MPEDA Newsletter

JUNE 2012

THE MARINE PRODUCTS EXPORT DEVELOPMENT AUTHORITY

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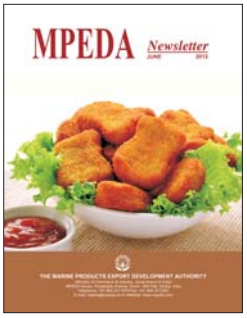

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On the platter.....!!

Dear Friends,

There was a time when overseas markets looked upon Indian Seafood, especially shrimps of aquaculture origin, with suspicion for the presence of antibiotic residues. All our statements and affirmations about the farmers following ethical practices fell on deaf ears. Apart from tarnishing the image of Indian seafood, this has also affected the relation between the shrimp farmers and exporters.

In order to remove this stigma from our seafood, it was felt that all the stakeholders must unite and follow a strategy of saying 'no' to antibiotics. MPEDA has contributed to this in many ways. The most important, however, has been the setting up of ELISA labs in and around shrimp farming hubs of all the maritime states in the country. There was active and loud support for this from the SEAI. Meanwhile, the EIC put in regulations to ensure that no exporter procured farmed shrimp without the same being pre harvest tested. This was a move that was enacted to safeguard the trade interests of the shrimp farmer as well as the exporter, and the Authority envisaged a harmonious development by both of the stakeholders to prosperity through this.

When the production of vannamei was introduced and started growing in the country, it was found that "restricted" purchase and pre-harvest testing would not cover the entire material procured for export. In view of this, MPEDA moved Government to permit the testing of all shrimp cultured for export. This was approved and the same is now being done. MPEDA has also put up an elaborate monitoring mechanism to ensure that the testing is done as per the Standard Operating Procedures.

During the various trade fairs as well as the visit of international delegations, there has been an appreciable increase in the appreciation of the quality of Indian seafood. It is now up to us to build on this - be stringent and ensure that only the best is marketed overseas.

Wish the farmers and the industry every success this season.

Best of Luck!

Sd/-
(LEENA NAIR IAS)
Chairman

July 2012

MARKETING NEWS

World Fisheries and Aquaculture – a vital sector to contribute more : New Report by FAO

According to the latest statistics available, almost 30 percent of fish stocks are overexploited. Sustainable fisheries and aquaculture play a crucial role in food and nutrition security and in providing for the livelihoods of millions of people. FAO's latest flagship publication on the state of fisheries and aquaculture, launched at the opening of the 30th session of the FAO Committee on Fisheries, highlights the sector's vital contribution to the world's well-being and prosperity, a point reflected in the recent Rio+20 Outcome Document.

The State of World Fisheries and Aquaculture 2012 reveals that the sector produced a record 128 million tonnes of fish for human food - an average of 18.4 kg per person - providing more than 4.3 billion people with about 15 percent of their animal protein intake. Fisheries and aquaculture are also a source of income for 55 million people. "Fisheries and aquaculture play a vital role in the global, national and rural economy," said FAO Director-General José Graziano da Silva. "The livelihoods of 12 percent of the world's population depend directly or indirectly on them. Fisheries and aquaculture give an important contribution to food security and nutrition. They are the primary source of protein for 17 percent of the world's population and nearly a quarter in low-income food-deficit countries."

Árni M. Mathiesen, head of FAO's Fisheries and Aquaculture Department, said: "Fisheries and aquaculture are making a vital contribution to global food security and economic growth. However, the sector faces an array of problems, including poor governance, weak fisheries management regimes, conflicts over the use of natural resources, the persistent use of poor fishery and aquaculture practices. And it is further undermined by a failure to incorporate the priorities and rights of small-scale fishing communities and the injustices relating to gender discrimination and child labour."

Boosting governance

FAO is urging governments to make every effort to ensure sustainable fisheries around the world. The report notes that many of the marine fish stocks monitored by FAO remain under great pressure. According to the latest statistics available, almost 30 percent of these fish stocks are overexploited - a slight decrease from the previous two years, about 57 percent are fully exploited (i.e. at or very close to their maximum sustainable production), and only about 13 percent are non-fully exploited. "Overexploitation not only causes negative ecological consequences, but it also reduces fish production, which leads to negative social and economic consequences," the report says. "To increase the contribution of marine fisheries to the food security, economies and the well-being of coastal communities, effective management plans must be put in place to rebuild overexploited stocks." Strengthened governance and effective fisheries management are required. The report argues that promoting sustainable fishing and fish farming can provide incentives for wider ecosystem stewardship and advocates enabling mechanisms such as the adoption of an ecosystem approach to fisheries and aquaculture with fair and responsible tenure systems.

Global fish production

Capture fisheries and aquaculture supplied the world with about 148 million tonnes of fish in 2010 valued at US$217.5 billion. Production growth from aquaculture keeps outpacing population growth, and it is one of the fastest-growing animal food-producing sectors - trends that are set to continue. Fish and fishery products are among the most-traded food commodities worldwide. Following a drop in 2009, world trade in fish and fishery products has resumed its upward trend driven by sustained demand, trade liberalization policies, globalization of food systems and technological innovations. Global trade reached a record US$109 billion in 2010 and 2011 points to another high estimated at US$125 billion.

Increase resilience, strengthen the sector

The report notes that the coming decades are likely to see major changes in economies, markets, resources and social conduct, where climate change impacts will increase uncertainty in many food sectors, including fisheries. It stresses the importance of the FAO Code of Conduct for Responsible Fisheries, and its associated international plans of action and technical guidelines, to achieving the goal of a global sustainable food production system. Small-scale fisheries employ more than 90 percent of the world's capture fishers and are vital to food and nutrition security, poverty alleviation and poverty prevention. The FAO Committee on Fisheries has recommended

developing international voluntary guidelines to contribute to policy development, secure small-scale fisheries and create benefits. Although women make up at least 50 percent of the workforce in inland fisheries and market as much as 60 percent of seafood in Asia and West Africa, their role is often undervalued and neglected. Here again, and as reaffirmed at Rio+20, the report shows that, in addition to working towards the UN Millennium Development Goal of gender equality and empowering women, mainstreaming gender is an essential component of alleviating poverty, achieving greater food and nutrition security, and enabling sustainable development of fisheries and aquaculture resources.

As fishers, fish farmers and their communities tend to be particularly vulnerable to disasters, the report examines approaches to improved preparedness for and effective response to disasters in fisheries and aquaculture. Emergency responses should strengthen food and nutrition security through the sustainable rehabilitation and long-term recovery of the fisheries and aquaculture sector and the livelihoods that depend on it, especially targeting women and other marginalized groups. "Enabling fisheries and aquaculture to flourish responsibly and sustainably requires the full involvement of civil society and the private sector," says Mathiesen, adding: "Business and industry can help develop technologies and solutions, provide investment and engender positive transformation. Civil society and international and local non-governmental organizations can hold governments accountable on agreed commitments and ensure that the voices of all stakeholders are heard."

Looking ahead

The primary threats undermining the food and nutrition security potential of fisheries and aquaculture result principally from ineffective management coupled with poor conservation of habitats. A transition towards people-centred approaches is required to enhance the sector's contribution to food and livelihoods security. As underlined at the recent UN Conference on Sustainable Development, Rio+20, such a shift could spur the global community to achieve the real sustainable and responsible use of aquatic resources to meet today's needs while ensuring benefits for future generations.

The full 2012 FAO State of World Fisheries and Aquaculture report is accessible at www.fao.org/docrep/016/i2727e/i2727e00.htm ●

Courtesy : FAO

Final results of 6th Administrative Review pegs the duty specific average rate at 2.51%

US department of Commerce published the final results of the 6th Administrative Review of the Antidumping duty order on certain frozen warm water shrimp from India on its Federal Register Notice dt. July 11, 2012. The period of review is February 1, 2010 through January 31, 2011. This review covers 184 producers / exporters. Respondents selected for individual examinations were M/s. Apex Exports and M/s. Falcon Marine Exports . As per the results of review, antidumping duty specific average rate applicable to individual companies will be 2.51%. The Antidumping Duty weighted – average margin percentages for M/s. Apex Exports and M/s. Falcon marine exports limited were 2.51% and 0.13% * respectively. The department intends to issue assessment instructions to CBP 15 days after the date of publication of the final results of review.

Note: * de minimis ●

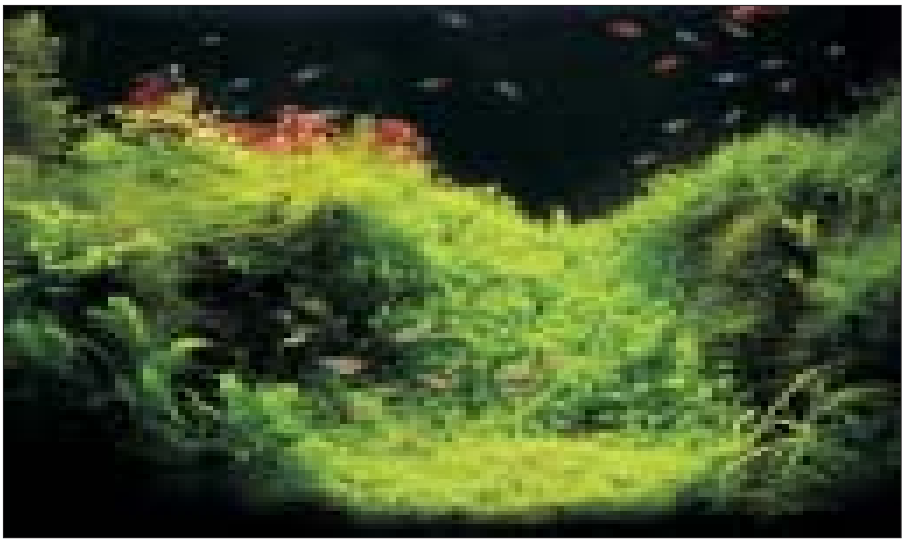
FOCUS AREA

Tetras: Small beautiful fishes in the aquarium industry - The glitterati among hobbyists

Compiled by: Dr. Ansar Ali A, Assistant Director (OFD), MPEDA

Ornamental fish keeping is one of the most popular hobbies that gains popularity across the world. The growing interest in aquarium fishes has resulted in steady increase in aquarium fish trade globally. The most traded fresh water ornamental fishes in the international market are the Guppies, Tetras, Angel, Sword tail, Platy, Gold fish and Koi. Among them, Tetras are regarded as the second largest traded freshwater ornamental fish after Guppies.

Tetras are small fishes of the family *Characidae* under the order *Characiformes* with their origins in South America and Africa. They are some of the smallest and most beautiful aquarium fishes. The four popular varieties of tetra are neon, cardinal, lemon and rummy nose. Adult tetras will have an average length of 1.5 to 2 inches. Tetras are active schooling fish that work well in the peaceful community aquarium. It is ideal to keep six or more fish of the same tetra species in the aquarium. Tetras, originated in the Amazon River, become stressed when subject to bright light. So, the aquarium should have floating vegetation to provide a shadowed environment. The general characters, water parameters, feeding, compatibility with other species and breeding and development of the four tetra varieties are described below.



A planted aquarium with tetras

Neon Tetras

Neon tetras (*Paracheirodon innesi*) are the most famous of the Tetra species. They are one of the slimmest tetras and are renowned for their colours. This fish is found in both black water and clear water streams in Brazil, Colombia and Peru. The top of the back is olive green in colour. Below this, there is an electric blue line from the top of the tail through the eye and below this line is a bright silvery belly. An important feature of neon tetra is a red stripe that runs from the middle of the body to the base of the caudal fin. Neon tetras like a well planted aquarium with sufficient open space for free swimming. Ideal water conditions suitable for neon tetras include a water temperature of 22-25°C and a pH of 5.5 to 7.0. In the aquarium, neon tetras accept most flake foods, frozen blood worms, brine shrimps and daphnia. Because of their small size they should not be kept with larger fishes in aquarium. In aquarium they mix well with guppies and other tetras like rummy nose tetra, cardinal tetra and glow light tetra.

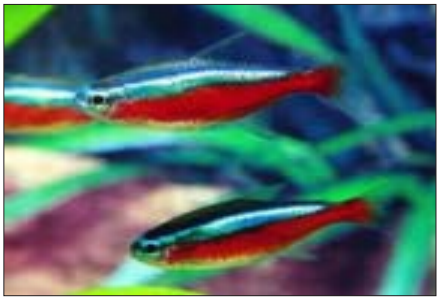
Photo courtesy (readingpf.hubpages.com readingpf.hubp ages.comreadingpf. hubpages.com)

Male is slender and its blue line is straighter. Female is rounder with a bent blue line. For breeding, a pair of the species may be introduced into a tank without light and gradually increasing the light until spawning occurs. Other inducers include mosquito larvae and a hardness of less than 4dGH*. The eggs has to be removed as soon as they are laid, otherwise the adult will often eat newly hatched fry. The eggs are sensitive to light and hatch within 24 hours of the laying. Fry can be fed with infusorians,

especially rotifers and egg yolk for the first four weeks, followed by nauplii of brine shrimp and formulated diets. Fry achieve adult coloration in about a month. Adult can spawn every two weeks.

Cardinal Tetras:

The cardinal is one of the most stunning freshwater species available in the hobby, with colours matching those of many reef-dwelling marine fishs. Cardinal tetra (*Paracheirodon axelrodi)* is often called as red neon tetra. In neon tetras, the lateral red stripe extends no longer than half way to the nose. If the red stripe is longer, the fish is a Cardinal tetra. Unlike the neon tetra, the Cardinal tetra is considered hard to breed in aquariums and this is one of the reasons behind its relative scarcity in the aquarium trade. Since the Cardinal tetra is a peaceful fish, it is often found in community aquarium. It is ideal to keep it with other South American species, such as other small tetras, pencil fish, hatchet fish, *Apistogramma*, *Corydoras* and small Loricariids. It is a top and mid dweller that will accept most food types, including flake food. Ideal water chemistry parameters for its survival include a water temperature of 23-27°C, dGH below 4 and pH between 4.6 and 6.2. Cardinal tetras are highly sensitive to high levels of soluble waste, especially nitrate and regular water changes are required. In the aquarium set up for cardinals, floating plants that dims the light a bit is recommended. The fish is considered as an annual species with a lifespan of just a single year in nature,but lives for several years in captivity.



(Photo Coutesy:i-aquarium.co.uk)

A pair of fishes can be introduced into the tanks with similar water parameters and also should be heavily shaded to simulate its native spawning grounds. Males will be slimmer than the females. If the female is ready to spawn, will allow the male to swim alongside her, together they will release egg and sperm. One of the major difficulties in captive breeding of the species is the photosensitivity of the eggs; they will die if exposed to bright light. If the eggs are fertile, and kept in darkened surroundings, they will hatch in about three days at 28°C. Free-swimming fry remain photosensitive for at least the first seven days of life, and need to be introduced to increasing light levels on a gradual basis. During this time, they require infusoria or liquid fry food. Newly hatched brine shrimp and other similar live foods, such as daphnia, can be fed to the growing fry at between seven and 14 days of age. Growth continues at a modest rate, and the fishes assume full adult colouration only after a period of around eight to 12 weeks, depending upon quality of food and aquarium water.

Lemon Tetra:

The Lemon tetra (*Hyphessobrycon pulchripinnis)* is a benthopelagic freshwater species endemic to the Tapajós River basin of Brazil. It is a small tetra growing to 5 cm in length. The lemon tetra is one of the deeper-bodied tetras and it is difficult to breed in captivity. The Lemon tetra is a peaceful fish and will work well in a peaceful community aquarium with other species of similar size. Suitable companions in an aquarium include other tetra species, small barbs, small danios, small rasboras, *Corydoras* and *Otocinclus* catfishes. The body is translucent with a slight yellowish tinge. The front fins feature a bright yellow coloration while the end and edge of the dorsal fin, as well as the back rays on the anal fin, are black. The upper part of the eyes has a characteristic strong red colour. Lemon tetras can adapt to a pH from 5.5 to 8.0, but acidic water is recommended. The water should be soft to medium hard and the dH should not exceed 25. Since the Lemon tetra is native to a tropical river, the water temperature in the aquarium should be kept between 23 and 28° C. Lemon tetras fare best in a planted aquarium, where they should be kept as schooling fishes.

(Photo courtesy: TropicalFishKeeping.com)

In the wild, the lemon tetra is a communally spawning fish. If the female is ready to spawn, then the pair will migrate to fine-leaved aquatic plants such as *Cabomba* or Java Moss, whereupon the pair will adopt a side by side position and release egg and sperm. The eggs are non-adhesive, and fall through the foliage, coming to rest either in thicker foliage at the base of the plants, or on the substrate. One of the problems presented to the aquarist by this species is that of egg-eating. The fertilized eggs will hatch after approximately 72 hours. The fry spend a further 24 to 48 hours absorbing the yolk sac, whereupon they become free-swimming. At this stage, the fry should be fed with infusoria and frequent partial water changes (around 10% of the aquarium volume every 24 to 48

hours). After 7 days, the fry should be ready to feed upon newly hatched Brine Shrimp.

Rummy nose tetras:

Rummy nose tetra is also a popular fish in the aquarium industry and having an origin from South America. This is also a small size fish growing to a maximum length of 5 cms when fully grown. Based upon distribution, three species of rummy nose tetras are known. They are *Hemigrammus rhodostomus* (Lower Amazon basin and Orinoco river), *Hemigrammus bleheri* (Rio Negro and Rio Meta river basins), and *Petitella georgiae* (Upper Amazon basin in Peru, Rio Purus, Rio Negro and Rio Madeira river basins). The fish is having a translucent silvery basal body colour; fins are hyaline except tail fin. Tail fin is with black and white horizontal strips varied in number. But usually there will be one black stripe in the central portion of the tail fin and two horizontal stripes in each caudal lobe. The Rummy nose has a distinctive bright red area around its "nose" and over its eyes. The red nose will disappear when the fish is stressed. They thrive well in water temperatures of 24-27 °C, pH of 5.5 to 7 and hardness of 2-15 dGH. An omnivorous fish Rummy nose tetras feed on a mixture of dried flakes and granules and small live and frozen foods. It's a very peaceful species that won't compete well with larger tank mates. It is ideal to keep them with other South American species, such as other *Hemigrammus* or *Hyphessobrycon* species, pencil fish, *Apistogramma* , *Corydoras* and small Loricariids. They are one of the more tightly shoaling small tetras, and will not do well if kept in insufficient numbers. Lifespan for the rummy-nose tetra in the aquarium is usually 5 to 6 years with careful maintenance.

This fish is harder to breed. The fishes will become sterile if they are kept in water with high amount of dissolved calcium ions. For the breeding purpose fishes must be maintained in soft acidic water throughout their life. Spawning is triggered by raising the temperature slowly up to 32°C. Spawning takes place amidst the aquatic plants or provided spawning media and the female and male fishes take a side by side position. It is advisable to keep

(Photo courtesy: ekmpowershop19.com)

the aquarium under dim lighting conditions until the eggs have hatched and the fry are free-swimming. Fertile rummy-nose tetra eggs take approximately 72 to 96 hours to hatch at 32°C and they spend a further 24 to 48 hours absorbing the yolk sac. The fry should be fed with infusorians and with frequent partial water changes (around 10% of the aquarium volume every 24 to 48 hours). The fry are among the slowest growing of *all* characins, and one amongst the slowest-growing of all popular aquarium fishes. It can take as long as 6 months to raise fry to juvenile sizes where they are capable of eating live daphnia on a regular basis.

(*dGH-degree of General Hardness, 1dGh: 10mg/L Cao) ●

Use of Carbon Monoxide (CO) and smoke in Seafood processing for retention of Colour

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Introduction

Smoke and carbon monoxide (CO) has been using from time immemorial for seafood preservation, shortly after caveman invented fire and learned how to catch fish.

Currently CO and smoke are used by the seafood industry to impart a more appealing colour such as bright red and pink tones in fish muscle by exposing it to smoke or gas blends containing CO. In the past decade, the demand for CO and smoke treated seafood products increased significantly, especially for tunas, swordfish, mahi-mahi and grouper. However, despite the advantages, this process also involves concerns regarding potential food safety issues and product deception, operational issues and regulatory guidelines. This paper attempts to provide a balanced view of the advantages, implications and concerns of CO treatment for seafood products.

The intentional use of filtered smoke and CO to retain red colour in fish had its beginning in the late 1980's when Woodruff and Silliker (1985) introduced a process to expose fish to about 0.10-1.5% CO in Modified Atmospheric Packaging(MAP) with CO_2 levels higher than 10%. This patented process could be applied for colour retention in fresh, non-frozen fish as well as fish which is prior frozen. Later in 1996, Yamaoka developed an alternate process to apply CO to fish prior to packaging so as to impart taste rather than colour and appearance. In 1999, Kowalski patented for his Hawaii International Seafood Inc. a process that will retain red colour in fish muscle by applying filtered smoke but will not impart taste. CO generated with smoke by burning organic matter was the active agent necessary to stabilise the red colour in the haeme protein.

Despite the advantages of colour retention in frozen products, potential food safety issues and product deception are of great concern and that is why most seafood trading nations, notably the EU are opposed to the use or import of fish products treated by smoke and CO.

Fresh untreated tuna loin

Smoked tuna steak

The colour chemistry of fish muscle

The red colour of the fish muscle is long considered as an indication of freshness and quality. Muscles having dark, yellowing, tan or brown colours that imply aging, poor quality and temperature abuse are treated as inferior quality product. The colour and appearance of the fish muscle have profound influence on the purchase decisions of consumers and on perceived quality.

For fish processors and retailers, it is a daunting task to maintain the fresh colour of seafood during processing, freezing, storage, transport, distribution and retail display without affecting its safety and quality. The colour chemistry of the fish muscle is complex and is influenced by a number of factors such as fish species, harvest season, chemical composition (water, lipid and protein content), freshness level, muscle type (dark vs white muscle) and type and quality of haeme proteins. Of all the factors, haeme protein is the major determinant of muscle colour in fish. This is particularly important in the case of fish with dark muscles such as tunas. In the case of fish, the red colour is the contribution of proteins viz. haemoglobin (Hb), the pigment of the blood, and myoglobin (Mb), the pigment of muscles. The transport and supply of oxygen to the body is performed by these two proteins. Haemoglobin is found in high

concentration in red blood cells and in some fish, it may constitute as much as 30% of the haeme protein in red muscle. Myoglobin is a globular protein which contains a globular protein portion (ie globin) and a non-protein haeme ring. The haeme ring contains an iron atom and the colour of the myoglobin molecule is partially dependent on the oxidative state of the iron within the haeme ring. Myoglobin is found in higher amounts in muscle cells and is typically found in higher levels than Hb in dark muscle. The Mb content, however, is influenced by a number of factors such as muscle fibre type, muscular activity, oxygen availability, blood circulation and the age of the fish. The quantity of myoglobin within the tissue and the intensity of the colour vary depending on species, age, sex, muscle type and physical activity. In well-bled muscle tissue, upto 80-90% of the total pigment is myoglobin. Species difference is apparent when comparing the lighter colour of the swordfish with the dark red colour of tuna meat. There are also differences within species in that some tuna will have a higher quantity of myoglobin in the muscle tissue than other tuna. These inter-species difference account for the variability in colour of tuna steak that are cut from different fish.

The colour of the meat is affected by the quantity of myoglobin in the tissue and by the oxidative state of iron in the myoglobin. In freshly cut meat, the flesh has a red or almost purple colour, which is the colour of the myoglobin. The myoglobin easily reacts with oxygen in the air and forms oxymyoglobin which has a bright red colour. When the oxymyoglobin is held in a conventional freezer environment, the iron ion in it is prone to oxidation and forms metmyoglobin, which has an undesirable brown colour. The oxidised iron can also adversely affect the taste and smell of the product by leading to the oxidation of unsaturated fatty acids in sea foods, thus generating volatile organic compounds (VOC) that produce the undesirable smell and flavour.

The myoglobin can combine with substances other than oxygen and form compounds that are more stable at conventional freezing temperatures than oxymyoglobin. Myoglobin reacts with components in conventional smoke forming carboxymyoglobin, nitric oxide myoglobin or nitrogen dioxide myoglobin, all of them are red.

FDA is of the opinion that during smoking and CO treatment of fish muscle, the red colour is retained by preventing oxidation of oxymyoglobin into metmyoglobin. In other words, CO and components in smoke "fix" or stabilise an existing colour rather than add new colours and hence it cannot be considered as colour additives.

Impact of freezing on colour of fish

Freezing has an adverse impact on the colour of tuna and other species of fish. The environment of conventional freezers with temperatures between 0 and -40 deg. F (-18 to -40 deg. C) facilitates the development of metmyoglobin in frozen tuna and other species of fish. Observable browning in frozen tuna loins and steaks are generally noticed after two months of freezing. The browning of tuna meat due to the oxidation of oxymyoglobin into metmyoglobin, accompanied by the development of off odour decreases the consumer acceptability of frozen tuna.

Smoke treatment of fish muscle

The only option to prevent this is to treat fish muscle with gases to stabilise the haeme proteins against oxidation. Two gases are commonly used, both of which bind with great affinity to Hb and Mb and also stabilises the protein molecule. Nitric oxide (NO) has the most affinity and is widely used in processed meats. NO binds to haeme proteins with 3000 more affinity than CO. This molecule, however, leads to a pinkish colour, which is not appealing for most fish species and is also unstable when exposed to light. The second gas molecule most widely used is CO, which binds to Hb and Mb with about 270 times more affinity than oxygen. The carboxymyoglobin thus formed is highly toxic and is stable, both bound and unbound in the product, imparting the muscle a bright cherry red colour.

Sources of gas for treatment

There are two sources of gas viz. CO and filtered smoke (FS).

1. Carbon monoxide (CO)

CO is a colourless, odourless and tasteless gas that is inflammable and highly reactive. CO is noted for its strong reaction with, and affinity for, haeme proteins such as blood Hb and muscle Mb. The affinity of CO for Hb is of great concern for CO toxicity as the bond formed between CO and Hb is over 270 times stronger than that formed between oxygen and Hb. As a result, CO will rapidly replace oxygen in the Hb leading to toxicity in personnel engaged in CO treatment of fishes, especially in the absence of adequate protection. But this is particularly advantageous for the development meat colour in treated fish muscle. The development and stability of CO-based colour has its greatest impact on meat products with the highest myoglobin content, such as lamb or beef.

2. Filtered smoke

The components in conventional

smoke "fix" the colour of the seafood by reacting with the myoglobin to form compounds that are more stable at conventional freezing temperature than oxymyoglobin. When fish meat is treated with conventional smoke, compounds such as carboxymyoglobin, nitric oxide myoglobin and nitrogen dioxide myoglobin are formed; all of which are stable under freezing conditions than oxymyoglobin.

Conventional smoke, however, imparts characteristic smoke flavour, thereby affecting the taste of the seafood product. Therefore, tasteless smoke (TS) is used as an alternative as it offers the benefits of conventional smoke without the "smoke taste".

The treatment with TS also results in the formation of carboxymyoglobin, nitric oxide myoglobin and nitrogen dioxide myoglobin. It is important in cold smoking to keep the meat raw and uncooked to maximise the amount of vital cells available for this reaction.

The TS is intended to be used on raw meat of seafood, such as tuna and salmon, before it is frozen. The TS is added to preserve the taste, aroma, texture and colour of the frozen product.

Components of smoke

Smoke has two phases: the particulate phase and the vapour or non-particulate phase. The most important flavour components of smoke are monoaromatic phenols which occur in both the particulate and non-particulate (gaseous vapour) phase. The phenols in the particulate phase have higher odour and taste enhancing capacity indicating that a smaller amount of particulate is required to produce the same level of smoke odour and taste as the gaseous vapour phase. The particulate phase, however, contains high levels of pollutants such as tar, soot, ash and char, which make it less desirable for use on food.

The primary components of conventional smoke generated from wood are vapour; carbon dioxide(CO_2); Carbon monoxide(CO); methane(CH_4); tiny particles of creosote, tar; soot, trace elements and over 390 microscopic compounds occurring in either particulate or gaseous or both phases. Conventional smoke also contains compounds such as Benzo(a)pyrene (BaP); 2,6-dibenzanthracene and other poly nuclear aromatic hydrocarbons (PAHs) which are proven carcinogens. These impurities are present in the particulate phase. TS do not pose the same potential health risks of conventional smoke because carcinogenic impurities are filtered out and removed. The super purifying process of producing TS removes these compounds from the particulate phase.The use of various smoke preparations (smoke vapour, liquid smoke extracts) have been routinely used in food preparation for centuries. In most operations, the particulate phase in both gaseous and liquid smoke preparation is removed by various physical means such as filtration, sedimentation and electrostatic precipitation. "Tasteless" smoke purification of Hawaii International Seafood, Inc. is an extension of traditional smoke purification.

Manufacturing process

Smoke manufacturing apparatus consists of (1) a smoke generator, (2) a precipitation filtering tower and (3) a temporary pressure pot storage chamber. Smoke is generated by burning (pyrolysis) an organic, food grade smoking material below 850 deg. F (454 deg. C) in a smoke generator. This conventional smoke is then passed through filter of water and/or ice, cloth and activated carbon. This filtration and purification process removes the pollutants and the carcinogenic compounds in the particulate phase. The filtered smoke is then allowed to flow directly into a smoking chamber used to treat the seafood or it is collected and stored in canisters for future use. The TS in canisters cannot be kept indefinitely since phenols, that impart flavours will begin to degrade. Treatment from canisters can be done after 1 hour of aging and preferably within one year of aging.

Application of TS

The application level varies from 1:1 to 100:1 ratio of TS to seafood. As

CO treated tuna block

CO treated tuna Saku

Untreated tuna steaks

a first step the TS is injected into interior part the fish muscle using needles. This is followed by placing the seafood in polythene bags and the air in the bag is carefully removed. A hose and dispensing nozzle from the pressure canister are inserted, and the valve is opened to flush the seafood with TS in a preferred range of 1:1 to 100:1 ratio of TS: seafood. The bag is then tightly closed and kept at refrigerated temperature. The TS is generally applied at a temperature of 5 deg. F (2.8 deg. C). The seafood is treated with TS until the desired effect is achieved which usually takes 12 to 54 hours depending on the size and thickness of the product. After treatment is completed each bag is emptied, the product is taken out, wiped, vacuum packed and then frozen at -40 deg. F (-40 deg. C) and can be stored up to one year at -4 deg. F (-20 deg. C). However, the ideal freezing method is to freeze cryogenically at -76 deg. F (-60 deg. C) though this is an expensive method. The product will remain up to one year without losing their vitality characteristics like colour, flavour, freshness and moisture retention on thawing.

Method of use

The treated product is quick thawed, preferably solution containing salt for approximately 20-40 minutes until the product is partially thawed and is then displayed in retail outlets, restaurants or sushi bar.

Health implications of CO and smoke treated sea foods

According to USFDA, there is no health implications from eating CO treated as well as Smoke treated sea foods, especially tuna products. TS contains 4-35% CO, while CO gas applications often involve the use of 100% CO. however, studies reveal that ingestion of TS exposed yellowfin tuna do not result in the release of CO into the body. FDA concludes that TS and CO do not have a lasting functional effect in the food and there will be no significant amount of CO left behind in the finished products. In FDA,s opinion only limited amount of CO will be absorbed during treatment and there will be significant reduction in CO during cooking.

However, the prime concern of TS and CO treated fish is the potential for colour masking of inferior, partially or previously decomposed or thermally abused fish that are more prone to development elevated levels of histamine. For TS treated seafood there is an ever present threat of histamine poisoning due to colour masking of otherwise spoiled scombroid fishes like tunas.

Conclusion

Despite the concerns of product deception and mis-labelling, TS and CO could be used as an effective method to improve the colour, appearance and flavour of fish products like tuna loins, tuna steaks and fish fillets. ●

Govt. of Gujarat provides free square-mesh trawl net cod-end to fishermen as a step towards sustainable fishing

As a long-term move towards sustainable fishing and conservation of fishery resources, Gujarat state fisheries department decided to distribute code ends with 40 mm square free of cost to all trawling vessels of Gujarat. Several studies have shown that the diamond-mesh cod end should be replaced with more acceptable and responsible solutions to conserve and manage the fisheries resources. Replacement of small sized cod ends with 40mm square mesh cod ends could be a reasonable, simple and inexpensive solution for a more sustainable management of the resources.

Even though the use of trawl nets with cod end mesh size less than 40

The newly distributed 40mm code end

mm was prohibited by Gujarat Fisheries Act 2003 and Gujarat Fisheries Rule 2003, many fishing vessels use the same to catch small sized fishes. The square mesh remain open while hauling and allows small fish to escape easily from the net. This is important as small fishes generally lack swimming speed and stamina. Small prawns, undersized fishes and small crabs, sea urchins, shellfish, etc., are let out by the 40 mm square mesh cod ends. Square mesh nets also reduce vessel drag thereby reducing fuel costs due to the reduced weight and volume of by-catch that is towed around by the vessel and also because of square meshes remain open throughout the operation. The Square meshes will retain the width of their opening even under load.

The Department is providing one cod end to each fishing boat and to ensure the use of newly provided code ends, old cod ends will be collected back from them. Likewise all trawl boats will be using the new cod-ends with 40 mm square mesh by next fishing season. Dept. of Fisheries officials have informed that the distribution/replacement work has already been initiated.

The old trawl net

(-As reported by NETFISH, Gujarat) ●

NETFISH distributed plastic baskets to fishermen at Nargol landing center, Gujarat

Nargol is one of the important landing centers at south Gujarat region. Wide variety of fishes such as Pomfret, Ghol, Dara, Shrimps, Lobster and a huge quantity of Bombay duck are landed here. The general practice is to use bamboo baskets for handling and washing fish since it is cheaper when compared to plastic baskets. For the last 40 years, fishermen have been using bamboo baskets at this landing center for various fish handling purposes. During the last five years, NETFISH with the coordination of member NGO Brackish Water Research Center has been conducting regular awareness programmes to fishermen on the demerits of the bamboo baskets. In order to practically demonstrate the advantage of plastic baskets over bamboo baskets, NETFISH decided to distribute plastic basket to fishermen community at Nargol Landing center.

In a function held on May 10, 2012 NETFISH distributed 75 plastic baskets to fishermen in the presence of the invited guests. The function was inaugurated by Mr. Jayeshbhai Tandel, President, Gram Panchayat, Nargol, who appreciated the effort by NETFISH-MPEDA and directed fishermen to use plastic baskets to keep quality of fish. Official of state fisheries dept. also advised the fishermen to switch to plastic baskets. State Coordinator, NETFISH, Gujarat has explained the benefit of use of plastic baskets over bamboo baskets in hygienic handling of fish. ●

Plastic basket distribution at Nargol landing centre, Gujarat

Marine Nutraceuticals as functional food ingredients

Dr. Al. Muthuraman, Deputy Director, MPEDA

The concept of nutraceutical has been derived by coining the terms "nutrition" and "pharmaceutical". In this context, active substances with pharmaceutical properties are delivered to the humans through food-based approaches to prevent or treat certain disease conditions.

An expanding body of scientific research indicates that the marine environment is emerging as a unique resource of functional food ingredients with health-promoting properties. Significant attention has been paid to exploration of potential nutraceuticals and pharmaceuticals derived from the ocean. Since the natural sources are recognized as safe for human consumption, the active substances produced in the diverse group of marine organisms have a wide role in the nutraceutical sector. These marine-derived active ingredients include certain polysaccharides, polyphenols, bioactive peptides, polyunsaturated fatty acids, and carotenoids which are known to have anti-cancer, anti-inflammatory, antioxidant, anti obese, hypocholesteroleic, antimicrobial, prebiotic, and probiotic activity enabling them to be applied as nutraceuticals.

Marine-derived products are in high demand, and experts predict continued growth in the years ahead. A number of new marine nutraceutical products have been introduced in the nutraceutical and functional food markets. The main sources and products of primary interest for marine nutraceuticals and ingredients include omega-3 fish / algal oil, phospholipids, micro / macro algal nutrition supplements, fish proteins and peptides, hydrolysates, shellfish chitin, fish collagen, and mineral supplements.

Among the marine nutracuticals, Astaxanthin, a carotenoid found in microalgae consumed by salmon and crustaceans is one of the important product that is responsible for giving salmon their characteristic pink color. It is a powerful antioxidant. It may maintain healthy cholesterol levels by reducing the effects of oxidative stress. Astaxanthin is shown to protect cellular membranes and ocular tissue against photo-oxidation. It may be beneficial in protecting against age-related muscular degeneration.

Fucoxanthin is a marine carotenoid responsible for the brown color in certain seaweeds, such as *wakame* and *hijiki*. Japanese researchers have found that it helps maintain a healthy weight by controlling overall body fat. Fucoxanthin may also promote the formation of Docosahexaenoic acid (DHA), an Omega-3 fatty acid found in fish. Fucoidan is a sulfonated polysaccharide found in brown seaweed. It is shown to have many benefits, such as helping to maintain immune and gastrointestinal health, neutralizing free radicals, and providing nutritional support throughout.

The long-chain Omega-3 fatty acids from fish, Eicosapentaenoic acid (EPA) and Docosahexaenoic acid (DHA), are the two most important long-chain FAs, valued for their contribution to vitality and health. EPA and DHA have been shown to support proper cognitive and mental development in infants. The FDA has issued a qualified health claim for products containing EPA and DHA: "May help reduce the risk of coronary heart disease. Wild Flavors, Inc. has the technology to help mask the aroma and taste associated with Omega-3.

Chitosan is a cellulose-like dietary fibre. It is positively charged in the gastrointestinal tract and can bind to fatty acids and bile acids. It is reported to reduce or block the body's absorption of fat.

Other aqua derived nutracueticals are Chlorella and Spirulina. Chlorella is a green algae that contains Vitamin C and carotenoids, which are antioxidants. It helps support a healthy immune system, blood pressure and cholesterol levels, and it also aids in maintenance of healthy weight while Spirulina is a blue-green algae that can contribute a blue hue to a finished product. Spirulina contains a wide variety of nutrients such as B vitamins, minerals, proteins, linolenic acid, and antioxidants such as beta carotene and Vitamin E. It helps in maintaining a healthy immune system and proper cholesterol levels. Since the incorporation of marine-derived active ingredients into the dairy products have caused minimal changes in the physico-chemical properties of the final product, marine-derived substances have been widely applied and have the potential to be applied as nutraceuticals in the dairy industry. ●

Responsible use of resources for Sustainable Aquaculture

Comparisons of production, water and energy efficiencies of aquaculture versus an array of fisheries and terrestrial agriculture systems show that nonfed aquaculture (e.g. shellfish, seaweeds) is among the world's most efficient mass producer of plant and animal proteins, according to a report led by B A Costa- Pierce, University of Rhode Island et al.

Various fed aquaculture systems also match the most efficient forms of terrestrial animal husbandry, and trends suggest that carnivores in the wild have been transformed in aquaculture to omnivores, with impacts on resource use comparable to conventional, terrestrial agriculture systems, but are more efficient. Production efficiencies of edible mass for a variety of aquaculture systems are 2.5–4.5 kg dry feed/kg edible mass, compared with 3.0–17.4 for a range of conventional terrestrial animal production systems. Beef cattle require over 10 kg of feed to add 1 kg of edible weight, whereas tilapia and catfish use less than 3 kg to add a kg of edible weight.

Energy use in unfed and low-trophic-level aquaculture systems (e.g. seaweeds, mussels, carps, tilapias) is comparable to energy use in vegetable, sheep and rangeland beef agriculture. Highest energy use is in fish cage and shrimp aquaculture, comparable to intensive animal agriculture feedlots, and extreme energy use has been reported for some of these aquaculture systems in Thailand.

Capture fisheries are energy intensive in comparison with pond aquaculture of low-trophic-level species. For example, to produce 1 kg of catfish protein about 34 kcal of fossil fuel energy is required; lobster and shrimp capture fisheries use more than five times this amount of energy. Energy use in intensive salmon cage aquaculture is less than in lobster and shrimp fishing, but is comparable to use in intensive beef production in feedlots.

Life Cycle Assessment of alternative grow-out technologies for salmon aquaculture in Canada has shown that for salmon cage aquaculture, feeds comprised 87 percent of total energy use, and fuel/electricity, 13 percent. Energy use in landbased recirculating systems was completely opposite: 10 percent of the total energy use was in feed and 90 percent in fossil fuel/electricity. Freshwater use remains a critical issue in aquaculture. Freshwater reuse systems have low consumptive use comparable to vegetable crops.

Freshwater pond aquaculture systems have consumptive water use comparable to pig/chicken farming and the terrestrial farming of oil seed crops. Extreme water use has been documented in shrimp, trout, and striped catfish operations. Water use in striped catfish is of concern to Mekong policy-makers, as it is projected that these catfish aquaculture systems will expand and even surpass their present growth rate to reach an industry of approximately 1.5 million tonnes by 2020.

Water, energy and land usage in aquaculture are all interactive. Reuse and cage aquaculture systems use less land and freshwater but have higher energy and feed requirements, with the exception of "no feed" cage and seawater (e.g. shellfish, seaweeds) systems. Currently, reuse and cage aquaculture systems perform poorly in overall life cycle or other sustainability assessments in comparison to pond systems. Use of alternative renewable energy systems and the mobilization of alternative (non-marine) feed sources could improve the sustainability of reuse and cage systems considerably in the next decade.

Resource use constraints on the expansion of global aquaculture are different for fed and non-fed aquaculture. Over the past decade for non-fed shellfish aquaculture, there has been a remarkable global convergence around the notion that solutions to user (space) conflicts can be solved not only through technological advances, but also by a growing global consensus that shellfish aquaculture can "fit in", not only environmentally but also in a socially responsible manner, to many coastal environments worldwide, the vast majority of which are already overcrowded with existing uses.

For fed aquaculture, new indicators of resource use have been developed and promulgated. Before this resource use in fed aquaculture was being measured in terms of feed conversion ratios (FCRs) followed by FIFO ("fish in fish out") ratios. First publications a decade ago measured values of FIFO in marine fish and shrimp aquaculture. More comprehensive indicator assessments of fish feed equivalencies, protein efficiency ratios and fish feed equivalences will allow more informed decision-making on resource use and efficiencies. Over the past decade, aquafeed companies have accelerated research to reduce the use of marine proteins and oils in feed formulations, and have adopted indicators for the production efficiencies in terms of "marine protein and oil dependency

ratios" for fed aquaculture species. Current projections are that over the next decade, fed aquaculture will use less marine fishmeals/oils while overall aquaculture production will continue its rapid growth.

Over the past decade, new, environmentally sound technologies and resourceefficient farming systems have been developed, and new examples of the integration of aquaculture into coastal area and inland watershed management plans have been achieved; however, most are still at the pilot scale commercially or are part of regional governance systems, and are not widespread. These pilot-scale models of commercial aquaculture ecosystems are highly productive, water and land efficient, and are net energy and protein producers which follow design principles similar to those used in the fields of agroecology and agroecosystems. Good examples exist for both temperate zone and tropical nations with severe land, water and energy constraints.

Increasing technological efficiencies in the use of land, water, food, seed and energy through sustainable intensification such as the widespread adoption of integrated multi-trophic aquaculture (IMTA) and integrated agriculture aquaculture farming ecosystems approaches will not be enough, since these will improve only the efficiency of resource use and increase yields per unit of inputs and do not address social constraints and user conflicts. In most developing countries, an exponentially growing population to 2050 will require aquaculture to expand rapidly into land and water areas that are currently held in common.

Aquaculture expansion into open-water freshwater and marine waters raises the complex issues of access to and management of common pool resources, and conflicts with exiting users that could cause acute social, political and economic problems. The seminal works of 2009 Nobel Laureate Elinor Ostrom could provide important insights for the orderly expansion of aquaculture into a more crowded, resource-efficient world striving to be sustainable, and rife with user conflicts.

Presented in the Aquaculture 2010 conference proceedings, published in 2012 by the Food and Agriculture Organisation of the United Nations (FAO) and the Network of Aquaculture Centres in Asia-Pacific (NACA) ●

Source:thefishsite

Monitoring pond water quality to improve production

The proper management of pond water quality plays a significant role for the success of aquaculture operations, writes Elisabeth Mayer, Biomin.

Each water quality parameter alone can directly affect the animals´ health. Exposure of shrimp and fish to improper levels of dissolved oxygen, ammonia, nitrite or hydrogen sulfide leads to stress and disease. However, in the complex and dynamic environment of aquaculture ponds, water quality parameters also influence each other. Unbalanced levels of temperature and pH can increase the toxicity of ammonia and hydrogen sulfide. Thus, maintaining balanced levels of water quality parameters is fundamental for both the health and growth of culture organisms. It is recommended to monitor and assess water quality parameters on a routine basis.

In this article the most important water quality parameters such as oxygen, pH, temperature, salinity, turbidity and nitrogen compounds are described with insights on how these parameters influence each other. Table 1 gives an overview of the water quality parameters with their standard values.

Dissolved oxygen (DO) is one of the most important parameters in

Table 1: Water quality parameters and their standard values

Parameter	Standard values
(Dissolved) Oxygen	> 4.0 mg / l
Temperature	Sepcies dependent
pH	7.5 - 8.5
Salinity	Fresh water : <0.5 ppt Brackishwater : 0.5 - 30 ppt Saltwater : 30 - 40 ppt Optimum : 15 - 25 ppt
Carbon dioxide (CO_2)	< 10 ppm
Ammonia (NH_4^+/NH_4- N)	0 - 0.5 ppm
Nitrite (NO_2)	< 1 ppm
Hardness	40 - 400 ppm
Alkalinity	50 - 300 ppm
H_2S	0 ppm
BOD	< 50 mg / 1

aquaculture. Maintaining good levels of DO in the water is essential for successful production since oxygen (O_2) has a direct influence on feed intake, disease resistance and metabolism. A sub-optimal level is very stressful for fish and shrimp. It is therefore important to keep DO at optimum levels of above 4.0 ppm.

The dynamic oxygen cycle of ponds fluctuates throughout the day due to phytoplankton photosynthesis and respiration.

The Daily Cycle of Oxygen in a Pond

Maximum DO will occur in the late afternoon due to the buildup of O_2 during the day through photosynthesis. As phytoplankton (microscopic algae) usually consumes the most O_2 and since photosynthesis does not occur during the night, DO levels decline. Critically low DO occurs in ponds specifically when algal blooms crash. The subsequent bacterial decomposition of the dead algae cells demands a lot of oxygen. Managing the equilibrium of photosynthesis and respiration – as well as the algae growth - is an important task in the daily work of a farmer.

When feeding the fish and shrimp, oxygen demand is higher due to increased energy expenditure (also known as specific dynamic action). To face this higher oxygen demand, several measures can be taken:

Other sources of oxygen than photosynthesis are diffusion or transfer from air to water. Wave action or mechanical aeration is forcing this oxygen diffusion. Paddlewheel aerators accomplish this by breaking water into small droplets and increasing contact of water surface with air. Aspirator aerators compel air into the water through a venture and a propeller. Another reason for aeration is the circulation of aerated water through the pond.

Biochemical oxygen demand (BOD)

Biochemical oxygen demand (BOD) of the pond can affect the oxygen cycle and thus, the oxygen equilibrium. Five-day biochemical oxygen demand (BOD5) is the amount of DO needed by aerobic biological organisms in the water to break down organic material present at a constant temperature during a 5-day period.

BOD5 is an important water quality variable that may be required to demonstrate compliance with water quality permits issued by the governments and to achieve farm certification.

The BOD5 of pond aquaculture effluents usually ranges from 5 to 20 mg/l. The greater the BOD, the more rapidly oxygen is depleted.

Temperature

Temperature is another important water quality parameter. It can affect fish and shrimp metabolism, feeding rates and the degree of ammonia toxicity. Temperature also has a direct impact on biota respiration (O_2 consumption) rates and influences the solubility of O_2 (warmer water holds less O_2 than cooler water).

Temperature cannot obviously be controlled in a pond. Aquatic animals modify their body temperature to the environment and are sensitive to rapid temperature variations. For each species, there is a range of temperature conditions (Table 2). It is therefore important to adapt fish and shrimp progressively when transferring them from tank to pond.

Also, the O_2 cycle and thus, the DO levels can be affected by changes in the environment; a cloudy day will diminish the photosynthetic O_2 input to DO. Correspondingly, uncommonly high temperatures will decrease the solubility of O_2 in water and hence lower DO. When a pond is in "equilibrium" DO will not change drastically.

Carbon dioxide (CO_2)

Carbon dioxide (CO_2) in ponds is primarily produced through respiration by fish/shrimp and the microscopic plants and animals that constitute the pond biota.

Carbon dioxide levels (and toxicity) are highest when DO levels are lowest. Thus, dawn is a critical time for monitoring DO and CO_2. High CO_2 concentrations inhibit the ability of fish and shrimp to extract O_2 from the water, reducing the tolerance to low O_2 conditions and inducing stress comparable to suffocation.

Table 2: Temperature (°C) conditions for aquatic species

Species	Lower lethal temperature	Preferred temperature	Upper lethal temperature
Rainbow trout	0	13 - 17	24 - 27
Nile tilapia	8 - 12	31 - 36	42
Tra catfish	9	23 - 27	33
Crucian carp	0	25 - 32	38
Channel catfish	9	22 - 29	37
Cobia	1	21 - 27	33
Tiger prawn	14	25 - 30	36
White shrimp	14	> 20	40

The Daily Cycle of Oxygen and Carbon Dioxide in a Pond

An increase in CO_2 may also decrease the pH, which can lead to toxicity of nitrite. If plants in the water absorb too much CO_2 for photosynthesis during the day, the pH will increase, and the fish and shrimp are subjected to higher un-ionized toxic ammonia (NH_3) concentrations.

Carbon dioxide concentrations above 60 ppm may be lethal. In an emergency, CO_2 can be removed by adding liming agents such as quicklime, hydrated lime or sodium carbonate to the pond water.

pH

pH is a measure of acidity (hydrogen ions) or alkalinity of the water. It is important to maintain a stable pH at a safe range because it affects the metabolism and other physiological processes of culture organisms. It can create stress, enhance the susceptibility to disease, lower the production levels and cause poor growth and even death. Signs of sub-optimal pH are besides others increased mucus on the gill surfaces of fish, unusual swimming behavior, fin fray, harm to the eye lens as well as poor phytoplankton and zooplankton growth. Optimal pH levels in the pond should be in the range of 7.5 – 8.5.

The CO_2 concentration in the water also influences the pH, e. g. an increase in CO_2 decreases the pH. As phytoplankton in the water utilizes CO_2 for photosynthesis, the pH will vary naturally throughout daylight hours. pH is generally lowest at sunrise (due to respiration and release of CO_2 during the night) and highest in the afternoon when algae utilization of CO_2 is at its greatest. Waters of moderate alkalinity are more buffered and there is a lesser degree of pH variation.

Ammonia

Ammonia is a very important parameter for good fish and shrimp production. Under particular conditions, ammonia can easily rise (through accumulation of overfeeding, protein rich, excess feed wastes and excreted ammonia) to dangerously high levels.

Ammonia in water exists in two forms, as ammonium ions (NH_4+), which are nontoxic, and as the un-ionized toxic ammonia (NH_3). The relative proportion of the one or the other depends on water temperature and pH. If the phytoplankton absorbs too much CO_2 during the day, and therefore increase the pH to a value above 8.5, the fish and shrimp are subjected, depending on the total ammonia nitrogen concentration, to high ammonia concentrations (NH_3). As little as 0.6 ppm (mg/l) free ammonia (NH_3) can be toxic to many kinds of fish and shrimp, causing gill irritation and respiratory problems.

Nitrite (NO_2-)

Nitrite (NO_2-) is another form of nitrogenous compound that results from feeding and can be toxic to shrimp and fish. Nitrite is an intermediate product of the transformation of ammonia into nitrate by bacterial activity. The absorbed nitrites from the gut bind to hemoglobin and reduce its ability to carry oxygen.

An increase in CO_2 may decrease the pH to a value below 6.5, which can lead to toxicity of nitrite through the formation of nitrous acid (HNO_2). At 2 ppm (mg/l) and above, nitrites are toxic (injurious or lethal) to many fish and shrimp.

Hydrogen sulfide (H_2S)

Hydrogen sulfide (H_2S), a colorless, toxic gas, is a by-product of the deterioration of organic matter, usually under anaerobic conditions. Anaerobic soils with moderate to high organic concentrations can be a significant source of H_2S, which is toxic to shrimp and fish even at low concentrations since it hinders their respiration. If the bottom soil becomes black and a rotten egg odor is recognized when sediment is disturbed, it indicates anaerobic conditions and the presence of H_2S. Hydrogen sulfide is highly toxic in the unionized form (comparable to ammonia). However, the unionized form is predominant at low pH (< 8) and high temperature. At pH 7.5 approximately 14 % of the sulfide is in the toxic H_2S form and at pH 6.5 about 61 %. Therefore, sulfide concentrations should be below 0.002 ppm.

Many marine species live in close proximity to sediments that often contain H_2S. Some even live in them. From the data in Table 3 it is clear, that the range of susceptibility to H_2S poisoning is huge.

Table 3: Toxicity of H_2S to various aquatic organisms

Common name	Species name	L C $_{50}$ (ppb)
Channel catfish	Ictalurus punctatus	846.7
Indian prawn	Penaeus indicus	179.3
Oriental river shrimp	Macrobrachium nipponense	51.0
Crab	Portunus trituberculatus	31.5
Black tiger shrimp	Penaeus monodon	62.6
Pacific white shrimp	Litopenaeus vannamei	60.2

Drying and tilling pond bottoms, in addition to maintaining thorough aeration of ponds and frequent water exchange, are effective means in diminishing hydrogen sulfide.

Alkalinity

Alkalinity is the buffering capacitiy of water and represents its amount of carbonates and bicarbonates. Alkalinity can affect the potential for primary productivity and also the water pH. In case the water pH fluctuates greatly during the day, lime can be used to increase alkalinity in the water to stabilize the water pH. Values of 50 – 100 mg/l are considered moderate and are recommended. Total alkalinity has been traditionally expressed as milligrams per liter (ppm) of equivalent calcium carbonate ($CaCO_3$). Generally, alkalinity varies from site to site. In the seawater, alkalinity is normally higher than 100 ppm but in freshwater areas, alkalinity is often low, particularly during the rainy season. Low alkalinity in freshwater or in low salinity areas will affect the survival rate and molting of shrimp.

Hardness refers to the concentration of calcium and magnesium in water.

Hard waters have the ability to buffer the effects of heavy metals such as zinc or copper which are toxic for fish and shrimp. Thus, hardness is a crucial parameter in maintaining good pond "balance".

Salinity

Salinity represents the total concentration of dissolved inorganic ions, or salts, in water. It plays a significant role for the growth of culture organisms through osmoregulation of body minerals from that of the surrounding water. For better survival and growth an optimum range of salinity should be maintained in the pond water. If salinity is too high, fish and shrimp will start to lose water to the environment. Younger shrimp appear to tolerate a wider fluctuation of salinity than the adults. Drastic changes of salinity may also alter the phytoplankton fauna and their population densities and lead to instability of the ecosystem. Lowering the salinity by more than 5 ppt, at each time of water exchange, is not recommended.

Conclusion

Careful monitoring of water quality parameters is important to understand the interactions between parameters and effects on shrimp and fish feeding, their growth and health. Each water parameter alone may not tell much, but several parameters together can reveal dynamic processes taking place in the pond. Water quality records will allow farmers to note changes and make decisions fast so that corrective actions can be taken quickly. ●

Source: thefishsite

NEWS SPECTRUM

Instant Fish Gravy Powder– A New product from CIFT, Cochin

Ready-to-cook foods are categorized as convenience foods which are designed to save consumer's time, reduce wastage from spoilage and reduce costs. Ready-to-eat fish curry in retortable pouch is available in the market which is very handy for the homemaker and save much time and avoids drudgery in the preparation of these products at home. Preparation of fish based dishes at home requires a lot of ingredients other than fish which are to be cleaned, mixed, fried and boiled to make a gravy before the addition of fish or prawn to form the dish. Ready-to-cook instant fish gravy powder developed by CIFT can be added to the fish at required quantity and boiled to prepare the dish within minutes.

Conventional fish gravy has a very short shelf life of 24 hours under normal conditions without addition of preservatives. At refrigerated temperatures (2 to 3°C), the shelf life can be extended to about 72 hours. By dehydrating, the shelf life of the gravy mix can be enhanced to six months at ambient conditions with suitable packaging. The gravy powder is very convenient to be packed in sachets of required quantity, can be easily transported and bulk stored with minimum facilities. To prepare 500g fish curry, 50g gravy powder will be required. The powder has to be dispersed in water and boiled with 200g cleaned fish steaks for 10 minutes.

Packaged instant fish gravy powder

The instant fish gravy powder is a ready-to-prepare form in sachets. This is a new product developed by employing a standardized process with optimum combination of ingredients to get the desired flavour. The ingredient composition of the product was optimized by trials and sensory evaluation studies. The gravy powder in metallised polyester pouches can be stored in good condition for more than six months at ambient temperature. This product does not contain any preservatives and additives. The sachet contain the required quantity of gravy powder for the preparation of 500g fish curry sufficient for one serving for a four member family. A patent has been filed for this product.

The Instant Fish Gravy Powder was formally launched by Shri Damodaran, Hon'ble Minister for Agriculture, Govt. of Tamil Nadu at the inaugural session of XXIII meeting of ICAR Regional Committee No. VIII held at Tamil Nadu Agricultural University, Coimbatore on 15 June, 2012. Dr. S Ayyappan, Director General, ICAR, New Delhi received the first packet. ●

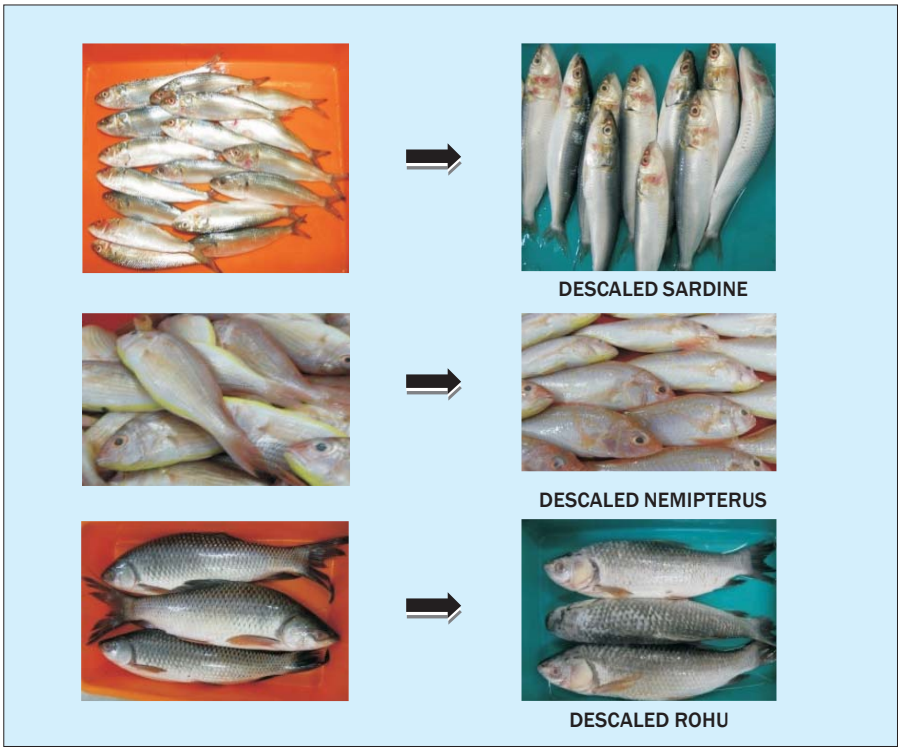
Fish descaling machine developed by CIFT, Cochin

Shortage of skilled manpower is a major problem faced by the fish processing industry. Development of a fish descaling machine is a step to reduce the drudgery of manual descaling of small sized fishes. Mechanization of descaling activity can significantly reduce the handling time, thereby shortening the pre-processing period. This in turn reduces the overhead costs and also enhances the quality of the final product.

Fish Descaling Machine

The Central Institute of Fisheries Technology, Cochin has designed and developed a fish descaling machine for removing the scales of fishes in batches. The operation of the machine can be extended for removal of scales from all types of marine as well as fresh water fishes. The descaling machine is based on a new design equipped with a perforated rotating drum and an induction motor of variable frequency drive.

The drum of the descaling machine has a capacity to load 10 kg fish. The time of operation and rpm of the drum has been standardized for each species under different size categories for the efficient removal of scales. The rpm of the drum can be adjusted at a minimum of 2 rotations to a maximum of 80 rotations per minute. Trials conducted have shown that 98% of the scales can be removed using descaling machine. For sardine, the descaling process requires 5 minutes at 20 rpm, for rohu it is 10 minutes at 30 rpm and for tilapia it is 8 minutes at 25 rpm. This is a batch process and the material can be loaded and unloaded easily and only one person is required to operate the machine. ●



Green warriors urge PM to protect oceans

Environmentalists have urged Prime Minister Manmohan Singh to take lead in ocean protection - an environmental issue that has so far failed to receive focused attention during negotiations and consultations at climate change meetings.

For the Rio+20 convention that the Prime Minister is slated to address on June 21, the host Brazil has chosen ocean protection as one of the top four most significant issues.

Now, as per Greenpeace campaigner Areeba Hamid, the PM's stand along with the G-77 on a global implementing agreement on protecting the oceans can be a turning point in the outcomes, especially considering the opposition from countries like the US, Russia, Canada and Venezuela.

"As the host country for the next Convention on Biological Diversity meeting in October, India has said marine biodiversity protection is a priority. A vocal support of starting negotiations for an implementing agreement at Rio would set a good example before the CBD, showing India is serious about meeting CBD targets," she says.

Statistics say less than one per cent of international waters are currently protected. There is a free-for-all in many parts of the high seas and, as per environmentalists, marine ecosystems are already reeling under impacts of over-fishing, destructive fishing, marine pollution, seabed mining, dumping, climate change and ocean acidification.

Three billion people in the world are dependent on oceans for livelihoods. In India alone, about 15 million people are dependent on fishing and allied activities along its vast coastline.

The high seas and the area of the deep seabed, that is the regions beyond national jurisdiction, contain the largest reservoir of biodiversity on earth. While technological capacity and demand for resources have also caused pressure in these areas, resulting in destruction of fishing habitat, climate change, ocean acidification and pollution, international rules and institutional governance structures for conservation and sustainable use of marine biodiversity have not kept pace with these developments.

Challenges to ocean resources have in fact evolved way beyond UNCLOS (United Nations Convention on the Law of the Sea), environmentalists say.

-Tribune News Service

Price List of MPEDA Publications / Periodicals

	PERIODICALS	Annual Subscription (Rs.)
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16	Directory of Exporters of Marine Products (Interactive CD)	50.00

Kerala charts Rs 650-cr plan for fisheries sector

The State government has initiated steps to implement projects worth Rs. 650 crore for the development of fisheries sector.

The State Fisheries Minister, Mr K Babu, said the projects will be implemented this year in association with the Fisheries department, Coastal Areas Development Corporation, Matsyafed, and Fishermen's Welfare Fund Board.

The Minister was talking after inaugurating the valedictory session of the State-level leadership camp of the Kerala Pradesh Matsya Thozhilali Congress.

The fund allocated in the State budget for the fisheries sector is inadequate. Therefore, funds will be mobilised from other agencies for improving infrastructure in the sector, he said.

The Minister pointed out that the benefits of Samashawasa project will be distributed through banks. The biometric cards for fishing workers will be distributed in three months.

He said that the government is giving high preference for the development of fisheries sector. He alleged that the previous government has done anything for the development of coastal areas despite receiving Rs 1,400 crore under the Tsunami rehabilitation scheme.

-The Hindu,

Standing Committee on Agriculture invites suggestions on development of fisheries

Parliament's Standing Committee on Agriculture, chaired by Mr. Basudeb Achariya, has invited suggestions of individuals, institutions and organizations on the development of fisheries, a subject it has taken up for examination.

An official press release said the committee had, in order to have wider consultations and a holistic view, decided to invite memoranda containing views and suggestions on the development of fisheries, including inland fisheries, fresh water fisheries, brackish water fisheries, aquaculture, estuaries fisheries and marine fisheries, thrust areas on which special attention is required to be paid, sustainable livelihoods for those involved in the sector, induction of suitable and sustainable technologies and scientific methodologies.

The release said those desirous of submitting memoranda may send two copies thereof, either in English or Hindi to The Committee Officer, Committee on Agriculture Branch, Lok Sabha Secretariat, Room No 616, Parliament House Annexe, New Delhi 110001 or to Fax No 23093338 or by e-mail to agricom@sansad.nic.in within three weeks.

The committee will also take oral evidence on the subject. Those who wish to appear before the committee, besides submitting memoranda, are requested to specifically indicate so. However, the committee's decision in this regard shall be final.

The committee has made it clear that the memoranda submitted to the committee would form part of the records of the committee and would be treated as strictly 'confidential' and not circulated to anyone, the release added.

-Netindian News Network

Fishermen to receive wireless devices

Fishermen along the coasts are slated to receive wireless devices to aid them in times of disasters. The project involves Rs.7.73 crores. Each device costing Rs.13,181 was being distributed to fishermen, said Minister for Fisheries K A Jayapal here in Nagapattinam.

The Minister along with Fisheries Secretary Gagandeep Singh Bedi, Director of Fisheries C Munianathan, was here inspecting the development works in fisheries sector.

The team reviewed the works on modernization of fishing harbour to be spread over 38.75 ha at a cumulative cost of Rs.35.65 crore.

The facilities envisioned for the project include a 530 meter long wharfage, a retaining wall, fish auction hall, fish processing center, toilet facilities, approach roads, and electrification and lamps. The project entails desilting up to a depth of three-meters along the Kaduvayar and Uppanar confluence to facilitate easy

navigation of boats into the anchorage. The anchorage has been conceived as a safeguard against cyclone and monsoon inflicted damages to boats.

Additionally, the fish processing centre under the aegis of the National Fisheries Development Board at a cost of Rs.1 crore was under progress. The centre is slated to be completed within a month.

Works on the fish landing centre with all infrastructure under way at a cost of Rs.10.60 crore at Nagore were also inspected during the tour. Also, progress on fish processing park at Thethi in Nagore was ascertained.

Speaking on the occasion, Minister for Fisheries K A Jayapal stated that the district was set to host the country's first Fisheries University and proposed at a cost of Rs.35 lakhs.

Also, a fishing harbour has been proposed over an area of 19.75 ha and at cost of Rs.380 crore.

-The Hindu

Fishing for marine biodiversity

Finfish, shellfish and nematodes in Indian EEZ to be DNA bar-coded

A wide variety of shrimps, crabs, rays and sharks found in the Indian waters will be genetically categorised shortly. Genetic scientists are all set to prepare the DNA barcodes of around 150 varieties of finfish, shellfish and nematodes (round worms), living in the Exclusive Economic Zone of the country and the Southern Ocean, this year.

The Centre for Marine Living Resources and Ecology (CMLRE) of the Ministry of Earth Sciences has initiated the project for barcoding marine finfishes, shell fishes and nematodes of Arabian Sea, Bay of Bengal, and parts of the Indian Ocean and Southern Ocean.

The marine fish varieties found around the Andaman and Nicobar Islands and Lakshadweep will also be bar-coded.

Most of the commercially important species including sardines, mackerels, tuna, sharks, rays, shell fishes and nematodes will be taken to the laboratories of the Kochi unit of the National Bureau of Fish Genetic Resources, CMLRE, and Indian Institute of Science, Education and Research, Kolkata, for barcoding.

Indian White Shrimp, Tiger Prawns, Banana Prawns, Mud Crabs, Spider Crab, Swimmer Crab, rays, sharks and non-edible deep sea resources are among the

species that are to be taken to the genetic laboratories for classification.

The categorisation of genetic diversity of a species is required for the accurate documentation of the biodiversity of a region. Such scientific and precise classification is required for the preparation and implementation of resource conservation and management plans for various species, said a researcher associated with the project.

The average marine fish production in the country is estimated to be around 3 million tonnes and finfishes form a major chunk of the catch. Though there are nearly 1,360 species of finfishes that have been identified in the Indian seas, taxonomic ambiguity exists in several groups of finfishes and many are insufficiently identified, according to a project document.

Applications

Besides "resolving taxonomic ambiguities and scientifically classifying several look-alike and closely related species, the DNA barcoding will have applications in fisheries management and conservation biology, including biodiversity surveys". The "benefits of barcoding include species identification for all potential users, including taxonomists; highlighting specimens that represent a range expansion of known species; flagging previously unrecognised species; and enabling identifications where traditional methods are not applicable," it said.

The scheme will also have forensic application as species can be correctly identified even from a tissue. Precise identification of the species can also offer assistance in complaints related to fish product adulteration, explained scientists.

Researchers will be collecting fish samples from the various fish landing centres in the country besides the catch from the cruises to be undertaken by the ocean research vessel Sagar Sampada. Once the project, which is expected to span over a period of five years, is completed, scientists hope to prepare the DNA sequences of at least 1,500 deep sea fish forms.

-The Hindu

CIFT, Cochin gets Recognition

The Effluent Treatment Plant (ETP) installed in the plant of M/s Bhatsons Aquatic Products, Cochin has been awarded SECOND POSITION by Kerala State Pollution Control Board for the year 2011. The award was conferred to the firm after a detailed visit by a panel of experts appointed by KSPCB. The award was presented to the firm by Chief Minister of Kerala, Shri OommenChandy, at a function held at Thiruvananthapuram on 5th June, 2012 in connection with World Environment Day celebrations.

The ETP was designed and developed by Central Institute of Fisheries Technology, Cochin.This plant functions as common ETP for three export oriented units, viz., M/s Mangala Sea Products, M/s Bhatsons Aquatic Products and M/s Roshan Foods located at the Industrial Development Area, Aroor, and has a capacity to treat 3 lakh litres of effluent per day. The treated effluent conform to the norms prescribed by Central Pollution Control Board and State Pollution Control Board.

The process advantages of the Energy Efficient Treatment Plant are: (i) the effluent discharged from the treatment process conform to the norms of CPCB/state PCB's, (ii) the water will be suitable for reuse in the plant, (iii) the land requirement for the treatment plant is very small, (iv) zero atmospheric pollution and eco-friendly, (v) less power consumption, and (vi) ease of operation

The main advantage of the unit is that, it is highly energy efficient. It needs only two numbers of 1 HP motors for its operation. CIFT, Cochin gives the technology on consultation basis.

Fisheries output to touch 10 mt in 2 years: Pawar

Shri Sharad Pawar, Union Minister for Agriculture and Food Processing Industries, has said the country could touch the 10-miilion tonne mark in the fisheries output.

From 6.5 mt six years ago, the output went up to 8.4 mt last year, promising to touch the 10-mt mark.

Addressing a gathering to mark the seventh meeting of the governing body of National Fisheries Development Board (NFDB) in Hyderabad, Shri Sharad Pawar said this segment was growing at about 5 per cent. The Government was planning to set up hygienic fish trading platforms in cities such as Nellore. Fish markets would come up at Rajahmundry, Kulgaon (Maharashtra) and at Salt Lake city (West Bengal).

The Government also proposed to set up a National Freshwater Fish Brood Bank at the fish farm of the Department of Fisheries at Kausalyaganga in Orissa. This bank would be managed by NFDB in association of CIFA (Central Institute of Freshwater Aquaculture) at Bhubaneswar. The executive committee of NFDB had given the in-principle nod to establish the bank.

During 2011-12, the Government spent Rs 100 crore for development fisheries sector through National Mission for Protein Supplements. Under this scheme, cage culture in reservoirs and intensive aquaculture in ponds and tanks.

This scheme would be continued in 2012-13 with an outlay of Rs 200 crore.

-Hindu Business Line

New fish species discovered

Scientists have discovered a new species of freshwater fish in an unnamed stream in the Western Ghats in southern Karnataka. The fish, coloured yellowish beige with blue-gray fins and measuring not more than 3 cm, was collected from among tree roots that grew into the edge of the stream flowing off the Barapole tributary of the Valapattanam River.

Researchers have named the fish *Dario urops* after the Greek words meaning "tail" and "eye" to denote a

conspicuous spot near its tail. *Dario urops* is the first member of the *Badidae* family that has been described from the Western Ghats. The remaining 19 species within the family are distributed in the rivers of Eastern Himalayas and Indo-Burma, they add.

The research team comprised Ralf Britz from the Natural History Museum, London; Anvar Ali from the Conservation Research Group at St. Albert's College, Kochi; and Siby Philip from the University of Porto, Portugal.

Dario urops was first collected 130 years ago from Wayanad in Kerala by the British Zoologist Francis Day, who, however, did not make a formal description of the species.

-The Hindu

Marine Harvest gets certification

Marine Harvest Canada (MHC), BC's largest supplier of BC farmraised salmon, announced June 28 that it has achieved the Global Aquaculture Alliance's Best Aquaculture Practices (BAP) certification at five marine salmon farm sites.

Third party audits of the BAP Salmon Farms standard will continue at all remaining MHC salmon farms, the company said. Successful certification of these additional sites will guarantee a continuous supply of certified product for Marine Harvest Canada customers.

"We are extremely pleased to have achieved this certification milestone which demonstrates our commitment to environmental integrity and continual improvement throughout our operations," said Clare Backman, Sustainability Director.

An MHC release said the BAP standard for Salmon Farms ensures the environmental impacts of aquaculture - water quality, feed resource conservation, fish escapes and wildlife interaction - are reduced or eliminated. It also covers community, animal health and welfare as well as food safety aspects of farming operations.

"BAP certification ensures that Marine Harvest Canada is responsive to the interests of our customers and the communities in which we operate," says Paula Galloway, Certification Manager. "It validates that our farming practices protect the environment for local wildlife as well as our fish while providing a safe and effective working environment for Marine Harvest Canada staff."

"Consistent practices that ensure environmental responsibility are imperative throughout our production. Our customers expect these high standards at all Marine Harvest Canada sites, not just a select few. Therefore, all marine farms will undergo BAP Salmon Farms standard audits prior to market," Backman added.

MHC said the certification announcement is an important step in the company's interest in receiving a full "four-star rating" from BAP, which will include certification of all its salmon farms, processing plants, feed mill suppliers and freshwater hatcheries.

The MHC announcement comes two weeks after Grieg Seafood BC announced Global Aquaculture Alliance BAP certification for another four of its farms, bringing the total to eight.

The Global Aquaculture Alliance is described as "the leading standards-setting organization for aquaculture seafood.

The Coastal Alliance for Aquaculture Reform (CAAR), however, says the Global Aquaculture Alliance certifications lack credibility and do not adequately protect wild salmon and the environment.

- Postmedia News/Courier-Islander

Fishing boats to be colour coded

Trawlers and fishing boats across India will have colour codes in the near future. The Union government has decided to introduce the new system to strengthen the security along the coast.

According to it, each coastal state will have its own colour code, which will help national security agencies differentiate and identify to which state a particular boat belongs. Once the system is implemented fishermen in the state can use only blue, black and white to paint their boats.

Vijaya Kumar, Assistant Director of the Department of Fisheries, said the Union ministry of shipping had decided to bring in the system keeping in mind the nation's security.

"The state directorate of fisheries has sent a directive to all district-level offices to ensure the implementation of the rule. While the cabin of the boats registered in the state should be painted with blue, upper and lower portion of boats' body should be painted with white and black colours respectively," he said.

The fisheries department has held a preliminary round of discussions with all stakeholders involved. A meeting of various fishermen societies and associations was also organized in this connection recently. "The information regarding the new colour code has been conveyed to fishermen representatives in the meeting," he added.

National Fishermen's Federation secretary Vasudev Boloor said that the National Fish Workers Forum had already welcomed the decision of the government."It is an important decision in the interest of the nation's security as well as for the coastal security. The security agencies and fishermen can identify the boats of other states. It will also help check intrusion of enemies through sea," he added.

-Times of India

Pondy plans to set up Fisheries Development Corporation

Puducherry Administration has drawn up plans to set up a Fisheries Development and Fishermen Welfare Corporation to address demands of fishermen in the Union Territory. Local Administration and Fisheries Minister N G Panneerselvam today held discussions with officials of the department to work out modalities for setting up the Corporation, a release said.

- ibnlive.in.com

Study finds white abalone on the brink of extinction

The shellfish was abundant till overfishing in the 1970s caused the population to plummet. Researchers say the only way to save it is through human intervention.

A study has found white abalone are on the edge of extinction. The endangered shellfish used to number in the millions off the Southern California coast, but researchers say the population has declined so drastically that now the only way to preserve it is for humans to breed abalone in capitivity and release it into the wild. (Kevin Lafferty / UC Santa Barbara / August 10, 2000)

White abalone, the endangered shellfish that once numbered in the

millions off the Southern California coast, have declined precipitously over the last decade and are on the brink of extinction, a study has found.

In research published this week, scientists for the National Oceanic and Atmospheric Administration reported "a dramatic and continued decline" in the population of hard-shelled sea snails, a trend that has only worsened since they were protected from overfishing in the 1990s.

Underwater surveys found a 78% drop in the number of white abalone lodged between rocks off the coast of San Diego since 2002, with most of those remaining either so old or isolated from one another they can no longer reproduce. Researchers warned that, without the ability to spawn a new generation, the aging sea creatures, which can live up to 35 years, will not be able to recover on their own.

"At this point, without human intervention, the species could go extinct within our lifetimes," said co-

author Melissa Neuman, white abalone recovery coordinator for NOAA's National Marine Fisheries Service.

The report, published in the journal Biological Conservation, urges "immediate, proactive conservation" by breeding white abalone in captivity and releasing them in the wild, saying it may be the only way to save them.

"The study highlights a new sense of urgency about the importance of captive breeding," said Kevin Stierhoff, lead author of the study and research fisheries biologist at NOAA's Southwest Fisheries Science Center in La Jolla, which operates an aquarium facility designed to culture young white abalone to boost wild populations. The University of California, Aquarium of the Pacific and Cabrillo Marine Aquarium are working on similar captive breeding programs, he said.

White abalone were abundant in kelp forests and rocky reefs from Point Conception to Baja California until the 1970s, when commercial divers plucked some 350,000 of them from the ocean for food. The overharvesting caused landings to plunge near zero and the fishery was shut down in 1997. White abalone was listed as a federally endangered species in 2001.

Currently, only a few thousand are left; A 2000 government report predicted white abalone would disappear entirely by 2010.

White abalone is one of the seven abalone species that live in California waters and were historically considered to be immune from extinction. Black abalone, a relative, was listed as endangered in 2009.

"The case of the white abalone, " the report notes, "illustrates that marine invertebrates, and particularly species with high commercial value, are unarguably vulnerable."

By Tony Barboza, Los Angeles Times

UN strengthens regulations on melamine, seafood, melons, dried figs and labelling

The UN food standards body has agreed on new regulations — including the maximum level of melamine in liquid milk formula for babies — to protect the health of consumers across the world. Other measures adopted include new food safety standards on seafood, melons, dried figs and food labelling.

The Codex Alimentarius Commission, jointly run by the UN Food and Agriculture Organization (FAO) and the World Health Organization (WHO), sets international food safety and quality standards to promote safer and more nutritious food for consumers worldwide. Codex standards serve in many cases as a basis for national legislation, and provide the food safety benchmarks for international food trade.

Seafood and viruses

Food hygiene in seafood, particularly for molluscs, such as mussels and oysters, have become a

major food safety concern. The Commission adopted a set of preventive hygiene measures aimed to control food-borne viruses. Viruses are generally more resistant than bacteria and those transmitted by the faecal-oral route can persist for months in bivalve molluscs, soil, water and sediments. They can survive freezing, refrigeration, UV radiation and disinfection but are sensitive to heat.

Common food-borne viral diseases are caused by hepatitis A virus and norovirus. The Commission noted that the main hazard for the production of molluscs, such as oysters and mussels, was the biological contamination of the waters in which they grow.

It is therefore important to ensure the seawater quality of growing areas, the Commission noted. When there is a likelihood or evidence of viral contamination, closure of the area, destruction of contaminated molluscs and/or heat treatment before consumption of already harvested molluscs is recommended.

Mandatory nutrition labeling

Codex recommended that food manufacturers across the world label nutritional content on their products to ensure that consumers are better informed; the recommendation is in line with WHO's Strategy on Diet, Physical Activity and Health and is a major step forward in promoting healthy eating worldwide.

The 49-year-old Codex Alimentarius Commission, meeting from 2-7 July, is attended by 600 delegates representing 184 countries plus the European Union.

- Source:indiaeducationdiary.in

Eating Seafood Once a Week Cuts Heart Attack Risk by Half

Eating one portion of seafood on a weekly basis may cut your heart attack risk by 50 percent, according to experts.

Shrimp, crabs, squid, and scallops have just as much vitamins and minerals as fish like salmon or cod and they also contain omega-3, an essential fatty acid that promotes heart health, the *Daily Mail* reported.

Eating one portion of seafood on a weekly basis may cut your heart attack risk by 50 percent, according to experts. (Microsoft)

Experts say that unlike cheese, red meat and fast foods, which contain cholesterol and are high in saturated fats, seafood does not increase levels of bad cholesterol in the body; therefore seafood is unlikely to have a major impact on cholesterol levels.

Jackie Lynch of the website *well-well-well.co.uk* told the *Mail* that people should try to eat fresh seafood because frozen products contain more sodium, which many already consume more than twice the daily recommended amount.

Lynch said that best thing about eating crab is that it contains high levels of protein and omega-3 and has trace elements of selenium, chromium, calcium, copper, zinc, minerals and antioxidants that are helpful in reducing blood pressure.

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However Lynch warned that crab should only be an occasional treat for those with high cholesterol, because most shellfish, especially crustaceans, are high in cholesterol.

Experts say that squid has high levels of protein as well as omega-3, copper, zinc, B vitamins and iodine. Foods that contain copper are good for the body's absorption, storage and metabolism of iron and the formation of red blood cells.

Oysters are high in protein. zinc, Omega-3 and are low in cholesterol. Nutrition experts also say that they contain large amounts of the amino acid tyrosine, which helps boost mood and regulate stress levels. Oysters also contain more zinc than most other foods, which supports reproductive and sexual health, especially in men.

Mussels contain selenium, iron, folic acid, Vitamin A, B vitamins, zinc and iodine, the chemical element which helps an underactive thyroid produce tyrosine, the hormone which makes it effective. Mussels also have the highest level of Omega-3 compared to all other shellfish and also contain high levels of folic acid and vitamin B12, nutrients that help with tiredness, confusion and nerve damage.

Scallops contain virtually no saturated fat and are low in calories. Like all shellfish, these mollusks contain high levels of protein and omega-3 and are a good source of vitamin B, magnesium and potassium.

Prawns and shrimp are high in levels of vitamin B12, which is necessary for cell division and selenium, which has highly protective properties and supports the immune system function and thyroid function.

Lobsters are high in iodine, selenium, and B vitamins and contain less cholesterol and calories than lean beef, pork, and shrimp. While lobster's often seen as a luxury food, it is a good source of lean protein, and its high levels of vitamin E protect the body's cells from damage.

Clams are also a great source of protein and are extremely high in zinc, which is good for skin and hair health as well as for immune function. Clams also contain high amounts of Vitamin A in the form of retinol, which helps boost night vision.

- Medicaldaily.com

Rameswaram fishermen on strike protesting 'price cartlelisation'

Fishermen in Rameswaram have launched an indefenite strike protesting the fish traders forming a "cartel" and quoting very low price for their catch.

Rameswaram fishermen's association president Emerit said on Sunday that in no other state the traders quoted such a low price for the fish nor did they form a cartel like in Tamil Nadu.

He alleged four fish trading companies formed a cartel and they did not allow others to pariticipate in the auction.

For example, prawn was quoted only for Rs 250 a kg or 300 while in Kerala it was quoted double the price. "We do not have cold storage facility to store the fish, and froced into a distress sale."

He wanted the government to intervene and break the cartel and provide cold storage facility. Officials of Nila Sea Food, one of the four companies facing the charge of price cartelisation, when contacted denied the allegation saying "We are paying fair price." However, they refused to compare with the prices prevailing in Kerala and Karnataka.

- Times of India