

Standardisation And Quality Evaluation Of Chilli Fish

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Abstract

Chilli fish made from *Rachycentroncanadum* locally known as 'Motha' were assessed for its overall quality and hence its acceptability. The quality was analysed by sensory and microbial methods. The sensory attributes include appearance, colour, taste, odour, flavour and texture. The microbiological parameters such as APC, *E.coli* were also evaluated. Out of the two samples prepared, viz. sample 1 was selected as the best one by the taste panel. The microbial and moisture analysis of the same were carried out. The moisture content of raw material were also analysed to determine the percentage loss of moisture during cooking. Good quality ready to serve products viz. chilli fish could be prepared from good quality fish by proper modification of the recipe for chilli chicken. It had a high quality shelf life of more than one month at -18°C. It had very low APC after one month storage and no *E.coli* was detected showing the raw material as well as the finished product was free from faecal contamination.

Keywords: Chilli fish, APC(aerobic plate count), E. coli (Escherichia coli), T-7 (Tergitol 7)

Introduction

Fisheries being a major source of food provide employment and economic benefits to large sections of the society in India. Fish is also very significant nutritionally, being an important source of

quality proteins and fats as well as vitamins and minerals, though consumption still tends to be low at the national level. But the studies on fish and fishery related products give rise to a growing demand of fishery products in the last few years. Taking the nutritional value of fish and related products into account, studies show that over one billion people rely on fish as their primary source of animal protein[7]. This positively increases the demand for fish in the local and international trade. Fish products as well as fishery products plays an important role in global trade rather than their nutritional benefits.

Rather than nutritional aspect, people also prefer to the various tastes offered by the food products. This has led to the introduction of value added products[2]. Value added products give rise to different variety of products without compromising its nutritional value and food safety.

Fish being highly perishable item, it cannot be stored for a long time in an effective consumable condition. Hence, before the introduction of mechanical methods of preservation such as freezing, icing, canning, etc. our ancestors thought of adding preservatives such as salt (curing or salting) to increase the shelf life of the fishery products. Fish pickles are one of the common products available from fish from the olden times.

People also prefer different tastes. This leads to the introduction of new products from fish. Apart from the taste, the advancements in the technical and

equipment such as many utensils like oven also made people to think of making innovative recipes. This has led to the development of products such as fish balls, fish cutlets, fish sandwiches, fish fingers, fish burgers, etc.

The introduction of value added products also helps to fetch good price for the low cost fishes and thereby increasing the income of the fishermen.

The demand for value added products are increasing day by day because in developed and developing countries like India, both men and women in a family are going for work. They do not have much time to prepare food at home. However they mostly like to have foods with different tastes without compromising the nutritional aspects. In such cases, they mostly prefer ready to eat products. In this point of view, the increase for value added products is expected to increase in future not only because of the increasing population but due to the high health benefits of fish and fishery products. Fish is considered as a good commercially valued item and this can be proved by analysing the variety of products available in the market and their increasing trend of consumer preference.

As fish is considered as highly perishable, the storage stability of the processed product is an important criterion which should be studied ^{[2][3]}. Storage condition, storage temperature and the appearance of product are the major parameters considered during the frozen storage ^{[5][6]}.

The study aims at producing a standard recipe for such kind of a variety food from fish 'Chilli fish' which could be introduced into the market at a reasonable price. Also the amenability of the products

for storage and preservation at low temperatures like -18°C are also studied.

Materials and methods

Motha fish (*Rachycentroncanadum*) which was in frozen condition were bought from the market, filleted and cut into cube pieces. It was then thawed, cleaned and marinated for half an hour prior to preparation of Chilli fish. The ingredients used for marinating and the other ingredients used during processing are shown in table 1 and table 2.

Sl. No.´	Ingredients	Composition
1.	Conflour	2g
2.	Maida	3g
3.	Chilli sauce	3g
4.	Chilli powder	3g
5.	Salt	5g

Table 1: Recipe of ingredients for marination

Sl. No.´	Ingredients	Composition
1	Fish pieces (either Motha or any other white fleshed fish)	1 kg
2	Big onion	½ kg
3	Ginger paste	100g
4	Garlic paste	100g
5	Chilli	100g
6	Capsicum	250g
7	Tomato sauce	2-3 table spoon
8	Soy sauce	1-2 table spoon
9	Chilli sauce	1 table spoon
10	Cornflour	5g
11	Chilli powder	4g
12	Masala powder (either fish masala)	15g

	or chilli chicken masala)	
13	Sunflower oil	500ml
14	Salt	30g

Table 2: Ingredients for making chilli fish

The fish were marinated for half an hour with 2g confflour, 3g maida, 3g chilli sauce, 3g chilli powder, 5g salt and 15g fish masala/chilli chicken masala. Formarination, the fish were equally divided into two experimental samples- Sample 1: Chilli fish using fish masala and Sample 2: Chilli fish using chilli chicken masala. All the other ingredients used during preparation were kept constant. The marinated fishes were then fried in refined sunflower oil till the color of the fish turned slightly brown. Onion and capsicum were fried in the left over oil along with ginger paste, garlic paste, salt, along with fish masala (in case of sample 1) and chilli chicken masala (in case of sample 2). Soy sauce and tomato sauce were also added.



Chilli fish prepared by using fish masala



Chilli fish prepared by using chilli chicken masala

The sample prepared with fish masala was kept in deep freezer at -18°C for analysing its quality as well as shelf life during frozen storage.

The sensory evaluation was carried out by 6 members and each of the members was requested to give a description of the product based on sensory factors and also give a score for the products using Hedonic scale ranking (table 3).

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

Table 3: Hedonic scale ranking method

Microbial quality of the raw material and processed Chilli fish were evaluated by determining Aerobic Plate Count (APC) and by conducting test for detection of *Escherichia coli* by Tergitol-7 (T-7) method. Both the tests were carried out through standard procedures.

Moisture content evaluations of the raw material and product were done using oven dry method (AOAC) 2000 whereas the microbial quality assessment were done using procedures recommended by BAM [1][4].

Results and discussions

Sensory evaluation

The sensory properties and scores after 5 days storage at -18°C of product 1 and

product 2 are shown in table 4 and 5. The evaluation of both products showed that the sample prepared with fish masala was favoured by the taste panel. Use of fish masala enhances the natural flavour while

meat masala gives a meaty flavour. This change is not appreciated by the taste panel members.

TASTE PANEL	COLOUR AND APPEARANCE	ODOUR	TEXTURE	TASTE	OVERALL RANKING
Person 1	Very good	Meaty	Slightly soft	Better taste	Like very much 8
Person 2	Very good	Good smell	Soft	Good taste	Like extremely 9
Person 3	Good	Oily and fish odour	Soft	Meaty	Like moderately 7
Person 4	Very good	Oily and fish odour	Firm	Sweet and spicy	Like extremely 9
Person 5	Good	Spicy	Firm	Spicy and sweet slightly	Like slightly 6
Person 6	Good	Spicy	Soft	Spicy	Like very much 8
Total score					47
Average score					7.8

Table 4: Sensory properties and score of product 1 after 5 days storage at -18°C

TASTE PANEL	COLOUR AND APPEARANCE	ODOUR	TEXTURE	TASTE	OVERALL RANKING
Person 1	Good	Slightly sweet	Firm	Tasty	Like moderately 7
Person 2	Good	Spicy and fish taste	Firm	Average taste	Like moderately 7
Person 3	Good	Spicy, sweet, fishy odour	Soft	Good	Like very much 8
Person 4	Good	Oily, spicy fishy odour	Firm	Sweet	Like very much 8
Person 5	Good	Chilli and oily	Firm	Sweet	Neither like nor dislike

					5
Person 6	Fair	Sweet	Firm	Slightly sweet	Like moderately
					7
Total score					42
Average score					7

Table 5: Sensory properties and sensory score of product 2 after 5 day storage at -18°C

Microbial analysis

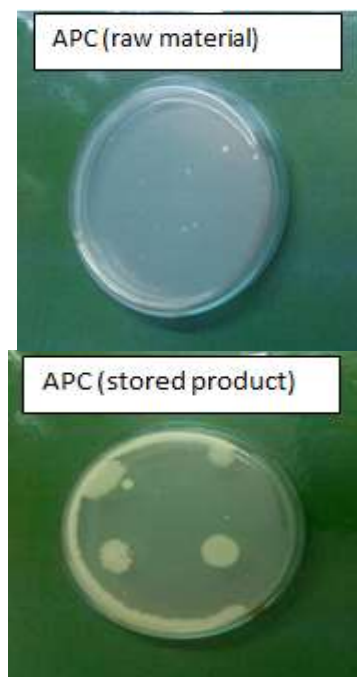
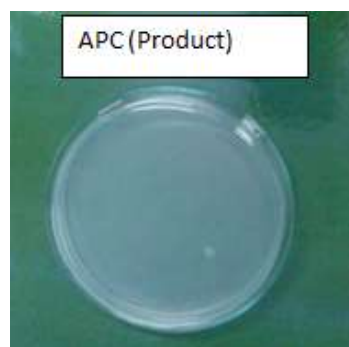
The load of APC on raw material and final product before and after storage at -18°C are shown in table 6. Both results show that the total viable counts on raw material

and product before and after storage were within the permissible limit. The product did not show any noticeable change even after one month storage at -18°C.

Raw material		Product		Product (after one month storage at -18°C)	
Dilutions	No. of colonies	Dilutions	No. of colonies	Dilutions	No. of colonies
10 ⁻³	74, 76	10 ⁻²	24, 28	10 ⁻²	22, 24
10 ⁻⁴	7, 9	10 ⁻³	1, 3	10 ⁻³	1, 1
10 ⁻⁵	3, 5	10 ⁻⁴	Nil, Nil	10 ⁻⁴	Nil, Nil

Table 6: Load of APC on raw material and final product before and after one month of storage at -18°C

- APC load on raw material = 7.5×10^4 cfu/g
- APC load on processed product = 2.6×10^3 cfu/g
- APC load on processed product (after storage) = 2.3×10^3 cfu/g



Figures of APC plates with colonies

The results of the test for detection of *E. coli* by T7 method is shown in table 7. The raw material, product before and after one month storage was free from characteristic colony. If the raw material quality is good and proper safety measures are followed during product formulation, a product of high quality and safety could be obtained.

Raw material		Product		Product (after one month storage at -18°C)	
Dilutions	<i>E. coli</i>	Dilutions	<i>E. coli</i>	Dilutions	<i>E. coli</i>
10 ⁻¹	NC C	10 ⁻¹	NC C	10 ⁻¹	NC C
10 ⁻²	NC C	10 ⁻²	NC C	10 ⁻²	NC C

*NCC-No characteristic colony

Table 7: Number of *E. coli* present in the samples

- *E. coli* on raw material = <20cfu/g
- *E. coli* on product = <20cfu/g
- *E. coli* on product (after storage) = <20cfu/g

Moisture analysis

The moisture content of the raw material, meat and meat plus slurry is shown in table 8. Around 10% of the moisture were reduced after cooking.

SAMPLE	MOISTURE CONTENT
Sample1 (Raw material)	75.48%
Sample2 (Meat only)	64.68%
Sample3 (Meat + slurry)	65.76%

Table 8: Moisture content of the samples

Conclusion

Chilli fish with good odour and flavour can be processed from different species of fish. Out of the two types prepared, the product made with fish masala was selected as the best by the sensory panel as it has the natural flavor. Also the storage studies of the product showed that without adding any preservatives (other than salt), the product is safe for consumption even after one month storage at -18°C. The Chilli fish was in very good condition based on microbiological and chemical characteristics. Also there were no significant changes in sensory characteristics during storage. Based on the microbiological evaluation, it has been found that *E. coli*, which is a fecal indicator, was not detected in the raw material as well as product which indicate that the samples were free from terrestrial contamination. The present study showed that good quality ready to serve product namely Chilli fish could be prepared from fish.

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