

## DEVELOPMENT AND QUALITY CHARACTERISTICS STUDIES OF BAIGAI-TOMATO SAUCE STORED IN DIFFERENT PACKAGING MATERIALS

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**Abstract:** Convenience food has long been a popular concept in the developed world, but it has only just entered the Indian market. In the recent decade, the growing number of nuclear families, rising family income, and a large growth in the number of single working men and women professionals have created opportunities for the ready-to-eat market. Utilizing simple techniques, an attempt was made to prepare snail meat incorporated in tomato sauce using indigenous food components. Snail meat can be made as a scrumptious low-calorie, high-protein, and mineral-rich food. Tomatoes have a wide range of therapeutic qualities. When compared to Baigai meat in tomato sauce (V1, V2, and V3), the Baigai (*Babylonia canaliculata*) powder in tomato sauce (V1, V2, and V3) was revealed to be the best (V1, V2 and V3) and of all other variations were proven lower to the V3. Polypropylene (PP) and Retort Pouches (RP) were used to pack Baigai meat and powder. During the duration of the study (90 days), no changes in biochemical components or microbiological proliferation were noticed in RTE Baigai meat and Baigai powder in RP. The major idea of implementing Baigai-tomato sauce is to save time, nutrition, and money by using less expensive and underutilised ingredients. The sample kept its freshness, palatability, and acceptability after being packed in retort pouches during storage period. In comparison to other seafood products, the price was also lower. As a result, it is a good source of protein and can be suggested as a supplement that may be used in other cuisines to alleviate protein-energy malnutrition in children.

**Key words:** Baigai, RTE, Polypropylene bags, Retort pouches

### INTRODUCTION

India has made lot of progress in agriculture and food sectors since independence in terms of growth in output, yield and processing. The food processing industry is one of the largest industries in India and it is rank 5th in terms of production consumption and export. Convenience food is a concept that is prevalent in the developed World since long, while its inception in to the Indian market has been recent. Convenience foods have been processed extensively by the manufacturer and require little or no additional processing or cooking prior to consumption. It is ready-to-eat as soon as the packers opened in a form, which is tasty and appetizing. As the variety demands by customers or increasing, food Industries are turning more and more to processed forms that provide economy in time and energy during food preparation. All over the world, during the last two decades, the convenience food market has witnessed breath-taking changes in quantity and quality of products available. The popularity of these products is due to their ready- to- eat convenience nature, unique taste and ready availability in different parts of the country.

Convenience foods are foods that provide convenience to the consumers by means of reduce the time and effort involved in the procurement, preparation, cooking of foods without foregoing those traditional culinary preferences as well as the safety and quality of food. The trend in consumption of convenience food is increasing due to the increasing number of due to the increasing number of working women population. Traditional foods have started entering into the market into in a new avatar now with long shelf life and new packaging techniques. The retorting or sterilization process ensures the stability of the ready to eat foods in retort pouches on the cool and at room temperature. The application of sterilization technology destroys all potentially harmful microorganisms, thereby making sure that the food product has a very long shelf life of over 12 months and needed no refrigeration.

Snails are raised for food, including abalones and some land snails. A sauce is a liquid or semisolid meal that is served on top of or used to prepare other dishes in the kitchen. Sauces are not generally consumed on their own; they are used to add flavour, moisture, and visual appeal to another dish. Tomatoes have a wide range of therapeutic qualities. Tomato is also known as the "Queen of the Vegetables," and tomato sauce is a canned tomato puree with a pinch of salt and a few spices. Tomatoes have a strong flavour, a low liquid content, very soft flesh that breaks down easily, and the proper composition to thicken into a sauce once cooked. All of these characteristics make them great for easy-to-prepare sauces.

Snail meat can be cooked into a scrumptious dish that is low in calories, high in protein, and mineral-rich. Manufacturers of small scale or cottage industries are now marketing a variety of Ready-To-Eat and Ready-To-Serve foods in India. During the preparation period, less focus was placed on scientific processing and its quality features. Using local food ingredients and simple processes, an attempt was made to make RTE dishes composed of snail meat and tomato sauce.

### **OBJECTIVES**

- To analyse the nutrient content and study the storage behaviour of RTE food packed in different packaging materials.
- To conduct organoleptic evaluation of the product prepared out of snail meat and tomato.

### **METHODOLOGY**

Baigai come in a variety of species and can be found all over the world. *Helix aspersa*, *Helix pomatia*, *Babylonia areolate*, *Babylonia canaliculata*, *Babylonia tutosa*, and *Cantharus undosus* were among the snail species found.

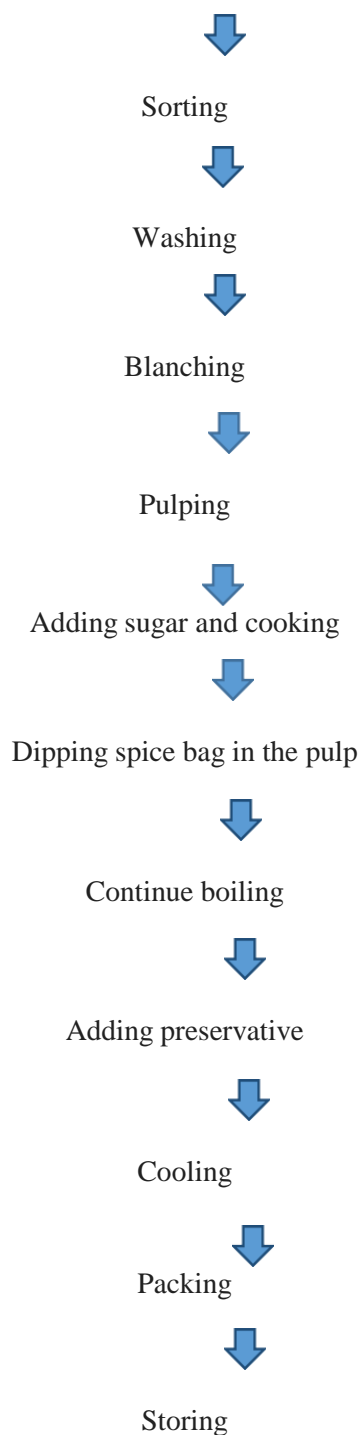
#### **Selection of sample**

The species *Babylonia canaliculata* was chosen for this research. In comparison to all the types, *Babylonia canaliculata* has been identified as an underutilised snail. It is also high in protein and minerals, which are essential for our daily lives. Furthermore, as compared to other snail species, the selected Snail sample was low in fat and less expensive. *Babylonia canaliculata* was chosen for the processing of meat and powder because it contains vital nutrients and is less expensive. Britto Seafoods Exports Private Limited, Thoothukudi, provided ten kg of small snail samples. To make tomato sauce, high-quality raw components were chosen, purchased, and cleaned, and then stored in an airtight plastic container until needed.

Britto Exports Private Limited, Thoothukudi, provided the packaging materials for the products. By removing the air from the pack, a vacuum was generated, and the pack was instantaneously sealed. Following the vacuum sealing operation, the pack was resealed in a sealing machine with a width of 10 mm. The pack was then sent to the retort machine for additional processing. In the machine, the sealed pack was uniformly distributed. The sealed bags were placed in the machine for 20 minutes to attain 121 degrees Celsius. Once the temperature was reached, it was kept at that level for about 35 minutes at a pressure of 25 psi.

After that, spores were killed by rapidly chilling for 15 minutes at 45 degrees Celsius. The retort packing was done primarily to destroy all germs and extend the product's shelf life. To explore and analyse the shelf life of products, an attempt was made to pack the Baigai-tomato sauce sample in PP (Polypropylene) bags and RP (Retort Pouches).

Sound ripe tomatoes (free from blemishes)



**Fig 1. Flow Chart for the preparation of Tomato Sauce**

The weight of the waste from the processed sample after processing was about 86.9 percent. Variations used to standardize Baigai meat and powder in tomato sauces were given in the Table 1.

**Table 1. Variations used to standardize Baigai Meat in Tomato sauces**

S.No.	Products	Variations		
		V1	V2	V3
1.	<b>Baigai Meat in Tomato Sauce</b>			
	Snail Meat	30	50	70
	Tomato Sauce	70	50	30
2.	<b>Baigai Meat Powder in Tomato Sauce</b>			
	Snail Meat Powder	10	20	30
	Tomato Sauce	90	80	70

Baigai meat products prepared by adopting V1, V2 and V3 were taken in the ratios of 30:70, 50:50 and 70:30 and the Baigai Powder variations were taken in ratios of 10:90, 20:80 and 30:70 respectively.

#### Microbial analysis of the packed samples

Once in every 30 days, the samples were inspected. To learn about their storage behaviours during the process of the study (90 days). These pouches were checked for the growth of microorganisms, the formation of any off flavours, and the generation of gas. The pouches were evaluated every 15 days for any changes, such as bloating or bursting.

#### Organoleptic evaluation of the samples

The food quality of the prepared products was rated on a 9-point scale by ten taste panel members. The created products were displayed and popularised among self-help group women in Melakulam, Tirunelveli District.

### RESULTS & DISCUSSION

The main purpose of preparing Baigai in Tomato sauces is to save time, wants of nutrients, less expensive and underutilized food. A good quality of packaging can retain the quality of food for a long time. Packaging of products reduces waste, adds value and makes a product qualitatively and quantitatively acceptable. Thus, it helps to reaching the sensory quality of products.

Sensory evaluation was conducted thrice and each sensory attribute such as appearance, taste, odour, consistency and overall acceptability was scored for each product prepared from the different variations. The V3 attained the highest score values in both Baigai meat and powder in tomato sauces as well as in Baigai meat powder in tomato sauces. Based on the consumer preference the V3 was selected to conduct the study.

#### Changes in biochemical constituents of the RTE products during storage

The moisture, ash, protein, carbohydrate, fat, pH (Table 2.) and acidity of both Baigai meat and powder in RP remained unaltered throughout the storage period. The moisture and acidity was found increased in both the products packed in PP.

**Table 2. pH content of prepared products**

S.No	Days	Baigai Meat in Tomato Sauce				Baigai Meat powder in Tomato Sauce			
		PP		RP		PP		RP	
1	0	4.57		4.57		4.57		4.57	
2	30	5.01		4.57		5.0		4.57	
3	60	5.1		4.57		5.67		4.57	
4	90	6.2		4.57		6.92		4.57	

**PP-Polypropylene**

**RP- Retort Pouch**

**Microbiological assay of the RTE products during storage**

Vibrio cholera was not found in Baigai Meat or Baigai Meat Powder packed in PP until the 90th day. Total Coliform Bacteria counts in Baigai meat in PP rose on the 60th day of storage. At the end of the 90th day of storage, TPC increased in both of the PP-packed samples. Towards the end of the storage period, E.coli was isolated in the sample packed in PP. By the 60th day of storage, yeast and mould found in the PP packed samples. Whereas, the microbiological count of Baigai powder in RP did not change. In contrast, the Baigai powder microbiological count in RP ( $1 \times 10^3$ ) did not change.

**Organoleptic evaluation of the RTE products during storage**

In almost all of the RP products, the V3 received the highest score.

**Table 3. Overall acceptability of the RTE products**

S.No.	Day	Baigai Products in Tomato Sauce											
		Meat						Powder					
		V1		V2		V3		V1		V2		V3	
		PP	RP	PP	RP	PP	RP	PP	RP	PP	RP	PP	RP
1	0	37	37	38	38	40	40	36	36	39	39	40	40
2	30	37	37	38	38	40	40	36	36	39	39	40	40
3	60	35	37	36	38	38	40	35	36	37	39	39	40
4	90	33	37	35	38	36	40	33	36	36	39	38	40

**PP-Polypropylene**

**RP- Retort Pouch**

Those products packed in RP did not change in appearance, color, flavour, taste, consistency, or general acceptability until the 90th day of storage.

**Cost Analysis of the RTE products**

The cost analyses of the prepared products are tabulated in the table 4.

**Table 4. Cost Analysis of the RTE products**

S.No.	RTE Products (100 g)	Amount (in Rs.)
1.	Baigai Meat in Tomato Sauce	18.00
2.	Baigai Powder in Tomato Sauce	22.00

In comparison to other snail species, the chosen snail (*Babylonia canliculata*) was also less expensive. It covered food costs, labor, packaging materials, overhead and maintenance, as well as product profit.

### CONCLUSION

In comparison to Baigai meat in tomato sauce, Baigai powder in tomato sauce was deemed to be the best. In RP, there was no change in biochemical components or microbiological growth in RTE Baigai Meat and powder. The sample kept its freshness, palatability, and acceptability after being packed in RP. V3 Baigai meat and RP Baigai powder received the highest overall acceptability score. The Baigai Powder in tomato sauce was chosen over the other two offerings. In comparison to other seafood products, the price was also lower. As a result, it is a good source of protein that may be used in other dishes and supplemented to treat Protein Energy Malnutrition in children and adults.

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