

## STUDIES ON THE PROCESSING OF FISH LOAF

By

**NATIVIDAD G. MACALINCAG<sup>1</sup>**  
**SILVESTRE V. BERSAMIN<sup>2</sup>**  
**FELICISIMA O. MAXINO<sup>3</sup>**

### ABSTRACT

Canned fish loaf is a new product developed in the technological laboratories of the Fisheries Utilization Division of the Philippine Fisheries Commission. In product acceptability tests undertaken, it was confirmed that canned fish loaf could compare very well with a popular imported variety of meat loaf in terms of palatability, texture, and eye appeal. The product is excellent from the point of keeping quality and possesses no problems on storage.

### INTRODUCTION

Protein deficiency in the Filipino diet is one of the causes of malnutrition. This disease is especially prevalent in the remote areas where fish is not available most of the time, because of lack of proper storage and transport facilities. The study of the processing of fish loaf was undertaken to correct this problem. The results obtained showed significantly that the product developed had a high acceptability score, — comparable to imported meat loaf, with an indefinite keeping quality, thus making possible its distribution even to the remotest barrio in the Philippines under varying environmental conditions.

### REVIEW OF LITERATURE

Vadhera and Baker (1970) mentioned that the popularity of food preparations made from meat emulsions dated as far as 500 B.C. By

<sup>1</sup> Senior Fishery Technologist.

<sup>2</sup> Chief Fishery Technologist (Division Chief).

<sup>3</sup> Jr. Fishery Technologist.

1929, Heller had standardized the preparation of making sausages and meat loaves from hogs and cattle.

Saffle (1968) had established the role of the binding property of meat protein in sausages, frankfurts, and bologna.

Tanikawa (1963) worked on the binding properties of fish protein in fish sausage and kamaboko which are also emulsified products. Learson, Tinkers, and Ronsivalli (1971) described the preparation of rolls and loaf-type products incorporating other fishery products as flavoring agents.

### EXPERIMENTAL METHODS

#### A. Procedure for making fish loaf:

Separate the white meat from the black meat and the rest of the scraps. Cut the white meat into cubes, wash in iced water, and drain. Add sodium nitrate previously dissolved in a small amount of water. Add the salt. Mix thoroughly, place in a suitable container or in a plastic bag and store at refrigerating temperature of 5° to 7°C for 10 to 12 hours. (This is the curing process).

Place the meat in a silent cutter. The whole procedure in the cutter must not exceed 10 minutes. During the first five minutes of operation in the silent cutter, add half of the ice, sugar and monosodium glutamate. During the rest of the operation, add the remaining ice little by little and the other ingredients. Add the starch near the end of the operation either as a powder or as an aqueous solution. An approved coloring material is added until the desired color is obtained. Pack in half-pound enameled cans previously greased with oil. The gross weight should not exceed 300 grams. An excess in contents may cause bulging of the cans immediately after processing or cooling. Bulging cans could be mistaken for spoiled products. Process for 90 minutes at 10 pounds pressure and cool at once in running water.

This product will keep indefinitely according to the study made.

The following formulas were tested:

## Formula I:

Tuna meat .....	100.00 grams
Ice .....	40.00 "
Pork fat .....	10.00 "
Flour .....	5.00 "
Salt .....	3.00 "
Sugar .....	2.00 "
Sodium nitrate .....	0.05 gram/kg. of fish meat
Monosodium glutamate .....	2.00 grams
Pepper .....	0.50 gram

Food color, mixture of 7 parts red and 1 part yellow q.s.,  
until desired color is obtained.

## Formula II:

Tuna meat .....	100.00 grams
Ice .....	40.00 "
Starch or flour .....	5.00 "
Pork fat .....	5.00 "
Ham .....	5.00 "
Salt .....	4.00 "
Sugar .....	2.00 "
Monosodium glutamate .....	2.00 "
Pepper .....	0.50 gram

Food color, mixture of 2 parts red and 1 part yellow q.s.,  
added until desired color is obtained.

## Formula III:

Tuna meat .....	100.00 grams
Ice .....	40.00 "
Flour .....	5.00 "
Pork fat .....	5.00 "
Ham .....	5.00 "
Salt .....	3.50 "
Sugar .....	2.00 "
Sodium nitrate .....	0.05 gram/kg. of fish meat

Monosodium glutamate .....	2.00 grams
Pepper .....	0.40 "
Chicken flavor .....	0.05 gram

Food color, mixture of red and yellow, q.s., until desired  
color is obtained.

## Formula IV:

Tuna meat .....	100.00 grams
Ice .....	40.00 "
Starch or flour .....	5.00 "
Pork fat .....	10.00 "
Salt .....	3.50 "
Sugar .....	2.00 "
Sodium Nitrate .....	0.05 gram/kg. of fish meat
Monosodium glutamate .....	2.00 grams
Pepper .....	0.40 gram
Chicken flavor .....	0.10 "

Food color, red, q.s., added until desired color is obtained.

## B. Taste Panel Methods:

Product acceptability of the samples was determined by a taste panel composed of 13 to 18 members, all employees of the then Philippine Fisheries Commission with varied backgrounds and educational attainments. The members of the panel have previously undergone a taste testing session whereby they were made to determine the different degrees of saltiness, sweetness, and acidity of an unknown sample. In determining the acceptability of the canned fish loaf which were served sliced straight from the can, the 9-point hedonic scale was used where: 9 to 6 describe descending degrees of acceptability, 5 neither like nor dislike, and 4 to 1 describe the ascending degrees of unacceptability. For comparison, a commercial brand of meat loaf which has gained wide acceptance was also opened and given to the panelists to taste.

## C. Microbiological Methods:

After the samples were processed, cooled and labelled, they were incubated at 37°C for two weeks. The canned products were ob-

served daily for 14 days to find out if bulges would occur. This was done to determine if the combination of processing time and temperature used would be enough to check the growth of spoilage bacteria originally present in the ingredients used in the preparation of the product.

### RESULTS

The results of the taste panel scoring for the different formulas of fish loaf and the meat loaf are shown in Table I:

The 9-Point hedonic scale was used where:

- 9 = Like extremely
- 8 = Like very much
- 7 = Like moderately
- 6 = Like slightly
- 5 = Neither like nor dislike
- 4 = Dislike slightly
- 3 = Dislike moderately
- 2 = Dislike very much
- 1 = Dislike extremely

The above data confirmed that canned fish loaf compared very well with canned meat loaf, a product which has gained wide acceptance as a viand for the poor and rich alike.

The general procedure given under experimental methods was followed in the preparation of canned fish loaf. However, experimental trials were made wherein a batch of filled cans were subjected to exhaustion before the final sealing, and another batch was half-sealed, steamed for 30 minutes, and then completely sealed. In the first case, the finished product contained plenty of air spaces which was unsightly, while in the second case, the results were the same as the samples which were completely sealed without prior steaming. The latter process was adopted as the general procedure because it was less time-consuming.

No swell was observed in all the batches of canned fish loaf incubated at 37°C for two weeks. Continuous incubation of the product for one year produced no can swell either. The results clearly

TABLE I  
COMPARATIVE AVERAGE HEDONIC SCALE RATINGS  
FOR MEAT LOAF AND FISH LOAF

SAMPLE	MEMBERS OF PANEL	AVERAGE SCORES FOR			GEN. AVE.
		EYE APPEAL	PALATA- BILITY	TEXTURE	
Fish Loaf					
Formula I	18	6.38	6.11	6.11	6.20
Formula II	13	6.80	7.00	7.10	6.96
Formula III	18	7.40	7.30	6.30	7.00
Formula IV	17	6.60	7.00	6.70	6.73
Meat Loaf	14	7.30	6.90	6.60	6.93

proved that processing was adequate, and that canned fish loaf could be kept indefinitely even at temperatures higher than room temperature.

### CONCLUSION

The processing of fish loaf as another form of convenience food holds much promise. From the results of the organoleptic scoring done by a trained panel of tasters in the then Philippine Fisheries Commission, it was shown that such product will gain wide acceptance. From the standpoint of keeping quality it is excellent and that it could be kept indefinitely without any problem of storage. Thus, its distribution could be carried on as far as the remotest barrios in the Philippines where fish is not available all the time. This form of fish preparation when developed will help boost the fishing industry.

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