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Part Two

MARCH 1990



NATIONAL SYMPOSIUM ON RESEARCH AND DEVELOPMENT IN MARINE FISHERIES

MANDAPAM CAMP
16-18 September 1987

Papers Presented
Sessions III & IV

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
(Indian Council of Agricultural Research)
P. B. No. 2704, E. R. G. Road, Cochin-682 031, India

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UTILISATION OF BLOOD CLAM *ANADARA GRANOSA*

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ABSTRACT

Blood clam (*Anadara granosa*) forms a fishery of considerable magnitude in the Kakinada Bay where an estimated 2000 t are landed annually. In addition culture technology for blood clam has been standardised in India, throwing open the possibility of large scale farming of this species. Presently clam meat is burnt along with shell to produce lime. In order to optimise the utilisation of blood clam as against the existing gross under utilisation Kakinada Research Centre of CIFT has developed the technologies for icing, freezing and canning of the clam. A pickled product and sausage are the other products developed by the Centre. The paper describes the technologies developed for utilisation of blood clam.

INTRODUCTION

In a number of South-East Asian countries, *Anadara granosa*, referred to as blood clam or

cockle, is fished and/or cultured for human consumption. Blood clam constitutes an important fishery in Kakinada Bay where approximately 2000 t are landed annually

(Silas *et. al.*, 1982). Average yields of about 40 t per hectare were obtained by culture in pen enclosures in Kakinada Bay (Narasimham, 1980). Average size at harvest is 4.5 cm in length and 31 g in weight. Shell forms about 65.5% of the whole weight. The cooked cockle has good meaty texture, attractive pink colour, sweet taste and good flavour.

At present, the whole cockles are burnt for production of lime, and the meat, a valuable source of animal protein, is lost. Many of the fishermen are engaged in hand picking of cockles and they get poor returns because of the current under utilisation of this shellfish. With a view to scaling up and rationalising the utilisation of cockle, research was undertaken to develop technologies for its optimum utilisation.

RESULTS AND DISCUSSION

Depuration of cockle

Cockle, like other shellfish, is a filter-feeder and hence sand, mud, enteric pathogens, heavy metals, pesticide residues etc., can gain entry into the digestive tract. If these are allowed to remain, they can cause grittiness to the meat in addition to posing health hazard to consumer. In order to eliminate these extraneous materials, the cockles should be subjected to depuration process before collection and utilisation of meat. Chakrabarti and Khasim (1982-'83) tried different methods for depuration of cockles. Saline water containing salt concentrations ranging from 1 to 2.5% was tried for periods of 24 hours. It was found that 48 hours depuration resulted in 5 to 10% mortality and 24 hours depuration was satisfactory. Attempts were also made to study the effect of keeping the cockles for the last one hour of depuration in saline water containing different concentrations of chlorine ranging from 0 to 10 ppm of available chlorine. It was observed that 1.5 to 2.0% saline water made from tap water was adequate for depuration and only slight improvement in bacteriological quality of the meat was noticed by including the chlorinated water during the last one hour. Acid insoluble ash and total bacterial

counts of cockle meat could be reduced by the above process and further reductions in these values were recorded by removal of gills and mantles immediately following depuration.

Proximate composition

The chemical composition of cockle meat varies depending upon season, sex, maturity etc. As reported by Basu and Gupta (1984) the proximate composition is as follows:

Moisture	:	79.0	to	83.87%
Protein	:	9.6	to	19.0 %
Fat	:	1.26	to	2.36%
Glycogen	:	5.4	to	13.6 %
Total ash	:	0.07	to	0.95%
Acid insoluble ash	:	0.02	to	0.09%

Icing

Cockle meat needs to be stored under proper conditions before its use directly for human consumption or for further processing. Basu and Gupta (1984) studied the ice storage behaviour of cockle. Changes in moisture content, protein, NPN, L-amino nitrogen, TVN, glycogen, free fatty acid, TBC and coliform count were followed every day. The results showed that cockle meat packed in 200 gauge polythene bag and kept in ice remained in very good condition for 4 days while meat stored directly in ice was found to be in an equally good condition for 2 days.

Freezing

Chakrabarti and Khasim (1982-83) studied the amenability of cockle meat to freezing and frozen storage. Meat collected by manually opening the shells as well as by boiling for 20 minutes was frozen in a plate freezer. Cockle meat without gills and mantles blanched in 7% brine for 5 minutes was also frozen in a similar way. Raw meat had more attractive original colour as compared to boiled meat. Coliforms were present to the extent of 10 to 20/g in raw meat while they were absent in boiled and blanched meats. During frozen storage, moisture content showed an increase in blanched meat while it decreased in raw and boiled meats.

All the types of meat used for frozen storage remained acceptable for over an year.

Canning

Steamed cockle meat without gills and mantle was blanched in 7% brine for 5 minutes. The blanched meat was canned in 2% brine containing 0.2% citric acid at 10 lbs pressure for 30 minutes. The product was found to be in good condition for three months. After this period, the drained liquid became turbid and meat became soft.

Pickling

Studies were carried out by Gupta and Basu (1985) to develop the technology for preparation of a pickle product from cockle meat. Three different recipes were tried and the recipe given below was found to be the best.

<i>Ingredients</i>	<i>Amount</i>
Cockle meat (blanched), kg	1
Salt, g	110
Chilly powder, g	70
Turmeric powder, g	2.5
Mustard (skinned), g	10.0
Garlic, g	80.0
Ginger (small pieces), g	25.0
Green chilly (sliced), g	40.0
Menthya, g	2.5
Pepper powder (white), g	12.5
Vinegar (natural acetic acid content 4%), ml	200
Gingelly oil, ml	350
Lemon (sliced), Nos.	4
Curry leaves,	5

The clam was allowed to dehydrate. After removing the meat, it was blanched in 7% brine for 5 minutes. The blanched meat was drained well and then cut into 4 portions. The meat pieces were fried in oil until brown in colour and kept apart. Sliced green chillies, ginger, curry leaves and crushed garlic were fried in the residual oil remaining in the pan after frying the meat. When they were brown in colour, the chilly powder, turmeric powder, mustard and menthya were added and again

fried for a short while. The pan was removed from the fire, the fried meat was added and mixed thoroughly. After sufficient cooling vinegar was added and again mixed well. The pickle was filled in sterile glass bottle and sealed with acid proof caps. Care was taken to see that there was a layer of oil over the contents in the bottle.

The texture of clam pickle initially was tough but with aging it became softer. The flavour also improved considerably after one month aging. The colour became pale after 165 days of storage. After 200 days the organoleptic analysis revealed slight rancid flavour and pale yellow colour. No mould growth was observed and coliform count was nil throughout the storage period.

Sausage

Basu (1987) worked on the preparation of sausage from cockle meat. Cockle meat was obtained by the same procedure as described earlier. Fat-oil mixture was prepared by mixing 30 ml melted goat fat and 30 ml peanut oil. Meat slurry from clam (100g), ice cold water (20 ml) and fat-oil mixture or melted hydrogenated vegetable oil or peanut oil (60 ml) was blended in the presence of additive (garlic 3 g, black pepper 2 g and salt 5 g) in an electric mixer for 10 minutes at a constant speed. The meat emulsions thus obtained were stuffed into a sausage casing (salted washed goat intestines) by hand stuffer. The sausage was cooked at 80°C for 30 minutes, boiled at 100°C for 30 minutes and then subjected to deep fat frying. Clam sausage with fat-oil mixture was rated best. Beef sausage was also prepared with 60 ml fat-oil mixture for comparison, the other ingredients remaining same. The results of organoleptic evaluation showed that in every respect clam sausage compared very well with beef sausage.

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