

Filleting of Fish and Utilization of Filleting Waste

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A manual method of filleting of different varieties of fishes, yields of skin-on and skinless fillets that can be obtained from them, levels of recovery of picked meat from the filleting waste and the utilization of the latter for the production of fish meal have been reported in this communication. The compositions of meal thus prepared are also given.

Indian fish landings consist of several species of fishes like cat fish (*Tachysurus* sp.), Indian halibut (*Psettodes erumei*), jew fish (*Pseudosciaena* sp.) etc. which can be processed into fillets with good consumer acceptability. At present filleting of fish is done only on a limited scale in our country, though fish fillets fetch good price in markets within the country and abroad. Very little research work has been carried out on the filleting of fish in our country. Menon & Samuel (1975) studied the production and economic aspects of marketing picked meat (minced meat) from trash fish and fillets from a few varieties of fishes. The freezing and storage characteristics of fresh and iced skin-on fillets of seer have been studied by Shenoy (1976). Devadasan *et al.* (1978) studied the frozen storage characteristics of fillets from six species of fresh water fishes. However, filleting of fish has not been adopted by the trade, the main reason being the non-availability of technological know-how regarding the process, information regarding the yield of fillets and the utilization of sizable quantities of the waste that is left behind. Mechanical devices for filleting and skinning are not available in our country and the imported machineries are very expensive. Further, sufficient raw material will have to be made available to feed and operate these machines economically.

This paper reports the studies made at CIFT on hand filleting and skinning of different varieties of fishes, yields of fillets obtainable from them, the possibility of recovery of picked meat from the filleting waste and utilizing the waste for the production of fish meal.

Materials and Methods

The fishes used for the study included cat fish (*Tachysurus* sp.), Indian halibut (*Psettodes erumei*), perch (*Lutianus malabaricus*), kalawa (*Plectoropomus* sp.), milk fish (*Chanos chanos*), ribbon fish (*Trichiurus* sp.), seer fish (*Scomberomorus guttatus*) and jew fish (*Pseudosciaena* sp.). These were obtained in fresh condition from the landing places at Fort Cochin or from the Integrated Fisheries Project's vessels. The fishes were brought to the laboratory immediately after landing, washed in potable water, stored in crushed ice and used for filleting.

Hand filleting was adopted and an outline of the general method of filleting is given below.

1. Graded the fish according to size and weighed.
2. Removed scales if any and viscera and washed in potable water.
3. Placed the fish on its side on the filleting table and driven in a sharp knife vertically from just behind the base of the pectoral fin until it touched the main bone at the back of the head. Tilted the knife towards tail and slid it along the line of the dorsal fin and removed the fillet.
4. Turned the fish over and separated the fillet from the other side exactly as described above.
5. Trimmed the fillets to remove belly flaps, fins etc. and weighed.

Table 1. *Yield of fillets, picked meat and waste meal from different varieties of fish*

Name of fish	Size grade g/fish	Yield on the basis of whole fish			
		Skin-on fillets %	Skinless fillets %	Picked meat %	Waste meal %
Cat fish	400-750	31.1-33.4	25.0-28.0	8.9-9.7	13.5-17.1
Indian halibut	450-1096	48.6-51.2	37.1-39.7	7.2-8.4	10.3-11.7
Perch	2060-2530	38.7-39.5	30.2-31.6	5.9-6.3	10.4-12.2
Kalawa	1250-2650	38.4-39.9	31.2-32.0	5.7-7.1	18.0-19.7
Milk fish	756-819	49.1-50.6	39.5-40.6	6.8-8.4	15.4-17.0
Ribbon fish	450-630	36.0-37.8	29.1-30.4	8.2-9.4	10.8-12.6
Seer fish	3500-4255	51.2-52.7	45.0-47.5	6.7-7.5	10.6
Jew fish	142-156	41.1-42.2	33.6-34.8	6.3-6.6	10.92-11.8

Table 2. *Composition of filleting waste meal*

Name of fish	Moisture %	Total ash %	Acid insoluble ash %	Fat %	Crude protein % (TN x 6.25)
Cat fish	6.67	29.27	0.08	20.62	43.94
Indian halibut	5.39	22.62	0.09	15.54	56.24
Perch	4.91	32.63	0.10	6.54	53.90
Kalawa	6.40	33.82	0.14	4.34	53.07
Milk fish	5.29	18.56	0.13	29.55	45.47
Ribbon fish	7.22	32.83	0.04	7.94	51.13
Seer fish	3.36	17.97	0.06	27.06	50.37
Jew fish	5.50	28.39	0.06	9.62	54.44

To remove the skin cut nick in tail of the fillet using a thin bladed knife longer than the width of the fillets. Angled the knife slightly downwards and pulled skin across the knife while at the same time making slight saw cutting movement with the knife.

Washed the skinned fillets thoroughly in water, allowed to drain for 5 minutes and weighed. Calculated the percentage yields of skin-on and skinless fillets.

The filleting waste contained considerable quantity of meat which could be recovered by suitable method. The meat adhering to bones and that present in the head portions were separated by a hand operated meat bone separator and the quantity of meat recovered in respect of different types of fishes noted.

The filleting waste after recovery of meat was cooked in an autoclave at 112°C

for 30 min, the cook drip drained off and residue dried as such either in the sun or in the tunnel drier (temp. 50–55°C). Fat was not removed by pressing. The dried material was powdered and used for further analysis. Moisture, fat, total ash, acid insoluble ash and crude protein were determined by the methods of AOAC (1960).

Results and Discussion

Table 1 gives the yields of skin-on and skinless fillets (without belly flaps), picked meat from the filleting waste and meal obtained by cooking, drying and pulverising the waste in respect of different species of fish studied. Maximum yield of skin-on and skinless fillets were obtained from seer (51.2–52.7 and 45–47.5% respectively) and the minimum from cat fish (31.1–33.4 and 25–28% respectively). Manual filleting worked well with all the varieties of fishes studied and the yields obtained were good. Appearance of the fillets was quite attractive in the case of both skin-on and skinless fillets. A skilled worker could fillet and skin 10–12 kg of fishes like cat fish, perch or milk fish per hour.

During the filleting process, the belly flaps are separated from the whole fillet as they are liable to discolour on subsequent storage. Their removal imparts an attractive appearance to the fillets. The belly flaps can be sold on the subsistence market, while the fillets would command a much higher price in the luxury market.

The maximum quantity of picked meat recovered from the filleting waste ranged from 8.4 to 9.7% in the case of cat fish, milk fish, ribbon fish and Indian halibut showing that considerable quantity of meat is left

behind on the bones and in the head portions, while in others it varied from 5.7 to 7.5% on the basis of whole fish. The yield of waste meal obtained by cooking, drying, and pulverising the filleting waste (after recovery of picked meat) was 18 to 19.7% from kalawa and the other fishes showed wide variations from 10.3 to 17.1%.

The compositions of the meal are given in Table 2. It can be seen that the crude protein content of the meal prepared from the filleting waste of many of the fishes studied was above 50%, which is the protein content of grade 2 fish meal (IS:4307–1967). But in the case of cat fish and milk fish the protein contents of the meal were 43.94 and 45.47% respectively. The acid insoluble ash of the meal was quite low in all the samples. The fat content of the meal was high in some of the samples (cat fish, seer fish and milk fish). This is due to the fact that the meal was prepared without pressing the cooked filleting waste.

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References

- AOAC (1960) *Official Methods of Analysis*. 9th edn., Association of Official Agricultural Chemists, Washington
- Devadasan, K., Varma, P. R. G. & Venkataraman, R. (1978) *Fish. Technol.* 15, 1
- IS: 4307–1967 *Specification for Fish Meal as Livestock Feed*, Indian Standard Institution, New Delhi–1
- Menon Devidasa, M. & Samuel, G. E. (1975) *Sea Food Export J.* 7, 15
- Shenoy, A. V. (1976) *Fish. Technol.* 13, 105