Investigations on Long Distance Transportation of Fish-V, Transportation of Filleted and Round Seer Fish (*Scomberomorus* sp.) from Kakinada to Calcutta by Rail

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Iced seer fish (*Scomberomorus* sp.) was transported by rail in expanded polystyrene-insulated plywood boxes from Kakinada to Calcutta in round and fillet forms. While both withstood the rigours of transportation squarely, the fillets fetched only half the price of round fish in the auction conducted at the Calcutta market.

A detailed comparative study of the insulation efficiencies of 25.4 mm thick expanded polystyrene slab and double and quadruple layer jute fabric, all sealed in 150 gauge polythene sheets, when employed for transportation of several varieties of iced marine and brackish water fishes in second hand teachests by rail over long distances (about 1000 km–journey time: 40 h approx.) has been reported in the last communication of this series (Rao *et al.*, 1978). The comparative amenability of one particular variety of fish, namely, seer (*Scomberomorus* sp.) in round and fillet forms to transportation in 25.4 mm thick expanded polystyrene-insulated plywood boxes from Kakinada to Calcutta and their consumer appeal in the Calcutta market in terms of their auction sale values form the subject matter of the present study.

Materials and Methods

Freshly landed seer fish from gill net catches at Kakinada were procured and transported immediately to the laboratory. They were washed and the flesh flayed off with a sharp knife from both sides of the backbone. The knife was driven down to the vertebral column transversely about one cm below the gill slit. The cutting edge was then directed towards the caudal region and moved grazing the backbone so that maximum possible amount of edible matter was severed in one piece from one side of the skeleton. This was subsequently cut transversely into 2 or 3 pieces depending upon the size of the fish. The fillets were then washed free of blood, adhering fragments of entrails if any, loose hanging pieces of flesh and any extraneous matter. In the case of transportation in round form, the fish were washed clean and used as such. Packing, transportation and assessment of quality were carried out as described in the earlier communication (Rao *et al.*, 1978). After drawal of samples for analysis, the transported fish were sold in public auction through a public undertaking at Calcutta.

Results and Discussion

Number of experiments performed, quantity of fish used, results of analyses at both the despatching and receiving centres and auction at the latter centre are summarised in Table 1.

The fish samples were of excellent quality at the despatching centre, but the bacterial loads and TVN values were comparatively more in the fillets than in the round fish. These are to be expected since filleting exposes large areas of the flesh which readily take up bacterial contamination

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Table 1. *Analytical results and auction rates of whole and filleted seer fish*

Particulars	Despatching centre		Receiving centre	
	Whole	Fillets	Whole	Fillets
Number of experiments	12	6	12	6
Weight of fish (kg)	917	105	917	105
Total bacterial count/g	3.8178	4.7326	4.9347	4.7928
(mean log values)	(0.277)	(0.375)	(0.686)	(0.218)
Total volatile nitrogen	10.15	15.8	16.88	20.65
mg/100 g (mean)	(1.7260)	(2.1863)	(4.3187)	(1.8436)
Organoleptic quality	Good	Good	Fair	Fair
Auction sale rate Rs./kg (mean)			1.88	0.86
			(0.5757)	(0.4620)

Figures in parentheses are standard deviations

from the washing water, holding utensils, table and other surfaces with which they come into contact, accompanied by consequent release of small quantities of volatile bases. This is in close analogy with the state of affairs obtaining in the prawn processing industry, where the peeled and deveined prawns which have got their entire flesh exposed, exhibit considerably higher bacterial counts than headless prawns, where only the cut ends at the head regions are exposed. At the receiving centre, the increase in total bacterial count of the round fish is significant, slightly above one log value, while the fillets do not exhibit any increase at all. This may be due to the initial bacterial loads in the intestines and gills of the round fish gradually proliferating during the transit period at both ends and in the train and finding access into the flesh, while such a contingency does not arise in the case of fillets. Being much thinner than round fish, quicker cooling takes place in fillets in contact with the crushed ice, which retards bacterial multiplication. Both round fish and fillets show almost the same bacterial loads at the receiving centre. TVN values in both round fish and fillets show reasonable increases; but not significant enough to indicate any appreciable degree of spoilage. From these as well as the organoleptic observations recorded, it can be concluded that both round and filleted seer fish withstand the transportation squarely, arriving at the destination in comparably good state of preservation.

However, the most striking difference is observed in the case of auction of the above forms at the Calcutta market, fillets being sold at less than half the price of round fish. Considering the fact that approximately 50% filleting losses occur due to elimination of heads, entrails and vertebral columns, one kg of fillet at the receiving end is equivalent to 2 kg of round fish. Hence the price realisation in the case of fillets in effect is only 25% of that of the round fish.

It is a known fact that top preference in the Calcutta market is always for fresh water fishes, followed by brackish water and marine fishes in the order. This has been amply borne out by earlier experiments conducted under the All India Co-ordinated Research Project on Transportation of Fresh Fish. While fresh water fishes like catla, rohu and silver carp netted sale values upto Rs. 12.41/kg, brackish water varieties like chanos and mullet could fetch only a maximum of Rs. 7/kg, average value lying between Rs. 3 and Rs. 4/kg and marine fishes were sold for even as low as 40–50 ps/kg (Anon, 1977, 1978). The present study shows that filleted fish command comparatively poorer demand at Calcutta than the same species in round form. From the points of view of scientific principles and

economy in transportation expenses, filleting has to be advocated, since in the first place this step removes all the carriers of micro-organisms like gills and intestines, which are all unwanted materials, thereby preventing entry of the organisms from this source into the edible flesh. The digestive enzymes, present in the entrails are also eliminated reducing the danger of their attacking the fish muscle. Secondly, filleting gets rid of other unwanted parts like heads and skeletons, thus concentrating the edible material in bulk, facilitating handling and transportation as well as effecting economy in the freight charges due to the following reasons: (1) It is more convenient and easy to pack fillets than round fish because of their shapes and dimensions. (2) Quantity of ice required to pack the fillets is about 50% of that required for round fish because of the reduction in volume of the material. (3) In fillet form, material equivalent to more than double their weight of round fish can be packed in the same size of container due to the same reasons as in (2). (4) Weight to weight more edible material is carried for the same freight in the fillet form. (5) Ultimate savings in transportation charges are considerable. However, this study shows that the consumers' acceptance/aesthetic sense is to be given preferential consideration than scientific principles or economy of transportation from the traders' point of view.

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