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Contents

Editorial Committee

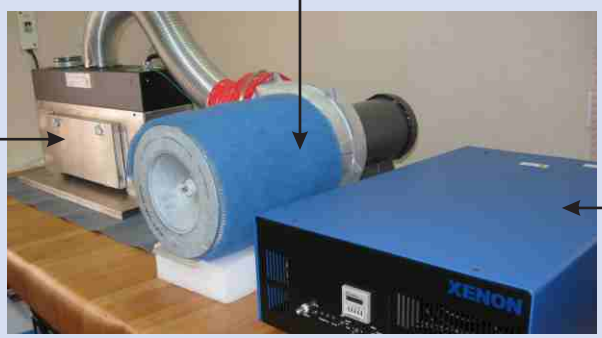
News from the Research Front

Pulsed Light Technology

Pulsed light technology, an emerging non-thermal technology for decontamination of food surfaces and food packages, is consisting of short time high-peak pulses of broad-spectrum white light. High intensity light is a synonymous term with pulsed UV light, pulsed light, broad spectrum white light and near infrared light. Pulse light technology is an alternative preservation technique to thermal treatment for killing microorganisms using short time high frequency of intense broad spectrum, rich UV light, which is the portion of the electromagnetic spectrum corresponding to the band between 200-280nm. Pulsed light is produced using technologies that multiply power many fold. It is used for the rapid inactivation of microorganisms on food surfaces, equipment, and food packaging materials.

The use of pulse light for the inactivation of microorganisms was intiated in Japan in the late 1970s. Later extensive work was done to sterilize pharmaceutical products. However, the technology was adopted by the food industry in 1996, only when Food and Drug Administration Authority approved the use of pulsed light technology for production, processing and handling of foods.

Electromagnetic energy is accumulated in a capacitor within fractions of a second and then released in the form of light within a short time (nanoseconds to milliseconds),



केन्द्रीय मात्स्यिकी प्रौद्योगिकी संस्थान
सिफ्ट जंक्शन, मत्स्यपुरी पी. ओ., कोचिन-682 029
Central Institute of Fisheries Technology
CIFT Junction, Matsyapuri P.O., Cochin - 682 029

resulting in an amplification of power with a minimum of additional energy consumption. Equipment used to produce pulse light is made up of one or more adjustable xenon lamp units, a power unit, and a high voltage connection that allows the transfer of a high current electrical pulse. As the current passes through the gas chamber of the lamp unit, a short, intense burst of light is emitted. The light produced by the lamp includes broad spectrum wavelengths from UV to near infrared. The wavelength distribution ranges from 100 to 1,100 nm: UV (100–400 nm), visible light (400–700 nm), and infrared (700–1,100 nm). Many fluids, such as water, have a high degree of transparency to a broad range of wavelengths including visible and UV light, while other liquids, such as sugar solutions and wines, exhibit a more limited transparency. Increasing the amount of solids will diminish the intensity of penetration of the UV radiation. The lethal effect of pulse light can be attributed to the rich broad spectrum UV content, its short duration, high peak power and the ability to regulate both the pulse duration and the frequency output of the flash lamp. The primary cell target of pulse light is nucleic acid. The effectiveness of pulsed light treatment depends upon several factors such as intensity, treatment time, food temperature and type of microorganism. Light pulses have the ability to inactivate enzymes in food as well. Pulse light treatment of 30J/cm^2 does not cause any loss of proteins, riboflavin and ascorbic acid in frankfurters and riboflavin content in beef, chicken and fish. The colour and shear force values did not show any significant change in catfish treated with 2-4 pulses of 2.5-5 J/cm^2 .

Packaging plays an important role in the preservation, transporting and marketing of the products. Suitable packaging materials are to be selected for packaging of animal products for pulse light treatment. Pulsed light can be used to inactivate microorganisms on the surface of food packaging materials, and potentially on the surface of products packaged in UV transparent materials. The use of pulsed light could lead to a reduction in the need for preservatives or chemical sterilizing agents. Chemical surface sterilizers such as hydrogen peroxide, propylene oxide or per-acetic acid may leave a residue or require time to reduce to an acceptable level. But pulsed light has the advantage of not leaving undesirable residue after treatment.

Pulse light is a novel non-thermal technology to inactivate pathogenic and spoilage microorganism on foods. This method can be used for surface sterilization of foods such as baked goods, seafood, meat, fruits and vegetables. Many research findings have shown that this can be used for the reduction of microbial load of *Listeria monocytogens, Salmonella enteritidis, Pseudomonas aeruginosa, Bacillus cereus*, *Staphylococcus aureus*, *Escherichia coli* etc. Many researches have shown extended shelf life in shrimp treated with pulsed light. Shrimp treated with pulsed light and stored at refrigerated condition for seven days remained edible, whereas untreated shrimp showed extensive microbial degradation and were discoloured, foul smelling and not edible. Pulsed light was able to reduce the psychotroph and Coliform population on the surface of summer flounder fillets. The sensory attributes indicate that fillets remained acceptable even after 15 days of refrigerated storage. There have been findings that indicate 1 log reduction of *Escherichia coli* O157:H7 or *L. monocytogenes* on salmon fillets, when pulsed light treatment of 5.6 J/cm^2 per pulse could be achieved after 60 sec. treatment at 8cm distance which was done without affecting the quality. Studies conducted at McGill University, Canada show promise for pulsed light treatment for cold smoked vacuum packed salmon to control *L. monocytogens* and *Clostridium botulinum* A and E.

Although majority of studies are related to microbial reduction in dairy products, vegetables and fruits, there are limited studies about effectiveness of pulsed light on fish micro flora and shelf life. Studies need to be conducted to assess the effects of pulse light treatments on food properties beyond safety and spoilage. There is a need for optimizing the critical process factors to achieve the target inactivation level for specific food applications without affecting quality. Pulsed light equipment with good penetration and short treatment time need to be designed for commercial purposes. In addition, the applicability of pulsed light treatments on an industrial scale needs to be compared with other non-thermal or conventional thermal processes.

Merits and Demerits

Merits: The inactivation of microbes by pulse light is a very fast process and cause a rapid disinfection in a very short period. It is a green technology as the consumption of energy is very less during its application. It has been proven as a safe technology for living beings and their environment without producing harmful residuals, chemicals and toxic byproducts in the pulse light treated foods. It does not affect the nutritional and sensory qualities of the products. The concerns of ionized radicals and radioactive byproducts in foods by consumers are removed in pulse light due to its non-ionizing spectrum.

Demerits: Pulse light application in meat industry has some constraints as it has low penetration power and chances of lipid oxidation. To get the desired outcome, the packaging materials showing high penetration of pulse light should be used while treating the packaged food in this

method. The limited control of food heating still remains the main concern in pulse light technology. Sample heating is perhaps the most important limiting factor of pulse light for practical applications.

Contributions from CIFT

Central Institute of Fisheries Technology (CIFT), Cochin under the NAIP sub project "A value chain on oceanic tuna fisheries in Lakshadweep sea" procured a pulsed light preservation machine (RC-847). Extensive work was done on standardization and studies are being conducted on shelf life extension of chilled fish.

Some of the salient achievements

Pulsed light treatment done on Pearlspot (*Etroplus suratensis*) for 12 sec. with a total energy of 25 J/cm^2 showed a bacterial reduction of 2.6 log cfu/ml. The biochemical and sensory parameters were superior for pulsed treated samples. The storage study indicated a shelf life extension of six days for pulsed treated Pearlspot fillets when compared to control.

Pulse treatment was done in Yellowfin tuna (*Thunnus albacares*) steaks packed in 12µ polyester/300 gauge low-density polyethylene laminate, 300 gauge polyethylene and 300 gauge cast polypropylene respectively. Cast polypropylene was found to give maximum bacterial reduction. Yellowfin tuna steaks were packed in cast polypropylene pouches and pulsed treatment for different time duration were given. Pulse treatment for 6 sec. with an energy output of 11.5 J/cm^2 with a bacterial reduction of 1.83 log cfu/g was found to be acceptable microbiologically and with regard to sensory attributes.

Yellowfin tuna steaks were dip treated in 2% sodium acetate, 2% potassium sorbate and a combination of 2% sodium acetate-potassium sorbate solution. Samples were packed in 300 gauge cast polypropylene pouches and pulsed for 6 sec. The textural properties were better for pulsed light treated samples. The sensory and L*a*b* colour values of tuna steaks of pulse treated samples were better than dip and pulsed treated combinations. Shelf life extension of 13 days for pulsed treated and pulsed-dip combinations was obtained. However organoleptically the pulse treated samples were rated superior.

Conclusion

The research data available in the scientific literature clearly demonstrate the potential of pulsed light technology to inactivate pathogenic and spoilage microorganisms in food products or in food-contact materials. It remains one of the least-studied emerging technologies and much work still needs to be done in this area. Besides microbial-inactivation studies, systematic work is also necessary to investigate the impact of pulsed-light treatments on the nutritional and sensory properties of the treated foods. A detailed study on the effect of pulsed light for shelf life extension is not available at present. Studies done in fish are very little and thus a detailed work on fish preservation with pulsed light treatment is necessary. There is a need for optimizing the critical process factors to achieve the target inactivation level for specific food applications without affecting quality. Pulsed light equipment with good penetration and short treatment times need to be designed for commercial purposes. In addition, the applicability of pulsed light treatments on an industrial scale needs to be compared with other non-thermal or conventional thermal processes.

Dr. T.K. Srinivasa Gopal, Dr. J. Bindu, Dr. Toms C. Joseph[#], Shri T.R. Ananthanarayanan and Shri C.T. Nitin

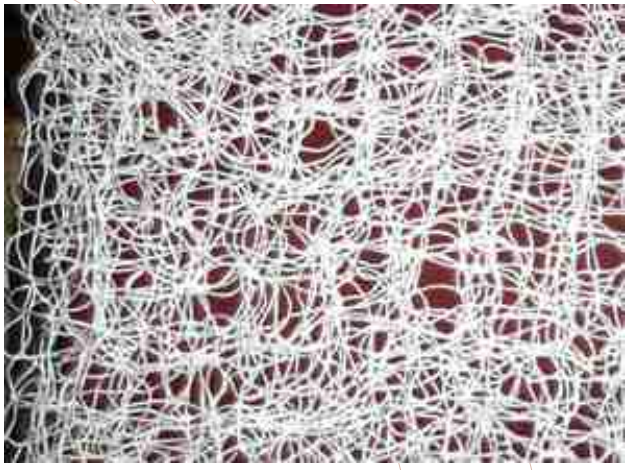
Fish Processing Division, CIFT, Cochin

[#]Microbiology, Fermentation and Biotechnology Division, CIFT, Cochin

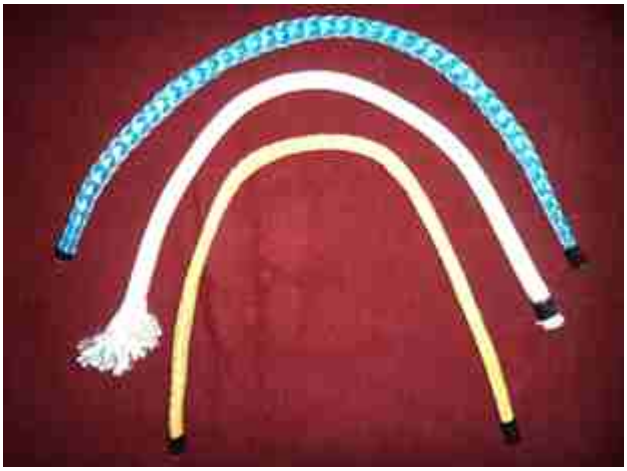
UHMWPE - The Strongest Fibre Enters the Fisheries Sector of India

The introduction of synthetic fibres has greatly influenced the efficiency and durability of fishing gear and also eased out the physical strain on the fishermen. In India, till 1950s, the basic materials used for fishing gear fabrication were natural fibres such as cotton, sisal and hemp for the webbing; and coir and jute for the ropes. By 1950s polyamide (PA) multifilament was introduced followed by high density polyethylene (PE) twisted monofilament and PA monofilament. Rope material was replaced by PE and polypropylene (PP).

In the fishing industry elsewhere, aramid fibres like Kevlar was a later introduction while the latest introduction to this sector is the ultra high molecular weight polyethylene (UHMWPE) fibres, also termed as high modulus polyethylene (HMPE) or high performance polyethylene (HPPE). The UHMWPE fibres made its impact on operation of purse seines, trawl nets and cages in the waters of New Zealand, Australia and North America (Anon, 2009a; Anon, 2009b). However, in the Indian fishing and culture industry, it is yet to be tested and proved for its suitability.



UHMWPE webbing



UHMWPE rope

UHMWPE fiber

UHMWPE is a type of polyolefin synthesized from monomer of ethylene. The fibre made by gel spinning has a high degree of molecular orientation resulting in very high tensile strength. The fibre is made up of extremely long chains of polyethylene, which attain a parallel orientation greater than 95% and a level of crystallinity of up to 85%. The extremely long chains have molecular weight usually between 3.1 and 5.7 million while HDPE molecule has only 700 to 1800 monomer units per molecule.

The material is produced by two different companies in two different brands *viz.*, Dyneema and Spectra. It was originally invented by DSM in the brand name Dyneema (Royal DSM N.V., The Netherlands) in 1974 and produced commercially in 1990. Spectra produced by Honeywell under a license from DSM, is chemically identical to Dyneema. Dyneema fibres produced in commercial grades, Dyneema SK60 and SK75 are specially designed for ropes, cordage, fisheries and textile applications. These fibres can be made into microfilament braided twine of minute diameter. Netting of single knot, double knot and knotless *viz*., raschel can be made with UHMWPE fibres.

The material is 15 times stronger than steel (on a w/w basis) and up to 40% stronger than Kevlar which is an aramid fibre. The material has high strength, low density, no water absorption capacity, low elongation at break, high abrasion resistance, high resistance to UV radiation and high resistance to degradation by micro organisms and to most chemicals except oxidizing acids. Dyneema is considered as the strongest fibre in the world. A comparison of some important properties of PA, PE, PP and Dyneema SK75 is given in Table 1.

UHMWPE fibre offer applications in various fields such as fisheries, automobile and aircraft manufacturing, personal protection, *viz*., in the manufacture of helmets,

Table 1. Comparative properties of synthetic fibres

Chemical/physical characteristics	Fibre					
	PA 6	PA 6,6	PES	PP	PE	Dyneema SK75
Tenacity (g/den)	9	9	9	7	5	40
Elongation at break (%)	23	20	14	18	20	3.5
UV rays resistance	Medium	Weak	Medium	Medium	Medium	Good
Specific weight	1.14	1.14	1.38	0.91	0.97	0.97
Melting point (°C)	215-220	255-260	250-260	160-175	125-135	144-152
Resistance to alkalis	Good	Good	Weak	Good	Good	Good
Acid resistance	Weak	Weak	Good	Good	Good	Good
Moisture absorption (%)	3.5-4.5	3.4-4.5	0.2-0.5	0	0	0

(Source: Badinotti, 2011)

vests, ballistic shields and cut-resistant gloves. In the medical field it is successful as surgical sutures and implants for total joint replacement *viz*., hip, knee and spine implants. It is also used for safety nets and cargo nets used in the construction and transport sector.

Commercial fisheries

The present day mechanized fishing operations are highly energy intensive and they exploit the limited reserve of the non-renewable fossil fuel. The mechanized and motorized fishing fleet of India has been estimated to consume about 1220 million litres of fuel annually (Boopendranath, 2006). In a typical bottom trawler, nearly 60% of the total drag is contributed by the netting (Wileman, 1984). The most important property of UHMWPE fibre is the requirement of a thinner material compared to PA and HDPE, thus developing less drag resulting in fuel efficiency. Due to the light weight property with minimum drag in the water, the material helps fishers to reduce fuel costs by 40%. New Zealand fishermen reported an average savings of one tonne of fuel per day while using twin-rig trawls made with Dyneema (Anon, 2009a). The trawls incorporating Dyneema products showed excellent geometric characteristics and a considerably reduced hydrodynamic drag (Sendlak, 2001). Sala *et al*. (2008) demonstrated that the replacement of knotless PA netting by Dyneema knotted netting in the wing portion along with use of larger meshes and reshaped wings in a demersal trawl for the Mediterranean fisheries resulted in 30% less fuel consumption and up to 40% more headline height, while assuming that fuel spent in trawling activities is 80% of the total fuel costs and 50% of the total expenses on a fishing trip as reported by Wileman (1984). The savings from the use of a demersal trawl incorporated with Dyneema netting in the wing portion replacing knotless nylon netting is 3% of the total spending costs. In addition to drag reduction, the trawls made with UHMWPE fibres especially in the codend maintain their shape and facilitate better filtering, reducing bycatch.

In purse seines, the use of UHMWPE facilitate faster sinking due to better filtering and reduced drag. Faster sinking reduce the chances of escape of the fish shoal. Nylon netting lose about 10-20% of its dry knot strength on immersion in water while UHMWPE netting do not absorb water. As there is no shrinkage due to wetting, the mesh size and shape are maintained during the operation. The netting twines made with Dyneema fibre can be reduced by up to a factor of 2 on thickness (diameter) basis and by a factor of 4 on weight basis.

UHMWPE is three times stronger than nylon of equal dimension and its abrasion resistance is also very good. Hence, the durability of the net is very high. Nylon purse seines lasts for about 2-3 years while UHMWPE netting ensures 2-3 times more life for the net. The Dyneema netting is very resistant to abrasion, tearing and cutting. Hemmingsson *et. al.* (2008) reported a seal-safe trap-net made of Dyneema netting in the pontoon trap fisheries along the Swedish Baltic coast. The high resistance of the material to fish bite can be pursued to prevent the damage to the netting by puffer fish prevalent in the coastal waters of India. UHMWPE ropes can be used in trawling to substitute wire ropes which helps in weight reduction and drag reduction and in fuel saving. A comparison of the properties of different synthetic fibre ropes is given in Table 2.

The Dyneema ropes were successful as warps,

Table 2. Properties of synthetic fibre ropes of 14 mm diameter

Properties	PA	PE	PES	PP	Dyneema
Breaking strength (kN)	31 (Very good)	23 (Good)	31 (Very good)	32 (Very good)	212 (Excellent)
Strength (g/den)	3.41 (Good)	2.72 (Not good)	2.36 (Poor)	4.49 (Very good)	17.40 (Excellent)
Elongation (%)	25 (Excellent)	16 (Good)	19 (Very good)	10 (Not good)	4 (Poor)
Elasticity (%)	19 (Good)	31 (Not good)	24 (Not good)	63 (Poor)	12 (Very good)
Resistance to abrasion (% loss in breaking strength)	19 (Good)	31 (Not good)	24 (Not good)	63 (Poor)	12 (Very good)
Length changes in water	Yes	No	No	No	No

Source: Ramose (1999)

replacing the steel warps used in large mesh pelagic trawls (Sendlak *et al*., 2001). By using UHMWPE ropes, the frequent oiling and greasing required for wire ropes can be avoided which would facilitate a clean and safe deck. It also helps in a clean catch devoid of oil and grease contamination. From the safety point of view, if UHMWPE rope breaks there won't be any backlash unlike in steel wire rope in which the backlash on snapping can be fatal. Since this material is unaffected by seawater, it lasts above 4-5 years against one year of wire rope (S.V. Raut, Personnel communication). Mending and repair of PA and PE nets during fishing often consume a lot of time and money, besides losing fishing days. As the new material is strong and abrasion resistant, the damage during fishing would be minimum.

The light weight property of the material facilitates more netting for same weight, and require less storage space onboard. The very high cost of the material is a disadvantage. However, more webbing for the same weight nullifies the increased cost, besides better durability, lower maintenance and fuel saving.

Recreational fisheries

The fibres are highly resistant to water with no elongation. It floats in water and is highly resistant to UV light, besides having very good abrasion resistance. These properties make the material ideal for recreational fishing *viz*., rod and reel fishing substituting nylon monofilament yarn. However, compared to nylon monofilament UHMWPE twine cuts deeper into the body of the fish making deep injury giving less chances of survival of the released catch (Barco *et al*., 2010).

Application in aquaculture

UHMWPE also finds good application in the aquaculture sector as a cage netting material due to the low diameter, favourable weight/strength ratio, low elongation and Nil shrinkage in water which helps the mesh size to remain stable during normal use of the netting. The high resistance of UHMWPE nets to UV light and abrasion make the nets last longer. Its strength allows the use of twines with smaller diameter aiding in use of larger cages without additional weight. With less outer surface for fouling to grow, the fouling growth would be less and the antifouling costs can be reduced by up to 50%. Annual maintenance cost is less and the nets are easier to handle.

On a weight-to-weight basis, cages made with Dyneema netting weighs only up to a third of the weight of a cage made of nylon twine, thus helping in reduced drag. On a comparative basis, cages made with Dyneema and nylon exposed to a current having a speed of 0.7 m/s, the residual volume was 54 and 34% respectively (Source: DSM Dyneema). As the twines are thinner, it improves water flow through the meshes resulting in a better exchange of nutrients and the filtering out of excreta making a cleaner and healthier environment for the fishes inside the cage. The improved water flow also helps in a reduced drag, thereby improving net stability. The material resists fish bites when farming biting fish species like cod, sea-bream etc. and also prevents attack of predators.

Studies conducted in India

Though this material has made its impact in the fishing and culture sectors elsewhere in the world, in the Indian fishing and aquaculture sector, it is yet to be tested and proved for its suitability. The material in the form of netting and rope is manufactured in India by Garware Wall Ropes Ltd, Pune under the trade name 'Plateena' with the raw material supplied by DSM, Netherlands.

The only report from Indian waters on the use of 'Plateena' rope as warp lines is on a trawler based at Visakhapatnam. It was reported to have resisted stormy weather for eight hours without any damage during the trials in 2011 when the net become stuck on the seabed (Anon, 2012).

Though the material is claimed to have many advantages, the very high cost involved is a major disadvantage. Hence, its feasibility in the Indian context as well as its performance need to be investigated and standardized. The Central Institute of Fisheries Technology, Cochin has taken up the initiative of testing the suitability of UHMWPE netting and ropes in the Indian context in collaboration with DSM, India and Garware Wall Ropes Ltd., Pune. The work is proposed under the project on "Green Fishing Systems for Tropical Seas" under the National Fund for Basic, Strategic and Frontier Application Research in Agriculture (NFBSFARA).

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Dr. Saly N. Thomas and Dr. Leela Edwin
Fishing Technology Division, CIFT, Cochin

Hydroxyapatite from Fish Processing Waste

Hydroxyapatite is seen embedded in the organic matrix of collagen, normally associated with the natural materials such as bones and fish scales. The percentage of hydroxyapatite in fish scales and bones ranges from 40 to 45 (wt%). Hydroxyapatite and calcium phosphate based materials have attracted considerable interest in the field of tissue engineering and hydroxyapatite from fish scale provides an abundant source for novel bone and cartilage replacement. It is one of the few materials, classified as a bioactive natural material that supports bone in growth and integration and hence, popularly known as the 'second generation calcium supplement'. Carbonated calcium-deficient hydroxyapatite is the main mineral of which the dental enamel and dentin of animals and human beings are comprised. The Fish Processing Division of CIFT, Cochin has developed and standardized a novel low cost method for preparing hydroxyapatite from fish processing waste. The work was also been extended to validate the suitability of the prepared hydroxyapatite for various industrial and biomedical applications.

Preparation of hydroxyapatite from fish scale

Hydroxyapatite was prepared from fish scale by a heat treatment method at different combinations of temperatures and durations based on a statistically validated model. The final product was further characterized by FT-IR spectroscopy, X-ray diffraction, scanning electron microscopy and high resolution UV-VIS spectroscopy.

FT-IR spectroscopy

The FT-IR spectrum of hydroxyapatite was used to identify the functional groups on apatite that could be responsible for its active properties. FT-IR spectra of hydroxyapatite prepared at different time-temperature combinations indicated major peaks of phosphate and hydroxide bands at various intensities and a minor peak of carbonate group.

Scanning Electron Microscopy (SEM)

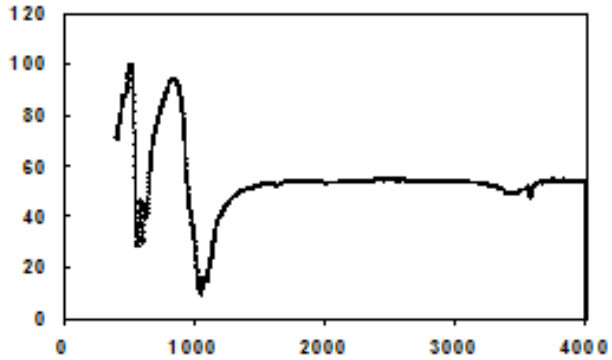
SEM images of hydroxyapatite heated at various temperatures showed crystalline particles with interconnected granular network pattern. Hydroxyapatite particle heated at higher temperatures yielded larger particles with lower impurities.

X-ray diffraction pattern

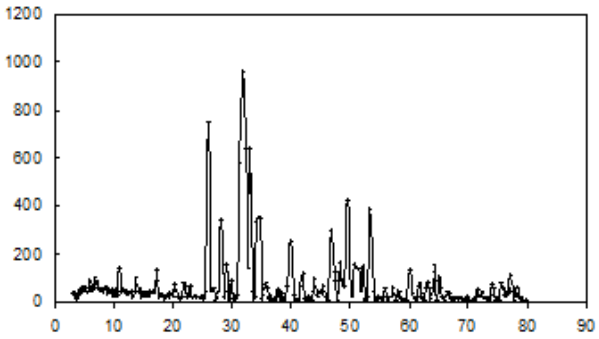
X-ray diffraction patterns of hydroxyapatite particles showed a gradual increase in the degree of sharpness of peaks with increasing temperature, indicating the formation of more crystalline particles at higher temperatures.

UV-VIS absorption spectra

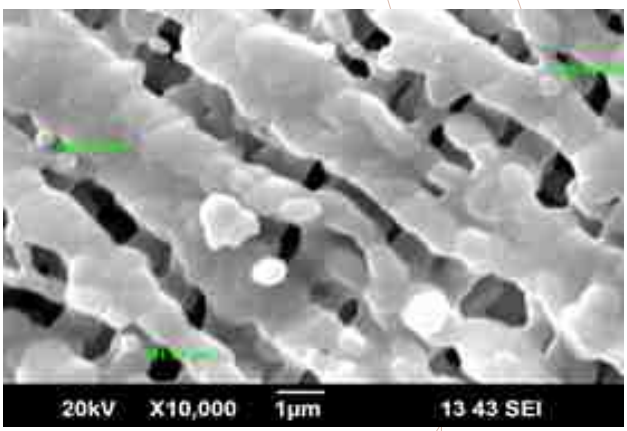
The UV-VIS spectra of apatite heated at different temperatures clearly indicated the escapement of organic matter as well as higher absorption intensity between 600-700 nm wavelength ranges, confirming the homogeneity of apatite crystals.



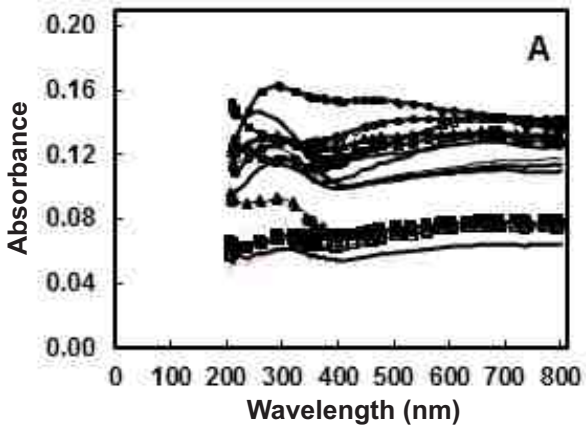
FT-IR spectra of hydroxyapatite crystals from rohu scale



X-ray diffraction pattern of hydroxyapatite crystals from rohu scale



SEM image of hydroxyapatite crystals from rohu scale



UV-VIS spectra of hydroxyapatite crystals heated at different temperatures

The study primarily emphasize on the development of an environment-friendly and profitable option for the utilization of fish processing waste by converting it into a high value product. The enormous potentials of utilization of hydroxyapatite as bio-adsorbants for the removal of heavy metal, recovery of proteinaceous solids and carotenoid pigments from industrial wastes are under the purview of study.

Dr. P.K. Binsi*, Dr. A.A. Zynudheen, Dr. George Ninan, Dr. P. Muhamed Ashraf[#] and Dr. C.N. Ravishankar
Fish Processing Division, CIFT, Cochin
*Mumbai Research Centre of CIFT
[#]Fishing Technology Division, CIFT, Cochin

Fish Processing Waste as a Secondary Raw Material for High Value Products

Fish processing operation generates wastes in the form of head, viscera, skin, bones, scales and entrails. It is estimated that industrial fish processing yields only 40% edible portions and remaining 60% is considered as waste which cannot be directly used for human consumption; the waste generated in the factory is seldom attended and creates environmental pollution problems like, off-smell, proliferation of insets and pests and other microbes. Moreover, it results in loss of huge quantity of nutrients. Annual discards from world fisheries including byproducts is approximately 30 million tonnes (25%) per year. In India, the industrial fish processing generate 3,02,750 tonnes of waste. Among the maritime states, maximum waste generation was observed in Gujarat (30.51%) followed by Maharashtra (23%) and Kerala (17.5%). An important waste reduction strategy for the industry is the recovery of marketable byproducts from fish wastes. The three most common methods for utilization of aquatic waste (either

from aquaculture or wild stock) are the manufacture of fishmeal/oil, the production of silage and the use of waste in the manufacture of organic fertilizer. High value end products for pharmaceutical and nutraceutical applications can be derived from fishery waste. Different products like chitin, chitosan, glucosamine hydrochloride, fish maws/ isinglass, squalene, fish calcium, collagen and its derivatives are being produced for various applications. The utilization of byproducts can potentially generate additional revenue as well as reduce disposal costs for these materials.

Fish processing waste is now considered as a secondary raw material for the development of various functional foods and nutraceuticals. Information on the biochemical and nutritional aspects of this secondary raw material will pave the way for better utilization and technological development. Thread fin bream (*Nemipterus japanicus*) and Croaker (*Johnius* sp.) are the two species which are commercially used as raw material for the surimi industry in India. Huge quantity of waste is generated during surimi processing from these species. The suitability of this processing waste as a secondary raw material has been investigated. For the present study fresh quality fish in early post rigor stage was collected from the local markets and dressed by removing inedible parts which was collected separately for analysis. The processing waste mainly consisted of head and viscera which accounted for 37-39% of the total biomass (Table 1). The differences in the waste percentage is depending on the size, season and feeding habit of the fish (Table 2).

Processing waste from different parts of Pink perch and croaker has been studied for the proximate composition and quality characteristics (Table 3). Moisture content of viscera was found to be high in both the species when compared to head which could be mainly due to the presence of soft tissues and visceral juice. The crude protein content of the samples varied from 13-21% with the highest percentage in swim bladder of Croaker. The ash content of

Table 1. Waste generation in industrial fish processing in India*

Products	Waste generated (%)
Shrimp products	50
Fish fillets	70
Fish steaks	30
Whole and gutted fish	10
Cuttlefish rings	50
Cuttlefish whole	30
Cuttlefish fillets	50
Squid whole cleaned	20
Squid tubes	50
Squid rings	55

** Assessment of Harvest and Post Harvest Losses in Marine Fisheries (2005), CIFT Publication, CIFT, Cochin.122p*

head was high when compared to other parts due to the presence of bone content. The study also showed that in both the species, the fat content was high in head waste, which need to be characterised for the presence of phospholipids for potential recovery.

Biochemical analysis of the samples have indicated that the spoilage indices *viz*., TMA, TVBN and FFA were low indicating the freshness of the samples. However peroxide value of the visceral portions in both the species were high.

The secondary raw materials obtained from processing of Thread fin bream and Croaker has the potential of good quality raw material for the production of high value products. However, the quantity of the processing waste is to be ensured by collection, segregation and proper preservation in very fresh condition in order to extract the intended products with desired quality attributes. This is particularly important in the case of extraction of enzymes, peptides and ω-3 poly unsaturated fatty acids. HACCP concept should be extended to the collection and processing of waste. Further studies on characterization of peptides and lipids from the secondary raw material is a priority area.

Table 2. Waste percentage in *Johnius* and *Nemipterus*

Physical characteristics and yield	*Johnius* sp.	*Nemipterus japanicus*
Average length (cm)	19.06	21.06
Average weight (g)	59.4	86.0
Head waste (%)	30.77	31.63
Viscera (%)	7.04*	8.25

**Includes swim bladder (3.04%)*

Table 3. Proximate composition of processing waste

	Johnius sp.			*Nemipterus japanicus*		
	Head	**Viscera**	**Swim bladder**	**Head**	**Viscera**	**Others***
Moisture (%)	75.87	81.15	73.73	73.85	78.00	76.76
Crude Protein (%)	15.20	13.16	21.04	13.75	13.20	13.36
Crude Fat (%)	4.09	2.47	2.51	5.84	3.028	3.61
Ash (%)	6.26	1.18	0.71	7.22	6.38	6.24
NPN (g/100g)	0.015	0.02	0.02	0.055	0.05	0.02
TMA (mgN/100g)	5.54	6.98	12.55	7.60	8.33	4.89
TVBN (mgN/100g)	9.70	2.79	11.16	6.91	ND	13.29
FFA (mg% oleic acid)	0.01	0.02	0.01	0.01	0.03	0.01
pH	7.0	6.53	6.15	7.25	6.81	7.06
PV (milieq O_2/kg fat)	12.67	63.49	1.14	7.47	89.44	11.30
TBARS (mg%/100g)	39.80	9.79	35.00	55.71	4.39	17.34

** include the skin, bone and scales and meat has been separated by meat bone separator*

Smt. V. Renuka*, Smt. A. Jeyakumari, Dr. A.A. Zynudheen, Dr. George Ninan and Dr. C.N. Ravishankar
Fish Processing Division, CIFT, Cochin
*Veraval Research Centre of CIFT

Application of Data Envelopment Analysis (DEA) for Determining Economic Efficiency of Ring Seiners Operated off Munambam Coast of Kerala

Data Envelopment Analysis (DEA) is an optimization technique being widely used for measuring efficiency of individual decision making units (DMU). An attempt was made to use DEA for studying the economic efficiency of ring seiners operating off the coast of Munamabam in Ernakulam district of Kerala. DEA is a non-parametric method of measuring the efficiency of Decision Making Units (DMU). In DEA the efficiency is worked out with reference to a particular group (or sample). The DEA relies on building a best possible production function from the inputs and outputs of the particular group (Ramanathan, 2003). The technical efficiency is the maximum output that can be obtained from the given level of physical inputs. In DEA this is with reference to the group and here the technical efficiency is the possible way the given inputs (craft, gear, crew, fuel etc.) is converted into outputs relative to the best DMU in the group. The best unit (DMU) will be operating at the maximum (100%) technical efficiency with reference to the group. DEA has been widely used in assessment of productivity in sectors like transportation.

The ring seiners sampled is the group in this particular study. The technical efficiency is the maximum output that can be obtained from the given level of physical inputs. In the study the given inputs is converted into outputs relative to the best DMU in the group and is considered for computation and comparison of technical efficiency. Here this set of inputs are required or are considered significant for production. The best unit will be operating at 100% technical efficiency and the DMU with less technical efficiency will be working at percentages below 100. The costs of inputs do not play any part in technical efficiency and this is factored in the allocative efficiency. Allocative efficiency is related to the cost of inputs in relation to the output, and equilibrium where marginal cost is equal to average revenue. A DMU allocative efficiency is with regard to the allocation of inputs *vis a vis* its price for a given level of output, so as to minimize the costs of production. Also expressed in percentages, the higher the percentage the better is the cost minimization with respect to the particular DMU. Cost efficiency refers to the product of technical and allocative

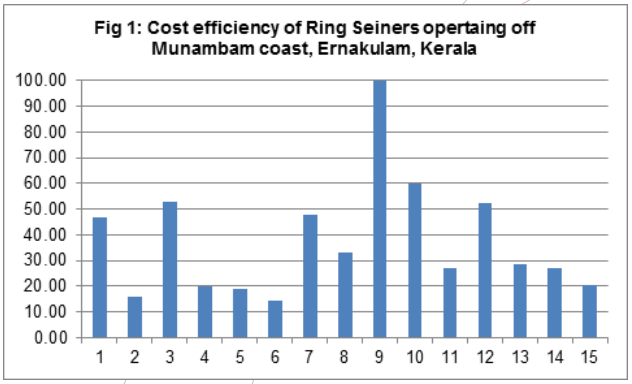
Table 1. Technical and allocative efficiency of ring seiners operating off Munambam coast, Ernkaulam, Kerala

DMU's	Technical Efficiency	Allocative Efficiency
1	1.00	0.47
2	0.26	0.61
3	1.00	0.53
4	0.80	0.25
5	0.28	0.68
6	0.17	0.86
7	0.52	0.92
8	0.37	0.90
9	1.00	1.00
10	0.74	0.81
11	0.30	0.90
12	0.53	0.99
13	0.35	0.81
14	0.36	0.75
15	0.22	0.92
Overall	**0.53**	**0.76**

efficiencies, expressed as percentage.

Data collected during a period July 2009 to June 2012 from 15 individual ring seines operating off Munambam fishing harbor were used for the analysis. Each of the 15 crafts was considered as one DMU. A set of repeated observations over the period of study for the 15 fishing crafts (ring seiners) was taken for the analysis. The quantity of fish catch was taken as the output variable and the input variables were craft (length in feet), fuel (litres), crew (number) and number of trips. For cost efficiency the costs of the inputs have been taken into account. The crafts were all in the size class 60-78 feet, fitted with inboard engines. The average crew size was 45. The group was fairly homogeneous as far as the method and area of operation was concerned.

The model selected for the study was input oriented constant return to scale model (Coelli, 2008) as the output, i.e., quantity of fish catch cannot be controlled. On the basis of data collected over a period of time, the attempt in the study was to minimize the inputs for achieving the level of catch. The production frontier in the DEA approach is



constructed using linear programming methods. The term "envelopment" is derived from the production frontier that envelops the set of observations. For each DMU the given inputs and output are taken into account and the value of the efficiency score for the i^{th} DMU is arrived at (the value being ≤ 1, with a value of 1 indicating a point on the frontier and hence a technically efficient DMU.

The analysis revealed that the overall technical efficiency of ring seiners operating in Munambam was 52.6% (Table 1). This indicates that the craft were operating at almost 50% inefficiency that can be attributed to technical factors and the crafts are using comparatively more inputs than necessary which includes the size of the craft, crew, fuel etc. in relation to the quantity of catch (production). The technical efficiency of individual DMUs ranged from 17% to 100%. Allocative efficiency is with regard to the allocation of inputs *vis a vis* its price, so as to minimize the costs of production, and it was 76.0% overall, with individual efficiencies ranging from 25% to 100%. The cost efficiency ranged from 14.62% to 100% for individual DMUs (Fig. 1).

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Coelli, Tim, (2008) - A Guide to DEAP Version 2.1: A Data Envelopment Analysis (Computer) Program (available at_htt;://www.owlnet.rice.edu/~econ380/DEAP.PDF)

Ramanathan, R. (2003) - An Introduction to Data Envelopment Analysis: A Tool for Performance Measurement, Sage Publications India Pvt. Ltd., New Delhi

***Shri V. Chandrasekar and Dr. Nikita Gopal**
Extension, Information & Statistics Division,CIFT, Cochin
*Veraval Research Centre of CIFT

Expression Profiling of Salt Responsive Genes in *Mangrovibacter* spp. by Prokaryotic Suppression Subtractive Hybridization

Mangrovibacter spp. is a facultative anaerobic, nitrogen-fixing bacterium which belongs to Enterobacteriaceae family, usually associated with the rhizosphere of mangrove-associated plants. So far only one species, *Mangrovibacter plantisponsor* having potential plant-beneficial properties was described (Ramesh *et al.,* 2009). Mangrove ecosystem is a bridge between terrestrial and marine ecosystem and harbours unique microbial diversity including salinity tolerant bacteria and is expected to contribute towards long-term goal of improving plant microbe interactions for salinity affected fields. In order to survive and adapt to salinity stress, bacteria modulate various responses based on the stress signals which includes physiological adaptations, alterations in gene expression and production of protective enzymes and metabolites. Bacteria offer an excellent model system for understanding the biochemistry and molecular genetics of osmoregulation.

To understand the physiological and molecular mechanisms of bacterial tolerance to salinity stress, genes that respond to salt stress were identified and characterized. Identification of salt tolerance genes using Prokaryotic Suppression Subtractive Hybridization (SSH) approach is expected to reveal new salt tolerance mechanisms of bacteria. This is the first report on Prokaryotic Suppression Subtractive hybridization for differential gene expression in *Mangrovibacter* spp. with reference to salt stress.

The salt tolerance of *Mangrovibacter* cells were analyzed by bacterial growth curve analysis under different salt concentrations (0.5% - 10%) and it showed an extended and well defined lag phase at 5.5% (Fig 1).

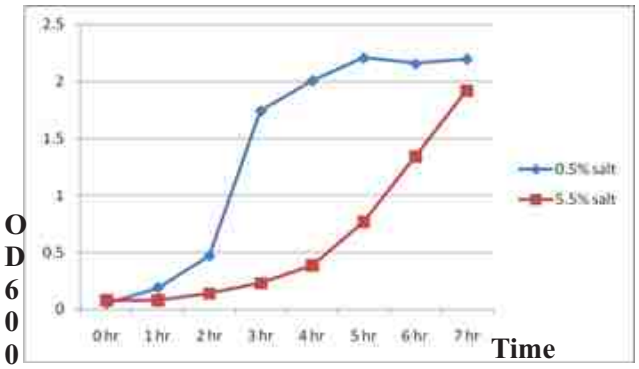

Fig1. Growth curve analysis of Mangrovibacter spp. under salt-stressed and normal conditions

In an attempt to exploit the salt responsive ESTs from *Mangrovibacter* spp., cDNA SHH library was constructed from these bacteria grown under normal (0.5%) and salt stressed (5.5%) conditions and obtained 160 clones which resulted in 37 uni-ESTs that comprised of 25 contigs and 12 singletons, most of which directly or indirectly involving in salt stress.

The genes that were identified as up-regulated in salt stress were further validated by quantitative real-time RT-PCR analysis. This was done to confirm the expression profiles of the genes by an independent method and to get additional quantitative information regarding the expression of these genes in both salt-stressed and normal conditions. Genes identified by SSH were upregulated from ~2.3 to ~31.63- fold at 5.5% salt condition (Fig 2).

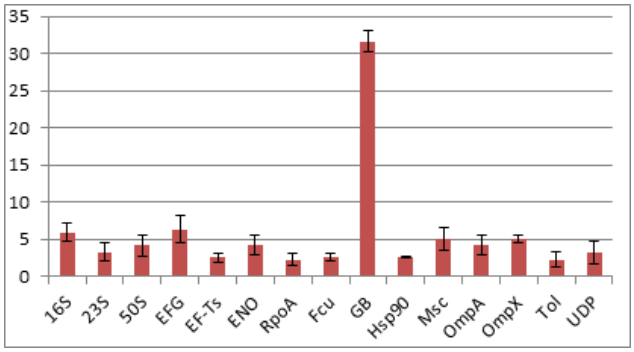

Fig 2. Fold change increase of target and reference gene expression between salt stressed and normal conditions in Mangrovibacter spp. by RT-qPCR analysis

Glycine betaine/L-proline transport ATP binding subunit (ProV) gene showed the highest up-regulation (~31.63 fold) in RT-qPCR analysis and expected that, this transport system has a major role in *Mangrovibacter* spp. at salt-stressed conditions (Fig 2). This transport system belongs to the larger ATP-Binding Cassette (ABC) transporter superfamily. The characteristic feature of this transporters is the obligatory coupling of ATP hydrolysis to substrate translocation. Bacteria recruit this transport system to accumulate glycine betaine and other solutes which offer osmoprotection during salt stress.

Fold changes in the level of expression of the outer membrane protein A and outer membrane protein X were ~4.26 and ~5.12 respectively at 5.5% salt condition. OmpA associated with the peptidoglycan layer plays a vital structural role and contribute the outer membrane stability and retains the rod shape of the cell. OmpA also functions as a biologically active pore to protect from osmotic stress. OmpX represents the smallest known channel protein. OmpX expression is inducible under high osmolarity,

which is accompanied by the repressed expressions of OmpF and OmpC. The over-expression of OmpX can balance the decreased expression of non-specific porins (OmpF and OmpC), for the exclusion of small harmful molecules.

Mechano-sensitive channel (MscS) appeared to be up-regulated (~5.08 fold) at salt stress; ion channels gated by mechanical stimuli are found in bacteria, animals, and plants, and are proposed to mediate the perception of osmotic stress. In prokaryotes, mechano-sensitive channel of small conductance (MscS) and mechano-sensitive channel of large conductance (MscL) from *Escherichia coli* are often described as "osmotic safety valves", as they are redundantly required for cell survival of extreme hypo-osmotic shock.

Prokaryotic suppression subtractive hybridization is an efficient molecular biology tool for isolating rare and abundant genes which are differentially expressed under specific conditions and potentially yielding a more diverse gene pool without any prior sequence information and genetics of the bacteria. Further studies on the novel genes identified in this study will help in exploring the unique mechanism of bacterial salt tolerance. These genes have potential applications in generating salt tolerant recombinant bacteria or transgenic plants.

Dr. Toms C. Joseph, Kum. Anju Baby and Dr. K.V. Lalitha
Microbiology, Fermentation & Biotechnology Division, CIFT, Cochin

Synthesis of Succinyl Chitosan and Preparation of Wound Healing Gel

Chitin and chitosan derivatives have been investigated as polymeric carriers for the optimization of drug delivery in pharmaceutical and nutraceutical fields because of biocompatibility and biodegradability. However chitosan is not soluble in water of neutral pH. This severally limits the application of chitosan. Chemical modification of chitosan may result in water soluble polymers, amphiphilic polymers and hydrogels.

In the present study succinyl group was introduced in chitosan by a simple reaction with succinic anhydride. Different ratio of chitosan to succinic anhydride was tried for optimization of reaction and it was observed that 5:1 ratio gives optimum yield and solubility. To see the effect of molecular weight of chitosan on succinylation studies were carried out for medium and low molecular weight chitosan. Low molecular weight succinyl chitosan showed comparable solubility (1mg/mL). However low molecular weight succinyl chitosan was more hygroscopic. Succinylation of chitosan was confirmed by IR

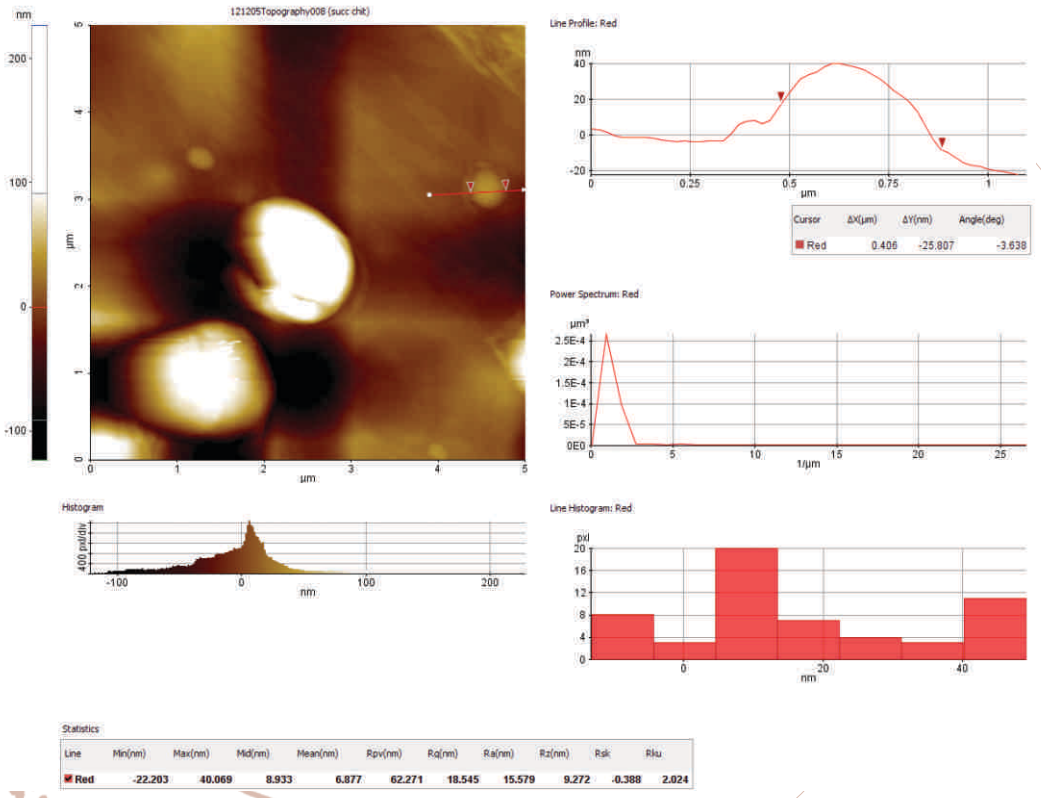

Figure1. AFM image showing a particle size of 405 nm

spectroscopy. Succinyl chitosan in contact with water showed hydrogel like swelling property. It showed a water absorption of >1000% of its dry weight, when kept in contact with water for six hours. Synthesised succinyl chitosan was used for micro/nano encapsulation of curcumin. A process was optimized to prepare encapsulated curcumin micro/nano particles. These particles were characterized using Atomic Force Microscope (AFM) (Figure 1). These particles were directly incorporated into a blend of succinyl chitosan-PEG hydrogel matrix to prepare a hydrogel formulation for wound healing (Figure 2). Two different type of formulations were prepared with different amount of succinyl chitosan, PEG and curcumin.

Figure 2. Succinyl chitosan hydrogel based potent wound healing formulation

These hydrogel formulations are expected to show excellent wound healing capability due to increased bioavailability of curcumin and absorption of wound exudates by succinyl chitosan. Currently an animal study is being carried out to see its wound healing effect

Dr. Niladri Sekhar Chatterjee, Dr. R. Anandan, Dr. K.K. Asha, Dr. Suseela Mathew and Dr. P.T. Lakshmanan
Biochemistry & Nutrition Division, CIFT, Cochin

Publications

Research Papers

1. Dwivedi, R.M., Chaudary Rajeswari, Solanki, H.V., Raman Mini, Matondkar, S.G.P., Madhu, V.R. and Meenakumari, B. (2012) – Study of ecological consequence of the bloom (*Noctiluca miliaris*) in off-shore waters of the northern Arabian sea, *Indian J. Geo Marine Sci.,* **41(4):** 304-313.
2. Muhamed Ashraf, P. and Leela Edwin (2013) – Corrosion behaviour of nano metre sized cerium oxide and titanium oxide incorporated aluminium in NACl solution, *J. Alloys and Compounds,* **548:** 82-88.
3. Muhamed Ashraf, P., Shaju, S.S., Gayathri, D., Minu, P. and Meenakumari, B. (2013) – *In situ* time series estimation of down welling diffuse alternators craft and southern Bay of Bengal, *J. Indian Sci. Remote Sensing*, DOI 10.1007/s 12524-012-0244-1.
4. Sanjoy Das, Lalitha, K.V., Nirmala Thampuran and Surendran, P.K. (2012) – Isolation and characterization of *Listeria monocytogenes* from tropical seafood of Kerala, India, *Ann. Microbiol.,* DOI 10.1007/s13213-012-0566-9

Book

Saly N. Thomas, Leela Edwin, P. Pravin, P. Muhamed Ashraf, M.V. Baiju and V.R. Madhu (Eds.) (2012) – Fish harvesting systems for resource conservation, Winter School Manual, CIFT, Cochin, 349 P.

Chapters in the book on Fish Harvesting Systems for Resource Conservation

1. Baiju, M.V. – Strategies for capacity reduction – Conservation of fishing vessels
2. Leela Edwin – Fisheries management methods and legislation
3. Leela Edwin – Traditional and mechanized fishing vessels of India
4. Leela Edwin – Materials of fishing vessels construction and alternate materials
5. Madhu, V.R. – Selectivity of fishing gears
6. Madhu, V.R. – Application of remote sensing and GIS for fisheries resources management
7. Muhamed Ashraf, P. – Productivity and fishery resource availability
8. Muhamed Ashraf, P. – Environment and fisheries conservation
9. Pravin, P. – Purse seine design and operation strategies for resource conservation
10. Pravin, P. – Lines design and operation strategies for resource conservation
11. Pravin, P. – Traps design and operation strategies for resource conservation

12. Remesan, M.P. – Trawl design and operation strategies for resource conservation
13. Remesan, M.P. – Inland fishing gear and methods: Conservation aspects
14. Saly N. Thomas – Advances in fishing gear materials
15. Saly N. Thomas – Gill net design and operation strategies for resource conservation
16. Saly N. Thomas – Recreational fishing: Status and conservation aspects

Manual

Sanjoy Das and Lalitha, K.V. (2012) - Microbiological and molecular methods of detection of *Listeria monocytogenes* in seafood, CIFT, Cochin

Leaflets

1. Molecular detection of *Listeria monocytogenes* from seafood by Sanjoy Das and K.V. Lalitha
2. Biofilm formation of food-borne bacterial pathogens, possible danger and control strategies by Sanjoy Das and K.V. Lalitha
3. Detection of enterotoxigenic isolates of *Bacillus cereus* by PCR (In Hindi) by Sanjoy Das and K.V. Lalitha

Training Programmes

Cochin

1. Microbiological and molecular methods for the examination of seafoods for commensal and pathogenic bacteria (10 September – 9 October)
2. Microbiological and chemical analysis of water (15-20 October)
3. Laboratory techniques for microbiological examination of seafoods (15-22 October & 17-29 December)
4. HACCP concepts (16-20 October)
5. Processing and packaging of condiment-incorporated dry fish (23 October)
6. Quality evaluation of fish meal and oil (30 October – 2 November)
7. Fish processing and extension methods (12-19 December)
8. Biochemical evaluation of fish and fishery products and microbiological examination of seafoods (26 December, 2012 to 2 January, 2013)

Visakhapatnam

1. Technical skill upgradation under Integrated Coastal Zone Management Project for women Self Help Group members from Ganjam, Chatrapur, Odisha (9-11 October)
2. Technologies in harvest and post harvest fisheries sectors for traditional fishermen youth (10 & 31 October)
3. Gear fabrication, hygienic handling and preparation of value added products (3 November)

Training for women SHG from Odisha

Outreach Programmes

During the quarter the following outreach programmes were conducted by the Institute:

1. Training programme on 'Value added products' for fish farmers at Krishi Vigyan Kendra, Roing, Arunachal Pradesh during 1-3 November, 2012.
2. Training programme on 'Ecofriendly fishing gear' at Ziro, Arunachal Pradesh in collaboration with Department of Fisheries, Arunachal Pradesh during 3-5 November, 2012.
3. Training programme on 'Fish canning' at Yazali, Ranaganadi river site, Arunachal Pradesh in collaboration with the Department of Fisheries, Arunachal Pradesh during 5-7 November, 2012.
4. Training programme on 'Interventions of CIFT technologies for the benefit of Scheduled Tribe fisherfolk,' at Vani Vilasa Sagar, Hiriyur taluk, Chitradurga District, Karnataka during 16-18 November, 2012.
5. Training prgramme on 'Harvest and post harvest technology for exploitation of reservoir fish and preparation of value added fish products' at Doyang reservoir area, Wokha district, Nagaland during 20-24 November, 2012.
6. Training programme on 'Harvest technology for exploitation of reservoir fisheries' for the benefit of about 50 fishermen habituated around the Dumbur reservoir area at Gandachera, Tripura during 24-25 November, 2012.
7. Training prgramme on 'Harvest and post harvest technology for exploitation of reservoir fish and preparation of value added fish products' at Rudrasagar reservoir area, Tripura during 26-28 November, 2012.
8. Training programme on 'Hygienic handling and preparation of value added products from fish' at Amalapuram, A.P. on 5 December, 2012.
9. Training programme on 'Value added products from freshwater fish for employment and income generation' at Ranchi, Jharkhand During 16-19 December, 2012.
10. Training programme on 'Hygienic handling and minimization of post harvest losses' at SIFT, Kakinada on 20 December, 2012.

Dr. U. Sreedhar giving training on Fabrication of multi mesh gill nets at V.V. Sagar

Training on Preparation of value added products at V.V. Sagar

Training at Ranchi, Jharkhand

Training at Doyang, Nagaland

Training on Hygienic handling of fish

Distribution of foldable traps

Participation in Exhibitions

During the quarter the Institute participated in the following exhibitions:

1. Exhibition held in connection with the Seminar on Mountain fisheries: Challenges and opportunities at DCFR, Bhimtal during 5-6 November, 2012.
2. Exhibition organized by Press Information Bureau at Piravom Panchayath during 5-7 November, 2012.
3. 32nd India International Trade Fiar, New Delhi during 14-27 November, 2012.
4. 'Swasraya Bharath – 2012' at Cochin during 30 November to 5 December, 2012.
5. Exhibition held in connection with Global symposium on Aquatic resources for eradicating hunger and malnutrition: Opportunities and challenges at Mangalore during 4-6 December, 2012
6. 'Fish and Food Fest 2012' held at Pathanamthitta during 16-21 December, 2012
7. 'Karshika Mela 2013' held at Thodupuzha during 26 December, 2012 to 5 January, 2013.

Bhimatal

Mangalore

Cochin

Pathanamthitta

National Seminar on Traditional Knowledge and Management Systems in Fisheries

A National Seminar on Traditional Knowledge and Management Systems in Fisheries (FISHFOLK 2012) was organized at CIFT, Cochin during 30-31October, 2012. The Seminar was jointly organized by Society of Fisheries Technologists (India) (SOFTI), Cochin, CIFT, Cochin, Zonal Technology Management Centre (ZTMC), Cochin and Bay of Bengal Programme-Inter Governmental Organization (BOBP-IGO), Chennai. The two day National Seminar featured invited talks from leading researchers and master fishermen in the field, and a Poster session which showcased 25 posters in the areas of Fish Harvesting, Fish Post Harvesting, Aquaculture, Fisheries Management and related sectors.

Professor Anil K. Gupta, Indian Institute of Management, Ahmedabad and Executive Vice Chair of National Innovation Foundation was the Chief Guest of the event. He is also the founder of Honey Bee Network, which is a crucible of like-minded innovators, farmers, scholars, academicians, policy makers, entrepreneurs and non-governmental organizations (NGOs), with its presence in more than 75 countries all over the world. His area of work and research lies in expanding global, national and local space for grassroot inventors and innovators to ensure recognition, and blending excellence in formal and informal science.

First day of the Seminar started with the inaugural session and plenary talk by Prof. Anil K. Gupta. During his talk, Prof. Gupta said that the impact of global climate change is going to affect the coastal communities at the first instance. According to him the age old indigenous traditional knowledge available with the people can help in indicating the climate change and its impact. The 'Akshaya' E-centres in Kerala could be utilized for traditional knowledge dissemination. At the same time, only ethically right, sustainable traditional knowledge needs to be encouraged.

The inaugural session was presided over by Dr. T.K. Srinivasa Gopal, Director, CIFT and President, SOFT(I). Dr. Srinivasa Gopal said that indigenous knowledge system can serve the community on a long term basis. Offering felicitations, Dr. P. Mohanasundaram, Director, MPEDA, Cochin and Guest of Honour of FISHFOLK 2012 opined that through traditional knowledge and wisdom, the fishermen are able to locate fish shoal movements, water currents etc. Dr. Leela Edwin, Convener, FISHFOLK 2012 and Dr. T.V. Sankar, Secretary, SOFT(I) also spoke on the occasion.

Prof. Anil K. Gupta inaugurating the Seminar

Dr. Y.S. Yadava giving the Lead Talk

A view of the poster presentations

Second day of the Seminar opened with the Lead Talk by Dr. Y.S. Yadava, Director, BOBP-IGO, Chennai on 'Mainstreaming traditional knowledge into marine fisheries management'. Shri Julian Teeler, Chief Executive, SIFFS, Thiruvananthapuram spoke on 'The co-management experience of SIFFS.' Dr. K.T. Thomson, Professor, CUSAT, Cochin spoke on 'The relevance of traditional institutional management systems and the debate on the relevance in the modernized and globalized scenario.' Shri Vincent Jain, Chief Executive, Association of Deep Sea Artisanal Fishermen, Thoothoor, spoke on 'Sharing of artisanal deep sea fishing knowledge' and explained the methods of fishing of the artisanal deep sea fishers. Dr. J.B. Rajan, Professor, KILA, Thrissur spoke on 'The factors that prevent utilization of traditional knowledge in modern research.' An account of 'Indigenous technical knowledge in aquaculture' was detailed by Dr. Ganagadhar Barlaya from CIFA, Bhubaneswar.

Winter School on Fish Harvesting Systems

A 21 days Winter School on 'Fish harvesting systems for resource conservation', organized by the Fishing Technology Division of CIFT, Cochin during 20 November to 10 December, 2012 was inaugurated by Dr. E.G. Silas, Former Vice Chancellor, Kerala Agricultural University, Thrissur and Former Director, CMFRI, Cochin on 20 November, 2012. In his inaugural address Dr. Silas said that there is an urgent need for a relook at the harvesting systems in fisheries in the context of sustainable fisheries. Use of under water technologies like Scuba Diving, Remotely Operated Vehicles (ROV) and remote sensing needs to be given importance. Similarly energy conservation in fisheries harvest, implementation of Code of Conduct and Best Practices needs to be given more thrust. The impact of unsustainable fishing pressure, stock decline such as fish famine are to be kept in mind while formulating strategies for sustainable fisheries. The inaugural session of the Winter School was presided over by Dr. T.K. Srinivasa Gopal, Director, CIFT. In his presidential address Dr. Srinivasa Gopal touched upon the efforts taken by CIFT for sustainable and responsible fisheries in the country. Offering the felicitations, Dr. D.K. Gulati, Zonal Director, Fishery Survey of India opined that the problems of fish harvesting needs to be addressed looking at the different perspectives like livelihood options and sustainability. Dr. Gulati also released the Winter School Manual by handing over a copy to Dr. Silas. Earlier Dr. Leela Edwin, Head, Fishing Technology, CIFT welcomed the gathering while Dr. Saly N. Thomas, Director of the Winter School gave a brief introduction about the Winter School. Dr. P. Pravin, Senior Scientist proposed the vote of thanks.

The Winter School concluded on 10 December with a valedictory function. Dr. A. Ramachandran, Registrar, Cochin University of Science and Technology and Director, School of Industrial Fisheries delivered the valedictory address and gave away the certificates to the participants. Dr. T.K. Srinivasa Gopal, Director, CIFT presided over the function. Dr. Leela Edwin, Head, Fishing Technology Division welcomed the gathering. Dr. Saly N. Thomas, Director, Winter School, presented a report on the Winter School. The function came to a close with vote of thanks by Dr. P. Pravin, Senior Scientist, CIFT.

Dr. Srinivasa Gopal in his presidential address pointed

Dr. E.G. Silas inaugurating the Winter School

Dr. A. Ramachandran delivering the valedictory address

out the importance of sustainable harvesting of resources. The necessity of surveillance and monitoring of Indian fishing vessels plying in the Indian EEZ was emphasized by Dr. A. Ramachandran. He remarked that there is no dearth of laws and regulations but lack of proper implementation is the main problem facing our industry. Participants reiterated the need for organizing such programmes in the future, equipping the various stake holders with the latest developments in the sector.

The Winter School was organized for the benefit of 25 participants from across the country comprising of teachers, researchers and subject matter specialists associated with fisheries. The Winter School aimed at providing the participants with the latest information on fish harvesting systems with special emphasis on resource conservation.

Pre-Conference Tutorials held at CIFT, Cochin

In connection with the International Pan Ocean Remote Sensing Conference 2012, a pre-conference tutorial was organized jointly by PORSEC, INCOIS and CIFT during 30 October to 3 November, 2012 at CIFT, Cochin. The pre-conference tutorial was inaugurated by the Dr. T.K. Srinivasa Gopal, Director, CIFT and felicitations were given Dr. S.C. Shenoy, Director, INCOIS and Prof. Jim Gower, President, PORSEC. The tutorials were held in two parallel sessions, one focusing on ocean colour remote sensing and the other on active microwave remote sensing. Thirty one candidates comprising of students, research scholars and scientists from eight countries participated in the five day training. Out of this, 16 candidates attended tutorials on active microwave remote sensing and the other 15 on ocean colour remote sensing.

On the first day of the tutorial Prof. Trevor Platt, Plymouth Laboratory, UK delivered lectures on the basics of ocean colour remote sensing and Dr. Rajkumar, Space Application Centre, Ahmedabad give a detailed outline on Microwave radiometry, active microwave remote sensing and scattering. Later days the classes were separately held for ocean colour remote sensing and microwave remote sensing.

Ocean colour remote sensing

Second day started with the lectures of Prof. Trevor Platt on Primary production modeling and familiarization of satellite data resources and their availability and on Data formats by Prof. Jim Gower. Prof. Gower also demonstrated the retrieval of ocean colour data from Giovanny. A detailed demonstration was done on the retrieval of Ocean Colour Monitor – 2 (OCM 2) from National Remote Sensing Centre, Hyderabad by Dr. K.H. Rao, Principal Scientist, NRSC (ISRO), Hyderabad. Practical sessions were conducted in detail to retrieve satellite data sets through various ocean colour satellites. The lectures on the third day were given by Prof. Trevor Platt and Prof. Shubha Satyendranath on the topics of Primary production modeling, Optical properties of the sea water, Algorithms for ocean colour data processing, Phytoplankton community structure and their optical characteristics. Generation of primary productivity maps using satellite data was presented by Dr. Mini Raman, Scientist, Space Application Centre (ISRO), Ahmedabad. A practical session on OCM-2 data processing using SeaDas by Dr. Nagamani, NRSC (ISRO) was also conducted. On the fourth day a field trip was organized to collect samples for different oceanographic and hydrographic parameters

Inauguration of the Pre-Conference tutorials

Session in progress

and to demonstrate various instruments such as Hyper spectral radiometer, Sun photometer etc. used for satellite remote sensing. The samples collected from the cruise were processed and analyzed using spectrophotometry and fluorometry for chlorophyll a. The participants were familiarized to analyze the Chromophoric Dissolved Organic Matter (CDOM) and chlorophyll specific absorption. On the fifth day the participants were divided into different groups to do mini projects. The participants retrieved satellite data from different places or incidents of interest and presented their work in the evening. The mini projects presented by the groups were of good quality and of excellent standard. The tutorial provided an opportunity for students and young scientists to interact and learn from some of the eminent scientists.

Microwave remote sensing

On the Second day, Prof. Abdrrahim Bentamy, Laboratorie d'Oceanographie Spatiale, France and Dr. Werners Alpers, Centre for Marine and Climate Research, Institute of Oceanography, University of Hamburg, Germany gave lectures on basics of scatterometry, principles of synthetic aperture radar (SAR) etc. A practical session was organized for the retrieval of SAR and scatterometer data from the satellite. Third day lectures were focused on the processing of the scatterometer data using different softwares by Prof. Bentamy and practical classes by Dr. Rakjkumar, Prof. Bentamy and Dr. Rishi Gangwar, SAC (ISRO). The altimeter data processing was demonstrated by Prof. Leonid Mitnik, Russia. During the cruise trip on the fourth day, the groups were demonstrated on how to take the samples using Automatic Weather station (AWS), Conductivity-Temperature Depth meter (CTD) and other oceanographic equipment. The processing of *in situ* data generated during field trip was demonstrated by Dr. Rishi Gangwar and Dr. Rajkumar. On the fifth day the participants were divided into four groups for the mini projects. The mini project results were presented in the evening and it was appreciated by all.

On 3rd November a valedictory function was organized and the Chief Guest of the function was Shri. S. Ananthanarayanan, Director, Naval Physical Oceanography Laboratories (DRDO), Cochin. The felicitation addresses were delivered by Dr. P.T. Lakshmanan, Director In charge, CIFT and Dr. S.C. Shenoy, Director, INCOIS. Feedback was given by the professors and students and they have appreciated about the course content and facilities extended by CIFT. The meeting ended with a vote of thanks by Dr. P. Muhamed Ashraf, Senior Scientist, CIFT and Co Chair of PCT.

Training Programme on Interventions of CIFT Technologies for the Benefit of Scheduled Tribe Fisherfolk

A training programme on "Interventions of CIFT technologies for the benefit of Scheduled Tribe fisherfolk" was conducted by the Visakhapatnam Research Centre of CIFT under the tribal plan component at Vani Vilasa Sagar, Hiriyur taluk, Chitradurga district, Karnataka state during 16-18 November, 2012. The training was conducted at the Office of the Assistant Director, Karnataka Fisheries Department, V.V. Sagar. Fifty tribal fishers participated in the programme. The programme was inaugurated by Shri Safiulla, President, Gram Panchayat, VV Pura. He informed the gathering that it was the first training of this kind being held at V.V. Sagar and thanked CIFT for choosing the area. He requested all the trainees to utilize the opportunity. Dr. U. Sreedhar, Dr. B. Madhusudana Rao, Senior Scientists and Dr. L.N. Murthy, Scientist from CIFT, Shri Srinivas, Asst. Director, Karnataka Fisheries Department, Shri Suresh, President, Fishermen Co-operative Society, VV Pura, Shri Kariyappa, Vice President, VV Pura, Shri Sridhar and Shri Shanta Kumar, Gram Panchayat members, VV Pura addressed the gathering during the inaugural session.

The training was imparted on the various harvesting methods that could be employed in harvesting resources from the reservoir. The tribal people till date were aware of only using monofilament gill and cast nets for harvesting the resources. Training was given in fabricating simple multifilament gill nets set either at bottom, mid-water or surface. Also they were exposed to fabrication of multi mesh gill nets using three different mesh sizes webbings based on the species available in three columns of the reservoir. Till date the predatory fishes and Scampi are not being exploited in the reservoir. For this purpose, hands on training was given in fabricating and setting of foldable traps for exploiting the resources. A few foldable traps were distributed for further use. Training was also imparted on use of troll lines and hook and line for freshwater fishes. Detailed information was disseminated to the tribal folk on various types of baits for use in reservoirs. Inputs such as simple multifilament gill nets (6 Nos.), multifilament multi mesh gill nets (2 Nos.), plastic coated iron meshed foldable traps (12 Nos.), troll lines, hooks and artificial baits were distributed to the trainees.

Shri Safiulla inaugurating the programme

Participants and faculty of the programme

The training session on 'Value added products' comprised of lectures on different methods of fish processing, different types of value added fish products, hygienic handling of fish and importance of packaging. Practical training was imparted to the tribal fisherfolk on preparation of fish pickle using freshwater fish, preparation of prawn pickle, preparation of fish mince employing a meat mincer, preparation of fish pakoda and preparation of fish cutlets. Inputs such as ice boxes (2 Nos.), insulated fish bags (4 Nos.), heat sealing machines (2 Nos.), a meat mincer, and standup pouches were distributed for the benefit of the trainees. Pamphlets in Kannada language on the preparation of fish pickle, fish wafers, fish cutlets and fish balls were prepared and distributed to the trainees. Trilingual (Hindi, English and Kannada) posters on the 'Health benefits of fish' was prepared and displayed at the Office of the Asst. Director, Fisheries Department, V.V. Sagar.

During the concluding valedictory session on 18th November, the trainees gave their feedback. The trainees informed that they were unaware that fish can be converted to so many different value added products and assured that they will try their best to utilize the acquired skills for income generation.

Training Programmes at NEH Region

At Hapoli, Arunachal Pradesh

A training programme on 'Fabrication of improved gillnets and eco-friendly fishing gear' was conducted at Hapoli, Ziro in Lower Subansiri District of Arunachal Pradesh during 3-5 November, 2012. The programme was organized by CIFT, Cochin in association with the Department of Fisheries, Government of Arunachal Pradesh. About 30 fishermen and fish farmers and 15 fishery extension officials from the Department of Fisheries participated in the programme.

The inaugural session held on 3 November, 2012 at Hapoli was presided over by Shri Pani Taram, District Fisheries Development Officer, Lower Subansiri District. Dr. Leela Edwin, Head, Fishing Technology Division, CIFT, Cochin inaugurated the programme. In her inaugural address, she highlighted the objectives/significance of the programme. Dr. J. Charles Jeeva, Scientist, Senior Scale, Extension, Information and Statistics Division gave a brief introduction about the technology transfer programmes being organized in NEH states. Smt. Pani Odyssey, Farm Manager, Regional High Altitude Fish Seed Farm, Tarin-Ziro and Shri Mudang Ranka, Asst. Fishery Officer offered felicitations on the occasion. Shri N.K. Purkayastha, Fishery Officer proposed a vote of thanks.

In the technical session which followed, Dr. Leela Edwin delivered lectures on responsible fisheries, inland fishing methods, craft and gear for inland fishing in India, the ill-effects of destructive fishing methods and the principles of gillnetting. Awareness was created among the participants about the responsible and eco-friendly fishing methods to be followed. Shri P.S. Nobi and Shri Aravind S. Kalangutkar, Technical Officers of CIFT handled hands-on training on fabrication/mounting of improved gillnets. The various technical queries raised by the fishermen trainees were cleared by the resource persons. A video film highlighting the research and extension activities of CIFT was also screened.

Resource persons with a section of the participants

Frontline demonstration of eco-friendly gillnet fishing

The programme was followed by on-site frontline demonstration in the large water bodies/large scale freshwater aquaculture ponds. Presently, harvesting is being done by drying of ponds and collecting fish, and the fishermen/fish farmers were not aware of gillnetting using monofilament materials. The eco-friendly fishing using improved gillnets of nylon monofilament materials were demonstrated and the participants were very much impressed with the catch, and size of the fishes harvested.

This was followed by field visits to aquaculture ponds and large water bodies in the fishing villages of Old Ziro. The perceived technological needs such as FRP canoe for fishing/aqua tourism, improved gillnets, drag nets and cast nets were expressed by the participants and the officials of the Department of Fisheries, Govt. of Arunachal Pradesh. Dr. J. Charles Jeeva from CIFT and Shri Pani Taram, DFDO coordinated the programme.

At Doyang Reservoir, Nagaland

Training cum demonstration programme on Harvest and post harvest technology for exploitation of reservoir fish and preparation of value added fish products was conducted at Doyang reservoir area, Wokha district, Nagaland during 20-24 November, 2012. Major objectives of the programme were:

- To introduce eco-friendly fishing gears and harvesting of fish by scientific methods for the benefit of fisher folk in the Doyang reservoir area.
- To conduct training cum demonstration on hygienic handling of fish and preparation of value added products.

Dr. M.M. Prasad, SIC, Visakhapatnam, Kum. Jesmi Debbarma, Scientist and Shri B.K. Panda, Tech. Officer (T5) of the Visakhapatnam RC of CIFT were involved in conducting the programme and more than 50 fishermen and fisherwomen have been benefited. On this occasion fishing traps (4 Nos.), stick held drag net (1 No.), Gillnets (3 Nos.), Iceboxes (2 Nos.), sealing machines (2 Nos.), insulated fish bags (4 Nos.) and meat mincer (1 No.) were handed over to the beneficiaries. During the programme technical talks on importance of fish as health food, hygienic handling of fish and importance of value added products for sustainable income were given by Dr. M.M. Prasad. Demonstration sessions on fabrication and operation of fishing gears and traps and preparation of value added products namely fish

Practical session in progress

Trainees along with faculty

pickle, fish cutlet, fill ball and fish pakoda were handled by Dr. M.M. Prasad, Kum. Jesmi Debbarma and Shri B.K. Panda. Field visit to the reservoir was also made for resource estimation and exploitation. Both water and fish samples from the reservoir were collected for quality assessment studies.

At Dumbur Reservoir, Tripura

Training programme on 'Improved gill nets and eco-friendly fishing gear' for exploitation of reservoir fisheries for the benefit of fishermen habituated around the Dumbur reservoir area was conducted at Gandachera, Tripura during 24-25 November, 2012. Shri Moka Swamy Kumar, Tech. Officer (T7-8) was the resource person.

Dr. S. Balasubramaniam, Head, EIS Division conducted the sessions on extension methodologies and management issues in the adoption of responsible fishing technics. Shri K.H. Tripura, Superintendent of Fisheries, Gandachera assisted the training team. There were 54 participants for the training. Dr. Balasubraminiam distributed the certificate at the end of the programme.

At Rudrasagar Reservoir, Tripura

Training cum demonstration programme on 'Hygienic handling of fish and preparation of value added products' for the benefit of fisher women at Rudrasagar reservoir area, Melaghar, Tripura was conducted during 26-28 November, 2012. Dr. S. Balasubramaniam, HOD, EIS, CIFT, Cochin, Dr. M.M. Prasad, SIC, Visakhapatnam, Kum. Jesmi Debbarma, Scientist, Shri Moka Swamy Kumar, Tech. Officer (T7-8) and Shri B.K. Panda, Tech. Officer (T5) were involved in conducting the programme. Fifty fisher women members of Rudrasagar Fisheries Cooperative Society were benefited from the programme. Shri S.S. Jamatia, Supdt. of Fisheries, Sonamura attended the valedictory session. Shri Bijoy Ghosh, Fisheries Officer, PHU, Agartala and Shri Kamal Hossain, Fisheries Officer, Melaghar, Tripura have assisted the training team. Certificates were distributed to all the beneficiaries at the end of the training programme

Training faculty at Dumbur

Training faculty at Rudrasagar

Participants of the training

Women trainees at Rudrasagar

Training Course on Fish Processing and Extension Methods

A training course on 'Fish processing and extension methods' was organized at CIFT, Cochin during 12-19 December, 2012. The programme was sponsored by Directorate of Extension, Ministry of Agriculture, Govt. of India, New Delhi. Thirteen fisheries officials from the State Fisheries Departments of Assam, Punjab, Manipur, West Bengal, Rajasthan, Odisha and Union Territory of Puducherry participated in the training.

The specific objectives of the training course were; i) to popularize the use of selected fish processing innovations, ii) to impart knowledge and skills on the use of selected fisheries extension methods, iii) to increase the extent of adoption of various fish processing innovations among the different categories of clients, and iv) to strengthen the linkages between the CIFT and the State Fisheries Departments so as to facilitate quicker dissemination of innovations. The training schedule consisted of both theoretical and practical aspects of various subjects/innovations. The subject areas such as post harvest handling and chilled storage of fish, freezing and frozen storage of fish products, canning and preservation of fish and shellfish, curing of fish, value added fish products, fishery byproducts, retort pouch processing and packaging materials, extension methods, extension programme development and adoption of innovations, technology transfer in fisheries, harvest and post harvest losses in fisheries and coastal zone management and evaluation methods etc. were included in the training schedule. Lectures, group discussions, demonstrations, case study analysis, and field visits were the training methods used. Training course manuals and course certificates were distributed to the trainees.

Participants and faculty of the training programme

Hands on training in progress

International Training Conducted

Ms. Dongdavanh Sibounthong, Head of Fisheries, Fisheries Resources and Wetland Management Session, Fisheries Division, Department of Livestock and Fisheries, Ministry of Agriculture and Forestry, Vientiane Capita, Lao PDR sponsored by TCS of Colombo Plan Programme of the Ministry of External Affairs has undergone training in "Fishery byproducts, prawn shell powder, chitin, chitosan and glucosamine hydrochloride" at CIFT, Cochin during 3-29 December, 2012.

Ms. Dongdavanh being trained

CIFT Signs Consultancy Agreement with NRCP

CIFT, Cochin signed a Memorandum of Agreement with National Research Centre on Pig, Rani, Guwahati to maintain close liaison and co-operation for providing technical advice and assistance relating to establishment of HACCP system for a pig slaughter house cum pork processing plant at NRC on Pig. CIFT will be charging an amount of ₹ 1,00,000/- + 12.36% Service Tax for the consultancy services. Under the agreement CIFT will validate the quality system operating in the pig slaughter houses and pork processing plant and will certify the unit after fulfilling the requirements laid down for the purpose.

CIFT Signs Consultancy Agreement with MPEDA

CIFT, Cochin signed a consultancy agreement with Marine Products Export Development Authority (MPEDA) (Ministry of Commerce & Industry, Govt. of India), Panampilly Avenue, Cochin – 682 036 for setting up of Quality Control Labs at Bhubaneswar, Nellore, Bhimavaram and Chennai. Under the agreement CIFT shall provide the services such as design of the laboratory (both chemical and microbiology), list of equipment, specification of the equipment, supervision visit etc.

The consultancy charges for the scheme realized is ₹ 1,87,500/- + Service Tax @ 12.36%. The agreement was signed between Dr. P. Mohanasundaram, Director, MPEDA and Dr. T.V. Sankar, OIC, ITMU, CIFT which was countersigned by Dr. T.K. Srinivasa Gopal, Director, CIFT on 27 September, 2012.

CIFT Signs Consultancy Agreement with MPI

CIFT, Cochin signed a consultancy agreement with Meat Products of India Ltd., Edayar, Koothattukulam, Ernakulam District (A Government of Kerala undertaking firm) for assistance for the production of ready to serve food products in retortable pouches and implementation of HACCP system. Under the agreement CIFT shall provide technical and other information for the production of ready to serve food products in retortable pouches and also technical consultancy for implementation of HACCP which includes preparation of HACCP manual, HACCP plan, SSOP and GMP for the desired products, providing layout, training to staff on HACCP implementation and auditing as also providing HACCP certification which is valid for a period of two years with scope for surprise audit at least three times during the validity period.

The consultancy charges for the scheme realized is ₹4,50,000/- + Service Tax @ 12.36%. The agreement was signed between Dr. Ani S. Das, Managing Director, MPIL

Handing over the consultancy agreement

and Dr. T.K. Srinivasa Gopal, Director, CIFT on 8 November, 2012 in presence of the members of the Institute Technology Management Unit of CIFT.

Fishing Craft and Gear Survey Conducted

Field visits were carried out to study the existing fishing craft and gear at Chombal (Badakama), Puthiappa, Kozhikode, Beypore, Kasargod, Thrissur and Malapuram of Kerala during 11- 21 October, 2012 and collected details on craft and gear. Dr. P. Pravin, Dr. M.P. Remesan, Senior Scientists and Dr. V.R. Madhu, Scientist of the Fishing Technology Division participated in the programme.

As part of Professional Attachment Programme, Dr. K.K. Prajith, Scientist, Fishing Technology Division made field visits to different landing centres of Kerala (Kasargod, Kozhikode, Ernakulam and Kollam), Karnataka (Uduppi and Manglore), Andhra Pradesh (Vishakapatanam and Kakkinada) and Tamil Nadu (Chennai and Nagapatanam) during July-September, 2012. The various aspects of ring seine designs and operation along south Indian coasts were studied. The study was under the mentorship of Dr. Leela Edwin, HOD, FT Division, CIFT, Cochin.

Field visit for collection of vessel and gear details at Ponnani

Dr. K.K. Prajith surveying the ring seine designs

RHSSP Project Participated in 32nd India International Trade Fair 2012

`NAIP project, "Responsible harvesting and utilization of selected small pelagics and fresh water fishes (RHSSP)" participated in the India International Trade Fair (IITF) held at Pragati Maidan, New Delhi during 14–27 November, 2012. As NAIP-RHSSP consortia was identified by the NAIP as one of the potential unit which deliver good technological innovative products to the beneficiaries, the project was directed to participate in the event. IITF is the largest trade fair held in India and this year the focal theme was "Technology to the Tiller". Honourable President of India, Shri Pranabkumar Mukherjee inaugurated trade the fair and various Ministries, Development agencies, State departments, leading business houses participated. Many international agencies representing Afghanistan, Bangladesh, Belarus, China, Cuba, Iran, Pakistan, Papua New Guinea, Sri Lanka, South Africa and Thailand also had set up their "National Pavilions" at the Trade Fair. About 480 overseas exhibitors from 22countries participated in this year's event.

The first five days of IITF were reserved exclusively for business vistors and from 19th to 27th it was open for public. The exhibition stall of RHSSP was arranged in the pavilion of Ministry of Agriculture. The commercial and nutritional significance of all the 25 value added fish products developed under RHSSP project were displayed in the stall. Moreover, information on the omega-3 fatty acid enriched products, fuel efficient propellers and boats were also displayed through informative posters and banners and were exhibited inside the stall and in the common corridors. There was very encouraging response from visitors and hundreds of enquiries were received during and after the event regarding the branded 'FISHMAID' products, omega enriched egg technology, fuel efficient propellers etc.

Several officials including DG, ICAR and Dr. Bangali Baboo, National Director, NAIP, ICAR visited the stall and DG has appreciated the project and the project team. Dr. Bangali Baboo also opined that this is one of the most successful NAIP projects under the ICAR. Through the event a very good awareness was created among the public and business houses about the technological contributions of CIFT with World Bank support.

Dr. S. Ayyappan and Dr. Bangali Baboo visiting the RHSSP stall

Awards and Recognitions

ZTM-BPD Unit, CIFT, Cochin receives "Certificate of Appreciation" from ICAR

The Zonal Technology Management–Business Planning and Development (ZTM-BPD) Unit at CIFT, Cochin was awarded a Certificate of Appreciation for the outstanding work on Establishment of Business Incubation Centre and Commercialization of Technology in Fish Processing, from National Agricultural Innovation Project (NAIP), Indian Council of Agricultural Research (ICAR).

Dr. Ravishankar receiving the Award from Dr. Ayyapan

Dr. C.N. Ravishankar, Principal Investigator, ZTM-BPD Unit, CIFT received the award from Dr. S. Ayyappan, Director General, ICAR and Secretary, DARE, Govt. of India during the Regional Committee Meeting of ICAR held at Central Arid Zone Research Institute (CAZRI), Jodhpur during 16-17 November, 2012. Dr. Ayyappan congratulated the ZTM-BPD Unit for nurturing the growth of technology based enterprises and for creating successful business ventures in the field of fisheries.

Best Paper Award

Dr. Femeena Hassan, Senior Scientist, Quality Assurance and Management Division of CIFT, Cochin received the Dr. Ravindran Endowment Award for best paper presented in the technical session 'Ocean technology and fisheries sciences' at the 22nd Swadeshi Science Congress held at CPCRI, Kasaragod during 6-8 November, 2012. Dr. Femeena Hassan presented the award winning paper entitled, "Isolation of squid chromato phores and its commercial application as a natural pigment in lipsticks" by Femeena Hassan, P. Muhamed Ashraf, V. Geethalakshmi and T.V. Sankar.

Dr. Femeena Hassan receiving award from Prof. B. Madhusudana Kurup,

In the study conducted by the team, the chromato phores from squid skin was isolated, and used as natural pigment in lipsticks. Different shades were developed using this pigment and they were screened for consumer acceptance applying hedonic scale method. Comparison with the instrumental reading was also done for the sensory scores. The newly formulated lipstick was subjected to physical, chemical and microbiological quality evaluation. The product was compared with the commercially available lipstick brands and the new product was found to have superior properties compared to the latter. It was also found that the new product met with the national quality standards laid down for such category of products. The new product gives a Direction to utilize squid skin, which otherwise is not useful.

The award was instituted by Swadeshi Science Movement, Kerala in the name of Late Dr. K. Ravindran, former President, Swadeshi Science Movement and former Director, CIFT, Cochin and an eminent ocean technology scientist. Prof. B. Madhusudana Kurup, Vice Chancellor, Kochi University of Fisheries and Ocean Sciences (KUFOS), Cochin gave away the award to Dr. Femeena Hassan during the valedictory session of the Science Congress.

Hindi Workshop

The Institute conducted a Hindi Workshop on Unicode on 7 November, 2012 for the benefit of Lower Division Clerks.

Celebrations

Vigilance Awareness Week

The Institute celebrated Vigilance Awareness Week during 29 October to 3 November, 2012. The observance of the week commenced with a Pledge administered by the Director and staff on 29 October.

Quami Ekta Week

The Institute celebrated Quami Ekta Week during 19-25 November, 2012. The observance of the week commenced with a National Integration Pledge administered by the Director and staff on 23 November.

Hindi Week

Hindi Week was observed at CIFT Visakhapatnam Research Centre during 1-6 October, 2012. Various competitions were held for the staff members of the Centre. Shri B.S. Murthy, Branch Manager, Central Bank of India, Visakhapatnam was the Chief Guest during the valedictory function of the Hindi Week celebrations.

Shri B.S. Murthy delivering the Chief Guest's Address

Radio Talks

The following radio talks were delivered by the scientists of the Institute during the quarter:

1. Dr. G. Rajeswari, Principal Scientist - Fish aggregating devices for resource conservation and enhancement (In Telugu) through AIR, Visakhapatnam on 30 October, 2012.
2. Dr. Suseela Mathew, Principal Scientist – Fish as health food (In Malayalam) through AIR, Kochi on 27 November, 2012.
3. Dr. R. Anandan, Senior Scientist – Biomedical applications of marine natural products (In Malayalam) through AIR, Kochi on 20 November, 2012.
4. Dr. K.K. Prajith, Scientist - Engineering and technological aspects of pond construction and pre-stocking procedure for aquaculture (In Malayalam) through AIR, Kochi on 17 December, 2012.

Invited Talk

Dr. O.N. Tiwari, Scientist, Indian Institute of Bioresources and Sustainable Development, Imphal delivered a talk on "Biodiversity analysis of cyanobacteria and microalgae from north east region of India falling under Indo-Burma biodiversity hotspots and possible commercial exploitations" at CIFT, Cochin on 28 December, 2012.

Dr. O.N. Tiwari delivering the talk

Deputation Abroad

Dr. R. Raghu Prakash, Senior Scientist, Fishing Technology, Visakhapatnam Research Centre of CIFT was deputed to attend the International fisheries symposium held at Can Tho, Vietnam during 6-8 December, 2012. Dr. Raghu Prakash also presented a paper entitled, "Role of fishing technology in responsible fishing for sustainable fisheries development and conservation of resources" by R. Raghu Prakash, G. Rajeswari and U. Sreedhar in the Symposium.

Shri C.K. Suresh, Junior Technical Assistant (T3),

Fish Processing Division, CIFT, Cochin was deputed to attend training in the maintenance and care of Isostatic Press System at M/s Stanstead Fluid Power Ltd., Harlow, U.K. during 19-23 November, 2011.

Dr. R . Raghu Prakash presenting the paper

Shri C.K. Suresh undergoing training

Post Graduate Studies

Ph. D. Received

Shri Niladri Sekhar Chatterjee, Scientist, Biochemistry & Nutrition Division, CIFT, Cochin was awarded Ph. D. degree from Indian Agricultural Research Institute, New Delhi (Deemed University) for his thesis entitled "Fate of Metal flumizone in cabbage, soil and water". He worked under the guidance of Dr. Suman Gupta, Senior Scientist, IARI, New Delhi.

Shri K.K. Prajith, Scientist, Fishing Technology Division, CIFT, Cochin was awarded Ph. D. degree from Cochin University of Science and Technology, Cochin for his thesis entitled "Application of Biofloc Technology (BFT) in the nursery rearing and farming of Giant Freshwater Prawn, *Macrobrachium rosenbergii* (de Man)". He worked under the guidance of Prof. B. Madhusoodana Kurup, Vice Chancellor, Kerala University of Fisheries and Ocean Studies, Cochin.

Personnel News

Participation in Seminars/Symposia/Workshops etc.

- **Dr. T.K. Srinivasa Gopal,** Director – Meeting to discuss skills and technologies for promotion of scientific and profitable fish production, ICAR, New Delhi (8 October). Dr. Srinivasa Gopal also made a presentation on Commercialized ready technologies related to CIFT, training programmes conducted at CIFT and skill development programmes related to harvest and post harvest technology.
- **Dr. T.K. Srinivasa Gopal**, Director, **Dr. C.N. Ravishankar**, HOD, FP and **Dr. A.A. Zynudheen,** Senior Scientist – National conference on Research, production and marketing of value added fish products: Present status and future directions, CFTRI, Mysore (4-5 October). Dr. Srinivasa Gopal delivered the Keynote address on Present status and potential of value added products from freshwater fish and shellfish. Dr. Srinivasa Gopal also chaired the technical session on Value added products from research point of view. The following invited papers were also presented by them in the Conference:

  i. Role of business incubators in entrepreneurship

development by C.N. Ravishankar, A.A. Zynudheen, George Ninan and T.K. Srinivasa Gopal

ii. Importance of fish oil and squalene as a functional ingredient by A.A. Zynudheen, George Ninan, C.N. Ravishankar and T.K. Srinivasa Gopal

- **Dr. T.K. Srinivasa Gopal**, Director and **Dr. S. Vishnuvinayagam,** Scientist – 2nd National conference on Fisheries biotechnology, CIFE, Mumbai (2-3 November). Dr. Srinivasa Gopal chaired the session on Biotechnology for post harvest processing and value addition while Dr. Vishnuvinayagam presented a paper entitled, "Prevalence of antibiotic resistant *Staphylococcus aureus* in the commercial fish markets" by S. Vishnuvinayagam, R. Chakraborti and K.V. Lalitha.

- **Dr. P.T. Lakshmanan,** HOD, B&N – Short course on Microwave assisted organic synthesis and new methodologies for the synthesis of novel multi-functional and bioactive molecules, IIT, Mumbai (31 October)

- **Dr. P.T. Lakshmanan,** HOD, B&N – Consultation meeting of Quinquenial Review Team, NAARM, Hyderabad (15-16 November)

- **Dr. Leela Edwin,** HOD, FT, **Dr. T.V. Sankar,** HOD, QAM, **Dr. C.N. Ravishankar,** HOD, FP, **Dr. M.M. Prasad,** SIC, Visakhapatnam, **Dr. P.T. Thankappan, Dr. S. Sanjeev, Shri M. Nasser, Dr. K. Ashok Kumar, Dr. Suseela Mathew,** Principal Scientists, **Dr. V. Geethalakshmi, Dr. Nikita Gopal, Dr. S. Ashaletha, Dr. P. Pravin, Dr. Saly N. Thomas, Dr. M.P. Remesan, Dr. A.A. Zynudheen, Dr. Femeena Hassan, Dr. J. Bindu, Dr. George Ninan**, **Dr. R. Anandan, Shri M.V. Baiju,** Senior Scientists, **Dr. S.K. Panda, Shri V. Radhakrishnan Nair, Dr. J. Charles Jeeva, Dr. K.K. Asha, Dr. Rakesh Kumar,** Scientists, Senior Scale, **Dr. V.R. Madhu, Shri A.K. Jha, Dr. V. Murugadas, Shri Ankur Nagori, Shri C.G. Joshy, Dr. Niladri Sekhar Chatterjee, Dr. K.K. Prajith,** Scientists, **Dr. A.R.S. Menon,** Tech. Officer (T9), **Shri C.R. Gokulan, Smt. K.B. Beena,** Tech. Officers (T7-8), **Dr. M. Baiju, Smt. P.K. Shyma, Dr. G. Usha Rani, Dr. B. Ganesan, Shri P.S. Babu, Smt. K.K. Kala,** Tech. Officers (T6), **Smt. K.G. Sasikala, Smt. G. Remanai,** Tech. Officers (T5), **Smt. N. Lekha,** Sr. Lab. Asst. (T4), **Dr. K.A. Martin Xavier,** Field Asst. (T2), **Smt. G. Archana,** Jr. Lab. Asst., **Shri S. Abhilash, Smt. A. Razia Mohamed, Smt. K.A. Anju, Shri M. Kirandas, Shri Renju Ravi Shri P.J. Antony Sijo** and **Kum. K.R. Remya Kumari,** Research Fellows - National seminar on Traditional knowledge and management systems in fisheries, CIFT, Cochin (30-31 October). The following posters were also presented by them in the Seminar:

I. Masmin – A specialty fish product of Lakshadweep by J. Bindu, C.T. Nithin, T.R. Ananthanarayanan, C.N. Ravishankar and T.K. Srinivasa Gopal

ii. Thermocole catamaran (An indigenous grassroot innovation) as livelihood option for fisherfolk – A case study in Alleppy district, Kerala by J. Charles Jeeva and P.J. Antony Sijo

iii. Traditional methods for fish preservation in Kerala by M. Kirandas, K.A. Anju, Nikita Gopal, A.R.S. Menon, K. Ashok Kumar, C.N. Ravishankar and T.V. Sankar

iv. Traditional knowledge on fisheries resources and management among fisherfolk in Kerala by K.A. Anju, M. Kirandas, Nikita Gopal, A.R.S. Menon, K. Ashok Kumar, C.N. Ravishankar and T.V. Sankar

v. Traditional fishing techniques for Pearlspot, *Etroplus suratensis* (Bloch, 1790) in Kerala by M.P. Remesan, V.R. Madhu and P. Pravin

vi. Traditional fishing at Minicoy, UT of Lakshadweep by P. Pravin, M.V. Baiju, Paresh S. Khanolkar and K.V. Aneesh Kumar

vii. Fisheries management perspectives in Kautilya's Arthashastra by Nikita Gopal

viii. Traditional practices for harvesting crab in the backwaters of Cochin by K.A. Martin Xavier and Nikita Gopal

ix. Ritualistic significance of fishing among the tribes of Wayanad, Kerala, India by K.K. Prajith and Leela Edwin

x. Lunar periodicity based indigenous resource management system in set bag net fishery of Kerala backwaters by Saly N. Thomas, G. Archana and Leela Edwin

xi. Biochemical composition and bioactivities of Cuttlefish (*Sepia officinalis*) ink that support the indigenous traditional knowledge by K.R. Remya Kumari, K.K. Asha, Suseela Mathew, R. Anandan, Niladri Sekhar Chatterjee and P.T. Lakshmanan

xii. Sardine oil paste for better durability of "Kettu Vallom" by Femeena Hassan and T.V. Sankar

xiii. Facts and benefits behind washing fish with banana leaf ash: An indigenous practice of Indian households by P.K. Binsi, George Ninan, S. Vishnuvinayagam and A.A. Zynudheen

xiv. Traditional methods of prawn seed collection using locally available bushes of Henna (*Lawsonia inermis*) plant in Narmada river basin, Bharuch district, Gujarat by A.K. Jha, V.R. Madhu, M.P. Remesan and P. Pravin

xv. Indigenous traditional knowledge on biomedical applications of marine natural products by T. Obulesu, R. Anandan, Suseela Mathew, B. Ganesan, K.K. Asha and P.T. Lakshmanan

xvi. Use of ecological knowledge in fish capture: The case of ring seine fishing in central Kerala by P.H. Dhiju Das and Leela Edwin

xvii. Drying of Bombay duck and ribbon fish in Gujarat by S. Remya, C.O. Mohan, V. Renuka, A.K. Jha, G.K. Sivaraman, C.N. Ravishankar, R. Badonia and T.K. Srinivasa Gopal

xviii. Traditional fishing practices used in inland waters by G. Rajeswari, R. Raghu Prakash and U. Sreedhar

xix. Seedhal: A traditional semi-fermented bio-processed fish product from north east hilly region by M.M. Prasad, B. Madhusudana Rao, L.N. Murthy and Jesmi Debbarama

xx. Traditional methods of harvesting prawns from impounded waters of western Odisha and value added product development by M.M. Prasad

xxi. Traditional management practices in coastal fisheries and its significance in resource conservation in the Indian context by Renju Revi, P.M. Vipin, Leela Edwin and M.R. Boopendranath

The Poster by Renju Ravi *et al*. was adjudged as the Best Poster presentation of the Seminar.

- **Dr. T.V. Sankar,** HOD, QAM – National seminar on Food safety – Role of standards, BIS, New Delhi (12 December)
- **Dr. T.V. Sankar,** HOD, QAM – First meeting of the Committee constituted by Department of Animal Husbandry, Dairying and Fisheries to examine the SPS notification issued by various trading partners to WTI pertaining to fish and fisheries products, New Delhi (17 December)
- **Dr. T.V. Sankar,** HOD, QAM and **Dr. K. Ashok Kumar**, Principal Scientist – Meeting of the Expert committee on National referral laboratory for fisheries, NRC Grapes, Pune (29 December)
- **Dr. C.N. Ravishankar,** HOD, FP – ASEAN-ICAR-CII industry meet, New Delhi (16-17 October)
- **Dr. C.N. Ravishankar**, HOD, FP – ICAR Regional Committee Meeting, CAZRI, Jodhpur (16-17 November)
- **Dr. C.N. Ravishankar**, HOD, FP – National conference of Krishi Vigyan Kendra's on 'Integrating technologies and best practices', PAU, Ludhiana (21-23 November). Dr. Ravishankar also delivered an invited talk on "Backstopping of KVKs for technology management, business planning and development – Experiences of ICAR" in the Conference.
- **Dr. C.N. Ravishankar,** HOD, FP, **Dr. K. Ashok Kumar,** Principal Scientist, **Dr. G.K. Sivaraman,** Senior Scientist, **Dr. L.N. Murthy, Dr. K.K. Asha, Dr. S.K., Panda,** Scientists, Senior Scale, **Dr. C.O. Mohan, Dr. S. Vishnuvinayagam, Shri A.K. Jha, Dr. P.K. Binsi, Smt. V. Renuka, Smt. A. Jeyakumari,** Scientists, **Shri C.K. Kamalakanth, Shri T.R. Ananthanarayanan, Shri C.T. Nithin** and **Shri Ginson Joseph,** Research Fellows – Global symposium on Aquatic resources for eradicating hunger and malnutrition: Opportunities and challenges, Mangalore (4-6 December). The following presentations were also made by them in the Symposium:

  i. Studies on nutritional composition, biochemical quality, textural changes and consumer preference of milk fish (*Chanos chanos*) by L.N. Murthy, B. Madhusudana Rao, Jesmi Debbarma and M.M. Prasad

  ii. Long term study on microbial and heavy metal analysis of fresh fish of local fish markets by S. Vishnuvinayagam, P.K. Binsi and R. Chakraborti

  iii. Preparation and characterization of bioactive peptides from fish scale by P.K. Binsi, S. Vishnuvinayagam, A.A. Zynudheen, George Ninan, K. Ashok Kumar, R. Anandan and R. Chakraborti

  iv. Detection of multidrug resistant coagulase positive B-Lactamase producing *Staphylococcus aureus* in seafood by G.K. Sivaraman, C.O. Mohan, A.K. Jha, S. Remya, R. Badonia and C.N. Ravishankar

  v. Microbial quality of seafood samples from

processing plants of Gujarat by G.K. Sivaraman, R. Badonia, C.O. Mohan, A.K. Jha and V. Renuka

vi. Studies on carbon footprint in demersal trawl fishing at Veraval, Gujarat by A.K. Jha, G.K. Sivaraman, C.O. Mohan, V.R. Madhu and R. Badonia

vii. Quality changes in Yellowfin tuna (*Thunnus albacares*) subjected to 200 MPa pressure during chill storage by C.K. Kamalakanth, Ginson Joseph, J. Bindu, K.K. Asha, Sanjoy Das and T.K. Srinivasa Gopal

viii. Shelf life evaluation of high pressure treated peeled and undeveined Indian white prawn (*Fenneropenaeus indicus*) at low temperature storage by Ginson Joseph, C.K. Kamalakanth, J. Bindu, K.K. Asha, Sanjoy Das and T.K. Srinivasa Gopal

ix. Physico-chemical changes in liquid smoke flavoured Yellowfin tuna (*Thunnus albacares*) sausage during chilled storage by C.T. Nithin, T.R. Ananthanarayanan, R. Yathavamoorthi, J. Bindu and T.K. Srinivasa Gopal

x. Effect of pulsed light and chemical treatment on shelf life of chill stored Yellowfin tuna (*Thunnus albacares*) steaks by T.R. Ananthanarayanan, C.T. Nithin, R. Yathavamoorthi, J. Bindu, Toms C. Joseph and T.K. Srinivasa Gopal

xi. Optimization of parameters for enzymatic production of oyster protein hydrolysate and evaluation of its antioxidant potential by K.K. Asha, R. Anandan, Suseela Mathew, Niladri S. Chatterjee and P.T. Lakshmanan

xii. Biogenic amine formation and quality indices of active packed seer fish (*Scomberomorus commerson*) steaks during chilled storage by C.O. Mohan, C.N. Ravishankar, K. Ashok Kumar and T.K. Srinivasa Gopal

xiii. Psychrotolerant histamine formation in tuna by S.K. Panda, S. Sanjeev, K. Ashok Kumar and T.V. Sankar

xiv. Effect of potassium sorbate and sodium metabisulpite on the quality changes of Pacific white shrimp (*Litopenaeus vannamei*) during iced storage by A. Jeyakumari, Jesmi Debbarma, S. Remya, C.N. Ravishankar, A.A. Zynudheen and George Ninan

- **Dr. R. Chakrabarti,** SIC, Mumbai – ICAR Regional Committee Meeting, Goa (9-11 November)
- **Dr. R. Badonia,** SIC, Veraval and **Dr. C.O. Mohan,** Scientist – Meeting with State Fisheries Officials to discuss the five year project plan of the Fisheries Department, Gujarat, Veraval (2 November)
- **Dr. M.M. Prasad**, SIC, Visakhapatnam – Advanced techno management programme for F&G level scientists, ASCI, Hyderabad (17 September – 19 October)

Dr. M.M. Prasad receiving certificate at ASCI

- **Dr. M.M. Prasad,** SIC, Visakhapatnam and **Dr. U. Sreedhar,** Senior Scientist – Awareness training programme on fishing technology for traditional fishermen youth of Visakhapatnam district, CIFNET, Visakhapatnam (3 November) (As resource persons)
- **Dr. M.M. Prasad**, SIC, Visakhapatnam, **Dr. B. Madhusudana Rao**, Senior Scientist and **Dr. L.N. Murthy,** Scientist, Senior Scale – National seminar on Microbial approaches towards sustainable development, Dr. V.S. Krishna Govt. College, Visakhapatnam (1-2 November). They also presented the following invited papers in the Seminar:

  i. Wealth from waste: Fish waste utilization: A case scenario by M.M. Prasad, B. Madhusudana Rao, L.N. Murthy and Jesmi Debbarma

  ii. Trends in seafood chemistry and residue contaminants risks for sustainable industrial development by L.N. Murthy, Jesmi Debbarma, B. Madhusudana Rao and M.M. Prasad

  iii. Microbial hazards in fish and fishery products: Regulatory requirements and economic implications by B. Madhusudana Rao

- **Shri P.K. Vijayan,** Principal Scientist – Governing body meeting of NIFAM, Thiruvananthapuram (16 October)
- **Dr. S. Sanjeev,** Principal Scientist – Project monitoring committee meeting for monitoring the shellfish growing water of Padanna (Kasaragod), MPEDA, Cochin (8 November)

- **Dr. T.K. Thankappan,** Principal Scientist, **Dr. J. Bindu, Dr. George Ninan,** and **Dr. G.K. Sivaraman,** Senior Scientists – National seminar on Mountain fisheries: Challenges and opportunities, DCFR, Bhimtal (5-6 November). The following research papers were also presented by them in the Seminar:

  I. Hygienic handling and value addition options in Rainbow trout (*Oncorhynchus mykiss* Walbaum) by George Ninan, P.K. Vijayan, J. Bindu, A.A. Zynudheen, C.N. Ravishankar and T.K. Srinivasa Gopal

  ii. Biochemical and sensory evaluation of Rainbow trout (*Oncorhynchus mykiss* Walbaum) in chilled and frozen storage conditions by George Ninan, A.A. Zynudheen, K.V. Lalitha, C.N. Ravishankar and T.K. Srinivasa Gopal

  iii. Quality evaluation of Rainbow trout (*Oncorhynchus mykiss* Walbaum, 1792) in chilled storage by George Ninan, K.V. Lalitha, T.V. Sankar, A.A. Zynudheen, C.N. Ravishankar and T.K. Srinivasa Gopal

  iv. Utilization of Decan Mahsheer, *Tor khudre* (Sykes) for the development of convenience products by J. Bindu, George Ninan, C.N. Ravishankar and T.K. Srinivasa Gopal

  v. Studies on the status of lipids, lipid peroxides and antioxidants with dietary supplementation of water soluble chitosan during aging in young and adult rats by T.K. Thankappan, B. Ganesan and A.A. Zynudheen (The Poster got IIIrd prize in the Best Poster Category)

- **Dr. G. Rajeswari,** Principal Scientist – Awareness training programme on fishing technology for traditional fishermen youth of Visakhapatnam district, CIFNET, Visakhapatnam (13 October) (As Guest of Honor)

- **Dr. Nikita Gopal,** Senior Scientist – 20th Annual conference of the Agricultural Economics Research Association (India) on Agricultural inputs and services delivery system for accelerating growth and improving farm income, IARI, New Delhi (9-11 October)

- **Dr. Nikita Gopal**, Senior Scientist – Meeting of the Nodal Officers of RFD, New Delhi (4-5 December)

- **Dr. P. Pravin,** Senior Scientist – Trawl ban committee meeting, Department of Fisheries, Govt. of Kerala, Thiruvananthapuram (14 & 27 December)

- **Dr. S. Ashaletha**, Senior Scientist – Project review meeting of NAIP on Mobilizing mass media support for sharing agro information, Anand (28-29 November)

- **Dr. R. Raghu Prakash,** Senior Scientist – International fisheries symposium, Can Tho, Vietnam (5-8 December). Dr. Raghu Prakash also presented a paper entitled, "Role of fishing technology in responsible fishing for sustainable fisheries development and conservation of resources" by R. Raghu Prakash, G. Rajeswari and U. Sreedhar in the Symposium.

- **Dr. U. Sreedhar**, Senior Scientist and **Dr. V.R. Madhu**, Scientist – Review meeting for the sanction of projects for 12th plan under PFZ Mission, INCOIS, Hyderabad (17 December)

- **Dr. U. Sreedhar** and **Dr. B. Madhusudana Rao,** Senior Scientists – Meeting with the Committee on the welfare of fishermen and allied workers of Kerala Legislative Assembly, CIFNET, Visakhapatnam (5 October)

- **Dr. Femeena Hassan,** Senior Scientist – 22nd Swadeshi Science congress, CPCRI, Kasaragod (6-8 November). The following papers were also presented by her in the Congress:

  i. Isolation of squid chromatophores and its commercial application as a natural pigment in lipsticks by Femeena Hassan, P. Muhamed Ashraf, V. Geethalakshmi and T.V. Sankar (The presentation by Dr. Femeena Hassan was selected for the 'Dr. Ravindran Endowment Award' for best paper presented in the technical session 'Ocean technology and fisheries sciences').

  ii. Studies on effect of delayed icing on the quality changes of white shrimp (*Litopenaeus vannamei*) during chilled storage by A. Jeyakumari, Jesmi Debbarma, S. Remya, C.N. Ravishankar, A.A. Zynudheen and George Ninan

- **Dr. P. Muhamed Ashraf,** Senior Scientist, **Dr. V.R. Madhu, Dr. K.K. Prajith,** Scientists, **Shri P.H. Dhiju Das, Shri S.S. Shaju, Kum. P. Minu,** and **Shri K.V. Aneesh Kumar,** Research Fellows – International conference on Ocean remote sensing for well being of all, Cochin (5-9 November). The following papers/posters were also presented by them in the Conference:

  i. Effect of optically active substances and atmosphere correction schemes on remote sensoring reflector and coastal site off Kochi by P. Minu, S.S. Shaju, Aneesh A. Lotliker, B. Santhosh Kumar, P. Muhamed Ashraf and B.

Meenakumari (The Poster won the Best Poster Award).

ii. Phytoplankton community structure and food preference on Indian oil sardine along west coast of India: Implication for ocean colour remote sensing by Rahul Raj, G. Archana, Mini Raman, B. Meenakumari, P. Minu, S. Ponskha, A. Thakre, P. Muhamed Ashraf and M.M. Shridhankar

iii. Observations on simultaneous trawling experiments carried out in and outside the INCOIS notified Potential Fishing Zones (PFZ) locations along Veraval coast, Gujarat by V.R. Madhu, P.T. Sreejith and B. Meenakumari

iv. Phytoplankton community structure and associated optical characters in coastal waters of Gujarat by Gunjan Motwani, Mini Raman, Hitesh Solanki, Prakash Chauhan, V.R. Madhu and P.T. Sreejith

- **Shri M.V. Baiju,** Senior Scientist – Tender scrutinizing committee meeting for purchase of 40 feet fibreglass reinforced plastic (FRP) boats, FITT, Chennai (22 October)
- **Shri M.V. Baiju**, Senior Scientist – Meeting to discuss about the recommendation of the committee constituted by Govt. of Kerala for formulating regulations of registration of boat building yard and restriction of engine power of fishing boats, Cochin (5 November)
- **Dr. Toms C. Joseph**, Senior Scientist – 15th Workshop on Biomedical informatics, Mahatma Gandhi Institute of Medical Sciences, Wardha (2 December)
- **Dr. Toms C. Joseph**, Senior Scientist – Seminar organized by Department of Zoology at Sree Narayana College, Nattika (20 December). Dr. Toms delivered a lecture on 'DNA, protein and modern perspectives'.
- **Dr. S.K. Panda,** Scientist, Senior Scale – Training programme on Use of modules in ICAR web portal, ICAR, New Delhi (15 October)
- **Dr. S.K. Panda,** Scientist, Senior Scale – e-Learning course on Food safety and traceability, APO, New Delhi (11-13 December)
- **Shri V. Radhakrishnan Nair,** Scientist, Senior Scale – Meeting of Kerala State Debt Relief Commission, Thiruvananthapuram (23 November)
- **Dr. K.K. Asha,** Scientist, Senior Scale, **Dr. Niladri Sekhar Chatterjee,** Scientist and **Kum. K.R. Remya Kumari,** SRF– International conference on Environment and human health, New Delhi (28-29 November). They also presented the following papers in the Conference:

i. Oyster peptide extract accelerates *in vitro* acetyl choline esterase activity of albino rat brain by K.K. Asha, Suseela Mathew, R. Anandan, Niladri S. Chatterjee and P.T. Lakshmanan

ii. Biochemical composition of neon flying squid *Stenotheuthis bartramii* (Lesucur 1821) from Indian sector of southern ocean by K.R. Remya Kumari, K.K. Asha, K.V. Aneesh Kumar and P.T. Lakshmanan

iii. Degradation of metaflumizone in soil: Effect of elevated temperature and atmospheric CO_2 level by N.S. Chatterjee and S. Gupta

- **Smt. Arathy Ashok**, **Shri V. Chandrasekar,** Scientists, **Shri P.H. Dhiju Das** and **Shri P.S. Khanolkar,** Research Fellows – Winter School on Fish harvesting systems for resource conservations, CIFT, Cochin (20 November-10 December)
- **Dr. S. Vishnuvinayagam,** Scientist – Expert consultation on Managing tranboundary diseases of agricultural importance in Asia Pacific, New Delhi (10-12 October)
- **Dr. S. Vishnuvinayagam,** Scientist – 18th International congress on Rural health and medicine, Goa (10-12 December). Dr. Vishnuvinayagam also made a presentation of the research paper entitled, "*Staphylococcus aureus*: Prevalence status of multiple resistance strain and its hazards in the rural community" by S. Vishnuvinayagam, P.K. Binsi and R. Chakraborti
- **Dr. P.K. Binsi**, Scientist – Expert committee meeting of MOFPI and DST, New Delhi (7 December). Dr. Binsi also presented a new project proposal on 'Use of natural resins and gums in processing, value addition and packaging of fishery products' in the meeting.
- **Shri M.S. Kumar,** Tech. Officer (T7-8) – Farm and home rural unit programme subcommittee meeting, AIR, Visakhapatnam (20 November)
- **Shri C.K. Suresh**, Jr. Tech. Asst. (T3) – Training on The maintenance and care of Isostatic Press System, M/s Stanstead Fluid Power Ltd., Harlow, U.K. (19-23 November)
- **Kum. Anu Mary Jose,** Jr. Tech. Asst. (T1) – Training programme on Overview of operational, preventive and corrective measures of HPLC and GC, CFTRI, Mysore (17-21 December)

- **Shri Ginson Jospeh, Shri C.K. Kamalakanth, Shri T.R. Ananthanarayanan** and **Shri C.T. Nithin,** Research Fellows – International conference and exhibition on Food processing and technology, Hyderabad (22-24 November). The following poster presentations were also made by them in the Conference:

  i. Physico-chemical and microbiological changes in high pressure treated Indian white prawns *(Fenneropenaeus indicus*) during chill storage by Ginson Joseph, C.K. Kamalakanth, J. Bindu, K.K. Asha, Sanjoy Das and T.K. Srinivasa Gopal

  ii. Quality changes in condiment-incorporated high pressure processed prawns during low temperature storage by C.K. Kamalakanth, Ginson Joseph, J. Bindu, K.K. Asha, Sanjoy Das and T.K. Srinivasa Gopal

  iii. Effect of variable pulse light treatment on Yellowfin tuna (*Thunnus albacares*) steaks by T.R. Ananthanarayanan, C.T. Nithin, R. Yathavamoorthy, Toms C. Joseph, J. Bindu and T.K. Srinivasa Gopal

  iv. Effect of spray application of liquid smoke on physico-chemical and microbiological changes of catla (*Catla catla*) fillets by C.T. Nithin, T.R. Ananthanarayanan, R. Yathavamoorthy, J, Bindu, Toms C. Joseph and T.K. Srinivasa Gopal

Personalia

Promotions

1. Dr. K. Ashok Kumar, Senior Scientist, Cochin as Principal Scientist
2. Dr. Suseela Mathew, Senior Scientist, Cochin as Principal Scientist
3. Dr. G. Rajeswari, Senior Scientist, Visakhapatnam as Principal Scientist
4. Dr. B. Madhusudana Rao, Scientist (SG), Visakhapatnam as Senior Scientist
5. Dr. Toms C. Joseph, Scientist (SG), Cochin as Senior Scientist
6. Smt. K.B. Beena, Tech. Officer (T6), Cochin as Tech. Officer (T7-8)

Transfers

1. Shri Charles Ekka, SAO, CIFT, Cochin to IIHR, Bangalore

Retirements

1. Dr. T.K. Thankappan, Principal Scientist, Cochin
2. Shri K.J. Francis Xavier, Tech. Officer (T9), Cochin
3. Shri T. Gangadharan, Tech. Officer (T5), Cochin
4. Shri A.K. Unnikrishnan, Tech. Officer (T5), Cochin
5. Shri N. Venkata Rao, Tech. Officer (T5), Visakhapatnam

OBITURY

We mourn the untimely and sad demise of Dr. K. Sobha, Tech. Officer (T6), CIFT, Cochin on 20 December, 2012. May the departed soul rest in peace.

Published by : Dr. T.K. Srinivasa Gopal, Director, Central Institute of Fisheries Technology, Cochin – 682 029. Ph: 0484-2666845 (14 lines); Fax: 091-484-2668212
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