Asian J. of Adv. Basic Sci.: 2(2), 2014, 66-71
ISSN (Online): 2347 - 4114
www.ajabs.org

Preparation of Bombay duck chutney from dried Bombay duck fish *Harpodon neherus*

B. P. Bhosale, N. D. Chogale, H. B. Dhamagaye, V. R. Bhatkar and R. D. Bondre

Marine Biological Research Station, Peth Killa, Ratanagiri-415 612
(Dr. B. S. Konkan Agril. University, Ratnagiri.), INDIA

Email ID: narya_fish@rediffmail.com & bhosalebp@yahoo.co.in

(Received 11Aug, 2013, Accepted 17 July, 2014)

ABSTRACT: A method for preparation of chutney from dried Bombay duck fish has been developed. The recipe, ingredients for the product has been standardized through taste panel studies. Besides, a treatment of antioxidant has been tried to assess the effect on shelf life of the product. The proximate composition, bacteriological and organoleptic changes in treated and untreated chutney has been studied during storage at room temperature. The quality of treated and untreated have better keeping quality and from organoleptic point of view both the chutney retain acceptable quality upto 90 days at room temperature in airtight polythene bag.

Keywords: Bombay duck, Chutney, Antioxidant, storage at room temperature, Proximate composition, Bacteriological, Organoleptic quality.

INTRODUCTION

Bombay duck is one of the commercially important fish distributed in northwest coast of India and third largest fishery in India averaging an annual catch of about 3,00,000 tonnes. It forms one of the largest single fisheries in northwest India (Radhakrishnan *et. al.* 1973). Bombay duck is very excellent food fish. In Maharashtra, Bombay duck (*Harpodon neherus*) is popularly known as 'Bombil'. Only a small quantity of the total landing is consumed in fresh condition, the remaining being converted into dried form for national as well as international market.

There is little attempt to prepare products of Bombay duck such as dried laminated Bombay duck, which has got good market. Nazir and Magar (1965) have studied the chemical composition of Bombay duck and changes occurring in the nutritive values of dried Bombay duck on storage. Sen (1969) has reported results of the protein concentration from Bombay duck fish and effect of processing variables on the nutritional and organoleptic quality. Kandoran *et. al.* (1969) worked on the storage behaviour of laminated and commercial Bombay duck. Prabhu (1972) studied the sun-drying characteristics of Bombay duck. Radhakrishnan *et. al.* (1973) have examined the preliminary studies on freezing characteristics of Bombay duck. Devaraj and Sreekrishna (1987) with the purpose of product diversification mentioned the development of simple techniques for making laminated Bombay duck, fish wafers and utilization of minced meat.

Now a day's all over the world people have preferred to eat ready to eat products. Though Bombay duck has got a characteristic flavor of its own and is available in large quantity, which makes it quite suitable for preparation of value added products and will be of interest for self-employment of women and individual entrepreneur. No attempts has so for been made in this regard. Therefore, an attempt has been made to develop a simple method for preparation of Bombay duck fish chutney and study its storage. Besides, a treatment of Butylated Hydroxyanisole (BHA) has also been tried to examine its effect on shelf life of the product.

MATERIAL AND METHODS

Dried Bombay duck was obtained from the local fish market at Ratnagiri. Dried Bombay duck of size 8-12 cm was selected for preparation of chutney. Dried Bombay duck was cleaned by removing head, fin and tail and was cut into small pieces of 2-3 cm size. The weight loss of the dried Bombay duck during the cleaning and roasting process was recorded. The other ingredients were obtained from local market at Ratnagiri.

The composition of ingredients (Table-1) standardized using a trained taste panel by considering the appearance, texture, odour, taste and colour of the products.

The method of the preparation of chutney is given in flow charts -1. The weight of final product was recorded.

The prepared chutney was divided into two lots, the first lot was untreated and the second lot was treated with antioxidant 0.01-0.02 % Butylated Hydroxyanisole (BHA) and were packed in airtight polyethylene bags and stored at room temperature.

Proximate composition of Samples was estimated at initial and final days of storage period. All the values are expressed, on wet weight basis, as percentage of products. The proximate composition analysis for moisture, protein and fat was done according to the recommended AOAC (1995) method.

Samples from the storage room were drawn at regular 15 days interval and the analysis of the same was carried out. The samples were analyzed for TPC (Malik, 1992), *E. coli* (Collins and Cyne, 1984), Coagulase positive *Staphylococci* (Baired Parker, 1962) and *Salmonella* (AOAC, 1995).

Beside the bacteriological analysis of the stored chutney, organoleptic test was also undertaken at every 15 days interval for both the samples by round a 10 trained panelist using a 10-point hedonic scale. The various characteristics evaluated are appearance, colour, taste, texture, odour and overall acceptability. The score given by the panelist for each attributes were pooled and the average score were taken into consideration.

The experimental data was subjected to statistical analysis wherever found necessary. One-way analysis of variance (Snedecor and Cochram, 1968) was done for overall quality characteristics with respect to storage period. Least significance difference based on t-test was used, as when necessary.

RESULTS AND DISCUSSION

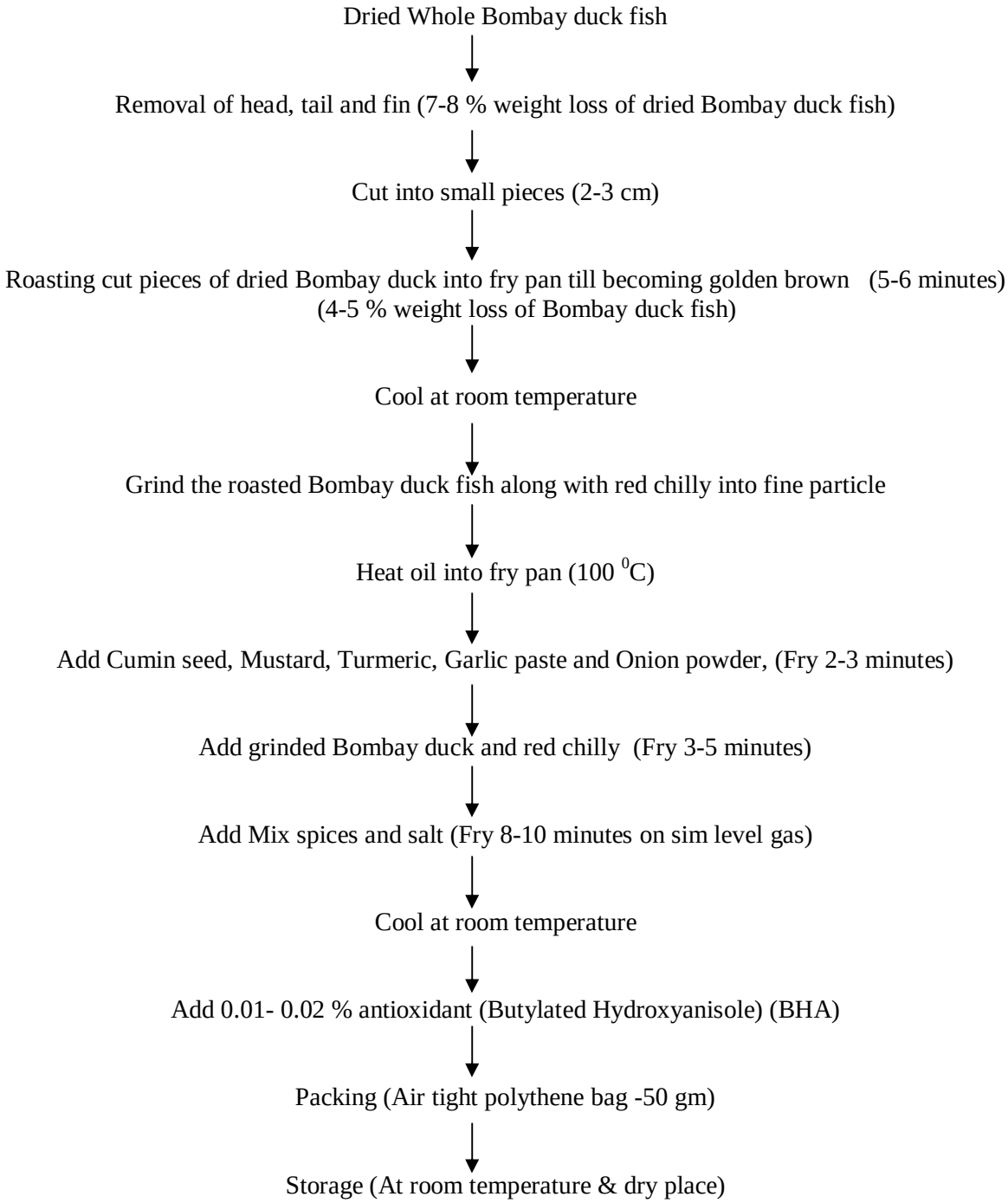
Dried Bombay duck of size 8-12 cm was selected for preparation of chutney. The medium size of dried Bombay duck was found to be suitable and comparatively cheaper in rate. Dried Bombay duck was cleaned by removing head, fin and tail and was cut into small pieces of 2-3 cm size. The small pieces of dried Bombay duck were roasted in a fry pan till its colour changed golden brown. The roasted pieces were subjected to grinding.

There was around 11-13 % of weight loss of the dried Bombay duck during the cleaning and roasting process.

The ingredients (Table - 1) were added in roasted and grind Bombay duck as given in flow chart - 1. Among the major ingredients used in the recipe the effect of different levels of garlic paste on the product characteristics were studied. Of the three levels of garlic paste tried (10, 20, 30 %), 20 % incorporation gave the best result with respect to all attributes of the product. Similarly addition of red chilly 10 %, refined sunflower oil 6.5 % and dry onion powder 15 % gave the best results with respect to all attributes of the product. Other ingredients such as salt, mustard, turmeric and mix spices added in order to give an oriental taste to the chutney.

The changes in proximate composition of treated and untreated product in initial and final days during storage at room temperature are shown in figure - 1. From figure, it is clear that during storage, there are slightly changes in moisture, protein and fat content. Nazir and Magar (1965) has indicated that treated and untreated dried Bombay duck stored for 9 months in polythene bag and tin container showed little variation in the values of moisture, protein and fat.

Flow Chart 1: Standardized Method of preparation of Bombay duck Chutney



The Total Plate Count (TPC) of both treated and untreated sample stored at room temperature was increased gradually from 0 to the end of 90th days is shown in Table - 3. TPC of treated and untreated sample were within the acceptable limits and ranged from 3,000 to 43,000 cfu.g^{-1} and 3,000 to 49,000 cfu.g^{-1} respectively. The pathogens like *Staphylococcus, E. coli* and *Salmonella* were absent during the entire period of storage study for both the samples. Low TPC and no coliform were reported in storage Bombay duck for 21 weeks (Radhakrishanan *et. al.*, 1973).

Organoleptic quality characteristics namely appearance, colour, taste, texture, odour and overall acceptability was studied of prepared Bombay duck chutney of both treated with antioxidant and untreated sample stored at room temperature as shown in Table 2. It was noticed that there was gradual decrease in the quality of both samples from o to 90 days. Nevertheless, they were well within the acceptable level. The scores ranged between 5.4 to 8.9 for all the attributes. Kandoran *et. al.* (1969) observed drop in the organoleptic quality of laminated and commercial Bombay duck storage at optimum humidity level for 9 months. Between the treated and untreated ones, treated Bombay duck chutney had higher scores for all attributes as compared to untreated, during the entire storage period. Also it was noticed that original flavors and crisp texture slightly decreased at the end of 90^{th} days but there was no rancid flavor and odor as noticed by panelist. Hence the product can be acceptable upto 90 days during storage at room temperature in airtight polythene bag. Similarly Nazir and Magar (1965) reported shelf life of plain dried and brined and dry Bombay duck kept in polythene bag was about 6 months.

ANOVA test of Overall Acceptability of treated and untreated chutney stored at room temperature was carried out for different days. Statistically, the score of untreated chutney showed no significant difference upto 30 days. In 90^{th} day, the panelist score was 5.7 that were acceptable. Statistically, the score of treated chutney showed no significant difference upto 30 days. In 90^{th} day, the panelist score was 5.7 that were acceptable.

Economics for Bombay duck chutney: The total production cost of Bombay duck chutney was Rs. 80.00 per kg including packing and labour charges.

Table 1: Various ingredients used for preparation of Bombay duck chutney.

Ingredients	Quantity in %
Dried Bombay duck	45.00
Red chilly	10.00
Salt	0.50
Cumin seed	0.50
Mustard	0.50
Garlic paste	20.00
Turmeric	0.50
Mix spices	1.50
Refined sunflower oil	6.50
Dried Onion Powder	15.00

Table 2: Changes in average organoleptic quality characteristics of Bombay duck chutney during storage at room temperature.

Sr. No	Storage period in days	R. T. (^{0} C)	Appearance		Colour		Taste		Texture		Odor		Overall acceptability	
			I	II	I	II	I	II	I	II	I	II	I	II
1	0	28.6	8.9	8.9	8.8	8.8	8.5	8.4	8.7	8.7	8.5	8.5	8.7^a	8.7^a
2	15	29.2	8.9	8.8	8.8	8.8	8.5	8.4	8.7	8.6	8.5	8.4	8.6^a	8.6^a
3	30	30.1	8.8	8.7	8.7	8.6	8.4	8.2	8.6	8.5	8.3	8.1	8.4^a	8.3^a
4	45	29.8	8.6	8.4	8.5	8.4	8.1	7.9	8.3	8.1	7.9	7.6	8.0^b	7.8^b
5	60	31.2	8.0	7.9	8.0	7.8	7.5	7.2	7.5	7.3	7.2	6.8	7.5^c	7.3^c
6	75	31.0	7.2	7.0	7.4	7.2	7.0	6.8	6.5	6.2	6.3	6.1	6.8^d	6.5^d
7	90	30.0	6.2	5.9	6.8	6.4	6.3	6.0	5.7	5.5	5.6	5.4	5.9^e	5.7^e

** abcde: means with the same subscript within a column for each experiment are not significantly difference ($p<0.05$).*

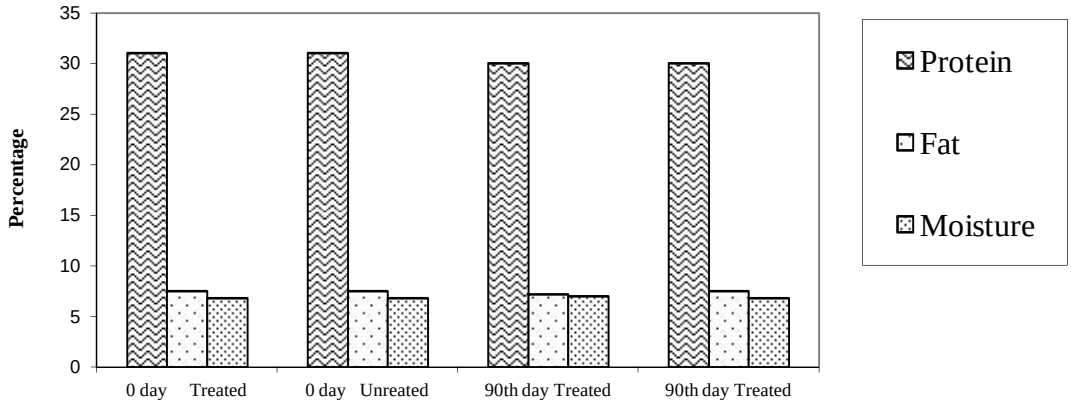
I = Treated with 0.01 wt. % to 0.02 wt. % antioxidant Butylated Hydroxyanisole (BHA)
II = Untreated without antioxidant.
Score: *Excellent-10, Very Good-9, Good-8, Moderately good-7, Slightly good-6, Acceptable-5, Slightly poor-4, Moderately poor-3, Poor-2, Very poor-1*

Table 3: Changes In Microbiological Counts Of Bombay duck Chutney During Storage At Room Temperature.

Sr. No	Storage period in days	R. T. (^{0} C)	TPC (cfu.g^{-1})		*E. coli* (cfu.g^{-1})		*Staphylococcus* (cfu.g^{-1})		*Salmonella* (cfu.g^{-1})	
			I	II	I	II	I	II	I	II
1	0	28.6	3,000	3,000	----------Nil----------					
2	15	29.2	7,000	7,500						
3	30	30.1	13,000	15,000						
4	45	29.8	20,000	23,000						
5	60	31.2	26,000	29,000						
6	75	31.0	36,000	42,000						
7	90	31.1	43,000	49,000						

** I = Treated with 0.01 wt. % to 0.02 wt. % antioxidant Butylated Hydroxyanisole (BHA)*
II= Untreated without antioxidant

Figure 1: Variation in Protein, Fat and Moisture contents of Treated and Untreated Bombay duck chutney



CONCLUSION

Bombay duck chutney can be easily prepared by using locally available ingredients and material. It is ready to eat product, which can be consumed without further elaborate preparation. The main advantage of this product is it can be stored at ambient temperature. The quality of treated and untreated chutney was acceptable upto 90 days at room temperature in airtight polythene bag.

ACKNOWLEDGEMENT

Authors are thankful to Hon'ble Vice Chancellor and Director of Research Dr. BSKKV, Dapoli for encouragement during the course of work. Also thanks to Dr. P. C. Raje, Associate Dean, College of Fisheries, Ratnagiri for providing necessary facilities and guidance during the course of this work. Also grateful to management of Naik ice and cold storage, Ratnagiri for extending necessary facilities to microbiological studies

REFERENCES

1. AOAC. (1995) Official methods of Analysis. Ed. W. Horwitz, 16th ed. Association of Official Analytical Chemist, Washington.
2. Baired Parker, A.C. (1962) An improved domestic and selective media for isolating Coagulase positive Staphylococci. Journal Applied Bacteriolgy 25, 12.
3. Collins, C. H. and Lyne P. M. (1984) Bacterial food poisoning. In: Microbiological methods. Ed. Butterworths, 5th ed. London Boston Durban Singapore Sydney Toronto Wellington. 182-189.
4. Devaraj, M. and Y. Sreekrishna (1987) CIFE contribution to Marine fishes R & D (research & development). CMFRI special publication, Cochin 40: 81-82.
5. Kandoran, M. K., K. K. Solanki and R. Venkataraman (1969) Studies on the storage behaviour of laminated and commercial Bombay duck. Fishery Technology VI (2), 140.
6. Malik, B. S. (1992) Laboratory manual of Veterinary Bacteriology Mycology and Immunology: CBS Publisher and Distribution, 68-70.
7. Nazir, D. J. and N. G. Magar (1965) Chemical composition of Bombay ducks and changes occurring in the nutritive value of dried Bombay ducks on storage. Fishery Technology 2, 170-179.
8. Prabhu, P. V. (1972) On sun-drying of Bombay duck. Fishery Technology IX (1), 64-67.
9. Radhakrishnan, A. G., K. K. Solanki and R. Venkataraman (1973) Preliminary studies on freezing characteristics of Bombay duck (Harpodon nehereus). Fishery Technology 10, 124-13.
10. Sen, D. P. (1969) Fish protein concentrate from Bombay duck (Harpodon nehereus) fish; effect of processing variable on the nutritional and organoleptic qualities. Food Technology 30, 683-688.
11. Snedecor, G. W. and W. G. Cochram (1968) Statistical methods state university press, Towa, 593.