



# MPEDA

## Newsletter

VOL. X NO. 10 JANUARY 2023

### MAIN STORY

The Role of Sulfated Polysaccharide  
in Inhibition of Viral Replication

MPEDA RGCA Signs MoU with  
Govt. of Andhra Pradesh

Prospects of Growth  
in Tilapia Exports



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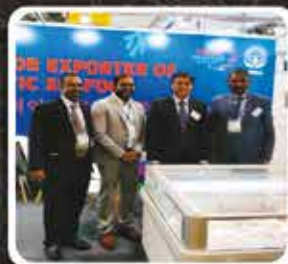
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## On the Platter

### Mr. Dodda Venkata Swamy Chairman

Dear Friends,

I wish all the readers and stakeholder members a "Very happy and prosperous New Year". When it comes to enhancing our marine products exports, we always talk about two critical factors. The first is value addition and the second is enhancement of production. The share of value added items in the total export value of marine products from India is around 10%, far below compared to our competitors in South East Asia or China. Though we have adequate infrastructure for value addition, the sector faces a dearth for skilled workers to make off-the-shelf products in all its appeal and quality. Only continuous skilling can bridge this gap. For this, focused skilling schools offering short term courses, capable enough to inculcate professionalism in every seafood processing worker are required.

This is what I have witnessed in a diamond processing unit in Vizag SEZ, where the workers are trained and skilled enough in shaping the diamonds, satisfying the requirements of European buyers. Our seafood processing workers shall be given opportunity to emulate such models and acquire skills to produce and export a diverse array of seafood world over. While making a presentation on the prospects of seafood exports from Odisha in the Make in Odisha Conclave, a call for better value addition was made to the entrepreneurs to enhance the overall and unit value of exports adopting successful models in other sectors. Secondly, during my recent visits to states such as Odisha and Karnataka I have emphasized the need to allocate more areas and appropriate policies for expansion of aquaculture, besides conservation of marine resources to sustain the production. MPEDA is directly engaging with District Collectors also to clear the bottlenecks specific to the districts and to propel aquaculture development.

It is important to expand our production bases for exports inward focusing on non shrimp species as the global seafood demand moves upward. GIFT Tilapia, Seabass and the mud crabs are potential species with proven seed production and grow out techniques for mass adoption by private players. Only few hatcheries supply GIFT seeds to farmers, and still lesser number for seabass. Reliance on wild seeds is not a feasible solution as it would deplete natural stock and risk crop loss due to low survival and disease. We look towards the transformation of the old OSSPARC facility in Ganjam district of Odisha to a hatchery with seed supply capacity of 30 million for Black Tiger shrimp and 3 million for seabass. The project is funded by State fisheries department and operational assistance is given by RGCA. RGCA scientists have been instructed to embark on a hands-on training drive for hatcheries and aquaculture students on the seed production of these potential species, to bring in more entrepreneurship in seed production and supply to grow out systems.

To certify our shrimp trawl fisheries under Section 609 of Public Law, Turtle Excluder Device (TED) need to be fitted in the trawl nets used here to facilitate escape of sea turtles during trawl operations. Through constant interaction with the US-NOAA & NFMS, we could zero in on a TED design by ICAR-CIFT based on the specifications prescribed by the US side. Field trials of this TED are underway off Cochin by CIFT. If the trials are successful, India shall be ready to fit TED in all the shrimp trawlers operated here to earn US certification. MPEDA has already sought the co-operation of Department of Fisheries, GOI and the coastal states. TED implementation across the coastline requires commercial production units, which will make it affordable and easily available. Companies that are engaged in casting of different products could be roped in to fabricate TED frames for supply to the trawl operators.

MPEDA and SEAI are constantly working to make 23<sup>rd</sup> India International Seafood Show, which will be held in Biswa Bangla Mela Prangan during 15<sup>th</sup> to 17<sup>th</sup> February 2023 at Kolkata, the best ever. The booking for exhibition space is expected to be over by mid January. The delegate application also pouring in. An International Buyer Seller Meet in connection with the India's Presidency of G-20 will be the highlight this time.

Dear reader, Kolkata is calling! It's now your turn is to register and make it to this mega event that hosts a plethora of business opportunities.

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## India participates in Busan International Seafood and Fisheries Expo 2022

### Seafood trade in South Korea

Seafood is in high demand in South Korea. Korean seafood imports totalled \$5.87 billion in 2021, up 9% from 2020. The nation currently has Free Trade Agreements with more than 52 countries. While Korea imports fish and seafood from over 100 countries, most of the supply comes from China, Russia, Vietnam and Norway. These four countries hold a 78.1% export market share of trade to the Republic of Korea, of which more than half of South Korean fish and seafood products are supplied by China.

Frozen fish, frozen shrimps, and prawns are the top two products South Korea imports from the World. The two fastest-growing products in the top ten imports to South Korea are frozen Cuttlefish and Squid.

The country depends more on imports to meet its increasing seafood demand, as there are constraints on increasing domestic production. Imported products that offer value, quality, nutritional benefits, new tastes and convenience products are showing strong growth in the market.

**Table 1: Seafood Imports in South Korea 2021 (US\$ million)**

Total Imports	Imports from India	India % share	India's Rank in export to South Korea
5878.08	33.04	0.56	21

The share of Indian seafood in South Korea's seafood export is very meagre and less than one per cent. There is significant scope for enhancing our seafood exports to South Korea and increasing our market share.

### India's seafood export to South Korea

South Korea is India's 23<sup>rd</sup> major Seafood market with an export of 10,409 MT valued at US\$ 31.85 million during 2021-22.

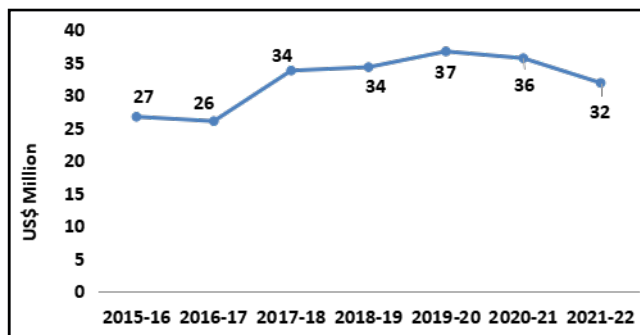


Fig. 1: Export of marine products from India to South Korea in US\$ value

Frozen Shrimps and Surimi constitute are major item groups exported from India to South Korea, followed by Frozen Fish and Frozen Cuttlefish (Fig.1). The top 5 major export items to South Korea from India are Frozen Surimi, IQF PD Tail on Vannamei Shrimp, Frozen Reef Cod, Frozen Imitation Crab meat shredded and Frozen PD Tail on Vannamei Shrimp (Fig.2).

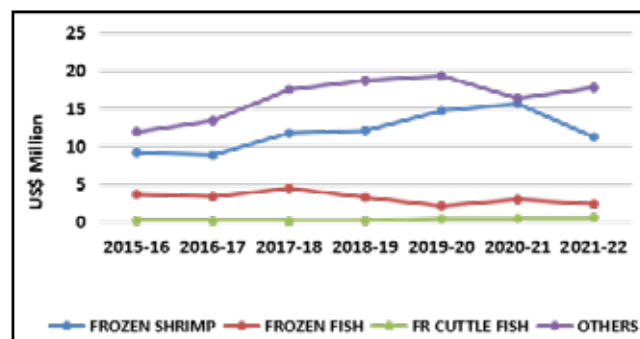


Fig. 2: Export trend of major items from India to South Korea in US\$ value

### Busan International Seafood and Fisheries Expo 2022 (BISFE-2022)

The 20<sup>th</sup> edition of Busan International Seafood and Fisheries Expo 2022 (BISFE 2022) was held from 2<sup>nd</sup> to 5<sup>th</sup> November 2022 at the BEXCO in Busan, South Korea. BISFE is one of Asia's top three seafood and fisheries trade fairs and the largest in Korea. The event was hosted by the Busan Metropolitan City and co-organized by BEXCO (Busan Exhibition and Convention Center), the Korea Fishery Trade Association, and the National Federation of Fisheries Cooperatives.

## MARKETING NEWS

His Excellency, The Ambassador of India to the Republic of Korea, Mr. Amit Kumar IFS, along with the Mayor of Busan City, Mr. Hyeong-Joon Park, Deputy Minister for Marine Policy, Ministry of Ocean and Fisheries, Mr. Lee Keong-kyu, and Member of the National Assembly, Mr. Ahn Byungjil, co-inaugurated the Expo on 2<sup>nd</sup> of November 2022.

A total of 416 exhibitors from 22 countries with 950 booths participated in BISFE 2022. The event also had a footfall of more than 12,000 visitors.

### Exhibition Content

The exhibition at BISFE-2022 hosted business promotion of different segments in the seafood value chain, including the promotion of various seafood items, seafood processing & equipment, international zones, seafood and fisheries start-up, venture capital support, Korean fishing specialized village, support promoting zone, K-fish, Korean seafood masters, customs authorities, fisheries institutes, certification bodies, ornamental fish trade etc.

Other major international trade events organized on the sidelines of the Expo included BISFE international buyers business meeting, BISFE export consultation meeting, network sessions, conferences and seminars. Business matching between major Korean buyers and exporters (buyer seller meeting) were organized systematically in earmarked areas equipped with all requirements to facilitate fruitful discussion.

### Concurrent Events

The organizers arranged an industrial tour for interested overseas exhibitors to the Busan International Fish Market. As part of the event, the organizers also organized Naver Shopping Live commerce, Youtube live streaming and sample tasting as promotional events.

### India's participation in BISFE-2022

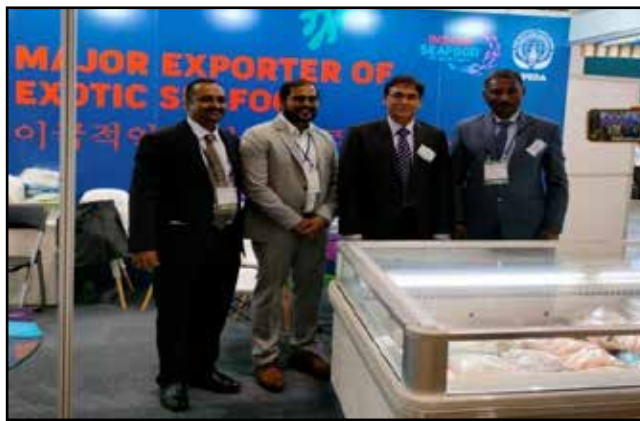
The Marine Products Export Development Authority jointly organized the participation of India in BISFE-2022 along with the Embassy of India in Seoul. MPEDA took a 90 Sq. m. area in Hall No.2, and EoI, Seoul took a 36 Sq. m. booth adjacent to the MPEDA stand. 11 Indian seafood exporters participated as co-

exhibitors in the Indian Pavilion. The backdrop of the India pavilion was designed in a manner to promote the Indian Seafood brand globally. The India pavilion was placed strategically, ensuring that all visitors entering the hall visited the pavilion.

MPEDA stall showcased the diverse frozen and ready to eat/serve value added seafood items. Publicity materials like co-exhibitors guide featuring the details of the participating exporters, pamphlets, product catalogue, commercial fish chart etc were displayed and distributed among buyers. The Indian pavilion was a major attraction to all the delegates and visitors. MPEDA booth of the India pavilion had a live cooking demo and display of a wide variety of frozen seafood products sourced from Indian exporters. Two interpreters were engaged to facilitate trade discussions with Korean buyers.

Dr. M. Karthikeyan, Director, MPEDA and Mr. Rakesh Thomas Kurian, Deputy Director, MPEDA Trade Promotion Office, New Delhi represented the Indian delegation. EoI, Seoul played a significant role in organizing the participation of India in the event. Mr. Swapnil Thorat IFS, Second Secretary, EoI, Seoul, South Korea, coordinated the organization of the Indian pavilion, arranging a cooking demo and meeting between importers and exporters.

Mr. Hyeong-Joon Park, Hon'ble Busan City's Mayor, visited the India pavilion and interacted with officials. Mr. Amit Kumar, H.E. Ambassador of India to South Korea also visited MPEDA stand and the Indian booths and interacted with exporters to understand their concerns about the Korean market.



*Mr. Amit Kumar, H.E. Ambassador of India and Mr. Swapnil Thorat, Second Secretary, EoI, Seoul along with MPEDA officials*



## MARKETING NEWS



*Dr. M. Karthikeyan, Director, MPEDA interacting with buyers*



*Dr. M. Karthikeyan, Director and Mr. Rakesh Thomas Kurian, Deputy Director discussing with buyers*

More than 50 buyers visited the Indian Pavilions. The MPEDA officers briefed the buyers about the Indian seafood industry focusing on various aspects like the quality of Indian seafood, sustainability of the Indian Seafood sector and strength of the Indian seafood processing sector. The MPEDA officials also answered the queries and trade inquiries raised by the visitors and buyers. The details of trade enquiries received from buyers of different countries who visited MPEDA stall are placed in the concerned section of this Newsletter.

### Cooking demo

There was a cooking demo in the Indian pavilion where Indian, Korean and fusion dishes with Indian Seafood were served hot for tasting by visitors and delegates.

Eol Seoul arranged a well-experienced Indian Chef Mr. Rajendar from Bombay Brau Restaurant in Seoul to prepare excellent dishes that all the visitors appreciated. Cooking demo was a significant attraction and distinguished our pavilion from other pavilions.



*Seafood dishes served for tasting in the India pavilion*



*Visitors enjoying the taste of Indian Seafood*



*H.E. Ambassador of India Mr. Amit Kumar along with the Indian delegation for BISFE-2022*

## MARKETING NEWS

### Support extended by Eol, Seoul

The Embassy of India, Seoul had played a pivotal role along with MPEDA in organizing the participation of India in the event. During the initial preparations, Eol had assisted MPEDA in organizing Virtual Buyer Seller Meets of Indian exporters with major Korean buyers. The contacts and networking of Eol helped guide major Korean buyers to the India Pavilion for B2B meeting with the Indian exporters. Eol Seoul also facilitated in arranging an experienced Indian Chef for the cooking demo in the India Pavilion. Besides, the Eol had also deputed 2 of its officers to assist the exporters and to guide the buyers to each Indian booth for the entire event period. Eol also arranged interpreters for accessible communication with the importers.

### Co-exhibitors

Seven seafood exporters from India participated as Co-exhibitors and MPEDA in the India pavilion. The list of the Co-exhibitors are listed below

1. M/s. Indian Exports, Veraval
2. M/s. Monsoon Bounty Foods Manufacturing Pvt Ltd, Chennai
3. M/s.Orchid Marine Exports private Limited, Bhubaneswar
4. M/s. NDM Seafood Processors & Exporters Pvt Ltd, Kolkata
5. M/s. Seacatch international, Mumbai
6. M/s. Ulka Seafoods Pvt. Ltd, Mumbai
7. M/s. Quality Marine Exports, Veraval

Four more seafood exporters from India had participated in the event through Eol Seoul

1. M/s. Nekkanti Sea Foods Limited, Visakhapatnam
2. M/s. Devi Fisheries Limited, Visakhapatnam
3. M/s. Devi Sea Foods Limited, Visakhapatnam
4. M/s. ITC LIMITED, Nellore

All the Co-exhibitors have expressed satisfaction in the stall arrangements and appreciated the cooking demo arranged in the India pavilion. As per the feedback received, the average business generated by each Co-exhibitor ranges from US\$1-10 Million with the number of buyers met ranging from 12-50.

### Visit to processing facility and fish market in Busan

#### Busan International fish market

As part of the event, the organizers arranged an industrial visit, and took the foreign delegates to the Busan International fish market. The facility is an

incubation facility for Seafood start-ups that offers the facility of a landing centre, processing facility and cold storage with all machinery and work force required for successful operation, for an initial period of 5 years. The facility is apartment type and has separate production lines in each floor.

### Jagalchi Seafood Market

Visit was also undertaken to the Jagalchi Seafood Market in Busan, a world famous market for fresh fish, chilled fish & seafood to take away or eat at the informal stalls. In it is the largest seafood market in South Korea. Almost all seafood items were available in live condition. The market was located in a multi storied building, which had parking facilities, recreation facilities and restaurant facilities for preparing the live fish for consumption. The most remarkable thing of the market is that it is well maintained with proper hygiene and sanitation. The variety of seafood available in the market and the rush in the market was a clear indication of the demand for live & fresh Seafood in South Korea.



*View of the Jagalchi Fish Market, Busan*

### Conclusion

Shrimps, which has been the mainstay of Indian seafood exports has been able to capture only 1.87 % share of the total shrimp imports by South Korea, whereas Vietnam is having a share of 49.85%. We may seek more leverages from Korea under CEPA for Indian seafood to compete with ASEAN nations in supply of seafood. As the market is very quality conscious Indian exporters have to comply with the regulations and gain confidence of the importers. Our exporters may also try out export of value added products as there is a good demand for ready to cook and heat and eat items. Active band promotion and repeated participation in exhibitions such as BISFE by exporters will definitely help in improving access to Korean seafood consumers.





## MPEDA participated in a business webinar with Vietnam

**M**PEDA participated in a business webinar co-organized by the Consulate General of India, Ho Chi Minh City, Vietnam on the topic "Promotion of production, processing, and consumption of agriculture and aquatic products from India" on 16<sup>th</sup> December 2022. Hon'ble Consul General of India in Ho Chi Minh City, Dr. Madan Mohan Sethi gave a welcome speech and highlighted the opportunities for India and Vietnam to expand cooperation in the field of trade, especially in agricultural and aquatic products.

Mrs. Vinita Sudhanshu, General Manager, APEDA gave a presentation on the "Role of APEDA in Agri exports". The presentation covered the status of agri exports to Vietnam from India. Dr. M. Karthikeyan, Director, MPEDA gave a presentation on "Seafood market update of India" the presentation covered the status of seafood exports to Vietnam from India and the major items exported. He also highlighted the export performance to Vietnam during 2021-22, the contribution of Indian seafood in Vietnam's global imports in 2020, and also discussed the Way forward in enhancing the exports. This webinar is considered an opportunity to strengthen the linkage between the two countries in expanding the market of agriculture

and aquatic products for increasing the consumption rate and for the development of the business. It aims especially at trade promotion and development of specific products as well as the strengthening of some central provinces of Vietnam and India.

According to the report of Khanh Hoa Province Department of Industry and Trade, for 3 years (from 2019 to 2021), the export turnover of goods in the province to the Indian market reached 5.06 million USD. Khánh Hòa is spending 3,386 ha of land in aquaculture, bringing in an output of 12,476 tons. Seafood is one of potential products that Vietnam exports to India. Japanese grape seaweed has been introduced to Vietnam and grown mainly in Khanh Hoa province. Khanh Hoa grape seaweed grows quickly and becomes a commodity with high economic efficiency. Seaweed grapes have a higher nutritional value compared to conventional protein-producing plants.

### Meeting with a buyer

MPEDA organized a meeting with M/s Happiness food Co. Ltd. on 24<sup>th</sup> November 2022. The company was represented by Mr. Takaomi Ise. Mr. P. Anil Kumar,

## MARKETING NEWS

Joint Director (Marketing), Dr. T R Gibinkumar, Deputy Director (MP & Statistics), Mrs. Anju, Deputy Director (MP & Development) and Mr. Jun Nakayama, Executive Assistant, TPO Tokyo attended the meeting. The aim of the meeting was to promote the export of value added products from India. The meeting focused on how well and innovatively the value added product can be produced by incorporating Surimi flavoured with shrimp along with various vegetables like lady's finger (okra), lotus root, brinjal (egg plant) etc to penetrate into the Japanese markets. The current requirement is for 2-3 containers of Surimi based vegetable products per week.

Meeting continued with the suggestions of MPEDA officials towards the representation of Surimi, like adding vegetables inside and coating with Surimi from the outside to get the Surimi converted into a fusion dish. Later a Q & A session was taken place with Mr. Takaomi Ise, where the officials asked regarding the market conditions of Japan, availability of raw materials for making Surimi etc.

MPEDA officials also drafted that the quality standards to be met for a company while entering vegetables into the fish processing firm should be considered and taken as a concern. MPEDA made sure that there will be a VBSM to fulfill the requirements of the party in the near future. Mr. P. Anil Kumar concluded the meeting by conveying thanks to the participants.

Happiness Food Co Ltd, deals with organic honey, chocolate, shrimp, lobster and other Frozen processed foods. They also do value added seafood such as fried shrimp, fried fish, tempura, fried chicken, etc. They also manufacture pasta sauces, bouillabaisse (French soup with seafood.), etc., using offcuts from lobster, crab, fish, etc., in response to customer requests.

### MPEDA organized Virtual Buyer Seller Meet

MPEDA had organized a VBSM for Indian exporters with a Russian importer M/s Lucky Fish, on 21<sup>st</sup> November 2022. The buyer was looking for headless shell on vannamei shrimps from India in different sizes at a quantity of 3 containers per month. 6 exporters had participated in the meet and presented their credentials according to the requirements of the buyer. Exporters also answered the concerns of the buyer on glaze, product range, packaging, capacity, countries to where they export, the availability of license to export their products to Russia, facilities they have etc.. Dr. T. R. Gibinkumar, Deputy Director (Market Promotion & Statistics) moderated the meet.

### Lucky Fish

Lucky fish is a seafood processing company mainly focused on Sea trout. The company has about 51 retail seafood shops. Lucky Fish offers a variety of product range including, fresh, frozen, whole & gutted fish, fish fillets, branded recipe ready-to-cook & eat fish etc.



The advertisement for Godrej Agrovet Aqua Feeds features a blue and green background with a wavy line representing water. At the top, the logo "Godrej agrovet Aqua Feeds" is displayed in a stylized font, with "brighter farming" written below it. The website "www.godrejagrovet.com" is in the top right corner. Below the logo, several bags of fish feed are shown, including "NutriFry", "SPARK PLUS", "SPARK", "VRUDHI-M", "POPULAR", and "INDICA". To the right, a bag of "INDICA" shrimp feed is also shown. A green circle with the text "AHC PRODUCTS" is positioned below the feed bags. At the bottom, a collection of various aquaculture products, including buckets, bags, and containers, is displayed. The text "We Provide Premium Quality Fish Feed, Shrimp Feed and Aqua Health care products" is written in a large, bold font. At the bottom left, the customer care information is provided: "Customer care: +91 91608 99992", "Godrej Agrovet Limited, Godrej One, 3rd Floor, Pirojshanagar, Eastern Express Highway, Vikhroli - East, Mumbai - 400 079."



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# Monthly Outlook Forecast Report

Ritesh Victor, -Co-Founder & Country Head,  
Myforexeye Fintech Pvt Ltd

## USDINR

A recovery was witnessed in the Indian rupee in November month. The USDINR pair started at 82.73 (01-Nov) followed by some pressure in the initial days of the month wherein, the local unit depreciated to 82.93 (03-Nov) against the US dollar. The beloved rupee gained to 80.51 (14-Nov) after which it bounced back to the level above 81 and sustained for the remaining part of the month. The benchmark Nifty 50 rose around 550 points to the level of 18,696. The 10-year bond yield of India is at 7.22%. The weak US data and the moderation in the US inflation contributed to the decline in the dollar. The rupee's performance was well short of other Asian currencies. The Chinese Yuan, the Korean won and the Malaysian ringgit were up from 1.5% to 2.5% last week.

The underperformance of the rupee is a reflection of how less volatile is our local unit relative to other currencies. If the dollar's current downtrend reverses, the Indian rupee will fall less than the rest of Asia. Forward premiums in the rupee continued to drift lower

with the 1-year yield declining to nearly 1.90%. Due to the downtrend in US and India interest rate differentials alongside likely buy/sell swaps by the central bank in near-term forwards pushed premiums to levels last seen 11 years back. All the major currencies across the board recovered due to the weakness in the greenback. the dollar index plunged from 113.15 (03-Nov) to 105.85 (25 Nov) almost 6.45%.

November turned out to be a decent month for our beloved Rupee – it recovered from levels close to all-time lows, towards 80.50 - strongest level since 22 Sep'22. Broad based decline in the dollar index along with recoveries in Asian currencies aided rupee's recovery. In the daily candlestick chart, old price gaps continue to remain unfilled – observe the pink and blue horizontal lines.

Price gaps in USDINR usually fills up – an indication that we could witness two-way volatility. An upward moving trend line (red color) connecting the previous dollar lows comes around 80.90 – 81.00. The 89-day simple moving average (SMA), which has been an important



## FOCUS AREA

indicator of turning points in the past, is at 80.90. Trend line and the SMA suggests that the region around 80.80 – 81.00 could be an important support area. The momentum indicators of MACD (5,35,5), 14-day RSI and Slow Stochastic are predominantly neutral. For an extended period, exporters have enjoyed good levels to hedge and capitalize. Spot around the 81 mark are good levels for importers to start hedging.

Strong recommendations to use vanilla options to hedge. Options volatility are close to its lowest levels in 3 months and hence option premiums will be quite cheap. Diversify risk by using simple forwards as well – forward premiums on USDINR are close to multi-month lows and just around 2% annualized, making forward rates palatable.

### EURUSD

EURUSD started the month at 0.9880 but rose to a 4-month high of 1.0480. The EUR/USD pair resumed its upward trend over the last week, reaching the 1.0395 resistance level to close the week. In response to unsettling news out of China, the US dollar rose in the past to past week, continuing its upward trajectory.

In the same week saw a modest movement for the EUR/USD pair, but Wednesday saw a bigger rise as US growth-related data surprisingly disappointed to the downside and the FOMC Meeting Minutes were noticeably more dovish than anticipated.

On the other hand, the energy crisis and the lack of a single budgetary plan, which has been an unfinished mission ever since the European Union (EU) was founded, continue to put pressure on Europe. Investor bets on a modest US Fed rate increase in December rose.

The FOMC meeting minutes from November revealed a dovish lean in the US Fed's approach to policy, as the markets all but guaranteed a rate increase of 50 basis points. The upcoming US Nonfarm Payrolls and Unemployment Rate figures will be interesting to watch because they could establish a pattern for the two.

The European currency has rallied significantly to restore the 1.05 level, which is a large, round, psychologically significant level and registered a gain of more than 5% in November month and now comfortable trading above 200 days SMA which is indicating a bullish momentum to remain in the near term. On the other hand if we broke 200 days SMA which is around 1.0375 might take the pair towards 1.03 level, maybe even down to the 1.01 level.

I think bulls will remain interested in buying unless we see some major positive news for the dollar as we are seeing strong volume of buying in this pair since the start of month. On the daily time frame momentum indicator giving bearish signal as it is trading at 68 which is considered to be an overbought zone while MACD giving mixed signals.





## FOCUS AREA

### GBPUSD



GBPUSD started the month at 1.1467 with a fall of about 300 pips but rose to a 3-month high of 1.2153. The GBPUSD rose as a result of rising trust in the new UK government and its budgetary stance.

The buildup of expectations for a tightening of the global economy was the exclusive emphasis of the Federal Reserve and the Bank of England's monetary policy announcements that caused the greenback's decline. In line with the US Fed, the Bank of England raised the interest rate by 75 basis points. Investor bets on a modest US Fed rate increase in December rose.

Following disappointing US CPI data, the gap between the US Fed's and the Bank of England's monetary policies began to shrink marginally, supporting the upward trend in the Cable. The minutes from the FOMC meeting in November showed a dovish slant in the US Fed's policy stance as the markets all but confirmed a rate increase of 50 basis points. It would be interesting to watch the upcoming US Nonfarm Payrolls and Unemployment Rate numbers as it may set a trend for the pair.

Sterling remained on front foot since the start of month and registered a 5% gain, GBPUSD closed above 200 SMA for the first time since September 2021 on the first trading day of this month which is indicating a significant bullish trend in the near-term. Bulls will remain interested in buying unless it returns below 1.2150 which was previous resistance.

Breaking of 1.2150 could push pair towards psychological level of 1.20. On the upside 1.23 seems to be an interim resistance ahead of 1.2360 (static level from June) breaking of these levels might take the pair towards 1.25. On the daily time frame momentum indicator RSI trading at 68 which is considered to be an overbought zone though it is a bearish signal but it seems difficult for the pullback in the near term as we are seeing huge buying in the pair since mid-October while MACD giving mixed signals.

### USDJPY

The USDJPY started the month at 148.742 and declined to a low of 137.494 before rising again. The US dollar's value in relation to the Japanese yen varied drastically because of the Federal Reserve meeting and the jobs data. Every time the Bank of Japan intervened, it failed spectacularly. Compared to the Japanese yen, the US dollar plunged sharply as a result of somewhat weaker-than-expected inflation figures.

The knee-jerk reaction was so severe that there was a lot of selling pressure on the USDJPY pair. Since the Bank of Japan has been in charge of the yield curve, the yield on its 10-year note has remained at 0.2%.

Thus, the notion that the Federal Reserve won't be aggressive cooled off the bond market and pushed yields lower. This suggests that there is less pressure on the Japanese Yen.

## FOCUS AREA



The USDJPY traded this month in a downward trend and closed at 138.118 (- 7.14%) level compared to the previous month's close at 148.742 level.

The pair also touched the low of 137.494 level. Now, the eyes will be on further depreciation if the dollar index falls. If the pair rebounds it could reach the top at the 50-day Moving Average of 141.92. As the previous major support at the 137.664 level was broken, the next support must be at the 130.39 level and the resistance at 138.18 if the pair recovers.

The MACD line crossed below the signal line and traded below the signal line which may expect a further divergence. If the MACD line takes support then it may reverse toward the signal line.

The pair ended the month at a lower level compared to the previous month which shows the price behaviour is in a downward trend. The Relative Strength Index has turned against and is moving away from its 14-day RSI's simple moving average which indicates no support for the pair.



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# Marine landing report November 2022

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

**N**ETFISH obtain real-time data on fish landings and boat arrivals on a daily basis from around 100 fishing harbours/landing centres of India, so as to support traceability and the catch certification system of MPEDA. The information on fishing vessels arriving at the landing sites and the species-wise catch quantity landed by these vessels, are recorded and fed into the MPEDA website on a day to day basis by the Harbour Data Collectors. This report gives a summary on the species-wise, harbour-wise and state-wise trends in marine landings during November 2022.

## I.Observation on fish catch landings

The marine landings recorded in November, from 93 selected landing sites along the coastline of India totalled to 1,08,564.58 tons. Of the total catch recorded, 62 % was comprised of Pelagic finfish resources. The share of Demersal finfishes to total catch was 22 % whereas the share of Crustaceans and Molluscs were 7 % and 9 % respectively (Fig.1).

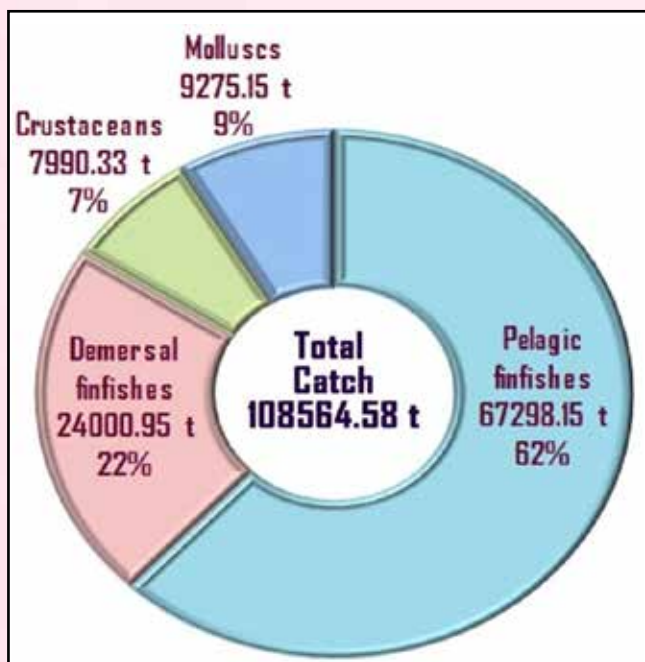


Fig. 1: Catch composition of marine landings recorded in November 2022

Landing of 262 species of marine finfishes and shellfishes were reported during the month, wherein, the major five contributors were *Rastrelliger kanagurta*, *Sardinella longiceps*, *Lepturacanthus savala*, *Nemipterus japonicus* and *Priacanthus hamrur* (Table 1).

Table 1 Major fish species landed during November 2022			
Sl. No.	Common name	Scientific name	Qty. in tons
1	Indian mackerel	<i>Rastrelliger kanagurta</i>	20,585.30
2	Indian oil sardine	<i>Sardinella longiceps</i>	17,034.36
3	Ribbon Fish	<i>Lepturacanthus savala</i>	7,428.69
4	Japanese thread fin bream	<i>Nemipterus japonicus</i>	3,699.38
5	Moontail bullseye	<i>Priacanthus hamrur</i>	2,766.81

Considering the group-wise landing, Mackerels, Sardines, Ribbon fishes, Scads and Croakers were observed as the major items recorded during the month. These five fishery items had together formed 54 % of the total catch (Fig 2).



## FOCUS AREA

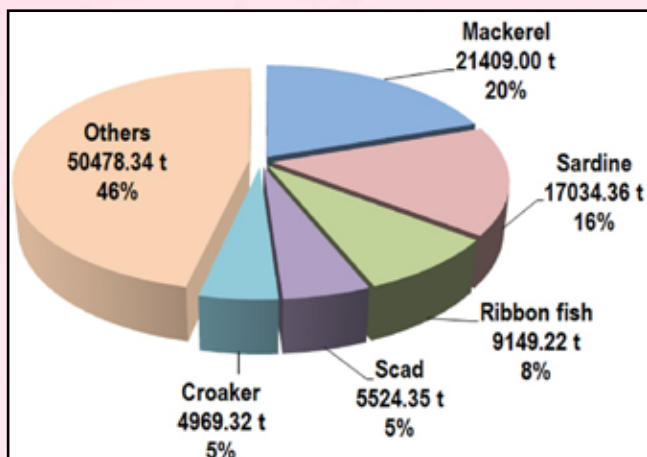


Fig. 2: Major fishery items landed during November 2022

Among Pelagic finfishes, the landings of Mackerels and Sardines were exceptionally high during the month. Among Demersal finfishes the Croakers and Threadfin breams were the most landed items. In the case of Crustaceans, more than 61 % catch was comprised of different species of Coastal shrimps, in which the *Karikkadi* shrimp was the dominant species with a total landing of 1806.77 tons. Among the Molluscan resources, Squid and Cuttlefish were the major items landed.

**State-wise landings:** Almost 25% of the total catch reported during the month was from the Karnataka state. The states of Kerala and Gujarat followed in the line with a share of 21% & 19% respectively (Fig. 3). The landings from West coast states had together formed 84% of the total catch. The least marine landing was reported from Andhra Pradesh.

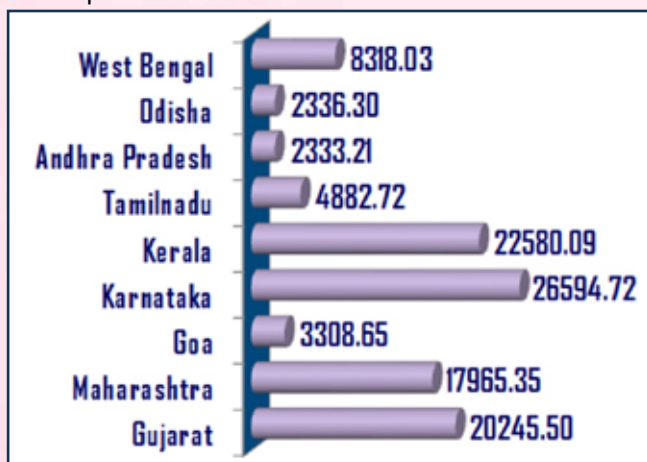


Fig. 3: State - wise fish landings (in tons) during November 2022

**Harbour-wise landings:** In November, the Malpe and Mangalore harbours in Karnataka had recorded the maximum fish landings, which was to the tune of 7,418.96 tons and 7,142.15 tons respectively.

Jagathapatnam landing centre in Tamilnadu had recorded the lowest landing during the period.

### II. Observation on boat arrivals

The total number of fishing vessel arrivals reported from 93 fish landing sites during the month was 42301 nos. From the state-wise figure (Fig. 4) it can be observed that the highest number of boat arrivals had occurred in Kerala and then in Gujarat. The state which reported least number of boat arrivals was Goa.

Mangrol (2010 nos.) and Porbandar (1806 nos.) harbours in Gujarat had topped the list in terms of highest number of boat arrivals. The last one in the list was Jagathapatnam landing centre,

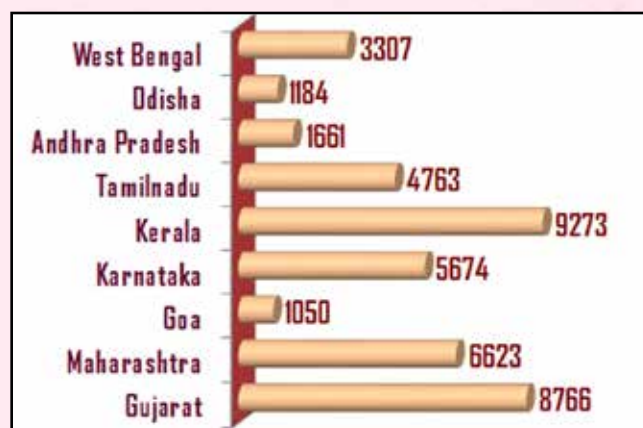


Fig. 4 State - wise Boat Arrivals (nos.) during November 2022

**Summary:** A total of 1,08,564.58 tons of marine landings and 42,301 nos. of boat arrivals were reported during November 2022 from 93 major fishing harbour/landing centres in India. After the increasing trend showed since July 2022, the total catch had a slight decline in November, by 801 tons when compared to that of October 2022. Whereas the number of boat arrivals has increased by 3,296 nos. than that of the previous month.

The Pelagic finfish resources continued as the major contributor to the total catch and the Indian Mackerel (*Rastrelliger kanagurta*) remained in the first position as the most landed species of the month. Karnataka retained the first place among the states in terms of total catch landed whereas Kerala retained the first place in terms of the highest number of boat arrivals. Among the various landing sites, the Malpe harbour in Karnataka continued in the first position in terms of total catch landed and the Mangrol harbour in Gujarat retained the first place in terms of highest number of boat arrivals.

## MPEDA – RGCA signs MoU with Govt. of Andhra Pradesh



*Mrs. Poonam Malakondaiah IAS, Special Chief Secretary, Govt. of Andhra Pradesh and Dr. S Kandan, Director, RGCA interacts after signing of MoU in the presence of Hon'ble Chief Minister of Andhra Pradesh Mr. Y.S Jagan Mohan Reddy*

A Memorandum of Understanding was signed by Rajiv Gandhi Centre for Aquaculture (RGCA), a society under MPEDA with Department of Fisheries, Govt. of Andhra Pradesh for establishing a GIFT Hatchery at Anantapur district. The MoU was signed by Dr. S Kandan, Director, RGCA in presence of Mr. Y. S. Jaganmohan Reddy, Hon'ble Chief Minister of Andhra Pradesh on the occasion of World Fisheries Day November 21<sup>st</sup> 2022, at Narsapuram, West Godavari district, Andhra Pradesh.

The Department of Fisheries, Government of Andhra Pradesh has celebrated the 'World Fisheries Day' on

21<sup>st</sup> November 2022 at Narsapuram, West Godavari district, Andhra Pradesh. On this occasion, Hon'ble Chief Minister of Andhra Pradesh has laid a foundation stone for AP Fisheries University. Other welfare activities also organized.

The MoU with MPEDA-RGCA envisages establishing 3 million capacity GIFT Satellite Breeding Centre at PABR (Penna Ahobilam Balancing Reservoir) fish seed farm of the Department of Fisheries, Andhra Pradesh in Anantapur district. The seeds produced in this farm will be supplied to Andhra Pradesh and Karnataka state initially.





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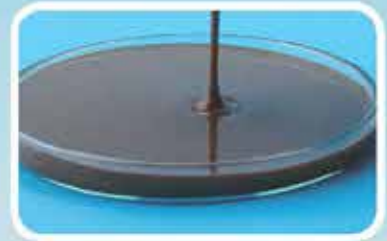
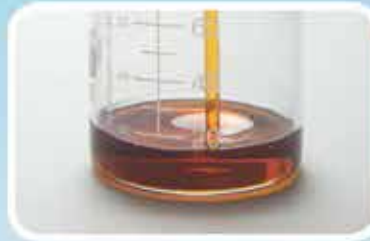
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# FSSAI announces ports for import of high risk products

## 1. Restricted entry of food items under specific ports:

To regulate and ensure the safety of food being imported in the country and to envisage a robust import control system ensuring efficient monitoring and traceability of high risk products, the Food Safety and Standards Authority of India (FSSAI) has decided that import of high risk products as specified below shall be permitted through 61 specified Ports only, which are directly manned and managed by FSSAI office/officials:

- Milk and Milk products,
- Egg powder,

- Meat and Meat products including poultry, fish and their products,
- Foods for Infant nutrition! Infant Foods,
- Nutraceuticals, Health supplements, Foods for dietary uses, Probiotic and prebiotic foods, Foods for Special Medical Purposes,

To further facilitate ease of doing business while ensuring the mandate of safe food imports in India, FSSAI has invited comments/suggestions from all the stakeholders in this regard. This order will be effective from 1<sup>st</sup> February, 2023.

SI No	FSSAI Regional Office	Location	Point of Entry	Port Code
1.	FSSAI, Southern Region	Chennai	Custom House Chennai	INMAA1
2.			Kattupalli port	INKAT1
3.			Ennore SEA (Kamrajar Port)	INENR1
4.		Chennai	ACC Chennai	INMAA4
5.		Chennai	ICD Concor Tondiapet	INTVT6
6.			ICD Irungattukottai-Chennai	INILP6
7.			SEZ J. Matadee Chennai Free Trade Zone	INCJJ6
8.			SEZ Pearl City Food Port SEZ (CCCL Infrastructure Limited)	INTNC6
9.		Tuticorin	Custom House Tuticorin	INTUT1
10.			ICD Tuticorin	INTUT6
11.		Cochin	SEZ Cochin Special Economic Zone	INCOK6
12.			Custom House Cochin	INCOK1
13.			ACC Cochin	INCOK4
14.		Krishnapatnam, AP	KRISHNAPATNAM SEAPORT	INKRI1



## FOCUS AREA

15.		Bangalore	Airport Bangalore,	INBLR4 IN-WFD6
16.			ICD Bangalore	
17.		Hyderabad	Hyderabad Airport,	INHVD4
18.			ICD Hyderabad	INSNF6
19.		Vishakhapatnam	Visakhapatnam International Airport	INVTZ4
20.			Visakhapatnam Sea,	INVTZ1
21.			Gangavaram Port-Vp	INGGV1
22.			SEZ Visakhapatnam	INVTZ6
23.			SEZ Ramky Pharma City India Ltd.	INAKR6
24.		Mangalore	ACC MANGALORE INTERNATIONAL AIRPORT	INIXE4
25.			NEW MANGALORE SEA	INNML1
26.	FSSAI, Western Region	Kandla, Gujarat	Kandla Seaport	INIXY1
27.			Kandla SEZ	INKDL6
28.		Mundra, Gujarat	MUNDRA SEAPORT	INMUN1
29.			OLD MUNDRA SEAPORT	INOMU1
30.			SEZ MUNDRA	INAJM6
31.		Mumbai	SEZ ARSHIYA LTD.-MUMBAI	INPNV6
32.			ICD Mulund	INMUL6
33.			JNCH Nhava Sheva	INNSA1
34.			JNPT-SEZ	INPJN6
35.			ACC Sahar	INBOM4
36.			NCH Mumbai	INBOM1
37.		Ahmedabad	AHMEDABAD AIR CARGO COMPLEX	INAMD4
38.			ICD SABARMATI	INSBI6
39.			ICD THAR DRY PORT	INSAU6

## FOCUS AREA

40.	FSSAI, Eastern Region	Kolkata	SEZ FALTA EPZ-KOLKATA	INFLT6
41.			Custom House Kolkata	INCCU1
42.			ACC Kolkata	INCCU4
43.			Haldia Port	INHAL1
44.	FSSAI, Northern Region	Haryana	ICD GARHIHARSARU	INGHR6
45.			ICD SONIPAT	INBDM6
46.			ICD PATLI	INPTL6
47.			ICD SAMALKHA, PANIPAT	INDWN6
48.			ICD PALWAL	INPWL6
49.			ICD REWARI	INREA6
50.		Uttar Pradesh	CFS STARTRACK DADRI	INSTT6
51.			ICD PAKWARA MORADABAD/ MEERUT	INMBD6
52.			CGML DADRI	INCPL6
53.			ICD CFS ALBATROSS DADRI	INAPL6
54.			ANFTWZ LTD -BULAND SHAHAR	INBUL6
55.			NOIDA (EPZ/SEZ)	INNDA6
56.		Delhi (NR)	ACC Delhi	INDEL4
57.			ICD Dadri	INDER6
58.			ICD Faridabad	INFBD6
59.			ICD Loni	INLON6
60.			ICD Patparganj	INPPG6
61.			ICD Tuglakabad	INTKD6







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# The role of sulfated polysaccharide in inhibition of viral replication

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Affiliation: TNJFU- Dr. M. G. R. Fisheries College and Research Institute, Thalainayeru

**S**eaweed" is a common term for the numerous marine plant and algal species that thrive in the ocean, as well as in rivers, lakes, and other bodies of water. Because of the availability of abundant sources of bioactive chemicals and the variety of biological activities they exhibit, seaweeds have now been recognised as valuable resource. Seaweeds are rich in protein, sugars, vitamins, minerals and trace elements. Sulfated Polysaccharides (SP) are negatively charged polysaccharides present in the cell wall of marine algae or seaweeds constituted mostly by cellulose and hemicellulose with high carbohydrate content and low calories and fat content (Muthukumar *et. al.*, 2020). Marine sulfated polysaccharides are a potential source of biologically active compounds for therapeutic development.

Marine-derived sulfated polysaccharides possess various antiviral activities against a broad range of enveloped and non-enveloped viruses. It has become the potential source of antiviral drugs for pharmaceutical development. These compounds have been reported to have varieties of pharmacological activities such as antitumor, antiviral, antioxidant, antimicrobial, anticoagulant, and immune-inflammatory effects.

Sulfated polysaccharides (SPs) are natural complex polymers found majorly in the cell walls of marine algae. Some of the essential SPs include carrageenan and agar from red macroalgae, ulvan from green macroalgae, and fucoidan and laminarian from brown macroalgae. The sulfated polysaccharides of seaweeds have shown to exhibit antiviral activity against a broad spectrum of viruses.

### Mechanism of antiviral activity:

Sulfated polysaccharides from marine sources have structures that have antiviral effects. The mechanism of sulfated polysaccharides in inhibiting the different

stages of the viral infection process involves blocking the initial entry of the virus or inhibiting its transcription and translation by modulating the immune response of the host cell. By directly deactivating virions prior to infection or by preventing its proliferation within the host cell, it prevents the various stages of the viral life cycle.

### • Inhibition of virus attachment to host cell:

Through an ionic interaction, positively charged outer glycoproteins on the surface of the enveloped virus make contact with the negatively charged surface of the host cell. Sulfate residues cause a high density of negative charge on the cell surface by interacting with the positively charged area of viral glycoprotein to disrupt the first virus-cell contact. By directly impairing the virus's ability to connect to the cell surface, sulfated polysaccharides may hinder virus entry into the host cell (Sepúlveda-Crespo *et. al.*, 2017).

### • Inhibition of virus penetration

The ensuing virus invasion phase is followed by irreversible adsorption via electrostatic interaction between the host cell and virus receptors after the virus has bound to the host cell. Some of the sulfated marine polysaccharides interact with virus receptors to stop this penetration operation. This blocks the contact of the virus with the host cell surface or directly interacts with virions to stop viral infection. Several studies have shown that negative charges residing over the sulfated polysaccharides interact with the virus by covering up the positive charge of the viral receptors (Wang *et. al.*, 2012).

### • Inhibition of internalization and uncoating of virus:

The outer membrane of the host cell is invaded by



## MAIN STORY

the virus, and resulting in the formation of a vacuole (endocytosis). It is then transferred to endosomes and other intracellular organelles by the transportation through intracellular fluid, or cytoplasm. Following endocytosis, the virus interacts with the cell membrane or forms an intracellular compartment that contains the virus, altering the viral capsid's shape and structure. Specific signals are generated when a virus connects with a receptor protein on the endosome, resulting in uncoating and releasing the virions (Mercer *et. al.*, 2010).

Interaction with the virus membrane proteins is another mechanism by which some sulfated marine polysaccharides interfere with the virus internalization. In order to prevent the virus from penetrating, they connect with carbohydrate groups attached to the polypeptide chains of the virus. Also, sulfated polysaccharides bind at the allosteric site of the viral capsid, which prevents the uncoating of the virus inside the host cell (Hans *et. al.*, 2021).

### • Inhibition of virus transcription and translation process:

The virus replicates inside the host cell after internalisation and uncoating. The production of viral messenger RNA, the synthesis of viral proteins, and the replication of the viral genome are all steps in the viral replication process. By interfering with replication enzymes like reverse transcriptase or by blocking the host cell from producing proteins from messenger RNA, many marine polysaccharides can hinder the virus' transcription and replication process after it has entered the host cells (Queiroz *et. al.*, 2008).

Various sulfated polysaccharides and their role in virus inhibition:

#### 1.Red seaweed:

##### • Carrageenan:

The outer cell wall and intracellular matrix of red seaweed include the soluble sulfatedgalactan known as carrageenan, which makes up 30–70% of the dry weight of red algae. The galactan backbone is produced in the Golgi apparatus and is subsequently sulfated by sulfotransferases in the cell wall. There are several carrageenans, differing in their chemical structure and properties, and therefore in their uses. The carrageenans of commercial interest are called iota, kappa and lambda. The polysaccharide is known to induce the immunostimulation in the culture

shrimp and also prevent the replication of virus. The carrageenan composition in red seaweeds differs from one species to another.

Table 1: Different forms of carrageenan available from various seaweed species (FAO, 2003)

Species of Seaweed	Available form of Carrageenan
<i>Chondrus crispus</i>	Mixture of kappa and lambda
<i>Kappaphycus alvarezii</i>	Mainly kappa
<i>Eucheuma denticulatum</i>	Mainly iota
<i>Gigartina skottsbergii</i>	Mainly kappa, some lambda
<i>Sarcothalia crispata</i>	Mixture of kappa and lambda

In particular, the majority of red seaweeds produce sulfatedgalactans with unique linear backbones made up of alternating (1,3)-D-galactopyranose units and (1,4)-D-galactopyranose residues. Sulfatedgalactan from red algae showed anti-WSSV activity through binding with viral proteins (VP 26 and VP 28) and inhibiting the viral attachment to the host cells. Sulfatedgalactan can inhibit C-terminal domain of WSSV viral protein VP37, which is responsible for hemocyte binding in shrimps (Mariot *et. al.*, 2021).

#### 2. Brown Seaweed:

##### • Fucoidan

Fucoidan is a component of the intercellular or mucilage matrix and makes up between 5 and 20 percent of the dry weight of brown seaweed. Evidences reveal that fucoidan is effective against a range of viruses. Fucoidan contains a number of immunomodulatory activities, including NK (Natural Killer) cell stimulation, cell development promotion, and other dendritic cell functions.

In addition, it enhances Th1-type immune responses by producing antibodies against specific antigenic determinants and generating memory T cells against specific viruses. According to reports, fucoidan has the finest adjuvant quality for next vaccine development

## MAIN STORY

and can strongly stimulate both humoral and cell-mediated immune responses (Apostolova *et al.*, 2020). Fucoidan obtained from *Fucus vesiculosus*, showed anti-WSSV activity in white shrimp *Litopenaeus vannamei*.

Fucoidin is also shown to improve the defence system of shrimp through modulation of immune parameters, proliferation of hematopoietic tissue (HPT), and upregulation of genes including astakine, hemocyte homeostasis-associated protein (HHAP), lipopolysaccharide and  $\beta$ -1,3-glucan-binding protein (LGBP), peroxinectin (PX), and prophenoloxidase (proPO I and proPO II). Fucoidan from *Sargassum wightii* had shown to enhance the resistance against WSSV in *Penaeus monodon* shrimp (Immanuel *et al.*, 2012).

### ● Alginate

Alginate is a linear polymer formed by 1,4-linked  $\beta$ -D-mannuronic acid and 1,4  $\alpha$ -L-guluronic acid moieties assembled in blocks. It is a soluble acidic polysaccharide found in the cell walls of brown seaweed. The compound has both antiviral and immunomodulatory activities. Polymannuroguluronate and Polyguluronate are common forms of alginate (Wei *et al.*, 2022). The major alginate producing brown algae includes *Ascophyllum nodosum*, *Laminaria digitata*, *Laminaria hyperborea*, *Laminaria japonica*, *Macrocystis pyrifera*, *Sargassum wightii*, etc.

Reports had shown the binding of alginate to TLRs in *L. vannamei* which results in upregulation of the antioxidant enzyme systems and eliminates excessive ROS, and preserving immune homeostasis.

At the same time, considering the virus–host interaction, it could be postulated that alginate binding with TLR interrupts the viral usage of the TLR-NF- $\kappa$ B pathway for viral replication in the host cell. Alginic acid extracted from *Sargassum wightii* improves resistance against WSSV in *Penaeus monodon* postlarvae by reducing the mortality rate (79–100%) within 21 days of WSSV challenge (Sivagnanavelmurugan *et al.*, 2018).

### 3. Green Seaweed:

#### ● Ulvan

Ulvan is the most common polysaccharide in the cell

walls of green seaweed, making up to 8–29% of the algal dry weight. Ulvan derived from green seaweed had shown anticoagulant, antibacterial, antiviral, and immunomodulatory activities. It can also serve as a growth promoter (Pankiewicz *et al.*, 2016).

### 4. Microalgae:

Sulfated polysaccharides are derived from different algae, diatoms and dinoflagellates which have antiviral and immuno-modulatory effects (Wei *et al.*, 2022).

Table 2: Microalgal sources of sulfated polysaccharides

Sulfated Polysaccharide	Source
p-KG03	Dinoflagellate- <i>Gyrodinium-mim pudicum</i>
Naviculan	Diatom – <i>Navicula directa</i> .
Calcium Spirulan	Algae - <i>Arthrospira platensis</i> .

### Conclusion

Marine polysaccharides are high-value bio products with a wide range of advantageous functional characteristics. Sulfated polysaccharides derived from seaweeds are considered a potential source of bioactive compounds for drug development. It has shown antiviral activity against a broad spectrum of viruses, including the common DNA viruses and RNA viruses (Hans *et al.*, 2021).

The antiviral mechanisms of these polysaccharides depend on multiple factors such as degree of sulfation, molecular weight, composition, and structure, etc. A broad range of antiviral mechanisms, low production costs, low cytotoxicity, and wide acceptability make the sulfated polysaccharides a promising antiviral agent.

Due to its ability to hinder virus attachment, adsorption, and multiplication and associated mechanisms, sulfated polysaccharides play a crucial part in enhancing the host's antiviral response too. Sulfated polysaccharides could provide an important approach in designing therapeutic vaccines.



## MAIN STORY

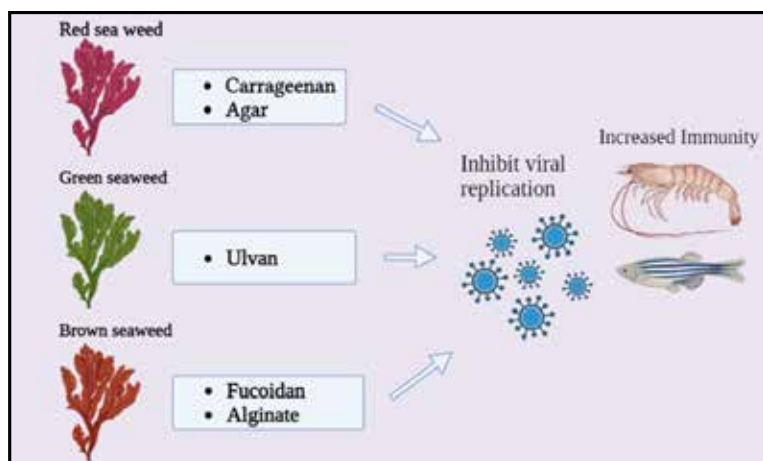


Fig. 1: Schematic representation of the different sulfated polysaccharides from seaweeds

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# The Amphibious Anabas



**V. K. Dey**

*V. K. Dey has over three decades of experience in diverse sectors of seafood industry in 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 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.*

**A**nabas species, belonging to the family *Anabantidae*, are air-breathing fishes generally known as "climbing perch". They originate from India, Sri Lanka and Southeast Asia including China. They also occur in brackish water but mainly inhabit small densely grown streams, rice fields and muddy pools. With a slender body covered with large scales and spines on the gill cover, the climbing perch is grayish brown to pinkish silver in colour. More colours have been noticed as they grow. A dark spot on the base of the caudal fin and a reddish hue on the fins are also observed.

They possess an accessory respiratory organ which allows them to breathe air or survive out of water for an extended period. It has been reported that they can survive out of water in moist conditions for several days, provided their air-breathing organ is kept moist. They are aggressive and shy; hence not suitable for an average community tank while they could be kept in larger community tanks, ideally with larger robust cichlids. Since the fish could jump out of water when surfacing for air, it would be a good idea to cover the aquarium.

They adapt easily to any kind of water, soft, hard, alkaline or acidic, even brackish. They can even tolerate unfavourable water conditions such as low oxygen and extreme temperature. The ideal water temperature could be 20-30°C with pH ranging from 6-8. They are fierce predators and will take all kinds of feed. They can be easily bred in aquarium conditions. The fish will spawn between the plants and the floating eggs will hatch in 24-36 hours. Though there is no parental care, the fish will not eat its fry. There are three species reported, *Anabas testudineus*, *A. oligolepis* and *A. cobojius*. All these species look similar.

*A. testudineus* is commonly known as climbing perch or climbing bass. The fish is oval-shaped with large scales and spiny rays on the dorsal fin. The body

colour is generally grayish to brown and occasionally green iridescence is present with a dark spot on the base of the caudal fin. The colour of the eye is orange red. They are widespread from South Asia to Southern China, exhibiting a wide range of habitats including fresh and brackish water.

The aquarium tank should be shallow and provided with floating plants and sufficient hiding places among rocks and woods. They are generally aggressive and can be combined with robust species such as cichlids, larger cyprinids, knife fish, eels and giant danios. The water temperature should be 23-30°C with pH ranging from 5.5 to 8, ideally 7, and water hardness 2-18 dH. They take any kind of feed, from small live fish to insect larvae and pelleted feeds.

They attain a maximum length of 20 cm and males have slightly longer anal and dorsal fins. Males are darker in colour and have more of a knife-edged anal fin than females. Breeding is moderately difficult due to the requirement of a large sized aquarium tank. They will not build nests and spawning is in open water.

*A. oligolepis*, also known as high-bodied climbing perch, is found in India and Bangladesh. It is hardy and omnivorous. Maximum size recorded is 30 cm. Their body colouration is entirely different from the common climbing perch, brighter brownish to orange with reddish brown fins.

*A. cobojius*, also known as the gangetic koi, is found in India. They are hardy and omnivorous. They will get along well with similarly sized but unaggressive fish like large barbs. They are greenish-grey in colour on the back and sides with lighter belly underneath. The water temperature should be 22-28°C with pH 6-8. The maximum size would be 30 cm. This species was commonly referred as *A. oligolepis* earlier while in looks it is identical to the common climbing perch to a certain extent.



# Prospects of Growth in Tilapia Exports

Dr. V. N. Biju and Dr. T. G. Manojkumar

Multispecies Aquaculture Complex, MPEDA-RGCA, Kochi-682504

The aquaculture production of Tilapia in India has been on the rise since last couple of years backed by the PMMSY scheme of Govt. of India and it was 23000 MT in 2021. MPEDA-RGCA has been playing key role in the development of Tilapia aquaculture in India since 2011 when it established nucleus breeding centre for Genetically Improved Farmed Tilapia (GIFT) at Manikonda, Vijaywada, Andhra Pradesh with the support of World Fish, Malaysia. Among several Tilapia species/ strains the Genetically Improved Farmed Tilapia (GIFT) *Oreochromis niloticus*, have shown considerably higher economic benefits than their unselected relatives.

In the export basket Tilapia fits under the low value seafood items unlike shrimp which occupies the high value category. However, value added Tilapia products competes with other high value seafood products.

After carp, Tilapia has become the second most important farmed fish globally. It remains as the “food fish of the 21<sup>st</sup> century” and with the advanced culture methods, Tilapia may surpass production of carps in near future. The global Tilapia market was valued at US \$ 12.3 billion in 2022. China currently dominates the global market, while other leading Tilapia producing countries are Indonesia, Egypt, Brazil, Bangladesh, Philippines, Thailand and Vietnam.

### 1. China's Tilapia production and export

The Global Tilapia production was 6.1 million MT in 2020 (FAO, 2022). The journey of aquaculture production of Tilapia in China is interesting and worth having a look. The production was 18100 MT in 1984 from there it has reached to the present production of around 1.8 million MT. China is currently the largest **producer, exporter** and **consumer** of Tilapia.

This phenomenal increase in production was achieved

by the recognition & adoption of Tilapia by Chinese farmers which led to considerable increase in area under culture, improved culture methods backed by genetically improved Tilapia strains.

The growth rate of Tilapia production increased initially and then decreased and now has reached plateau stage. The average annual growth rate of Tilapia production was 5.84% from 1961 to 1970, 4.21% from 1971 to 1980, and 29.86% from 1981 to 1990. It grew at the rate of 9.48% from 1991 to 2020.

### 1.1. Major Tilapia strain under culture

At present, the GIFT (Genetically Improved Farmed Tilapia) strain of Nile Tilapia and Red Tilapia (*Oreochromis spp.*) are mainly produced in China.

### 1.2. Aquaculture Systems

The major aquaculture systems are ponds, mountain ponds, reservoirs and paddy cum fish culture.

### 1.3. Aquaculture Regions

The production areas are mainly in Guangdong Province, Hainan Province, Guangxi Zhuang Autonomous Region, Yunnan Province, and Fujian Province, which account for more than 95% of the production.

### 1.4. Export trend

From 2002 to 2013 Tilapia export from China saw average annual growth rate of 26%. There was decline in 2014 and thereafter the growth was stable. China exports around 400 thousand tons of Tilapia. US is the major market for Tilapia with around 30% market share. The trade disputes between China and US had its impact on Tilapia exports also. US has imposed an

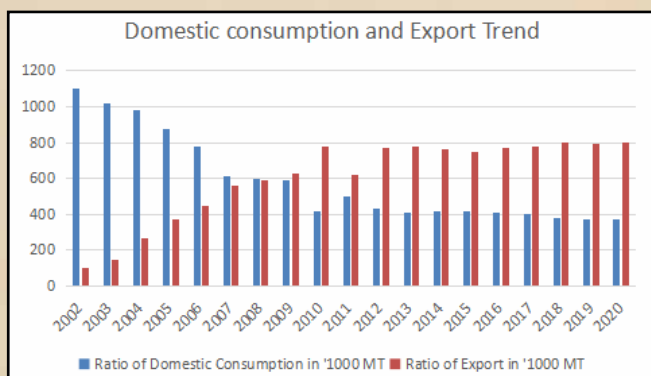


# AQUACULTURE SCENE

import tariff of 25% on Tilapia from China. The peak Tilapia export from China was 446000 MT in 2018 and thereafter has fell to 431000 MT. China exports Tilapia mainly to United States, Mexico, Ivory Coast, Israel, and Burkina Faso.

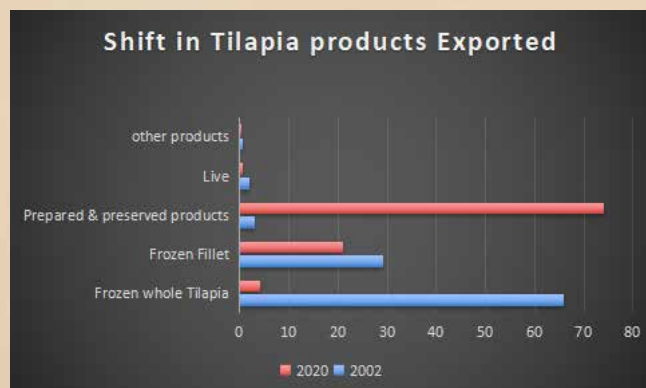
## 1.5. Trend of Domestic consumption and Export

In the early stage of Tilapia's introduction in China, the production was going mainly for the domestic market, with low outputs and low export volumes. In 2002, domestic consumption exceeded 90% of the total production, which decreased each year until 2010. Due to the significant increase in market demand of Tilapia in importing countries, the Tilapia industry in China developed rapidly. After 2009, domestic consumption accounted for less than 50% of total production, and the Tilapia market was transformed into an export-oriented industry. Total quantity of Tilapia exported reached 11,18,183 MT in 2020.



## 1.6. Tilapia Products

The major Tilapia products are live Tilapia, frozen Tilapia, frozen Tilapia fillets, prepared or preserved Tilapia, chilled Tilapia and chilled Tilapia fillets. In addition, small quantities of other products are made, such as Tilapia skin and Tilapia scales.



The domestic market of China has altogether a different preference for Tilapia products, it primarily prefers live Tilapia. However, off late there is shift in consumption pattern in domestic market with increase in movement of ready to eat Tilapia products and Tilapia fillet.

This shift in consumption pattern is driven by the increase in standard of living in China and more women entering the workforce.

The processed Tilapia products go to the international export market. The main exported products also changed over the years from frozen Tilapia to frozen Tilapia fillets, followed by prepared or preserved Tilapia. Various size grades of Tilapia are being exported from China starting from 200 g up onwards to around 800-900 g.

Farm gate price of Tilapia was 7 Yuan/Kg for 500 g live Tilapia in 2009, in 2011 10 Yuan and presently it is 12 to 16 Yuan/Kg (USD 1.89 to 2.52/ Kg).

## 2. Tilapia production by Brazil

One of the other major Tilapia producing nation is Brazil. Brazil has produced around 600,000 tons of Tilapia in 2020, having produced next to nothing 20 years ago. Brazil has very strong domestic market and most of the production goes for domestic consumption.

Since up to a considerable extent the domestic fish requirement is met by Tilapia which ensures other high valued fishes become available for export. Hence, Brazil is not a major player in the Tilapia export market compared with other countries such as Indonesia, Egypt, Bangladesh, Vietnam, Philippines, Thailand, Mexico, Honduras, Colombia and Ecuador.

## 3. Major Tilapia importing countries:

US is the major export destination for Tilapia products. Tilapia is the fifth most consumed fish in the US. US imports 7.6 million pounds frozen whole Tilapia valued at USD 6.1 million per month from Asian countries. It imports 23.3 million pounds Frozen Tilapia Fillet valued at USD 41.1 million per month. Frozen Tilapia fillet fetches retail price of around USD 8 to 12 per Kg in US market based on quality and size grade.

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EU is other major market for Tilapia. The four largest EU importers of Tilapia are the Netherlands, Spain, Belgium and Germany which account together for the majority of EU imports of Tilapia. Frozen Tilapia fillet is the most imported Tilapia product into Europe, followed by whole frozen Tilapia.

United Kingdom is another major importer of Tilapia.

Middle East is an increasingly important market. Currently, about 90 percent of Indian Tilapia exports head to these markets, with the United Arab Emirates, Saudi Arabia and Oman as the leading importers.

### 4. Conclusion:

According to Prof. Kevin Fitzsimmons, University of Arizona, USA despite the continued rapid growth of the sector globally, Tilapia prices are set to increase even more rapidly and according to his forecast, while global Tilapia production is due to increase from approximately 6.9 million tons in 2020 to nearly 10 million tons by 2030, the value of the sector is likely to increase from around \$12.3 billion to \$25 billion in the same timeframe.

Tilapia is packed with vitamins and minerals like choline, niacin, Vitamin B12, Vitamin D, selenium, potassium, calcium, magnesium and phosphorous. Selenium is a mineral that plays a role in the prevention of cancer, heart diseases, cognitive decline and thyroid disease.

Nutrients like calcium, Vitamin D, magnesium and phosphorous is very essential for bone strength. Moreover Tilapia contains more heart healthy omega-3 fatty acids than beef, pork, chicken or turkey.

The scientific farming of Tilapia using high yielding varieties have less than 15 years history in India. Tilapia has tremendous potential to fill the export basket of India and to become one of the leading diversified species for large scale production and export from the country. The immediate steps required towards this are:

1. Increase the production: Popularize Tilapia culture in unutilized water bodies/ water bodies not suitable for high value fishes and also cage culture in large water bodies like reservoirs and backwaters.
2. Reduce the cost of production: On an average 60-70% of the total cost of production going towards



## AQUACULTURE SCENE

feed. The average cost of production for quality Tilapia (free from geosmin) in the present condition is around Rs.120-150/kg. This can be reduced to Rs. 100/kg through the implementation of proper scientific culture methods, using fast growing varieties like GIFT and the formulation and manufacture of good quality on-farm feeds.

3. Even though Tilapia can grow at low protein diets (25-30%), the maximum growth rate can be achieved with diets having 40% protein, around 400 Kcal energy/100g feed and 10-15% lipid profile. By giving proper trainings, feeds in the above nutrient status can be manufactured by farmers themselves at their farms at a production cost of around Rs. 65-70/kg. Moreover, the use of high protein feeds will reduce the culture period considerably.

4. Value addition: The scope for production of various value-added products of Tilapia for export is high since the raw material is cheaper compared to high value items like shrimp. Value added Tilapia products fetch higher price and competes with other high value seafoods.

5. Implementation of international standards BAP, GAP, ASC etc. will help fetch better price in the export market. Through efficient farming systems, use of fast-growing Tilapia strains such as GIFT, reduction in cost of production and culture period and scale up of production, Indian farmers/exporters would be able to compete with other Tilapia exporting countries including China.

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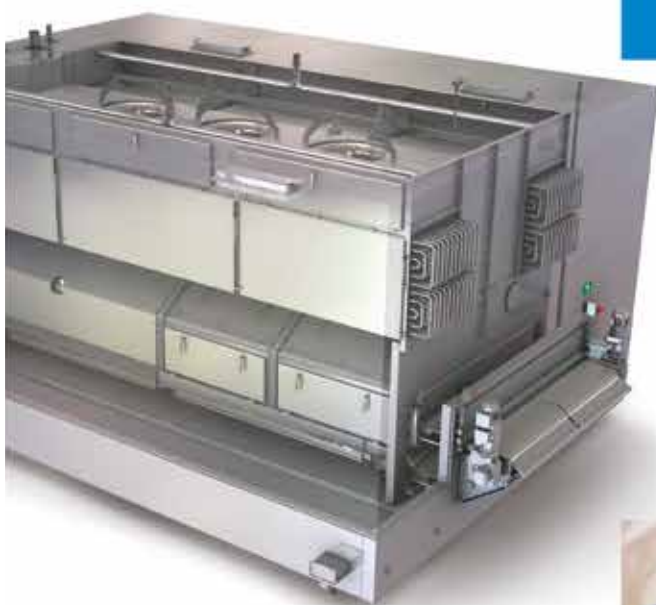
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# Mayank Aquaculture Pvt. Ltd. becomes the first Shaphari Certified aquaculture farm in India

Certification in aquaculture is a market tool to identify produce which is cultured with minimum negative impacts in terms of socio- economic aspects, animal health, food safety and environmental integrity. MPEDA has introduced a certification scheme in 2020 for aquaculture farms and hatcheries named “Shaphari”, which means pure in Sanskrit, as a measure to supply residue free shrimp to the export value chain. Through the implementation of this certification scheme, MPEDA reiterates its commitment to improve the quality of seafood products exported from the country. As most of the exports are supported by aquaculture sector, the need to ensure the quality of farmed produce is also substantial.

“Shaphari” certification programme for farms and hatcheries have been initiated as an extension to its efforts in adoption of Good Management Practices, to minimise the disease risks in the system and to make the aquaculture shrimp products residue free. The standards laid down aim to enable farmers to adopt good management practices that improve the food safety of aquaculture product. MPEDA is implementing “Shaphari” Certification for hatcheries since 2021. So far 7 hatcheries have been certified, and another 21 hatcheries under various stages of certification process.

### First “Shaphari” certified farm

Mayank Aquaculture Pvt. Ltd. located in Mandroi village, Surat district of Gujarat has become the first Shaphari certified aquaculture farm in India. Mr. D. V. Swamy IAS, Chairman, MPEDA released the certificate and handed it over to Dr. Manoj M. Sharma, Managing Director of Mayank Aquaculture Pvt. Ltd. in an online function held on 1<sup>st</sup> November 2022.

The farm underwent two stage audits wherein it was assessed for compliance with the standards of the certification programme by empanelled auditors.



Chairman, while appreciating the endeavours of Dr. Manoj in promoting shrimp aquaculture expressed hope that the certification programme will trigger positive changes in the sector and prompt other farms in the region to come forward to certify their farming practices. Dr. Manoj, in his reciprocation impressed upon the responsibility of farmers to do farming following the protocols throughout the production period.

A ‘Shaphari’ certified farm is eligible for an add-on certification- Shaphari Plus, for which the farm shall undertake Pre Harvest Test for banned antibiotics for all the ponds and with no positive results for two consecutive crops. Further to certification, testing all the ponds in the farm is mandatory for every crop to maintain the Shaphari Plus certification status.

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# Need For Aquaculture Insurance In India

*C. A. Srinivasan*

*Vice President – Corporate Solutions Group, Alliance Insurance Brokers Pvt. Ltd.*

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India's shrimp farming area is around 174,000 hectares. The South-eastern coastal state of Andhra Pradesh has been the anchor of aquaculture in India. Its land and water resources and entrepreneurial farmers have made it No. 1 in farmed freshwater fish and marine shrimp production over the last three decades. Although the industry has grown more than six-fold over the last two decades, there is still room for expansion. Of the 3.56 million hectares currently available, only a third is used.

- Indian shrimp production currently stands at close to 9,37,000 metric tons for all species, approximately 90% of which is Vannamei.
- The shrimp exports from India during 2021-22 was 7,28,123 metric tons valued at Rs. 42706 Cr..
- The United States was the largest market followed by China, European Union, South-East Asia and the Middle-East.
- Frozen shrimp, which earned Rs.42706 Cr. (USD 5828.59 MN) retained its position as the most significant item.
- India ranks third in fisheries production, and second in aquaculture. Fisheries alone has employed 16.5 million people and contributed to 1.07% of the GDP and generated export earnings of Rs 334.41 billion as per a recent estimate of National Fisheries Development Board.

Aquaculture Insurance is a risk management tool that provides the mechanism for the transferring of risks faced by the farmers in aquaculture production. Increasing domestic and foreign demand is fuelling expansion of India's aquaculture industry. Cooperatives and farmers' associations now need credit to build

their business. Banks are reluctant to lend, however, because risks threaten to hamper fish farmers' ability to service their loans. With its international experience in aquaculture risk management and its underwriting expertise, it is only the Insurer who can provide the much-needed support and succour to the Industry.

### **BENEFITS OF AQUACULTURE INSURANCE:**

- Social, economic, and environmental benefits
- Increasing the access of small-scale aquaculture farmers to insurance will benefit all stakeholders – fish farmers, insurers, other actors in the value chain and the government. Here are some of the payoffs to society:
  - Embraced within a country's social security policy, insurance helps farmers recover quickly from disaster, forestalling costly post-disaster public compensation, which is commonly a strain on government finances.
  - Enabling farmers to recover quickly from the impact of risk, insurance shortens the disruption of activities along the entire value chain since the business viability of aquaculture insurance depends on aquaculture becoming more efficient and less prone to risk, insurance can be used to encourage farmers to adopt better farming practices and more collaborative organization.

### **Benefits to small-scale farmers**

- Protection of capital invested.
- Protection against events or natural hazards that affect assets and harvest
- More secure incomes



# AQUACULTURE SCENE

- Increased stability and economic welfare and improved access to investment capital and credit.

## Why Aquaculture Insurance failed?

- Expensive premium rates demanded by insurance companies.
- The unilateral discontinuance of insurance cover after consistent crop failures as happened after the Golden Growth Period of 1990-94.
- Cumbersome documentation, “small print” of terms and conditions and a massive list of exclusions under the policy.
- Practical difficulties faced by farmers in notifying insurers on emergency harvest situations.
- Scarcity of trained Fisheries Professionals in insurance companies, poor understanding of modern aquaculture systems and practices by the insurers and reluctance to align the product in tune with the current day practices and requirements.
- Fear of false claims, fear of huge losses that may arise on account of epidemic or new disease attack.

After a gap of nearly 15-20 years, a revised Aquaculture Insurance Product, with necessary safeguards and flexible enough to be an attractive proposition for the farmers was recently launched in the Indian market.

The insurance product offers protection against;

Natural hazards like flood, tidal waves, storm, tempest, cyclones, tsunami and earthquake.

- Biological hazards like diseases, predation and microbiological activities.
- Chemical hazards like Pollution caused by External Factors
- Technical hazards such as structural failure, mechanical breakdown, accidental damage to machinery and electricity failure.
- Social hazards like malicious acts and theft.

## References:

- <http://www.agritech.tnau.ac.in/>
- and FAO's blue growth initiatives—aquaculture for small farmers





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LINES

3  
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EMPLOYEES

>1000  
CHANNEL  
PARTNERS

>10000  
SATISFIED  
FARMERS





## Details of the SPF L. vannamei brooders imported & quarantined at AQF during November 2022

Sl. No	Name of the stakeholders	State	Country of origin/ supplier	Date of receipt of the lot at AQF arrival	Broodstock imported (nos)		
					Male	Female	Total
1	B Tech Hatcheries	Andhra Pradesh	SIS; Florida	02.11.22	500	500	1000
2	BKMN Aqua	Andhra Pradesh	SIS; Florida	11.11.22	200	200	400
3	BMR Exports - Tindivanam	Tamil Nadu	Syaqua Americas Inc; Florida	14.11.22	600	600	1200
4	Srinidhi Biotechnologies	Andhra Pradesh	Kona Bay; Hawaii	18.11.22	330	330	660
5	Sun Glow Marine	Tamil Nadu	Kona Bay; Hawaii	18.11.22	220	220	440
6	SVR Hatcheries	Andhra Pradesh	Kona Bay; Hawaii	18.11.22	330	330	660
7	Sree Victory Shrimp Products Pvt. Ltd	Andhra Pradesh	Kona Bay; Hawaii	18.11.22	495	495	990
8	Srinidhi Biotechnologies	Andhra Pradesh	SIS; Florida	18.11.22	600	600	1200
9	KPR Hatchery	Andhra Pradesh	SIS; Florida	19.11.22	300	300	600
10	Vaisakhi Bio-Marine Pvt. Ltd - Unit II	Andhra Pradesh	SIS; Florida	19.11.22	300	300	600
11	Sarada Hatcheries - Unit I	Andhra Pradesh	Kona Bay; Hawaii	21.11.22	440	440	880
12	Aquatic Farms Ltd	Odisha	Kona Bay; Hawaii	21.11.22	440	440	880
13	Seven Staar Aquatech	Tamil Nadu	Syaqua Americas Inc; Florida	21.11.22	200	200	400
14	Winner Marine Hatchery - Unit II	Tamil Nadu	Syaqua Americas Inc; Florida	21.11.22	200	200	400
15	Sri Mahalakshmi Hatcheries - Nellore	Andhra Pradesh	Syaqua Americas inc; Florida	21.11.22	200	200	400
16	Krishna Godavari Aquatech Pvt. Ltd	Andhra Pradesh	SIS; Florida	25.11.22	300	300	600
17	Fedora Sea Foods Pvt. Ltd	Andhra Pradesh	SIS; Florida	25.11.22	150	150	300
18	Sapthagiri Hatcheries - Unit II	Andhra Pradesh	Kona Bay; Hawaii	25.11.22	660	660	1320
19	Sapthagiri Hatcheries - Anakapalli	Andhra Pradesh	Kona Bay; Hawaii	25.11.22	660	660	1320
20	Vaisakhi Bio-Resources Pvt. Ltd	Andhra Pradesh	Syaqua Americas Inc; Florida	25.11.22	600	600	1200
TOTAL					7725	7725	15450

# Farmers meet

**M**PEDA Sub Regional Division, Nagapattinam organized a farmers meet on 'Technologies, technical development and recent challenges in shrimp Aquaculture' at Manamelkudi of Pudukottai district, Tamil Nadu on 9<sup>th</sup> December 2022.

76 active farmers of the Manamelkudi, Katumavadi & Kotaipattinam region participated in the meet. The technical session covered the topics like- farm management measures for prevention & control of diseases in shrimp farming.



*Officials on the dais: Mr. R. Anandhan, General Manager, M/s. CPF India Ltd, Chennai, Mr. M. Chinnakuppan, ADF, Dept. of Fisheries, Pudukottai, Mr. S. Sornaraj, RDO, Aranthangi, Mr. S. Raja, Tahsildar, Manamelkudi taluk, Dr. Kalidoss, Senior consultant- shrimp culture and Mr. S.Pandiarajan, Assistant Director, MPEDA SRD, Nagapattinam*



*A view of participants*



*Mr. R. Anandhan, General Manager, M/s. CPF India Ltd, Chennai handling the technical session*







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# Seafood HACCP training programme by MPEDA at Bhimavaram

**M**PEDA Sub Regional Division Bhimavaram organized a four day training programme on Seafood HACCP from 6<sup>th</sup> to 9<sup>th</sup> December, 2022. This training programme was organized for the benefit of the technologist, plant managers and supervisors working in the seafood processing plant of this region. The programme was attended by 25 candidates working in processing plant spread across West Godavari and East Godavari districts of Andhra Pradesh.

The programme was inaugurated by Dr I. Suryarao, President of SEAI, West Godavari region, A.P. and Chief Managing Director of M/s. Suryamitra Exim Pvt. Ltd., Bhimavaram. He emphasized on the need of implementing HACCP in the seafood processing industry and appreciated the efforts taken by MPEDA for organizing the programme. Mr. Vaniya Kishor Kumar, Assistant Director, SRD Porbandar gave a brief introduction on HACCP. Dr. Gopal Anand Kandikatla, Assistant Director, MPEDA, Bhimavaram welcomed the participants, and Dr. K. Biak Lun, Assistant Director, MPEDA Bhimavaram proposed the vote of thanks.

The classes on various topics as per the prescribed syllabus were handled by the faculty comprising of Mr. Vaniya Kishore Kumar, Mr. Subray Pavar, and Dr. K. Biak Lun, Assistant Directors. Certificates were distributed to the candidates who have completed the training programme successfully at the valedictory function.



Fig. 1: Dr. K. Gopal Anand, Assistant Director welcomes the audience



Fig. 2: Dr. I. Surya Rao, President of SEAI, W.G. region inaugurates the training



Fig. 3: Dr. K. Biak Lun, Assistant Director, SRD Bhimavaram proposes Vote of thanks



Fig. 5: Group photo of seafood HACCP trainers and trainees





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## Cheranalloor village in India's southern state of Kerala has reported a bumper tilapia harvest, after using a biofloc system established by ICAR-CMFRI



**T**he Sreelekshmi self-help group – whose members come from a scheduled caste – have harvested a good yield of Genetically Improved Farmed Tilapia (GIFT) from a biofloc unit set up adjacent to their households, following an initiative led by the ICAR-Central Marine Fisheries Research Institute (CMFRI).

According to CMFRI, 1,800 tilapia fry were stocked into the 5 m diameter tank in November. They will be harvested according to demand, at an average size of 500-550 g, and the farmers expect to harvest a total of

around 900 kg of fish, generating an income of around Rs. 200,000 (\$2,458). CMFRI provided the group with the 23,500-litre biofloc tank, the fry, feed and technical guidance under its Scheduled Caste Sub Plan (SCSP).

“The CMFRI team monitored different phases of the farming regularly to ensure that fishes attain maximum growth. A water quality kit also was supplied to the SHG to maintain the required parameter,” said Dr K Madhu, Principal Scientist of CMFRI, who led the project.

[thefishsite.com](http://thefishsite.com)





# Aquaculture – Tilapia an opportunity for India



**O**n 15<sup>th</sup> Nov 2022 world population reached 8.0 billion mark and estimated to grow to 8.5 billion in 2030 and 9.7 billion by 2050. More than the half of the increase will be contributed by India, Philippines, Pakistan and Sub-Saharan region.

India's current population is 1.4 billion (UN estimates) which is expected to grow to 1.5 billion by 2030 and 1.7 billion by 2050. Currently estimated 270 Mn people are below the poverty line out of which 80% lives in rural areas. Approx 51% of the rural poor depends on casual labour (non-farm and farm) which is their main source of income. Approx 45% of rural poor are illiterate where as 15% are secondary and above. Only 40% are primary educated or literate. They spend 56% of their income in food which does not take care of daily nutritional requirement of children, adolescent girls, expectant mothers and lactating mothers.

India has set a target to reduce stunting amongst children to 25% by the end of 2022. However, it seems difficult due to various challenges due to Covid and Post Covid economic situation. Children younger than five years of age are stunted due to chronic undernutrition which has its long-lasting impact on development of brain and health and hence earning potential in adult stage.

Liu Zhenmin, UN Under-Secretary-General for Economic and Social Affairs says "The relationship between population growth and sustainable development is complex and multidimensional. Rapid population growth makes eradicating poverty, combatting hunger and malnutrition, and increasing the coverage of health and education systems more difficult."

Aquapost.com



## BISFE, Korea 2022

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43	Nhi Truong Sales Manager Vietocean Seafood Vietnam 08 <sup>th</sup> Floor -34 Hoang Viet Street, Tan Binh District, Ho Chi Minh City- Vietnam Ph: +84 28 399 13503 Website:www.vietoceanseafood.com.vn Tax ID: 0311778924 <i>Frozen Shrimps</i> 		
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## TRADE ENQUIRY

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