
ORIGINAL ARTICLE

Value added Product from a Trash Gastropod

Sini Margret.M*, Therasita Mary. M, Amutha Rani.C, Ajitha Mol. A

Assistant Professor, Dept of Zoology, Nanjil Catholic College of Arts & Science, Kaliyakkavilai.

Corresponding Author: Dr. M. Sini Margret, margretviagulam@gmail.com

ABSTRACT

*Eating habits change very fast due to the vast improvement in socioeconomic conditions. Consumers prefer the types of value added product, hygienically prepared, nutritious and attractively packed products. Nowadays, only a smaller sector of the fisher folk consumes the flesh of gastropods and the majority are not aware of the real value and the delicacy of its flesh. Pickling is one of the most important ancient gastronomic crafts used to preserve the food with salt, brine or vinegar, which is a simple and effective method for preserving the easily perishable food materials for a long period and for a long journey. Hence the present study is attempted to utilize the trash mollusc *Thais bufo* to prepare pickle for human consumption.*

Key words: Trash mollusc, *T. bufo*, value added product, pickle

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INTRODUCTION

In India, about two-third of the total landed fish are consumed in fresh condition, and the remaining is preserved by various methods. All over the world, food technologists are focusing much attention on the development of products based on consumer acceptance [8]. The people consume approximately 14% of animal protein from marine fisheries, but it varies from country to country. In recent years, seafood and seafood-based products have become very popular worldwide, as they are rich in protein, vitamins, minerals and polyunsaturated fatty acids. Safety of seafood is very much important because it is highly perishable, and consumption of contaminated and spoiled fishes from polluted water leads to food poisoning [17].

Seafood and their by products are delicious, nutritious and rich in protein, vitamins, minerals and polyunsaturated fatty acids. The marine molluscs too form protein rich and low fat food. The meat of snail is delicious and nutritious but its utilization is limited and restricted to poor and coastal fisher folk communities along the east coast of India. This is mainly due to the conservative food habits of our people and lack of knowledge on the nutritive value [11].

Throughout the world, among the non-vegetarian eaters, the demand for the fishery products become increasing day by day. The over exploitation of marine resources leads to the shortage of fish and fishery products. Protein malnutrition is very common in India and though crustacean is rich in protein, the poor people cannot afford to buy them due to its high price. So there is a need to produce an alternative and cost effective source of nutritious food from nonconventional sources to meet the needs of poor people. Hence, in the present study *T. bufo* had been utilized to prepare pickle and their shelf life under storage in glass bottles at ambient temperature was assessed to utilize the meat for edible purpose.

MATERIAL AND METHODS

Processing of raw gastropod meat

The gastropod *T. bufo* was collected among the trash fish and brought to the laboratory in an ice box. It was cleaned with fresh water to remove the adhered materials, operculum was removed and boiled in water for 20 minutes and the meat was sucked out. For the preparation of pickle, the edible portions viz; foot and adductor muscles were separated manually, cleaned and blanched with a small quantity of salt,

chilli powder and turmeric powder and kept for half an hour. The meat was fried in gingili oil to golden brown colour and kept aside. Standard recipe given in the table: 1 was followed to prepare the pickle.

Table 1: Ingredients for gastropod pickle

Ingredients	Quantity (g)
Meat (cooked)	500
Garlic	250
Ginger	100
Chilli powder	50
Coriander powder	50
Mustard seeds	10
Turmeric powder	5
Asafoetida	10
Salt	40
Vinegar (4% acetic acid)	100ml
Gingili oil	300ml

Edible oil was taken in a pan and heated to 180°C. For seasoning, mustard and curry leaves were added to the oil and fried, until attaining brown colour. Ginger garlic paste and asafoetida solution were added and stirred followed by the addition of vinegar. The liquid portion of the heated product was separated out by the addition of vinegar and then the blanched gastropod was added to it slowly and mixed well. After sufficient cooling the prepared pickle was packed in an air tight sterilized bottle. Before sealing, little hotter gingili oil was poured on the top of the pickle to cover the solids to prevent the exposure of meat pickle to air and the bottles were stored at ambient temperature (30±2°C).

Biochemical parameters

The protein content of pickles was estimated using the method of Lowry *et al* [10]. The percentage of lipid content was determined by the method of chloroform methanol [5].

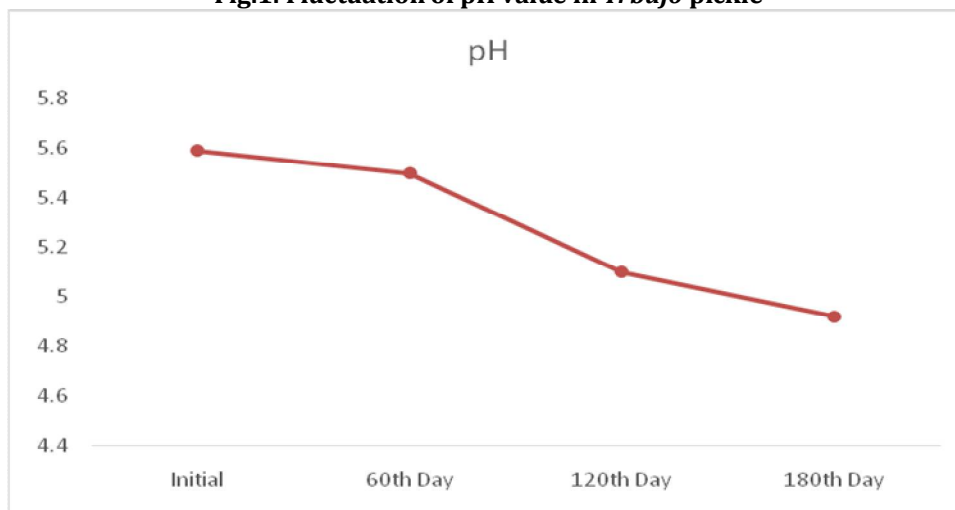
Shelf life assessment

The quality indicators like pH, TMA-N [3], TVB-N [4], Free Fatty Acids (FFA) [9], microbes [14, 1] and organoleptic characters [2] were analyzed from random samples for each month and continued for a period of six months.

RESULTS AND DISCUSSION

The protein contents of *T.bufo* meat pickle was 24.1% respectively and lipid content was 12.24% respectively. The pH of the pickle was found to decrease from an initial value of 5.59 to 4.92 in *T.bufo*. The fluctuation of pH is given in Fig. 1. Renitta [12] also observed static decrease in pH from 5.46 to 4.9 in *C. ramosus* pickle and 5.78 to 5.34 in *H.pugilinus* pickle. Similar decreasing trend in pH of fish and mussel pickles have been reported by Gopal *et al* [7] and Vijayan *et al* [16] respectively. Lowering the pH increases the effectiveness of an organic acid as a preservative [13]. In the present investigation vinegar (4% acetic acid) was used as a preservative.

Fig.1: Fluctuation of pH value in *T. bufo* pickle



The chemical parameters like FFA, TMA-N and TVB-N showed a gradual increase during storage period though their values were very low and within the prescribed limits. In the present observation the FFA values were initially low but little increased in both pickles during the storage period. Similar findings were reported by Emilin and Jamila Patterson [6] also observed increasing trend of FFA in smoked meat of *B. spirata* and *C. virgineus* during the storage period of 180 days which ranged from 0.026 % to 0.126 % and 0.03% to 0.22% respectively. The present investigation showed an increase in the level of TMA-N during the storage period in both pickles but it was well within the limits of acceptability. The levels of Trimethylamine- Nitrogen (TMA-N) of *T. bufo* pickle increased from 10.83 mg/ 100gm respectively. Shanthini [13] observed slight increase in the TMA-N value of *H.pugilinus* pickle.

The TVB-N values in the present study were found to have a similar trend as that of TMA-N values. The TVB-N content of *T. bufo* pickles was ranged from 7.5 to 28.93 mg/100g respectively. The statistical analysis showed that there was a significant differences ($P < 0.05$) between the days of storage in FFA, TMA-N and TVB-N contents of meat pickle. The meat pickles examined after processing and during storage showed the absence of *E.coli*, *Vibrio* and *Solmonella*. The total plate count (TPC) increased in *T.bufo* pickle from an initial level of 6.4×10^3 to 11.2×10^3 CFU/g. Yellappa and Chandrasekar [17] have reported the total plate counts were in the range of 10^3 to 10^4 g⁻¹ in the clam pickle using organic acids.

Table 2: Biochemical and microbiological quality of *T. bufo* pickle

Parameters	Initial	60 th day	120 th day	180 th day	P value
pH	5.59 ± 0.01	5.48 ± 0.03	5.12 ± 0.05	4.92 ± 0.02	P < 0.05
FFA (%) (Oleic acid)	0.049 ± 0.001	0.093 ± 0.01	0.138 ± 0.01	0.152 ± 0.01	P < 0.05
TMA-N (mg/100g)	3.7 ± 0.05	6.02 ± 0.1	8.13 ± 0.2	10.83 ± 0.4	P < 0.05
TVB-N (mg/100g)	7.5 ± 0.06	12.13 ± 0.2	19.6 ± 0.1	28.93 ± 0.3	P < 0.05
TPC ($\times 10^2$ CFU/g)	6.4 ± 0.5	7.6 ± 0.6	8.9 ± 0.62	11.2 ± 0.45	P < 0.05

P < 0.05 is statistically significant

Table 3: Changes in the Organoleptic Characteristics of *T. bufo* pickles

Organoleptic Characters	Initial	60 th day	120 th day	180 th day	P value
Appearance	8.8 ± 0.2	8.6 ± 0.4	8.2 ± 0.1	8.0 ± 0.6	P < 0.05
Colour	8.6 ± 0.3	8.5 ± 0.7	8.3 ± 0.2	8.2 ± 0.2	P < 0.05
Odour	8.8 ± 0.4	8.8 ± 0.4	8.4 ± 0.3	8.3 ± 0.1	P < 0.05
Taste	8.6 ± 0.2	8.9 ± 0.2	8.6 ± 0.3	8.3 ± 0.4	P < 0.05
Texture	8.5 ± 0.3	8.7 ± 0.2	8.4 ± 0.1	8.2 ± 0.1	P < 0.05
Flavour	8.4 ± 0.5	8.4 ± 0.1	8.2 ± 0.11	8.0 ± 0.2	P < 0.05
Overall acceptability	8.6 ± 0.3	8.7 ± 0.1	8.3 ± 0.4	8.1 ± 0.2	P < 0.05

P < 0.05 is statistically significant

The mean score for all the organoleptic characteristics remained within the acceptable limits throughout the storage period. The pickled product had maximum scores on 60th day and thereafter a decreasing trend was noticed.

As the pickled product of the gastropod *T. bufo* has long shelf life periods it is safe for human consumption upto six months. *T. bufo* pickle had maximum organoleptic scores Besides, there is also more possibility to export these pickles as canned products. This study has proved that the pickling was one of the best methods for the better utilization of these underutilized marine gastropod.

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