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Business Incubation Centre Inaugurated at CIFT, Cochin / के मा प्रौ सं, कोचिन में व्यवसाय उद्भवन केन्द्र का उद्घाटन

The Business Incubation Centre established at CIFT, Cochin under the project Zonal Technology Management - Business Planning and Development (ZTM-BPD) Unit was inaugurated by Dr. S. Ayyappan, Secretary, DARE and Director General, ICAR on 5 April, 2012. Dr. Ayyappan was of the opinion that development of innovative technologies and commercialization of them is the need of the hour. He hoped that the Business Incubator Centre established at different parts of the country like the one at CIFT will lead the way for taking the developed facilities to the end users. About 40 technologies have already been

क्षेत्रीय प्रौद्योगिकी प्रबंध-व्यवसाय नियोजन एवं विकास (क्षे प्रौ प्र - व्य नि वि) यूनिट के अधीन के मा प्रौ सं, कोचिन में स्थापित व्यवसाय उद्भवन केन्द्र का उद्घाटन डॉ. एस. अय्यप्पन, सचिव कृ अनु शि वि और महानिदेशक, भा कृ अनु प द्वारा 5 अप्रैल, 2012 को किया गया। डॉ. अय्यप्पन इस केन्द्र उद्घाटन के समय विचार व्यक्त किए कि नवोन्वेषन और उपलब्ध प्रौद्योगिकियों का समाकलन समय की माँग है; इस केलिए के मा प्रौ सं, कोचिन जैसे कृषि उद्भवन केन्द्र देश की अगुआई करना चाहिए। करीब 40 प्रौद्योगिकियाँ देश भार में स्थापित 10 व्य नि वि यूनिटों द्वारा भा कृ अनु प प्रणाली में पहले ही व्यवसायीकरण किए गए है। के मा प्रौ सं, कोचिन में इस व्यवसाय उद्भवक व्यवस्था

Dr. S. Ayyappan delivering the address after inaugurating the Business Incubation Centre at CIFT, Cochin. Also seen are Dr. Leela Edwin, Shri Anwar Hashim, Dr. K. Gopakumar, Dr. Bangali Baboo, Dr. T.K. Srinivasa Gopal, Dr. B. Meenakumari, Dr. S. Mauria, Dr. G. Syda Rao and Dr. C.N. Ravishankar

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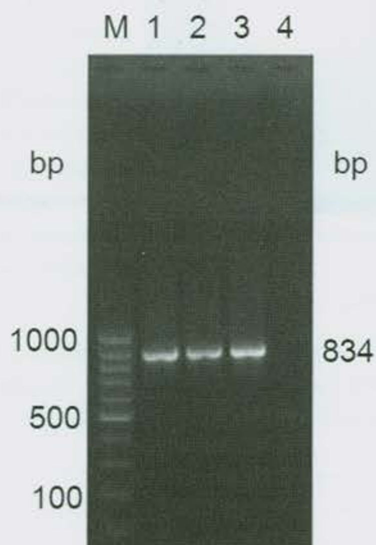
saline. The spiked sample along with control was macerated with 90 ml of BHI broth and was incubated at 37 °C. After 1 hour of incubation, Polymixin B was added to each macerated broth and the final concentration of Polymixin B was made 15 mg / L and incubated for 18 hrs.



PCR-based on hbla gene: Lane M: 100 bp DNA ladder; Lane 1: 10 cfu; Lane 2: 100 cfu; Lane 3: 1000 cfu; Lane 4: Control

Two ml from the overnight enriched broth was centrifuged at 2000 x g for 15 min. to settle the debris. The supernatant was taken in a fresh tube and was centrifuged at 4 °C at 6500 x g for 5 min. The supernatant was used for RPLA test and the pellet was used for preparation of crude DNA for PCR test. The pellet was washed once with sterile normal saline and was suspended in 250 µl of sterile distilled water. It was kept at boiling water bath for 10 min. and was frozen immediately after boiling. After thawing, it was centrifuged at 3000 x g for 2 min. and 5 µl of the supernatant was used as PCR template. *hbla* gene specific primers hbla 1 (5'- GCTAATGTAGTTTCACCTGTAGCAAC-3') and hbla 2 (5'- AATCATGCCACTGCGTGGACATATAA-3') were used for PCR amplification (Mäntynen and Lindstrom, 1998). PCR was done in 25 µl reaction mixture, which consisted of 5 µl of template, 2.5 µl 10 X PCR buffer (Fermentas), 10 µM of each primer, 1 U *Taq* DNA polymerase (Fermentas) and 200 µM of each dNTP. PCR reaction condition consisted of an initial denaturation at 95 °C for 5 min. followed by 30 cycles of 94 °C for 30 s, 58 °C for 45 s and 72 °C for 1 min. At the end, the final extension was carried out at 72 °C for 5 min. PCR product was resolved by agarose gel electrophoresis on 1.5% agarose gel containing 0.3 µg /mL ehtidium bromide.

RPLA test was also carried out using the supernatant. The supernatant was passed through a 0.22 µ membrane filter to prepare cell-free supernatant. Cell-free supernatant was used for detection of enterotoxin by RPLA test using BCET-RPLA kit (Oxoid, U.K.) as per manufacturer's instructions.

Total eight seafood samples were screened for the presence of enterotoxigenic *B. cereus* after enrichment in BHI broth-using PCR and RPLA methods.

In spiked samples, the detection could be done even at 10 cfu spiking level as evidenced by presence of 834 bp amplified product in PCR assay (Fig. 1). In RPLA test, 1000, 100 and 10 cfu spiking level showed positive to enterotoxin assay as evidenced by mat formation. In seafood samples tested (8 nos.), two samples showed 834 bp amplified product by PCR and were positive for enterotoxigenic *B. cereus*. The same samples were found positive in RPLA also. So, the RPLA test results were in agreement with *hbla* specific PCR detection method.

Detection of *B. cereus* enterotoxin in seafood samples by RPLA is very expensive as it is required to import very expensive kits. But as compared to imported kits, this *hbla* gene specific PCR method is cheap and takes less time. Using PCR assay, detection of enterotoxigenic *B. cereus* is possible within 24 hrs. The PCR assay will detect only enterotoxigenic strains and non-enterotoxigenic strains will be excluded from detection. So, it can be concluded that *hbla* gene specific PCR method can be used as a cheap alternative of RPLA-based imported kit method for detection of enterotoxin producing *B. cereus* in food.

- **Dr. Sanjoy Das and Dr. K.V. Lalitha**
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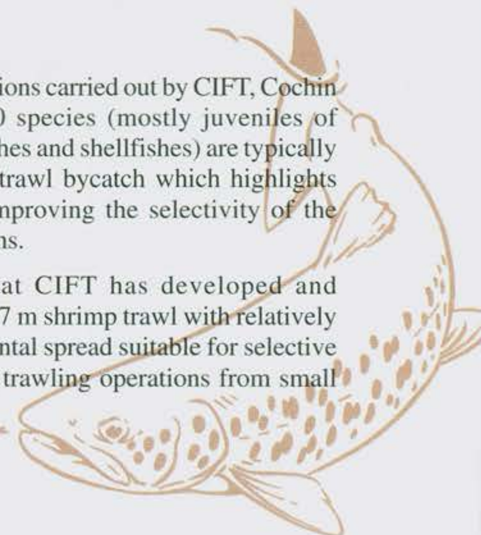
Short body shrimp trawl to reduce bycatch

Globally, India is the second largest producer of shrimp from capture fisheries contributing about 30% to the global shrimp captured from the wild. Trawling is the most important fishing method for shrimps in India which also contributes to the bulk of demersal species from marine waters. There are about 35,228 trawlers in the size class of 12-17m L_{OA} operating all along the Indian coast. Trawl nets are non-selective and result in landings of huge quantities of juvenile fishes and other non-targeted aquatic organisms, which are often discarded, leading to an irreparable damage to the ecosystem. Investigations carried out by CIFT, Cochin has shown that about 280 species (mostly juveniles of commercially important fishes and shellfishes) are typically represented in the shrimp trawl bycatch which highlights the imperative need for improving the selectivity of the presently used trawl systems.



The research team at CIFT has developed and successfully field tested a 27 m shrimp trawl with relatively short body and large horizontal spread suitable for selective retention of shrimp during trawling operations from small

mechanized trawlers which are popular in India. The length of the trawl body has been considerably reduced by increasing the taper ratio and the vertical opening of the mouth has been reduced to eliminate bycatch which predominantly consists of non-targeted fishes (Fig. 1 & 2). The relatively better swimming ability of finfishes compared to shrimps help them to counter the short and lower vertical height of trawl and swim out of the net (Fig. 3). Because of the larger horizontal spread of the trawl mouth, the effective sweep area is more, which is an important requirement for an efficient shrimp trawl.

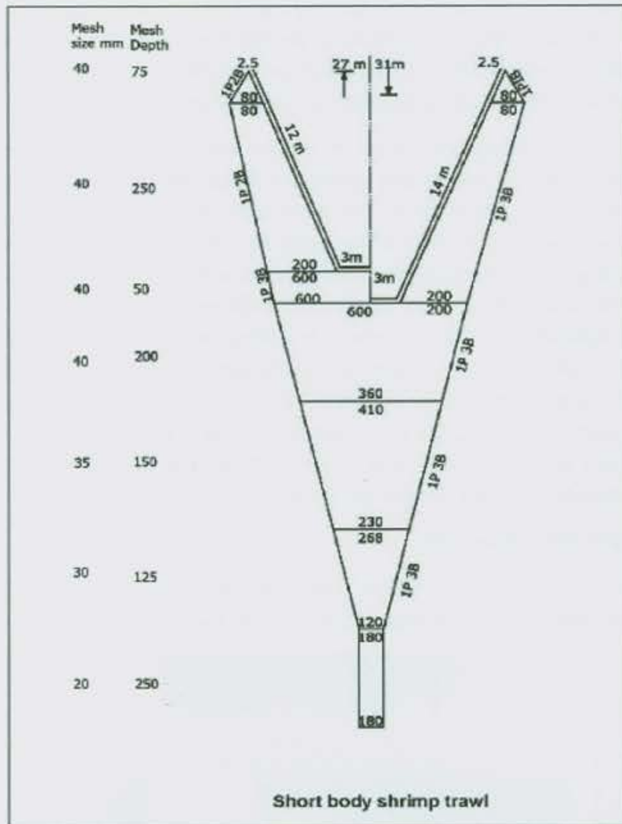


Fig. 1. Design of the 27 m short body shrimp trawl

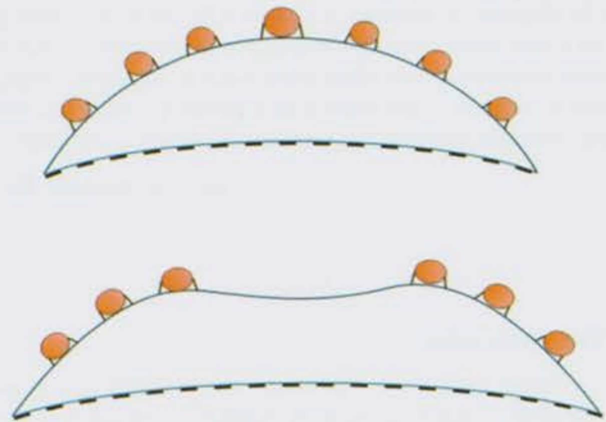


Fig. 2. Buoyancy of the head rope is reduced to limit the vertical opening

Experimental fishing operation using short body shrimp trawl

Trials carried out along the coastal waters off Cochin with a prototype of short body shrimp trawl revealed considerable reduction in the fish catch due to the difference in relative swimming speed and vertical distribution profile of shrimp and finfishes.

The results indicate that there is a significant reduction in the mean catch per unit effort (CPUE kg. h^{-1}) of non-targeted bycatch which reduced from 9.75 kg.h^{-1} to 2.75 kg.h^{-1}. No significant reduction in the shrimp catch was noticed, when compared to the catches from a commercial trawl design.

Since no major investment is needed for adopting this technology, fishermen

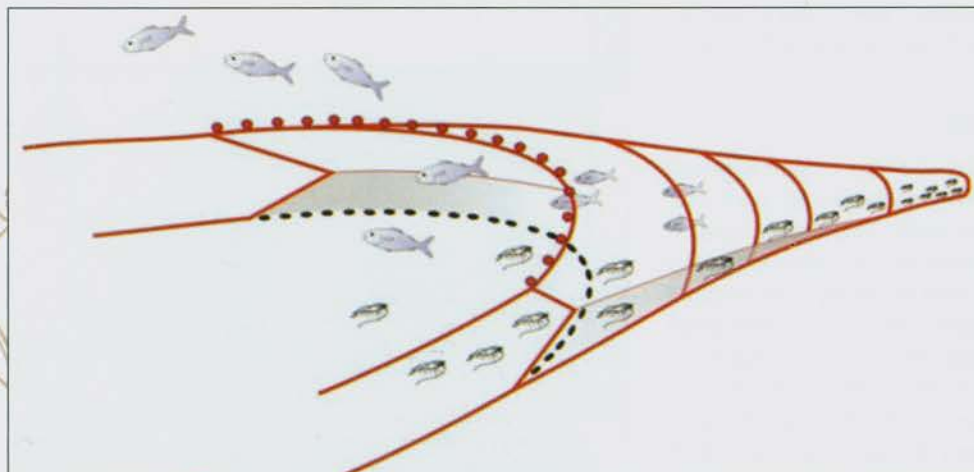


Fig.3. Finfishes escaping from the short body shrimp trawl due to better swimming speed (Artist's perspective)

will adopt the technology as there will be increase in shrimp catch and reduction in bycatch and also reduction in cost of fabrication due to reduction in the material required. Sorting time is reduced as the catch of non-target species is less and this will also increase the productive tow time and help in fuel saving. It is suggested that the use of selective shrimp trawl nets should be popularized for sustainable fisheries for the long term benefit of conservation of resources and protection of biodiversity.

- **Dr. V.R. Madhu, Dr. M.P. Remesan, Dr. P. Pravin and Dr. M.R. Boopendranath**

Fishing Technology Division, CIFT, Cochin

Box filtration unit for recirculation of water during depuration

Why depuration?

Food safety is a concern for consumers, food processors, and food system regulators because of the multiple health risks from food contaminants. Shellfishes, by virtue of their aquatic habitat concentrate microbiological/chemical contaminants or natural toxins in their gut. As people normally eat raw shellfish without removing the gut, they are likely to get ill, if the product is harvested from contaminated areas. Polluted oysters are made safe for human consumption by a process of purification known as 'Depuration'. The primary purpose of depuration is the removal of microbial contaminants. The process involves placing the harvested oysters in tanks of high quality water so that they purge any contaminants stored in their gut. It is usually undertaken because it is required by regional, national or local legislation but need to be applied by the industry to protect their customers, demonstrate due diligence, or to satisfy the requirements of legislation in other regions or countries in order to be able to export these products.

Why recirculation?

The minimum velocity within a shellfish depuration system is determined by the requirement of oxygen supply to the shellfish. If the velocity of circulation and hence frequency of recreation is too low, then insufficient oxygen will reach the shellfish. On the other hand, too high rate of circulation may result in localized turbulence and re-suspension of particulates. The particulate matter is considered to be hazardous because it may contain viral and bacterial particulates which can be re-ingested by the oysters if re-suspension occurs.

Avoidance of recontamination

A primary requirement for avoiding recontamination during depuration is the operation of a batch "all-in/all-out" system, with no more shellfish being added to the system once the depuration cycle has been started. This is necessary to prevent partially depurated shellfish being contaminated again by the material excreted from freshly introduced shellfish. It also prevents settled faecal material being re-suspended during the addition of further shellfish. It is necessary to use clean seawater both for the primary source of abstracted water, including relevant treatment, where necessary, and if seawater is recycled during a single depuration cycle, or re-used from one cycle to another. It has been shown that bacterial pathogens may survive in faecal strands and may subsequently be released into the overlying water. It would be expected that survival, and thus the potential for recontamination, would be greater with viruses due to their greater survival in seawater.

An adequate flow of water within the system is necessary to ensure that depurated faeces and pseudofaeces are taken away from the shellfish. At the same time, especially in recirculation systems, the flow must allow adequate settlement of the depurated material. If the flow is too much, the strands of material will be broken up and re-suspended in the seawater. Disinfection systems may not be sufficient to inactivate pathogens before they are recirculated and re-ingested. Therefore, it is absolutely essential to optimize the water flow so that there is a balance between disinfection and removal of depurated material and settling of solid particulate bodies.

Box filtration unit

The box filtration unit designed by the Quality Assurance & Management Division of CIFT is very efficient

Box filtration unit