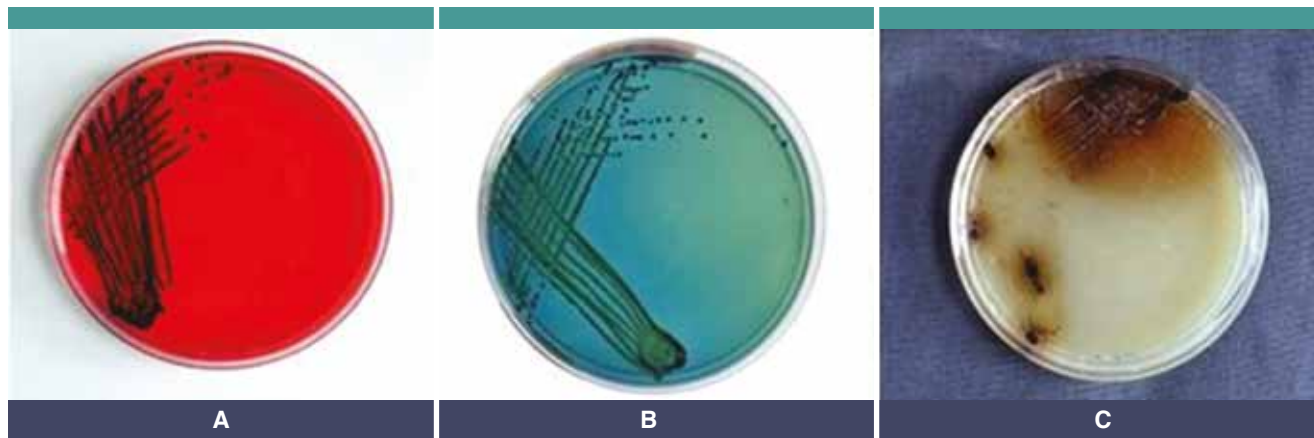


Fig. 1: Morphology of Salmonella in different selective media

A: XLD plate (Salmonella colonies are red in colour with black center) **B:** HEA plate (Salmonella colonies are green in colour with black center) **C:** BSA plate (Salmonella colonies are blackish to brownish with metallic sheen)

Pathways of Salmonella contamination in seafood

At the time of catch, fish meat is sterile but bacteria including Salmonella often get introduced into fish and fishery products during post-harvest handling and processing. In the seafood products, Salmonella has been isolated mainly from intestine, gills and body surface. Seafood can get contaminated with Salmonella from handlers at collection site, and during transportation, preprocessing, processing as

Manual (BAM), USDA or ISO standard 6599. The selection of isolation procedure can be our choice or it may be to fulfil the requirements of the importing country. Both USDA and ISO recommend steps such as pre-enrichment in lactose broth, enrichment in (BAM – Rappaport Vassiliadis broth (RV), Tetrathionate broth (TTB); ISO – Rappaport Vassiliadis broth with soya (RVS), Muller Kauffman tetrathionate broth with novobiocin (MKTn) followed with selective plating on BSA, XLD and HEA. Various biochemical tests, serotyping

MAIN STORY

Rapid methods for the detection of Salmonella

Basis of detection	System	Manufacturer
Biochemical reactions	API	bioMerieux
	Cobas IDA	Hoffmann LaRoche
	Micro-ID	REMEL
	Enterotube II	Roche
	Spectrum 10	Austin Biological
	RapID	Innovative Diag
	BBL Crystal	Becton Dickinson
	Minitek	Becton Dickinson
	Microbact	Microgen
	Vitek2 (Automated system)	bioMerieux
	Walk/Away (Automated system)	MicroScan
	Replianalyzer (Automated system)	Oxoid
	Cobas Micro-ID (Automated system)	Becton Dickinson

and PCR methods can be done to identify Salmonella at the genetic level. Modern and rapid methods based on biochemical reactions listed above can support the industry in the quick detection of Salmonella.

Things to remember to avoid Salmonella contamination in seafood

To mitigate the problem of Salmonella contamination in wild marine catch as well as cultured products, proper management plans as listed below must be employed at each level in the seafood chain from production to consumption.

Infrastructure

The aquafarm and seafood industry should select a proper lay out in a sewage free area with water treatment options. Seafood industry should meet all the national and international

standards in construction and operation with preprocessing, processing, and packaging facilities. In house laboratory should be equipped to test Salmonella in the product. The toilet facilities and septic tanks should be constructed away from the farm/production site to avoid faecal Salmonella contamination through leakage or drainage.

Harvest

Seafood industry should maintain proper registers for the collection and preprocessing sites for traceability. It is advisable to use enough clean or potable water for harvesting, handling and cleaning operations in the supply chain.

Water and Ice

The source of water should be treated properly to avoid Salmonella contamination. Cold chain is to be maintained

MAIN STORY



throughout the seafood production chain from harvest to consumption. The water used in ice making should be treated properly. The ice should be handled and stored in proper temperature and sanitary condition to avoid further cross contamination. Chlorinated water and hypochlorite solution should be used in the seafood industry at levels indicated at different stages of production to minimise Salmonella cross contamination.

Preprocessing sector

Visceral rupture of fish and shrimp can occur during pre-processing practices such as peeling, evisceration, descaling, deheading, deveining etc. This may increase the exposure of meat, contact surface and hands of the handler to intestinal Salmonella and result in further dissemination and cross contamination. Therefore, washing with hypochlorite solution/ chlorinated water remains a crucial step in the pre-processing section to prevent contamination due to Salmonella from gut remains and blood contents.

Storage condition

The processed seafood products should be stored at low temperature till consumption. As the seafood holds a long supply chain, any temperature abuse results in growth of microbial pathogens, especially Salmonella. Ability of Salmonella to withstand extreme environmental conditions such as freezing and drying makes it persistent even in frozen and dried seafood. Therefore, temperature in the cold chain should be continually monitored.

Aquaculture systems

In case of wastewater fed aquaculture, gamma irradiation can be adopted as an effluent water treatment option. The aquaculture inputs such as feed as well as fertiliser, especially natural fertilisers like cow dung and poultry litter also carry Salmonella very frequently. Therefore, screening of water and sediment for Salmonella should be carried out with standard procedures to monitor the level of contamination throughout the production process. Light should be permitted to enter the ponds as this assists in photoinactivation of microbial pathogens. Birds, rodents, frogs, insects, reptiles and other domestic animals act as carriers in Salmonella contamination. To avoid such contamination, aquaculture farms should be secured from the entry of other animals with proper biosecurity measures such as netting, strengthening of bunds to prevent runoff water etc. To minimise the cross contamination, farm implements like nets, cages, containers

should be cleaned and disinfected properly prior to use in exchange between farms.

Health status

The handlers should be free from typhoidal, paratyphoidal and nontyphoidal Salmonella infections. The direct or indirect contact of seafood with faecal matter of infected persons results in Salmonella cross contamination. In the seafood sector, health check-ups are mandatory to prove the status of Salmonella infection. Likewise, the personnel involved in aquaculture transportation and preprocessing areas also should be screened for Salmonella. Along with that, handlers should be properly educated about food safety, necessity to use clean utensils and to handle the aquaculture products hygienically for minimizing the cross contamination from other sources during harvesting, transferring to freezing facility and up to final packaging of the finished product.

HACCP / Training / Monitoring

All persons involved in the seafood production chain should be trained and educated with the sources and chances to cause Salmonella contamination to prevent, reduce and eliminate them timely. Overall, good management and hygienic practices should be adopted in the seafood industry and in aquaculture to minimise Salmonella contamination. Adoption of Hazard Analysis and Critical Control Point (HACCP) and GAQP systems at farm level by the seafood industry helps to prevent and eliminate or to reduce Salmonella contamination. HACCP should be implemented in the seafood industry and washing with hypochlorite solution / chlorinated water should always be considered to eliminate Salmonella. In this sense, the chlorine dosage and exposure time remain as a critical challenge to the seafood industry in Salmonella control. Authorities should take special attention to give adequate updated education and training to the workers and handlers in aquaculture and to implement HACCP at aquafarms and preprocessing areas to promote food safety.

References

1. *Bergey's Manual of Determinative Bacteriology* (1975) Eighth Edition, Am J Public Health. Available online at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1778052/>
2. Billah, M. M., & Rahman, M. S. (2024). *Salmonella in the environment: A review on ecology, antimicrobial resistance, seafood contaminations, and human health implications*. *Journal of Hazardous Materials Advances*, 100407.
3. Centers for Disease Control and Prevention (CDC) (2018) *National Outbreak Reporting System (NORS)*. Available on <https://www.cdc.gov/norsdashboard/>
4. Center for disease control and prevention (CDC) (2021) *Salmonella home page*,
5. Available on <https://www.cdc.gov/salmonella/index.html>



CONVEYOR BELTS

DISCOVER
OUR BELTS



GET RELIABLE FREEZING SOLUTIONS WITH OUR CONVEYOR BELTS

- + FREEZING PERFORMANCES
- + PLANT LIFETIME
- OPERATIONAL COSTS



STRAIGHT CONVEYOR BELTS



CURVED CONVEYOR BELTS

Costacurta is specialised
in the design and manufacture
of metal conveyor belts.
To discover our offer for the
Indian market, scan the QR code.

 **Costacurta**

RAINBOW IN A BOWL

TYMPANOPLEURA



V.K. Dey

V.K. Dey has over three decades of experience in diverse sectors of the seafood industry in the Asia-Pacific region. He was the Deputy Director of MPEDA and then associated with INFOFISH, Malaysia. As part of INFOFISH, he was involved in several studies related to the seafood industry in the Asia-Pacific region and beyond, including setting up of Aqua-technology Park for ornamental fish. MPEDA has published Living Jewels, a collection of his articles on ornamental fish.

AQUACULTURE SCENE

The Neotropical catfish genus, *Tympanopleura*, previously synonymized within *Ageneiosus*, is revalidated and included species are reviewed. Six species, *T. nigricollis*, *T. atronasus*, *T. brevis*, *T. rondoni*, *T. longipinna* and *T. cryptica* are now recognized, two of which are described as new. Species of *Tympanopleura* are distinguished from each other based on unique meristic, morphometric, and pigmentation differences. *Tympanopleura* is distinguished from *Ageneiosus* by having an enlarged gas bladder not strongly encapsulated in bone; a prominent 'pseudotympanum' consisting of an area on the side of the body devoid of epaxial musculature where the gas bladder contacts the internal coelomic wall; short, blunt head without greatly elongated jaws; and smaller adult body size.

Tympanopleura atronasus, *T. brevis*, *T. longipinna*, and *T. rondoni* are relatively widespread in the middle and upper Amazon River basin. *T. cryptica* is described from relatively few specimens collected in the upper portion of the Amazon River basin in Peru and the middle portion of that basin in Brazil. *T. cryptica* was described scientifically only in 2015; before that the species was probably always confused with other species, hence the species name *cryptica*, which means "hidden, concealed". The males of *T. cryptica* get a strongly extended back-fin during the reproductive time like all dolphin-catfish, that serves during the mating to press the female against the side of the male. The inner fertilisation takes place on that occasion with a mating-organ that is formed from the first five rays of the anal fin. One can recognize the males by it also outside the reproductive period while the long back fin spine is shed. One can compare this quite well with the antlers of the stags, which are formed again annually.

Interestingly they have very large nose pores, which at first made to think that the animals had bumped somewhere. But since this phenomenon occurs in many specimens and always on both sides and can also be seen in the preserved type specimens and it is normal. They are strictly nocturnal and move during the day only when food is given, as it is known from other driftwood catfishes. Concerning the feeding it is to be said that one should be careful with *Tympanopleura*, what concerns the tankmates. They are predatory, and can eat surprisingly large fish. However, they will also accept all usual frozen food.

Maximum attainable length reported to be 14.9 cm, dorsal spines 2; with dorsal soft rays 6, Anal soft rays 23 – 30. *T. atronasus* is distinct from others in having the greatest number of pleural ribs. It differs from others by the following combination of characters: a large, dark patch of dense melanophores concentrated on the flank above the anal fin, longitudinal black to purplish stripe in each caudal-fin lobe, a broad, black crescent on the chin. It is diffused pigment or unpigmented, except *T. cryptica*. It is distinguished from *T. cryptica* in having fewer gill rakers. *T. brevis* has fewer anal-fin rays, fewer pectoral-fin rays, fewer gill rakers on the first arch and shorter distance between pectoral- and dorsal-fin origins. *T. longipinna* in having fewer anal-fin rays, fewer pectoral-fin rays, fewer gill rakers, more preanal vertebrae and greater prepelvic length with a shorter anal-fin. *T. rondoni* is having fewer anal-fin rays, fewer pectoral-fin rays, fewer gill rakers, more preanal vertebrae, more total vertebrae with shorter, non-recurved posterior diverticula on gas bladder and larger eye diameter and absence of prominent, irregular spots distributed extensively on the head and body.



Tympanopleura cryptica



SUSTAINABLE SOLUTIONS FOR SEAFOOD INDUSTRY.

GEA offers a variety of modern compression solutions to fit every cooling need for seafood industry. Our line of GEA Grasso Screw and Reciprocating Compressors uses natural refrigerants to reduce total cost of ownership and deliver best-in-class performance for all your process need.



GEA Grasso Screw
Compressors



GEA Grasso
Reciprocating
Compressors



GEA Grasso
Compressor
Package



GEA Chillers



For more information contact us at
sales.india@gea.com

Tel: +91 (0) 20 67089100/01, Mo. +91 9978978011

GEA Engineering
for a better
world.

Better Management Practices in scientific shrimp farming

Dr. T. G. Manoj Kumar, Deputy Director, MPEDA, Bhimavaram
N. Purna Chandrasekhar, Regional Coordinator, MPEDA-NaCSA, Kakinada

In the last issue we discussed about biosecurity measures to be followed in shrimp farming as well as the shrimp seed selection and stocking procedures. In the current issue, we will discuss about the feed management in scientific shrimp farming

Feed management is one of the most important aspects for successful shrimp production as the feed accounts for around 50 to 60% of the operating cost. Hence, following steps to be followed while feeding the animals :



Fig. 1: Feed trays are key tools for feed management

i. Feeding

- Check the date of manufacture on feed bag upon its arrival. It is advisable that feed should not be more than 90 days old from date of manufacture. The feed should not be used after the expiry date.

Start feeding from the day of seed stocking. An indicative feed chart is given in Table 1 (*Feed chart is only a guideline. The actual feed consumption in each pond will vary with the health condition of the animals, water quality and climatic conditions. Hence it should be estimated regularly based on the check tray observations.*)

- The starter feed (crumble) should be mixed with little water to distribute easily and to ensure that it sinks rapidly.
- Determine the pellet size based on the size of the shrimp. A mix of two feed sizes should be used for at least 4 days, while switching over from one feed size to the next.
- Each time the required feed should weigh accurately and record the feed quantity to be given in the pond record book.
- Reduce feeding during periods of low DO, plankton crash, rain fall, moulting, extremes of temperature and also during disease outbreaks, if any.
- Active swimming of shrimp around the edge of the pond during day light hours (but not at the water surface) indicates under feeding. If this behaviour is observed consistently, check the feeding rate and increase accordingly.
- Install feed trays after 10 days of stocking and monitor the feeding from 20th day (Fig.1).

- Do regular sampling of shrimps once in a week after 45 days to determine growth rate and to calculate FCR. The best FCR is estimated to be 1:1.2 (Fig. 2).
- Avoid overfeeding. Slight underfeeding is preferable to overfeeding, as it helps save money and reduces the risk of diseases.
- Never use/mix any antibiotics with the feed. Also, the farmer shall not use feed brands which have a history on antibiotic contamination as reported under NRCP / other monitoring checks.
- There is no need to add any additives to the feed as long as it is fresh and of good quality.
- Farm made feeds are not recommended, as there is no enough mechanism to ascertain the purity of the ingredients, nutritional quality and factors like stability. Lapses in these may lead to malnutrition, contamination and other risks associated to the crop.

ii. Feed distribution

- During the first 10 days of culture, feed should be spread within 2 to 4 m from the edge of the pond (Fig. 3).
- Use scoop for wide distribution of the feed.
- After the first ten days, the shrimps tend to move into the main part of the pond. Therefore, the feed should be distributed evenly across the entire pond using a boat or floating device, rather than only being spread along the sides and shallow areas. (Fig. 4).
- Check the pond bottom soil on a regular basis and avoid feeding in areas with black and badly smelling soil and in corners. Feed should be supplied to clean areas in the pond.



Fig. 2: Weekly sampling for assessing biomass & FCR

- In ponds with aerators, feed in the areas cleaned by the water movement. It is preferable to switch off the aerators just before feeding until 2 hrs. after feeding, based on stocking density.
- If auto feed transmission is arranged, feed need to be verified in storage and timing need to be adjusted according to check tray observation. (Fig. 5).

AQUACULTURE SCENE



Fig. 3: Bund feeding during first week of stocking

- Use 4 to 6 preferably stainless-steel feed trays (round shape with 80 cm dia) per ha pond to monitor the feed consumption by shrimp from 20th day onwards.
- Feed trays should be placed on the pond bottom 4 m away from the slope of the pond bund, from aerators, sluice gates and pond corners.
- Provide 2% of the total feed in feed trays and check after 2 hours.
- Record the feed quantity, brand and batch no. in the feed record data sheet.
- Release the check tray slowly into the water to prevent the feed from scattering. Ensure the check tray settles on the pond bottom.



Fig. 5: Auto feeders in aquaculture ponds



Fig. 4: Farmer feeding in boat to cover potential area

- Suspend the next feeding if more than 25% of feed remains on the tray; if 10-25% feed remains on the tray, decrease feed by 50% for the next feeding; if less than 10% of the feed remains on the tray, continue feeding as scheduled; and if no feed is found or remaining in the check trays increase feeding approximately 5% for the next feeding.
- There are several factors, other than survival that affect feed consumption in trays; when the reduction in feed consumption is noticed check for the following:
 - Deteriorating water quality and pond bottom.
 - Competitors in the pond.
 - Quality of the feed.
 - Moulting cycle.
 - Temperature, salinity, and rain fall.
 - Diseases.
- If consumption drops drastically and does not improve within two to three days, then check the shrimps for any health problems.
- After feed tray observation, keep the check trays clean and dry till next feeding. Ensure the net in the feed tray is not damaged.
- Examine the gut content colour of the shrimp caught in trays and take corrective actions as given below.

Gut Content Colour	Probable Food Item	Probable Cause(S)	Corrective Action
Black	Benthic detritus, sediment	Underfeeding; inadequate feeding frequency	Increase feeding and frequency
Dark brown			
Red	Cannibalized body parts from dead shrimp	Disease event in pond	Check for dead shrimp in the pond
Pinkish			
Green	Benthic algae	Under feeding	Increase feeding
Pale	Manufactured feed or natural food	Gut infection	Reduce feeding
Whitish			
Light	Manufactured feed	Normal	
Golden brown			

AQUACULTURE SCENE

Table 1: Feeding Guidelines for *L.vannamei* for 1 lakh seed

Doc	Feed No	Abw (Gr)	Meal 1 (Kg)	Meal 2 (Kg)	Meal 3 (Kg)	Meal 4 (Kg)	Feed / Day (Kg)	Cumulative Feed	Feed Increase/Day
1		0.01	0.7		0.7	0.6	2.0		
2		0.07	0.9		0.8	0.7	2.4	4.4	0.4
3		0.12	1.0		0.9	1.0	2.9	7.3	0.5
4		0.17	1.3		1.0	1.0	3.3	10.6	0.4
5		0.23	1.5		1.2	1.0	3.7	14.3	0.4
6		0.27	1.9		1.2	1.0	4.1	18.4	0.4
7		0.34	2.0		1.5	1.0	4.5	22.9	0.4
8		0.41	1.5	0.9	1.5	1.0	4.9	27.8	0.4
9		0.47	1.5	1.0	1.5	1.3	5.3	33.1	0.4
10		0.53	1.6	1.0	1.5	1.5	5.6	38.7	0.3
11		0.60	2.0	1.0	1.5	1.5	6.0	44.7	0.4
12		0.69	2.0	1.0	1.5	2.0	6.5	51.2	0.5
13		0.77	2.0	1.4	1.5	2.0	6.9	58.1	0.4
14		0.85	2.0	1.5	1.8	2.0	7.3	65.4	0.4
15		0.94	2.0	1.5	2.0	2.2	7.7	73.1	0.4
16		1.02	2.4	1.5	2.0	2.2	8.1	81.2	0.4
17		1.12	2.6	1.5	2.0	2.5	8.6	89.8	0.5
18		1.22	3.0	1.5	2.0	2.5	9.0	98.8	0.4
19		1.32	3.0	1.5	2.4	2.5	9.4	108.2	0.4
20		1.42	3.0	1.5	2.5	2.8	9.8	118.0	0.4
21		1.52	3.0	1.5	2.7	3.0	10.2	128.2	0.4
22		1.64	3.0	1.7	3.0	3.0	10.7	138.9	0.5
23		1.75	3.0	2.0	3.0	3.1	11.1	150.0	0.4
24		1.87	3.4	2.0	3.0	3.1	11.5	161.5	0.4
25		1.99	3.5	2.0	3.0	3.4	11.9	173.4	0.4
26		2.10	3.5	2.0	3.0	3.8	12.3	185.7	0.4
27		2.22	3.5	2.2	3.0	4.0	12.7	198.4	0.4
28		2.35	4.0	2.2	3.0	4.0	13.2	211.6	0.5
29		2.47	4.0	2.6	3.0	4.0	13.6	225.2	0.4
30		2.60	4.0	3.0	3.0	4.0	14.0	239.2	0.4

- Feed guide for 1lakh shrimp, density 30-40/m²
- Feed time & ratio %: 6:30am-10am-2pm-5pm @ 30%-25%-15%-30% respectively (summer)
- Feed time & ratio %: 7:30am-10:30am-2pm-4:30pm @ 20%-30%-25%-25% respectively (winter)



Details of SPF *P. vannamei* brooders imported & quarantined at AQF during June 2024

Sl. No.	Name of the importer	State	Country of origin/ supplier	Date of receipt of the lot at AQF arrival	Broodstock imported (nos)		
					Male	Female	Total
1	CP Aquaculture (India) Pvt. Ltd - Mukkam	Andhra Pradesh	American Penaeid, Florida	06.06.24	250	250	500
2	Ananda Foods	Andhra Pradesh	SIS, Florida	06.06.24	230	230	460
3	Saivasista Hatcheries	Andhra Pradesh	SIS, Florida	06.06.24	200	200	400
4	Sreevalli Hatcheries	Andhra Pradesh	SIS, Florida	07.06.24	300	300	600
5	Meenakshi Hatcheries Pvt. Ltd	Andhra Pradesh	SIS, Florida	08.06.24	600	600	1200
6	Sun Glow Marine	Tamil Nadu	SIS, Florida	08.06.24	175	175	350

AQUACULTURE SCENE

Sl. No.	Name of the importer	State	Country of origin/ supplier	Date of receipt of the lot at AQF arrival	Broodstock imported (nos)		
					Male	Female	Total
7	DSR Hatcheries	Andhra Pradesh	Kona Bay, Hawaii	09.06.24	222	222	444
8	BMR Industries Pvt. Ltd	Tamil Nadu	Blue Genetics, Texas	09.06.24	310	310	620
9	Sapthagiri Hatcheries	Andhra Pradesh	SIS, Florida	09.06.24	400	400	800
10	Sheng Long Bio-Tech (India) Pvt. Ltd	Tamil Nadu	SIS, Florida	16.06.24	260	260	520
11	CPF (India) Pvt. Ltd	Tamil Nadu	American Penaeid, Florida	16.06.24	300	300	600
12	Sai Gnaneswary Hatcheries	Andhra Pradesh	SyAqua Americas Inc, Florida	21.06.24	200	200	400
13	BMR Exports - Tindivanam	Tamil Nadu	SyAqua Americas Inc, Florida	21.06.24	500	500	1000
14	Prince Aqua Pvt. Ltd	Andhra Pradesh	SIS, Florida	21.06.24	400	400	800
15	Vaisakhi Bio-Marine Pvt. Ltd - Unit III	Andhra Pradesh	SIS, Florida	26.06.24	300	300	600
16	Rama Shrimp Hatchery	Andhra Pradesh	SyAqua Americas Inc, Florida	28.06.24	300	300	600
17	Balaji Aqua & Agro Products Pvt. Ltd (a)	Andhra Pradesh	SIS, Florida	28.06.24	270	390	660
18	Balaji Aqua & Agro Products Pvt. Ltd (b)	Andhra Pradesh	SIS, Florida	29.06.24	230	110	340
19	Unibio (India) Hatcheries Pvt. Ltd	Tamil Nadu	Aquaculture De La Mahajambal; Madagascar	04.06.24	60	39	99
20	Unibio (India) Hatcheries Pvt. Ltd	Tamil Nadu	Aquaculture De La Mahajambal; Madagascar	05.06.24	28	51	79
21	Unibio (India) Hatcheries Pvt. Ltd	Tamil Nadu	Aquaculture De La Mahajambal; Madagascar	06.06.24	115	116	231
	TOTAL				5650	5653	11303



◀ EMPLOYEE CORNER

Superannuation

Mr. Ram Pal Singh
Driver Grade II
Head Office, Kochi

JiraKorn

Food Additives

“Think Food Additives
Think Jirakorn”

Jirakorn Co., Limited (Thailand)
is a leading provider of various
high quality and innovative food
ingredients with almost 50 years
of experience.



TRITON TRADING CORPORATION

Distributor for India

Email : tritontradingcorp@gmail.com

Customer Care No : 9388418750

CUSTOM BLEND for shrimp

- Non-Phosphates
- Mixed-Phosphates

FOOD ADDITIVES



We can supply customized food additives or any
of our diverse range of products to your liking.

“Just the way you like It”



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”



R.O. : DEEN COMPLEX, O.S.M. NAGAR, MAYILADUTHURAI - 609001.
MAYILADUTHURAI DIST., TAMILNADU, INDIA .
Tel : 04364 - 229134 / 224619 / 224967
e.mail : bismiaqua@gmail.com www.bismigroups.in

INNOVATIVE - SCIENTIFICALLY FORMULATED - PROVEN

- Greater Appetite • Healthy & Faster Growth • Low FCR with Higher Returns
- Friendly Water Quality • Avanti Aqua Health Care Products



Vannamei Feed



Black Tiger Shrimp Feed



Black Tiger Shrimp Feed



In the business of quality prawn feed and prawn exports
Aiding Sustainability & Reliability to Aquaculture
An ISO 9001 : 2015 Certified Company



Avant Pre'W
Salt & Water Products

Avant Bact

Avant Immunapak
Immunity Enhancer

AVANT HERCOZIN

Saldo Mixtos
Water Marker

Avant D-Flow
Water Quality Improver

Avant Ammonio Absorb

AVANT MAGIC DE PLUS

AVANT SNAIL

AVANT GEO TUFF

AVANT PRO PS

Avant Life
Bio-Genitor

AVANT AQUADIS

Avanti Feeds

- Prawn Feeds • Fish Feeds • Shrimp Hatchery

Avanti Frozen

Prawn Processing & Exports

Avanti Feeds Limited

Corporate Office: G-2, Concord Apartments, 6-3-658, Somajiguda, Hyderabad-500 082, India. Ph: 040-2331 0260 / 61, 040-4460 8222

Regd. Office: Flat # 103, Ground Floor, R Square, Pandurangapuram, Visakhapatnam-530003, Andhra Pradesh, India. Ph: 0891-2555011

Feed Plant Kovvur: D.No. 15-11-24, Near Railway Station, Kovvur - 534 350, W.G. Dist, Andhra Pradesh, India, Tel: 231541 & 231588, Fax: (08813) 231421

www.avantifeeds.com



NO. KERENG/2013/61656

Broker at **LLOYD'S**

Your Security is our Priority

Tysers are specialists in Rejection and Marine/Transit insurance. We are committed to providing innovative, bespoke insurance solutions to cater for the diverse nature of your insurance needs.

Our in-depth knowledge and understanding of the seafood business enables us to provide you with the highest levels of service for your business.

To find out more about our services please contact:

Raja Chandnani - +44 (0)7984 191072 - raja.chandnani@tysers.com

www.tysers.com



Tysers Insurance Brokers Limited is authorised and regulated by the Financial Conduct Authority.
Registered Office: 71 Fenchurch Street, London, EC3M 4BS. Registered Company No. 2957627 England