PROCESSING THE FLESH OF THE PEARL OYSTER

(*Princtade vulgaris* Schum)

by

C. Gunasekera

Research Chemist, Fisheries Research Station,
Colombo, Ceylon.

ABSTRACT

The processing of the pearl oyster for food involves the separation of its adductor muscle and the rapid sun-drying of this fleshy portion. The unused parts of the oyster (which include the mantles) may be processed separately for pearls. When weather or handling conditions do not permit quick drying, the oyster muscles can be stored in a saturated salt solution till they are ready for drying. The processed material is a palatable food and a good source of protein and can therefore be recommended for inclusion in the local diet.

INTRODUCTION

Recent surveys of the Ceylon Pearl Banks in the Gulf of Mannar have revealed the presence of considerable numbers of mature oysters (Sivalingam 1958, p. 320). The extent of the beds indicate that there is every possibilty of holding an oyster fishery during the calm season of each year for several years to come. Oysters have been fished so far only for the pearls they may contain. The flesh of oysters is edible and nutritious (Tressler & Lemon 1951; pp. 572-574) but it is not a popular food in Ceylon mainly because oysters are not available on the market. If oyster flesh can be successfully marketed, oyster fisheries could be held for the purpose of providing food as well as pearls or even for food purposes alone. As a first step, experimental work was directed towards finding a simple method of preserving oyster flesh for the local market.

MATERIALS AND METHODS

The pearl oysters in a sample from the fishery of 1958, had an average weight of 60 g. each, amounting to 760 oysters per 55 kg. The oysters had a total flesh content of approximately 15% while the adductor muscle alone formed 11% and the shells 65% of the total weight. Analysis of the flesh showed a protein content of approximately 19% with 74% moisture, 2% ash and 2.5% fat leaving a balance 2.5% for carbohydrates. A knife was used to manually separate the flesh from the oyster either while fresh (alive) or after boiling for about 5 minutes. The flesh was then dried in the sun either directly or after salting.

EXPERIMENTAL RESULTS

Oysters with only their shells removed could not be processed as the presence of viscera caused decomposition of the flesh. The retention of mantlefolds, which dried into shrivelled skinny appendages, lowered the visual appeal of the product a great deal. Therefore the adductor muscle which forms a central compact flesh mass, was the only portion judged fit for processing. The experimental results obtained are given in table below.

The muscle could be separated manually from the rest of the oyster at the rate of 200 pieces per man-hour when the oysters were handled fresh (alive) and at a rate of 215 per man-hour after boiling the oysters.

TABLE OF RESULTS

	Type of Muscle			
	Fresh	Fresh Salted	Boiled	Boiled Salted
Rate of separation of meat per man hour	200	—	215	—
Wt. (g.) of meat per 100 pieces	740	—	340	—
% of total oyster	11	—	5	—
% moisture before drying (only approximate as flesh drips)	74	61	66	48
% Moisture after drying	7	5	6	8
% Protein after drying	65	34	62	38
% Salt after drying	—	35	—	33
% Ash (not salt) after drying	14	12	10	7
% Fat after drying	1	1	½	½
% Carbohydrate after drying	13	13	21	13
Wt. (g.) of meat per 100 pieces after drying	150	240	110	150

Boiling reduced the slime but shrank the flesh considerably as the muscles weighted 740 g. per 100 when removed from fresh oysters and 340 g. per 100 from boiled oysters. The fresh muscle constituted approximately 11% and boiled muscle 5% of the total oyster.

The fresh muscle had a moisture content of 74% and dried out to 7% moisture in a few days of sun-drying. The dried flesh weighed approximately 150 g. per 100 pieces and contained about 65% protein. The fresh muscle when salted for two days in a brine containing solid salt (maximum salting) reduced its moisture content to 61% and sun-drying gave a final product of 5% moisture weighing 240 g. per 100 pieces. After salting the muscles dry faster if given a preliminary quick rinse to wash off accumulated slime. This product gave salt and protein values of approximately 35% each.

The muscles from boiled oysters had a moisture content of 66% which on sun-drying was reduced to 6% with a weight of approximately 110 g. per 100 pieces. After salting for two days in brine containing solid salt, the boiled muscles had a moisture content of 48% and on sun-drying this was reduced to 8% with a weight of approximately 150 g. per 100 pieces. These products gave figures for protein and salt similar to those found in the corresponding products from fresh muscles.

When washed and cooked, all preparations gave palatable products. However, in the case of boiled muscles which were salted before drying, the flesh broke up on cooking within 3 to 5 minutes to form a pulpy mass showing that the product had been over-processed.

When stored exposed to the atmosphere, all products showed signs of change after two months. The dried product from unboiled, unsalted muscle, had developed a fungus and a putrid odour and had increased its moisture content to 28, showing that decomposition had set in. The other three products were undecomposed, but had increased moisture contents as follows: 20% in boiled unsalted muscle, 27% in boiled salted muscle and 32% in unboiled salted muscle.

For long storage, therefore, the products must be protected against moisture by the use of air-tight packs or humidity-controlled storerooms. If the products are stored unprotected

quality may be maintained by the expedient of re-drying the products at intervals. The intervals have to be judged by the appearance of the product and will depend largely on prevailing weather conditions.

DISCUSSION

As the central muscular portion alone is to be processed for food, the rest of the oyster can be worked on separately for the recovery of any pearls it may contain. Most of the pearls of commercial value are found in the mantle and viscera (Herdman, 1906: pp. 16 and 30) and this means that it may be commercially feasible to ignore the pearls which may be situated in the central adductor muscle.

Boiling the oysters before separating the muscles increases the speed of handling very little even when the operators are compartively unskilled. Boiling reduces the weight of the final product showing that some solids are dissolved out in this process. Finally a boiled muscle cannot be salted without danger of disintegration on cooking. The expense and labour to boiling oysters can therefore be dispensed with, making the process more ratisfactory for working on beaches near the fishery.

Drying without salting yields a product which is reasonably stable. The chief disadvantage in this process is that the sun-drying has of commence immediately on separating the muscle. Further, the separation of muscles has to be timed for the early morning to provide sufficient hours of direct sunlight for satisfactory drying.

When dealing with large quantities of oysters or in cloudy weather, salting will become necessary. When oyster flesh is placed in a saturated salt solution, it can keep for indefinite periods before drying. Salting increases the weight of the final product which may be an advantage in the market.

The protein content of the unsalted dried product is very high being about 66%. In the salted product, the presence of salt reduces the protein value down to about 35% which is still a satisfactory figure. The possibility of adding a portein-rich food to the local diet is a powerful argument for introducing oyster flesh in the Ceylon markets.

REFERENCES

1. Herdman, W.A. (1906): *Report to the Government of Ceylon on the Pearl Oyster Fisheries of the Gulf of Mannar.* Publ. Roy. Soci. London, V: 1-42.

2. Sivalingam, S. (1958): Survey of the Pearl Banks of Gulf of Mannar 1955. *Indian J. Fisheries,* V (2): 308-325.

3. Tressler, D. M. and J. Mc. W. Lemon (1951): *Marine Products of Commerce.* 2nd Edition xiii + 782 pp. Reinhold Publishing Co., U.S.A.