

PURIFICATION OF LIVE CLAMS FOR PROCESSING

K. K. Balachandran and P. K. Surendran

Central Institute of Fisheries Technology, Cochin-682029

UNTIL recently, clam meat was used only on a very limited scale, for human consumption and that too, only in areas adjoining clam collection centres. Processing of clam meat for long term preservation did not practically exist. Long back, canning of clam meat was attempted by M/s. Mermaid Foods, Calicut (Sebastian, 1970). Technological process for canning as well as freezing of clam meat have already been developed (Balachandran and Nair, 1975; Chinnamma George, 1974). During the "Lab-to-land" programme of the Central Institute of Fisheries Technology, Cochin,

a process involving low cost technology was developed for preparing pickle from clam meat (Vijayan *et al*, 1982) and demonstrated extensively in the field. As a result of several research, development and promotional activities, an awareness has been created regarding the importance of clam meat as a protein rich food and its potential for processing into different products which could command domestic as well as export markets. In recent years, clam meat processed in different styles has entered the export market. (Table-1)

Table-1
EXPORT OF PROCESSED CLAM MEAT FROM INDIA

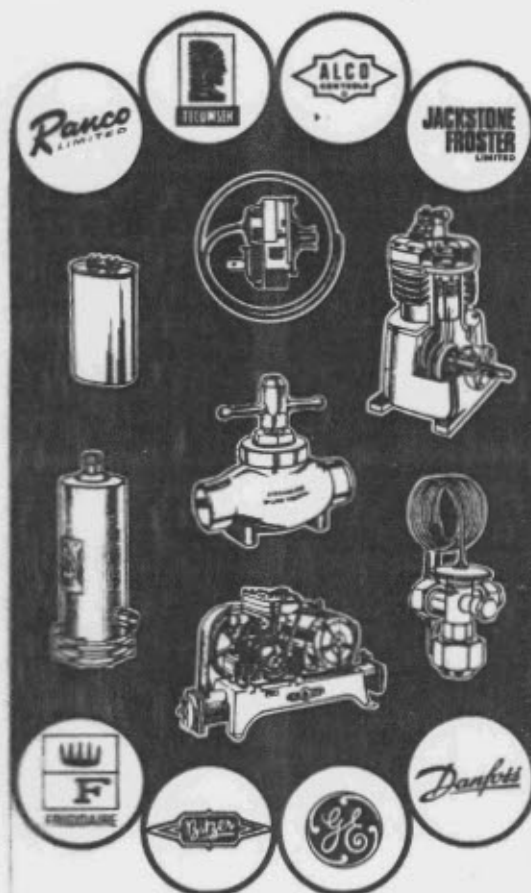
Item		1981	1982
Clam meat pickle	Q	1600 Kg.	9192 Kg.
	V	Rs. 28,212/-	Rs. 61,416/-
Frozen clam meat	Q	16,000 Kg.	398,000 Kg.
	V	Rs. 1,11,000/-	Rs. 84,79,000/-
Canned clam meat	Q	10,070 Kg.	—
	V	Rs. 1,85,794/-	

Q = Quantity

V = Value

Source: Marine Products Export Review, 1982, Marine Products Export Development Authority, Cochin-16.

Everything For Freezers Cold Storages, Ice Plants & Refrigeration Equipments.....



IMPORTERS AND STOCKISTS OF
Refrigeration Equipment such as Contact
Freezer Plates, Open Type Compressors for
Plate Freezers and Cold Storages, Air
Handling Units and Defusers, Solenoid
Valves, Expansion Valves, Thermostats,
Dial Thermometers, Gauges, Copper Tubes,
Globe Valves, etc.

UNIVERSAL COMMERCIAL CO.
17, COMMERCE HOUSE, ROPE WALK LANE,
OFF FORBES ST., FORT, BOMBAY 400 001
Cable: 'UNICOMMER' Phones: 272416, 271054

Clam fishery of Kerala is predominantly supported by *Villorita* sp. and *Meretrix* sp. Clam meat is rich in protein besides containing considerable quantity of glycogen, which is responsible for its characteristic sweetish taste. (Table-2)

Table-2
PROXIMATE COMPOSITION OF
RAW CLAM MEAT

Moisture	78.50%
Fat	2.52%
Protein	10.09%
Ash	0.86%
Acid insolubles (Sand)	0.38%
Glycogen	6.68%

Clams are "filter feeders" dwelling on the muddy bottom of lakes and seas. Their stomach will usually be loaded with mud and sand, besides bacteria, such as coliforms and salmonella, depending on the environmental conditions. If not expelled, the gut contents will impart grittiness and muddy taste to the meat and can cause infections and food poisoning due to bacteria. Therefore, a cleansing operation to free the clams from sand, mud and bacteria is an essential step before utilizing clams for processing.

A biological method involving starvation in water helps in achieving depuration of live bivalves (Novak, 1970; Stroud, Torry Advisory note-84). Balachandran and Nair used this technique for depuration of live clams for canning the meat. A process of starvation of live clams in water from its natural habitat and its effect on the extent of

expulsion of sand and improvement in bacterial quality have already been worked out (Balachandran and Surendran, 1984). The salient details of the process and important findings are as follows.

Live clams (*Villorita cyprinoides*) were collected from Vembanad lake near Vaikom. Water, mud and sand from the same clam bed were also collected. After cleansing the surface of clams by a jet of water, they were kept for starvation immersed in the clean lake water. In another set of experiment, clean lake water chlorinated at 5 p. p. m. level, was used for starvation of the clams. The process of this starvation was continued for 48 hours. Samples were drawn at intervals and analysed for sand content of the meat and the changes in the bacterial content, including pathogens.

In table 3, the bacterial quality and sand content of the raw clam meat (before depuration), water and the mud from the clam bed are given. The starvation of clams in their natural habitat water significantly improved their bacterial quality and removed almost the whole of sand, as shown in table-4. However, depuration in chlorinated water did not achieve the level of improvement of bacterial quality as well as removal of sand, as in the case of starvation in non-chlorinated natural water, as evidenced by the results in table '4' itself. This is because of the following reason. Live clams remain slightly agape under water. When the water is chlorinated, they remain tightly closed until such time that the chlorine completely disappears from the water. Therefore, no self cleansing activity leading to depuration takes place, during this period.

New Toyo Seafoods Co. Ltd.,

Ishikawa Bldg., 20-1, 2-Chome,
Misaki-Cho, Chiyoda-Ku,
Tokyo, JAPAN

T. BANERJI
President

IMPORT

- Frozen Shrimps, Cuttlefish
- Lobster Tails,
Other Marine Products
- Distributor of Frozen Seafoods

EXPORT

- All Frozen Seafoods
- Fishing Trawlers
Freezing Plants
- Fishing Gears & Equipments

OFFER

- Parties in India interested in Securing Japanese Technical know-how-collaborations are invited to contact us.

Cable: "NEWSEAFOOD TOKYO"
"BANERJI TOKYO"

Telex: J25220 NEWFOOD

Phone: 262-4408
264-4373
(Res.) 269-5444

Table-3
SAND CONTENT AND BACTERIAL QUALITY OF CLAM MEAT,
WATER AND MUD SAMPLES

Type of count	Raw clam meat	Water from clam bed	Mud from clam bed
Sand %	0.38	—	—
Total viable bacterial count	1.2×10^6 / g	5.5×10^4 / ml	9.06×10^3 / g
Total coliforms	6.3×10^3 / g	100/ml	25/g
<i>Escherichia coli</i>	3×10^3 / g	Not detected in 10^{-2} dilution	Not detected in 10^{-2} dilution
Faecal streptococci	8.5×10^3 / g	-do-	-do-
Coagulase positive staphylococci	nil	nil	nil
<i>Salmonella</i>	nil	nil	nil

Table-4
EFFECT OF STARVATION OF CLAMS FOR 24 HRS IN NATURAL WATER ON
THE SAND CONTENT AND BACTERIAL QUALITY OF CLAMS MEAT

Type of count	Raw clam meat before starvation	Clam meat after starvation in water from natural habitat	Clam meat after starvation in water from natural habitat chlorinated at 5 p. p. m. level
Total viable bacterial count	5.8×10^6 / g	3.82×10^5 / g	8.91×10^5 / g
Total coliforms	3.8×10^4 / g	2.19×10^3 / g	7.06×10^3 / g
<i>E. coli</i>	2.2×10^2 / g	nil	nil
Faecal streptococci	5.14×10^4 / g	4.82×10^3 / g	9.1×10^3 / g
Coagulase positive staphylococci	nil	nil	nil
<i>Salmonella</i>	nil	nil	nil
Sand content	0.34%	0.012%	0.024%

Starvation studies for depuration of clams were done using other systems like portable water, common salt solution (of the same strength of the water from the natural habitat of clams), as well as these systems chlorinated at 5 p. p. m. level. The results showed that these media are not as effective as water from natural habitat of clams, for depuration.

It has also been found that starvation of clams in natural habitat water for 24 hrs followed by chlorination of the system at 5 p. p. m. level and maintaining like that for 2 hours, could improve the bacterial quality of the meat further (Table-5). Hence, it is concluded that the best method of depuration of clams is to starve them in water from their natural habitat, for 24 hours, followed by chlorination of the system at 5 p. p. m. level and maintaining like that for 2 hours.

REFERENCES

1. Balachandran, K. K. and T. S. Unnikrishnan Nair (1975)
Proc. Symp. Fish. Process. Industry in India. P. 53 CFTRI, Mysore.
2. Balachandran, K. K. and P. K. Surendran (1984)
Fish. Technol. **21** : 65
3. Chinnamma George (1974)
Fish. Technol. **11** : 22
4. Novak, W. S. W. (1970).
The Marketing of Shellfish. P. 110. Fishing News (Books) Ltd., London.
5. Sebastian, M. J. (1970).
Seafood Export J. **24** : 25
6. Stroud, G. D. Torry Advisory Note No. 84. Torry Research Station, Aberdeen, U. K.
7. Vijayan, P. K., Perigreen, P. A., Surendran, P. K. and Balachandran, K. K. (1982).
Fish. Technol. **19** : 25

Table-5
BACTERIAL QUALITY OF CLAM MEAT AFTER DEPURATION FOR 24 HRS AND SUBSEQUENT CHLORINATION OF THE SYSTEM AND MAINTAINING LIKE THAT FOR 2 HRS.

Type of bacterial count	Raw meat before depuration	Raw meat after depuration in natural water for 24 hrs.	Raw meat after duration for 24 hrs and then chlorination at 5 p. p. m. level and keeping for 2 hrs.
Total bacterial count	5.8 x 10 ⁶ / g	3.82 x 10 ⁵ / g	2.92 x 10 ⁵ / g
Total coliforms	3.8 x 10 ⁴ / g	2.9 x 10 ³ / g	1.02 x 10 ³ / g
<i>E. coli</i>	2.2 x 10 ² / g	nil	nil
Faecal streptococci	5.1 x 10 ⁴ / g	4.82 x 10 ³ / g	2.96 x 10 ³ / g
Coagulase +ve staphylococci	nil	nil	nil
<i>Salmonella</i>	nil	nil	nil