

STANDARDISATION OF RECIPE FOR THE PREPARATION OF LOBSTER ANALOGUES¹

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ABSTRACT

Lobster analogues were prepared with lobster base flavour (paste), lobster cook water (whole lobster homogenate:water, 1:1 and 1:0.5) and lobster meat mince. In another experiment, different combinations of ginger-garlic paste and lobster base flavour, *i.e.*, 1:3, 1:4, 1:6, 3:3, 3:4, 3:6, 5:3, 5:4 and 5:6 were added to the lobster analogue paste. It was observed that lobster analogues prepared with lobster base flavour (paste) are suitable organoleptically. The combination of ginger garlic paste and lobster base flavour in the ratio of 3:4 was found to be suitable organoleptically. Lobster analogues coloured with annatto seed colour at 1:2 (annatto seed:water) concentration had high values for the colour attribute as compared to orange-red synthetic colour, beetroot colour, caramel colour and paprika colour. It was observed that come-up-time to achieve a temperature of 850°C was 28 minutes with a processing period of 11 minutes.

Keywords: Lobster analogues, surimi, colour, flavour

INTRODUCTION

Fish mince (surimi) can be formulated into seafood analogues like lobster, crab, shrimp and scallop. Surimi was mixed with salt, starch and flavour to prepare analogue paste and then it was moulded, coloured, steam-cooked, cooled and packed.

Several scientists have worked to improve the taste of fish paste product suitable to the Indian palate by incorporating high quantities of spices (Balange, 1999; Kamat, 1999; Thorat, 2000; Farnandes, 2001; Dagare, 2001; Mote, 2001). Several types of colour and flavour are used commercially to produce lobster analogues.

There are scanty reports on the use of spice mixture, colours and flavours for the preparation of lobster analogues.

Therefore, an attempt was made to study the use of different levels of spice mixture, flavours and different types of colour for the preparation of lobster analogues suitable to the Indian palate.

MATERIAL AND METHODS

Frozen surimi prepared from pink perch, *Nemipterus japonicus*, containing 5% sugar and 0.3% polyphosphate was obtained from a commercial factory and stored in deep-freezer at a temperature of -14C until further use. As and when required, frozen surimi was taken out and thawed before use.

Lobster analogues were prepared from thawed surimi according to the method and recipe of Flick *et al.* (1990) but with modifications such as addition of ginger-garlic paste, lobster flavour and

¹This paper is a part of the M.F.Sc. dissertation of the senior author.

omission of sorbitol to the fish paste to be moulded into lobster analogues.

Lobster mould was prepared with plastic by pouring the melted plastic on clay moulds with different sizes and shapes. Lobster mould was prepared in two trials. The lobster analogue prepared as per Martin and Flick (1990), was subjected to visual evaluation for the selection of lobster mould.

Commercially prepared lobster base of Customs Food Products, Oswego (US), in the form of paste, lobster cook water flavour prepared as per Jayarajah and Lee (1999), and lobster meat (Table 1) were incorporated in the preparation of lobster analogues. The lobster analogues, thus

Table 1: Methods used for the preparation of different lobster flavours

Sr. no.	Method	Percent Used
1.	Lobster cook water (1 : 1 : Whole lobster homogenate : Water)	2.5
2.	Lobster cook water (1 : 0.5 : Whole lobster homogenate : Water)	2.5
3.	Lobster meat mince	2.5
4.	Lobster base flavour (paste)	2.5

prepared, were subjected to organoleptic evaluation by a group of ten trained judges using the 10-point hedonic scale, viz., Excellent - 10, Very good - 9, Good - 8, ----, Acceptable - 5, -----, Poor - 2 and Very poor - 1.

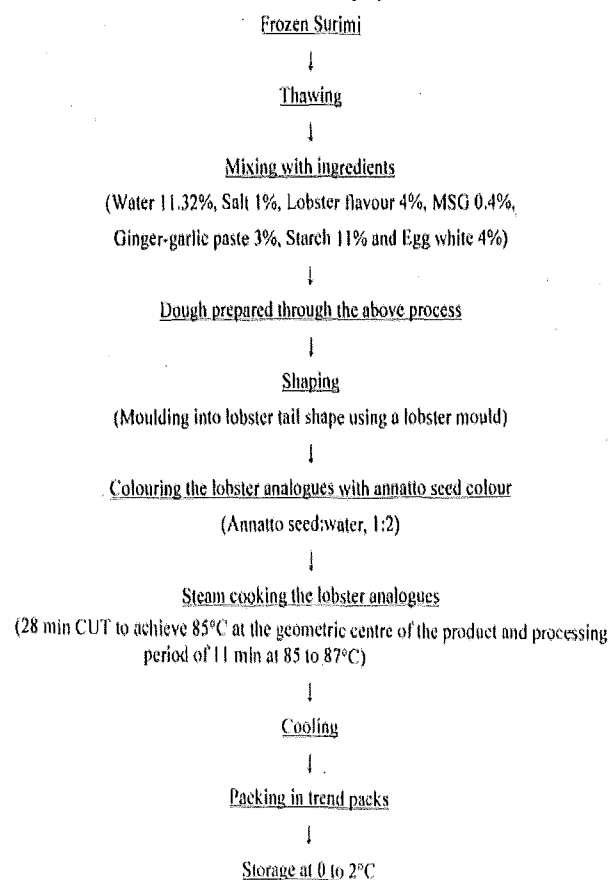
Lobster analogues were prepared with different combinations of ginger-garlic paste (GG) and lobster base flavour (LF), viz., 1:3, 1:4, 1:6, 3:3, 3:4, 3:6, 5:3, 5:4 and 5:6 (GG:LF); the other ingredients were varied accordingly (Table 2). Lobster analogues, thus prepared, were subjected to organoleptic evaluation.

Table 2: Recipe of lobster analogues prepared with ginger-garlic paste and lobster base flavour (paste) in different combinations

Ingredient	Percentage								
	1:3	1:4	1:6	3:3	3:4	3:6	5:3	5:4	5:6
Surimi	66.23	65.23	63.23	64.23	63.23	61.23	62.23	61.23	59.23
Salt	01.00	01.00	01.00	01.00	01.00	01.00	01.00	01.00	01.00
Ice water	11.32	11.32	11.32	11.32	11.32	11.32	11.32	11.32	11.32
Egg white	04.00	04.00	04.00	04.00	04.00	04.00	04.00	04.00	04.00
Starch	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
Monosodium glutamate	00.40	00.40	00.40	00.40	00.40	00.40	00.40	00.40	00.40
Vegetable oil	02.50	02.50	02.50	02.50	02.50	02.50	02.50	02.50	02.50
Colour	00.55	00.55	00.55	00.55	00.55	00.55	00.55	00.55	00.55
Ginger-garlic paste	01.00	01.00	01.00	03.00	03.00	03.00	05.00	05.00	05.00
Lobster base flavour	03.00	04.00	06.00	03.00	04.00	06.00	03.00	04.00	06.00

Lobster analogues were coloured by applying solutions of annatto seeds (1:1, colour:water), paprika (oil-soluble, 5%

Flow chart 1: Standardized method for the preparation of lobster analogues



w/v in oil), caramel (oil-soluble, 5% w/v in oil), beetroot powder (1:1, colour:water) prepared at the rate of 0.55% of lobster analogue paste.

Lobster analogue paste was prepared following the standardized method (Flow chart 1) and recipe (Table 2), moulded into the shape of a lobster. The thermometer bulb was inserted into the geometric centre of the lobster analogues. The lobster analogues were steam-cooked and the temperature was measured every minute. This was continued till the come-up-time (CUT) to achieve a temperature of 85C and further temperature was noted during the processing time (PT) of 11 minutes and cooling period.

RESULTS AND DISCUSSION

For the preparation of lobster analogues, lobster-shaped mould is necessary. A clay mould was prepared resembling the shape of lobster tail. Using this clay model, a mould was prepared with the help of plastic. In the initial trial, the lobster analogues prepared from surimi tended to lose the grooves (resembling the segmentation of the body) after steaming due to the expansion of the fish paste. Therefore, another mould was prepared in which the height of the groove wall was increased to such a level that the lobster analogue could retain the shape with segmentation after steaming.

As can be seen from Table 3, lobster analogues prepared with lobster base flavour (paste) at the rate of 2.5% of lobster analogue paste was found to score high values for all the attributes except for texture, particularly for the taste characteristics as compared to those of others with lobster cook water flavour

Table 3: Standardized recipe of lobster analogues prepared with 3% ginger-garlic paste and 4% lobster base flavour (paste)

Ingredient	Percentage
Surimi	62.23
Water	11.32
Egg white	04.00
Starch	11.00
Monosodium glutamate	00.40
Vegetable oil	02.50
Salt	01.00
Colour	00.55
Ginger-garlic paste	03.00
Lobster base flavour	04.00

(both 1:1 and 1:0.5, whole lobster homogenate: water) and lobster meat mince ($p < 0.05$).

The panelists felt that the lobster analogues prepared with lobster cook water (both the ratios) have off-odour (off-notes). Similarly, Voight *et al.* (1990) reported that there is the presence of off-notes in crab flavourant. The leaching action and the usage of sea water on a shoulder meat resulted in these undesirable attributes. The most desirable odours are present from the cook water, tip/leg shells, leg meat and tip meat. In the present study, the whole lobster was minced, mixed with water and boiled for the extraction of flavours. The contribution of off-odour to the flavour could have been clear had the extraction been made from different parts of lobster as studied by the above authors in the case of crab flavour.

In the case of lobster analogues prepared with lobster meat mince, it was observed that there was no proper mixing of lobster minced meat, either in raw or cooked condition, with the lobster analogue paste. The lobster analogues prepared with lobster base had high scores

for colour attribute as compared to those of other flavours. This may be due to the fact that paprika colour is added in the commercial lobster base flavour unlike that of the other flavours.

The results of organoleptic evaluation of lobster analogues prepared with different combinations of GG and LF showed that the ones prepared with a combination of GG and LF in the ratio of 3:4 scored high values for all the attributes as compared to those with 1:3, 1:4, 1:6, 3:3, 3:4, 3:6, 5:3, 5:4 and 5:6 ($p < 0.05$).

As the fish paste products are bland in taste with white colour and high elasticity, the fish paste products are not preferred by Indian palate; hence, the addition of high level of green chilly, coriander, garlic and ginger paste (GCGG) for different paste products such as 20% GCGG fish chikuwa (Bhatkar, 1998); fish ball in curry product requires 3% GCGG (Balange, 1999); fish ball in curry from mackerel mince bleached and unbleached requires 5% GCGG (Kamat, 1999); wada shaped fish kamaboko and kamaboko with palak bhaji mixture require 20% GCGG (Thorat, 2000); 15.2% GCGG mixture is required for fish ball with pudina (Dagare, 2001); 20% of GCGG mixture is necessary for fish ball in spinach curry (Mote, 2001); and 15.2% GCGG mixture is required for kamaboko with carrot bhaji (Farnandes, 2001).

The difference between the present study and the ones mentioned above may be due to the combination of GG and LF rather than GCGG alone. As the colour is added, only GG was selected so that the colour added is not masked. The lobster analogues coloured with annatto seed solution (1:1, colour:water) were found to

be significantly different from those of others coloured with beetroot colour, caramel colour and paprika colour, not from synthetic orange-red colour ($p < 0.05$).

However, the colour scores for lobster analogues coloured with annatto seed colour had higher average values for the colour attribute than that of synthetic orange-red colour. Apart from this, Lauro (2000) reported that surimi paste could be coloured with artificial or natural colours. The ever-increasing consumer demand for "all natural" products favour natural colours as being more compatible with the image of surimi. Therefore, natural annatto seed colour was selected. The lobster analogues coloured with annatto seed solution (1:2, annatto seed:water) had scored high values for the colour attribute as compared to those with 1:1 and 1:1.5 (colour:water) ratios.

The lobster analogues coloured with annatto seed colour solution with the concentration of 1:2 (annatto seeds:water) were found to be significantly different from those of others ($p < 0.05$). Therefore, annatto seed colour at the concentration of 1:2 (annatto seeds:water) was selected for lobster analogues.

Fish paste was prepared as per the standardized method (Table 3) and recipe, moulded into lobster tail shape and further annatto seed colour (1:2, colour:water) was applied with brush on the moulded lobster paste.

In order to pasteurize lobster analogues, it is necessary to measure the temperature at the geometric centre of lobster analogues so as to find out CUT, PT and holding time (HT), which will be

essential in fixing the duration of pasteurization in steam cooker. Therefore, it was planned to cook lobster analogues in steam cooker at 100C. It was observed that the CUT to achieve a temperature of 85C at the geometric centre of lobster analogues is 28 minutes and at a PT of 11 minutes (87.0C).

Shie and Park (1999) reported that the internal temperature reached 75 and 85C after six minutes at 75 and 85C water baths, respectively. Keeping surimi at an internal temperature of 75C for an additional five minutes is enough to result in zero aerobic plate count (APC).

At the three processing temperatures (75, 85 and 93C), 15 minute was enough to result in zero APC. At 15-minute PT, the two major characteristics of surimi (texture and colour) were more preferable at 75 and 85C than at 93C. This indicated that 15 minutes at 75 or 85C is the optimum thermal processing condition (Shie and Park, 1999).

Similarly, many scientists (Balange, 1999; Dagare, 2001; Farnandes, 2001; Mote, 2001) have selected a temperature of 85C for processing considering the microbiological and textural characteristics. The temperature of 85C was selected for pasteurization based on the report that surimi when kept at 75C for 11 minutes (internal temperature) resulted in zero APC (Shie and Park, 1999). Therefore, pasteurization of lobster analogues at 85C for 11 minutes was chosen.

ACKNOWLEDGEMENTS

The authors wish to thank the Associate Dean, College of Fisheries,

Ratnagiri, for his kind encouragement and the facilities provided.

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