Pickle from Blood Clam (*Anadara granosa*) Meat

S.S. GUPTA and SUBRATA BASU

Research Centre of Central Institute of Fisheries Technology, Kakinada-533 002

A pickle was prepared from blood clam *(Anadara granosa)* meat. The pickle was subjected to biochemical, bacteriological and organoleptic tests at different stages of storage. The pickle has a shelf-life of more than 5½ months at ambient temperature.

In a number of southeast Asian countries *Anadara granosa* (Linnaeus) is fished and utilised as food. Also it is cultured in China, Japan, the Philippines, Thailand, Indonesia and Malaysia (Pathansali & Soong, 1958; Bardach *et al.,* 1972; Chen, 1976). In India the experimental culture of *A. granosa* has been taken up recently (Narasimham, 1980). Along the Indian coasts this species occur at a number of places and forms a fishery of considerable magnitude in the Kakinada Bay where an estimated 1000 t are landed annually (Narasimham, 1973).

The present practice in this region is to burn the cockle shell (Now onwards *A. granosa* will be referred to as "Cockle") with the meat intact to produce lime, thus destroying valuable protein. The cooked cockle meat has good meaty texture, attractive sweetish taste, good flavour and pink colour. To popularize the cockle meat among the local population it was felt necessary to develop some attractive product from cockle meat. Although pickle has been prepared from green mussel *Perna viridis* (Muraleedharan *et al.,* 1980), there is no study made on cockle meat for pickling. So this work was taken up to prepare cockle meat pickle and study its shelf life.

Materials and Methods

Live cockles were collected from local landing centre and stored in clean seawater for 16–24 h and allowed to depurate. Then the cockles were throughly washed thrice with chlorinated (10 p.p.m available chlorine) tapwater and cockles were shucked. Intestine was removed and the meat thoroughly washed three times with potable water. The washed meat is then blanched in 6% boiling brine for 5 min. The blanched meat is drained well on a perforated vessel and then fried in gingelly oil until brown in colour. The fried meat is kept aprat. The required quantities of spices and other ingredients except pepper, turmeric, chilly, mustard, salt and vinegar were fried together in refined oil for 2–3 min. At this stage pepper, turmeric, chilly and skinned mustard were added and fried for about 30 sec. All the powdered spices were made into a thick paste by adding water and stored for 15 min before use. The required amount of salt was added and the mixture boiled. The fried meat was then added to this and stirred for a few seconds. The pan was then removed from the flame and the ingredients mixed thoroughly for 2 to 3 min and then cooled. When sufficiently cooled, vinegar was added and mixed thoroughly. It was then packed in pasteurized glass screw-cap bottles and stored at room temperature.

Moisture, ash, total nitrogen and titrable acidity were determined by 'AOAC' methods (1975). Total volatile nitrogen (TVN) and α amino nitrogen (α amino–N) were determined from trichloro acetic acid extract of the meat. TVN determination was done by Conway diffusion method and α amino nitrogen by the method of Pope & Stevens (1939). Total fat was estimated by extracting the moisture free sample with petroleum ether (40–60°C) for about 5 h using soxhlet extractors. Peroxide value of the pickle oil was determined following 'AOAC' method (1975). Glycogen was

determined by the method of Roe & Dailey (1966). In all the above analysis except peroxide value determination, the meat was wiped with whatman No.1 filter paper to make it free from adhering moisture or oil as the case may be. In the determination of pH, the pickle was stirred and a representative sample including meat, oil, spice etc. was taken and made to a paste by thoroughly grinding in a waring blender. About 30–40 g of the paste was taken in a beaker and double the amount of water by weight was added to it and mixed well. Then the pH was measured by using Toshniwal Digital pH meter, model CL 46. Total bacterial count (TBC) was determined by the standard pour plate method using tryptone glucose agar medium incubating the plates at 27°C and *coliform* count by using desoxycholate medium. The organoleptic quality of the cockle meat was evaluated by a panel consisting of 5 experienced members. The quality characteristics considered for the pickle were texture, colour and flavour. The grades given for the above characteristic were excellent, good, fair and poor.

Results and Discussion

Three different recipes were tried and the one shown in Table 1 was declared the best by all the five panelists. The proximate composition of the meat is shown in Table 2.

Table 1. *Standard recipe used in preparation of cockle pickle*

Ingredients	Amount
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, g	5.0

The chemical and bacteriological properties of cockle meat pickle at different stage of storage at room temperature are presented in Table 3.

Titrable acidity increased gradually which is also reflected in the pH values. This may be due to the multiplication of certain acid bacteria at the low pH, which produced acid. Probably these bacteria are also responsible for improved flavour after one month storage. Of course the multiplication of these bacteria is not reflected in our total count data. This may be due to the fact that the medium used for total count was not congenial for the growth of acid bacteria. *Coliform* count in the pickle was nil throughout the storage period. The TVN values and α amino nitrogen values increased slowly but steadily. This may partly be attributed to the breakdown of protein by bacteria and partly to the acid hydrolysis at that low pH. Peroxide value of the oil used increased slowly. But up to 165 days no rancid flavour was noticed organoleptically. There was gradual sharp breakdown of glycogen in the muscle in that low pH.

Table 2. *Proximate composition of cockle meat*

Moisture %	Protein, TN× 6.25 %	Fat %	Glycogen %	Total ash %	Acid insoluble ash %
79–81.5	9.6–19.0	1.26–2.36	5.4–13.6	0.7–0.95	0.02–0.09

The organoleptic scores of the pickle is presented in Table 4.

Initially the texture was tough but with aging it became softer. The flavour also improved considerably after one month aging. The colour became little pale after 165 days of storage. But after 200 days the organoleptic analysis revealed slight rancid flavour and pale yellow colour. No mould growth was observed throughout the storage period. So this pickle could be

Table 3. *Storage characteristics of cockle pickle*

Frequency of test days	TVN mg/ 100 g	Peroxide value N/500 thio/ g. fat	Titrable acidity (as % acetic acid)	pH	∝ amino N mg/100 g	Glycogen %	Total count/g
0	10.80	Nil	0.39	4.50	57.85	16.60	9.7×10^4
15	11.12	5.34	0.42	4.50	59.27	13.94	3.5×10^5
30	14.71	6.65	0.55	4.45	77.69	12.52	5.6×10^5
60	15.26	8.01	0.56	4.41	86.76	11.39	1.5×10^5
90	18.80	8.72	0.57	4.40	88.00	9.47	2.9×10^5
125	19.44	9.02	0.58	4.39	86.33	7.39	1.1×10^5
165	20.90	10.75	0.68	4.36	92.50	5.99	1.5×10^5

Table 4. *Organoleptic evaluation of cockle meat pickle*

Storage days	Colour	Texture	Flavour	Remarks
0	Excellent	Poor	Good	Texture was very tough
15	Excellent	Fair	Good	Testure softer
30	Excellent	Good	Excellent	Textute still softer Flavour better
60	Excellent	Excellent	Excellent	Texture still softer
90	Excellent	Excellent	Excellent	—
125	Good	Excellent	Excellent	—
165	Fair	Good	Good	Colour little pale
200	Poor	Fair	Fair	Slight rancid flavour, colour pale, texture very soft

stored at room temperature at very good acceptable condition up to 5½ months.

The authors wish to thank Dr. C. C. Panduranga Rao, Director, Central Institute of Fisheries Technology, Cochin for his help and guidance in carrying out this work and to Shri D. Imam Khasim for his help and suggestions.

References

AOAC (1975) *Official Methods of Analysis,* 12th Edn. Association of Official Agricultural Chemists, Washington

Bardach, J.E., Ryther, J.H. & Mciarney, W.E. (1972) *Aquaculture,* John Wiley & Sons, Inc. p. 868

Chen, T.P. (1976) *Aquaculture Practices in Taiwan.* Page Bras (Norwich) Ltd., p.162

Muraleedharan, V., George Joseph, K. and K. Devadasan (1980) *Symp. Coastal Aquaculture,* Mar. Biol. Ass. of India. 12–18 January, Cochin

Narasimham, K. A. (1969) *Proc. Symp. Mollusca.* Mar. Biol. Ass. India, Part II, p. 407

Narasimham, K.A. (1973) *Indian J. Fish.* 20, 209

Narasimham, K.A. (1980) *Mar. Fish. Inform. Serv. T & E Sev.,* 23, 7

Pathansali, D. & Soong, M.K. (1958) *Proc. Indo- Pacific Fish Coun.* 8, 26

Pope, C.G. & Stevans, M.F. (1939) *Biochem. J.* 33, 1070

Roe, J.H. & Dailey, R.E. (1966) *Anal. Biochem.* 15, 245