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# मत्स्य प्रौद्योगिकी समाचार Fish Technology Newsletter

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## Contents

News from the Research Front	1
Publications	11
Training Programmes	11
Exhibitions	12
Outreach Programmes	14
Workshops and Seminars	14
Deputation Abroad	25
VIP Visits	28
Awards and Honours	30
Personnel News	30
Personalia	34
Publications Available from CIFT	35

## Editorial Committee

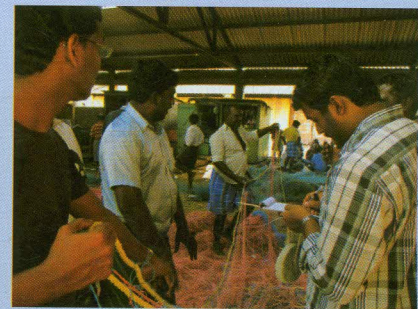
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## News from the Research Front

### First All India Technical Survey on Fishing Craft and Gear

The first all India baseline survey of marine mechanized fishing craft and gear and use of energy in the fishing sector of the country was successfully completed, for the creation of a database on fishing craft of India. A technical report was submitted by FAO experts to the Govt. of India in 1950's. The lack of a technical compilation of fishing craft and gear at the national level and a comprehensive database in this area has been a lacuna for many years which deterred policy makers and administrators from reaching conclusions for decision making. Marine fisheries have gone through significant changes since the 1950's and there has been enormous changes in type of fishing operations, number, capacities, catch and adoption of advanced technologies. Scientists, Research Scholars and Technical Officers from Fishing Technology Division of CIFT carried out this survey from 1<sup>st</sup> October 2012 to 30<sup>th</sup> September 2013. This was done as part of the project 'Green Fishing Systems for Tropical Seas' funded by National Fund for Basic, Strategic and Frontier Application Research in Agriculture (NFBSFARA).

The study covered the main fishing harbours and important landing centres all along the Indian coast including Lakshadweep and Andaman & Nicobar Islands. Twenty two maritime districts from the west coast and 15 maritime districts from the east coast and one typical centre each from the island territories were identified as survey locations based on the maximum number of fishing units operated as per CMFRI Marine Fisheries Census 2010, India (Fig. 1). Three to five fishing villages were covered under each



Field level benchmark survey conducted along the Indian coast

केन्द्रीय मत्स्यकी प्रौद्योगिकी संस्थान

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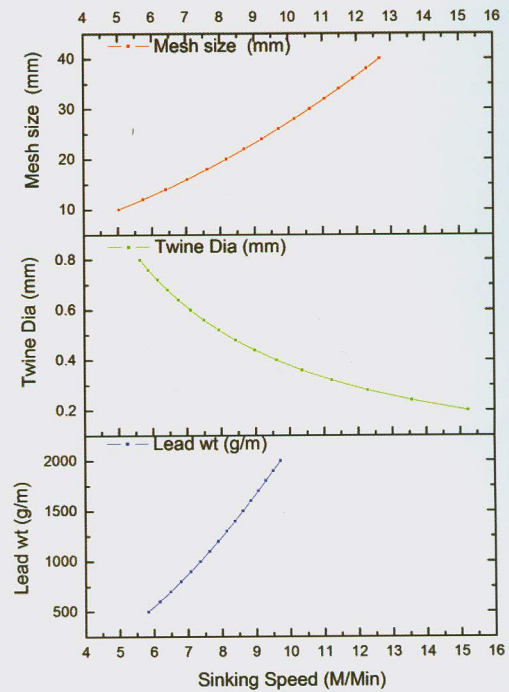
makes a straight path and at all depths the ring seine sinks at a constant speed.

$$\text{Sinking Speed (m/min}^{-1}\text{) (Z)} = \sqrt{\frac{G \times 2g}{\rho \times C_{d0} \times S}}$$

- G = Weight of ring seine material in water (webbing + accessories)
- g = Acceleration due to gravity (m/s<sup>2</sup>)
- ρ = Density (g/cc) of sea water
- C<sub>d0</sub> = Drag coefficient of knotted meshes
- S = Webbing surface area

The formula was applied for varying twine diameter, mesh size and lead weight as shown in the picture:

This method shows that mesh size, twine size, density of webbing material in water and sinker weight are the main factors influencing the sinking speed of ring seines commonly operated along the Kerala coast. Field trials with prototype designs are required for substantiating the theoretical findings.



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## Quality evaluation of monosex tilapia during ice storage

Tilapia species is currently one of the most popular cultivated freshwater fish in the world, to such an extent that they have been called the fish of the future. The most important producers of tilapia today are China, Egypt, Indonesia and Philippines. The advantages of tilapia are its rapid growth, resistance to various diseases and stress, tolerance to changing environmental conditions, and willingness to spawn in captivity. Very few studies have been conducted on the quality and shelf life of freshwater fish during ice storage conditions in contrast to the information available for marine species.

The common tilapia is normally highly prolific. As a

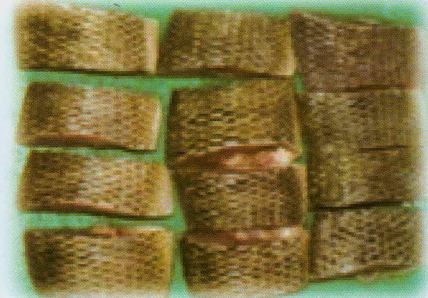
result, space and food become limited resources leading to a reduced growth rate or even stunting. Batches of young monosex tilapia can be obtained from tilapia breeders by utilizing techniques such as hybridization and hormones. When certain species or strains of tilapia breed with each other, the resulting batch of hybrids consist of a very low number of females or no females at all. Breeding of female *Oreochromis nilotica* (Nile tilapia) or *Oreochromis mossambicus* (Mozambique tilapia) with male *Oreochromis aurea* (Blue tilapia) or *Oreochromis hornorum* (Zanzibar tilapia) will result in all male tilapia offsprings. Such monosex tilapia will have comparatively better growth than common tilapia.



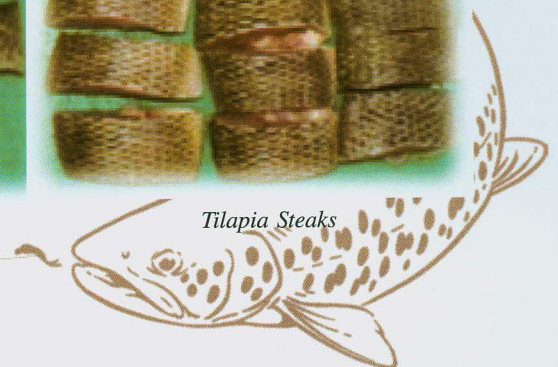
Whole cleaned tilapia



Gutted and cleaned tilapia



Tilapia Steaks





The purpose of this study was to evaluate the quality and shelf life of monosex tilapia during ice storage. Monosex tilapia having an average length and weight of about 22 cm and 266 g respectively was procured from a local culture pond. The sample was further made into three lots viz., whole cleaned (Sample A), gutted and cleaned (Sample B) and steaks (Sample C). All the samples were packed in polythene bags and kept in insulated boxes in iced condition. Ice was changed periodically throughout the sampling period and sampling was done at two days interval.

The proximate composition of tilapia was analyzed (Table 1). The fatty acid composition study indicated that oleic acid (33.28%) and palmitic acid (24.70%) were found in higher levels whereas caprylic acid (0.028%) was the most limiting one. The major class fatty acids in tilapia were the mono-unsaturated fatty acids (42.36%), which is mostly on account of the high content of oleic acid. It was also found that omega-3 fatty acid present in the sample was 7.15%. The amino acid analysis indicated higher levels of aspartic acid (16.15%), glutamic acid (22.52%), lysine

(15.64%) and alanine (15.74%), whereas tryptophan (0.03%) was the most limiting amino acid. Proline (1.05%), tyrosine (1.69%) and methionine (1.86%) were also found in low levels.

Quality parameters viz., pH, TBA, PV, FFA, TMA and TVBN as well as colour and texture were analyzed during the storage period. The moisture content of all the samples remained steady throughout the storage period whereas in all the samples there was a slight increase in pH values which may be on account of the bacterial action on fish during ice storage.

The TBA values showed an increasing trend during the storage. TBA increase was less in Sample A compared to Sample B and C. PV and FFA also showed increasing trend for all the samples indicating that oxidation of fish lipids is taking place during the storage.

Sensory evaluation was conducted based on the quality attributes like appearance, flavour, odour, texture and over all acceptability. The present study showed that whole cleaned samples (Sample A) had a higher shelf life of 27 day and Sample C had a marked off-taste towards the 19<sup>th</sup> day whereas Sample B was rejected on the 23<sup>rd</sup> day under iced conditions. The results indicated a gradual reduction in the quality during ice storage.

Monosex tilapia is getting popular and has high potential in the future market. Hence more studies need to be conducted on the quality and processing aspects of the species.

Table 1. Proximate composition of monosex tilapia

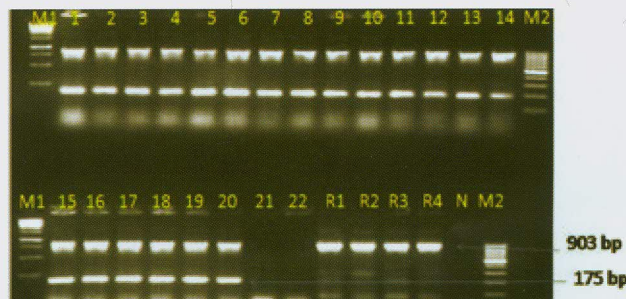
Parameter	Composition (%)
Moisture	73.44 ± 0.24
Protein	17.11 ± 0.16
Fat	6.75 ± 0.04
Ash	1.18 ± 0.01

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## Predominance of Enterotoxigenic *Escherichia coli* in seafood and aquatic environments of Kerala

*Escherichia coli* can cause wide variety of diseases in human beings including in infants of even after few days of birth. It is having great potential to colonize and reside in the intestinal tract of almost all the warm blooded animals including human beings. *E. coli* is transmitted mostly through contaminated water and food materials which is popularly called as feco-oral route of transmission. Contamination is mainly because of the anthropogenic activity near the water reservoirs such as rivers, lakes, drinking water sources etc. *E. coli* is used as an indicator organism for sewage contamination in water. So, its presence in the food reflects the poor sanitary hygiene and sewage water contamination.



M1-1kb marker, 1-22 *E. coli* isolates, R1- strain 11113, R2- strain 12568 R3- strain vt3, R4- strain O42, M2-100bp

Multiplex PCR for detection of enterotoxigenic *E. coli* targeting *pho A* (903bp), *Lt1* (275bp) *Lt2* (720bp), *St1* (175bp) genes

