

4. PROCESSING, QUALITY CONTROL AND UTILIZATION OF BECHE-DE-MER

IMPROVED METHODS OF PROCESSING HOLOTHURIANS FOR BECHE-DE-MER

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ABSTRACT

The value of *beche-de-mer* depends on the quality and method of processing. The present day processing leaves much to be desired. At present holothurians in India are processed in the same manner. The hygienic conditions of processing holothurians are not satisfactory. Improved methods for processing of different species of holothurians are given in the paper.

INTRODUCTION

The value of *beche-de-mer* depends upon the quality. The quality depends on the method of processing. At present there are lot of defects during processing. All species of holothurians in India are now processed in the same manner. The processing in hygienic conditions are not upto the mark and fetch poor price when compared to the material from other countries. Hornell (1917) was the first person who gave several suggestions for the improvement of quality of *beche-de-mer*. Durairaj (1982) and Durairaj *et al.* (1984) evolved quality standards for *beche-de-mer*. Recently James (1986) suggested methods for quality improvement in *beche-de-mer*.

FACTORS CONTROLLING QUALITY

The quality of *beche-de-mer* mainly depends on the species used, size, shape, appearance, colour, odour and moisture content. Many of the above factors can be controlled during processing. Presently the processing is with the hands of unscrupulous profitters who not only process them under unhygienic condi-

tions, but resort to adulteration of the product to make quick money.

The processing has been introduced by the Chinese nearly 2000 years ago and supervised under their watchful care. Slowly in order to make profits, processors restored to short-cut methods at the expense of quality.

Species

Only about ten species are of commercial value from India. Among them the teat-fish *Holothuria nobilis* ranks first, as it commands maximum price. Prickly red-fish *Thelenota ananas* ranks second, black-fish *Actinopyga miliaris* ranks third and the sand-fish *Holothuria scabra* which is the most common species for processing ranks fourth in quality.

Size

Size is the most important criterion to fix the quality and price. The first grade quality is above 12 cm when processed. Though small sized forms have some demand, they fetch very low price. Longer, sturdier and stouter ones fetch higher prices than shorter, slender and flexible ones. The sea-cucumbers usually shrink to one third the size on processing.

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Appearance

Price is controlled mainly based on appearance. The appearance of a product should be neat and free from any dirt, sand and also from white chalky deposits. The presence of white chalky deposits is due to improper processing. Such material needs to be re-processed. Those which have tear markings, lesions on the skin fetch low prices. The cut made for degutting should be neat and straight.

Shape

The shape of *beche-de-mer* depends upon the species used. Neat, cylindrical forms are preferred. Some species like teat-fish and prickly-fish have characteristic projections in the end product also. These help in identifying the species of the product.

Colour

Traders prefer darker coloured products since the consumer believes darker ones are the true sea-cucumbers. Unscrupulous persons resort to colouring the material with bark of mangroves. This should be avoided and checked.

Odour

Clean and thoroughly dried product has no odour at all. Care should be taken to see that moisture content is around 8 to 10%. The product is hygroscopic and absorbs moisture and gives a foul and offensive smell. This can be avoided by thorough drying and packing in polythene bags. *Beche-de-mer* should never come in contact with fresh water since it spoils the material.

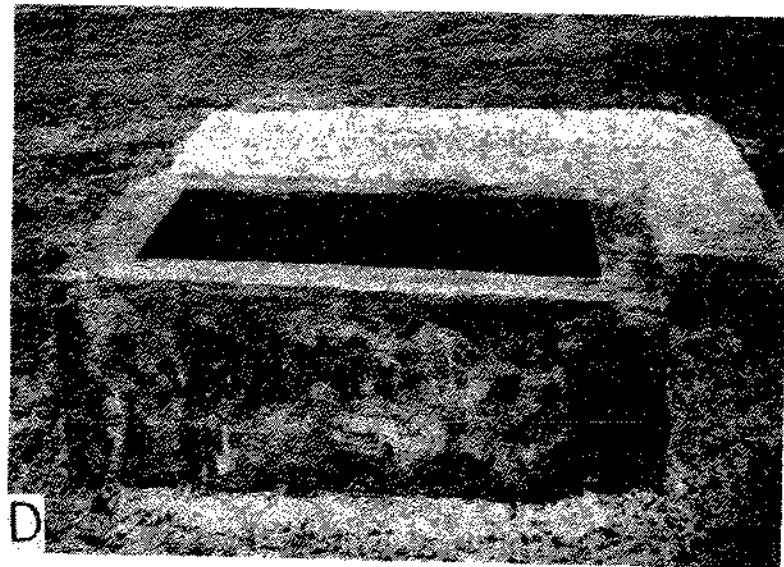
IMPROVEMENT IN HANDLING

Handling the catch on board in a proper manner is foremost in improving the quality of the product, reducing the losses during processing and ensuing cleanliness and hygiene. As soon as sea-cucumbers are brought to the boat (Pl. I A) a slit of 2 to 3 cm is made through the cloaca and the animal is held out of the boat so that eviscerated material falls into the sea. This way the final product also remains neat and clean. The sea-cucumbers should never be

kept in palm leaf baskets and net bags since the animals closer to the holes shape into them. It is best to keep the sea-cucumbers in a plastic fish box or trays having a smooth interior surface and drain holes of 1 cm diameter or less. If the holes are larger the animals that are closer to the holes shape into them and the holes get blocked. The box should be cleaned prior to placing of the animals as dirt and sand particles become embedded into the body wall. If coral bits and algal pieces are found attached to the body they should be removed and the animal is cleaned in sea water before placing them inside the box. Sand-fish can be placed one above the other and they flatten out while alive. In case of teat-fish a single layer is preferable. If stacked one above the other the outer skin of the body wall tends to break and after processing these appear as tear marks down grading the product. Prickly-fish needs special care as the tubercles get damaged if handled improperly. After capture the sea-cucumbers should never be exposed to sun as the top layer of the animal dries up and starts peeling off. The surface of the boat makes an imprint on the animals bringing down the quality of the final product. Nets should not be present on the deck of the boats since the animals easily get entangled. As far as possible the animals should be processed soon after they are brought to the shore. If they are kept overnight in fish boxes the animals become weak and this affects the quality of the product. If they are kept in pens lesions due to higher temperature form on the outer skin of the body wall leading to breakage of the body wall and softening.

PRECAUTIONS DURING PROCESSING

During processing a number of precautions have to be taken to ensure a high quality product. The sea-cucumbers should not be kept in sea water and then boiled since heating causes both outside and inside water of the animal to boil. Pressure builds up inside and the body wall bursts. The correct method should be first the water should be boiled over high flame and the animals should be introduced one by one. This way the animals are quickly killed in a few seconds. The animal assumes cylindrical shape which is the most preferred one in the market. It is necessary to keep the products well stirred



IMPROVED PROCESSING METHODS FOR BECHE-DE-MER

PLATE I A. Degutting of holothurians, B. Saucer-shaped cast iron pan for boiling holothurians (back view, the hole seen serves as an outlet for smoke), C. Sea-cucumbers kept in a pit lined with gunny bag and D. Burying pit and drying platform constructed for demonstration purpose.

during boiling. The material should be well rolled during boiling. This makes the product perfectly cylindrical. The shape of the pan used for boiling also determines the quality. A saucer-shaped shallow pan (Pl. I B) made of cast iron is most suitable since it distributes heat uniformly to all animals. Aluminium vessel is also used for hygienic processing. The most important factor in boiling is to keep intense heat. Slackness or relaxation is detrimental to the product. Eviscerated holothurians should not be added in bulk to the boiling water since it quickly brings down the temperature. They should be slid along the edges of the saucer-shaped pan one by one. Cleaning of the sea-cucumbers after boiling is necessary. Fine mud gets embedded in the outer body wall of the dorsal and lateral surfaces. These have to be removed to have an acceptable product for the market. The traditional method involves bacterial decomposition of the outer layer which scrubbed off to remove the outer mud embedded layer and the pigmented layer. Bacterial decomposition is activated by allowing the bacteria from the sand to odour the sea-cucumber. After boiling, the sea-cucumbers are cooled and kept inside pits lined with gunny bag (Pl. I C) on the beach and covered by sand. Bacteria multiply fast and eventually cover the entire surface of the body and they penetrate inside the body wall. It is just enough if the bacteria penetrate 2 mm or so. Therefore duration of time for keeping the sea-cucumbers inside the pits is an important factor. If kept for longer period the body wall may become too soft for further processing. If the material is not moist at the time of burying, bacterial action may be slow and decomposition inadequate. Proper care should be taken for selecting the site for burial. Most beaches near villages are polluted with faecal matter. Not all beaches are sandy and tidal waters move in and out at certain areas. Therefore clean sandy beaches with little human activity are the best sites. First boiling should be for 45 minutes, stirring should be continued at every 3 to 5 minutes interval. The material removed from the pan should first be allowed to cool on the sand. The pit for burying should be cleaned, sandy beach 100 cm long, 75 cm wide and 30 cm deep and as far as possible with even floor. The sea-cucumbers should be arranged in single layer and they should be packed densely and covered with

jute hessian sac after sprinkling water on the sac the pit is closed with sand and marked. After thorough cleaning those which still have white patches of calcareous deposits are once again boiled and the whole process is repeated. In recent times a de-scummer is designed by Sachithanathan *et al.* (1975) to remove the chalky deposits. About 100 sea-cucumbers can be cleaned in 5 minutes using a de-scummer with a chamber 1 m diameter and 0.45 m in height and the base plate rotating at a speed of 120 revolutions per minute motivated by a 3 H. P. Electric motor. The cleaned product is once again boiled for 45 minutes to kill all the remaining bacteria. The product is now put out for drying on drying platforms or trays in the sun. The product should never be dried on sand since sand particles stick to them and are difficult to remove later and this will bring down the quality of the product. They can also be dried on palmyra mats. The product should never be kept out when drizzling. During rainy season smoke driers can be used since the product is hygroscopic it should be put in the sun now and then to keep the moisture level low. However smoked product is not preferred. Around 8 to 10% moisture content seems to be the best level.

PACKING AND FORWARDING

Packing and forwarding is an important aspect in quality control. The product has to be packed in cardboard box cartons lined by polythene. This will help in extending shelf-life and also it is easy to stock them. This way handling during transport is easy and shipping lines also accept them as hold cargo. If they are packed with jute-hessian sacs lined internally with palm leaves the shipping lines will accept only as deck cargo. The product will absorb moisture and will be spoiled. The shipping lines do not prefer to keep this cargo inside and this is a limiting factor. The internal lining of palm leaf oven mat protects the product when carried in open deck and covered by canvas from sea spray, rain spray, etc. This is not a desirable way of packing. If *beche-de-mer* could be sealed inside the polythene bag after a good day of drying, the chances of moisture absorption is reduced. To prevent tear in the bag it could be kept inside an appropriate box carton. Storage life of the product could be extended this way.

MALPRACTICES TO BE CHECKED

Malpractices have to be checked during processing at any cost. In order to increase the weight of the product, processors often resort to processing the smaller forms with sand inside. Apart from getting a low grade product they are often rejected since they are full of sand inside. Processing smaller forms will deplete the stock since the animals do not have any chance to breed even once. In order to increase the weight of the product, the processors sometimes mix up

sand-fish with lolly-fish *Holothuria atra*. Lolly-fish has toxin which fortunately breaks down during boiling. In order to make the product free from all white chalky material some persons add hydroxide during second boiling. Such products are dangerous to consume from the health point of view. Also many holes are found in the material to reduce the value of the product is lost. At times the processors resort to colouring the material by using the bark of mangroves since darker material commands higher price. This malpractice has to be checked.

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