Available online www.jsaer.com

***Journal of Scientific and Engineering Research*, 2017, 4(9):392-396**

Research Article

ISSN: 2394-2630
CODEN(USA): JSERBR

Food composition and sensory quality of fish crackers made from *Luciobarbus esocinus*

Nermin KARATON KUZGUN

Fisheries Faculty, Munzur University, Tunceli, Turkey

Abstract In this study, it was aimed to product of fish crackers using *Luciobarbus esocinus*. Based on the total dough, 1.10% salt, 1.90% sugar, 13,50% sunflower oil, % 1.62 egg, % 0.88 vinegar, % 13.50 butter, % 48.40 flour, were added and stirred until a homogenous mixture was obtained. For the purpose of adding groups into the dough mixture, two different groups of crackers were produced as A and B by adding fish meat at the rates of % 10 and % 20. The mixture was compressed in an extractor and baked. Nutriment composition (moisture, raw protein, raw oil, raw ash, carbonhydrate) and sensual quality of the samples that were acquired in the study were determined and the analyses were repeated for 3 times. Evaluating the data acquired as a result of chemical analyses in the study statistically; it was determined that the difference between these two groups was significant in terms of food composition ($p<0.05$). Additionally, energy values of the products were determined respectively as 521.1—518.5 Kal/100 g in the groups A and B. As a result of sensual analyses which were conducted in this study; samples in the group A received the highest number of likes from the panelists among the products that were prepared experimentally.

Keywords Fish cracker, *Luciobarbus esocinus*, Food composition, Energy value, Sensory quality, Nutriment composition

1. Introduction

In our contemporary world, in parallel to evolving life style, changes in eating habit have increased consumption of foods easy to carry and ready to eat. Food products such as crackers, treats, biscuits and chips are considered as low nutritious and imbalanced because they lack of some nutrition elements although their energy values are high [1-4]. Therefore, if snack foods are consumed frequently between meals this might result in excessive energy intake. It is considered that it would be worth to enrich these products with fish meat since they are consumed in large volumes today [1-7]. On preparing fish cracker one starts by mixing fish meat, tapioca flour, water, and some seasonings including salt, sugar, and monosodium glutamate [8].

The present study aims to investigate the effect of fish meat on chemical composition, energy values and sensorial characteristics of crackers in order to supply an alternative food, crackers containing meat of *Luciobarbus esocinus* aquacultured in Turkey.

2. Material and Methods

Within this study, *Luciobarbus esocinus* fishes with certain economic value were procured from fisheries in Pertek territory in the Keban Dam Lake. Fishes were transferred in insulated polyurethane carriage boxes with ice in them to the laboratory set in the Pertek Vocational College. Then, they were processed in the very same day. After fish fillets were prepared, they were rinsed with fresh water. Then, they were boiled in water for 10 minutes before grounding in blender.

2.1. Creation of Fish Crackers

Figure 1 exhibits flow chart of fish cracker process and Fish crackers are seen in Figure 2. As a result of these operations, 2 distinct groups were prepared and each operation was repeated for three times.

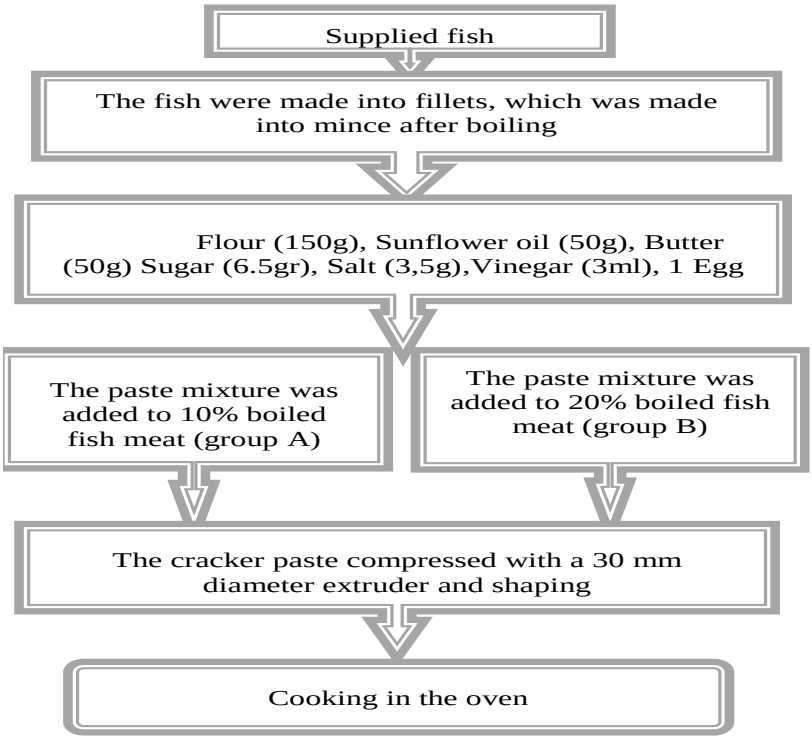

Figure 1: Flow chart of fish cracker process

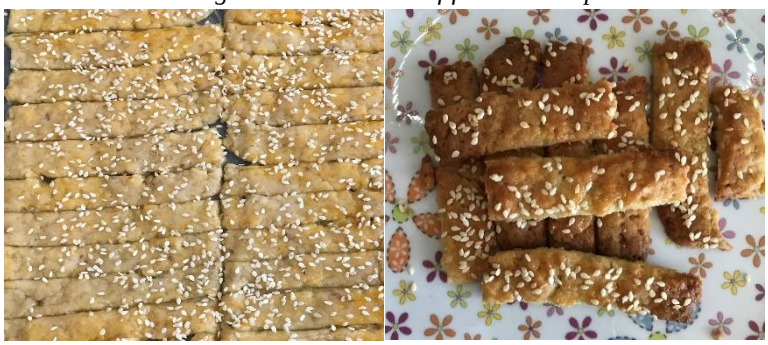

Figure 2: Cracker dough and cracker samples

2.2. Chemical Analyzes

Moisture content % was determined by drying the sample at 100 °C until constant weight was obtained. [9]. Crude Protein% was determined according to AOAC procedure with crude protein % analysis [10]. In analysis of crude fat% content, Soxhelet (Extraction) method was employed [11]. The percentage of ash content was determined by means of crude ash % burning method [10]. Carbohydrate value was determined by subtracting total moisture, crude ash % , crude protein % and crude fat % amount percentages found during analysis from 100 [12]. Energy values were obtained by adding up energy values supplied by individual nutrition elements [12].

2.3. Sensory Analysis

Sensory analyses on samples were conducted by a group of panelist (n=40) aged 18-65. Each panelist sensorial examined cracker samples in terms of their colour, odour, flavour appearance and general acceptability (5-Very Good to 1—Very Bad) [13].

Table 1: Sensory analysis scoring form [13]

Panelist name:				Date:	
Grup	**Colour**	**Odour**	**Flavour**	**Appearance**	**General acceptability**
A (10% Fish+cracker)					
B (20% Fish+cracker)					

2.4. Statistical Analysis

In statistical analysis of acquired data within the scope of the present study, IBM SPSS®22 (SPSS Inc., Chicago, IL, USA) statistical package software was employed. The statistical significance of the difference among groups was investigated by means of variance analysis (ANOVA) ($p<0.05$) [14].

Results and Discussions

Table 1 exhibits chemical compositions of prepared samples. According to the Table 1, average moisture, protein, fat, ash, carbohydrate contents of fish meat ingredient of cracker samples were determined as follows 70.50±0.50%, 19.33±1.66%, 6.85±0.85%, 1.14±0.05% and 2.17±0. 26%, respectively. Table 1 exhibits moisture%, protein%, fat%, ash% and carbohydrate % amount of prepared cracker paste as they were containing fish meat in various proportions. In parallel to these findings, Karaton Kuzgun [15], reported in their study conducted on *Luciobarbus esocinus* fillet that moisture, protein, fat and ash percentages were 71.27±1.20%, 19.21±1.78%, 7.75±1.20% and 1.19±0.28%, respectively. These values are also similar to our findings.

Across these samples, statistically significant difference wasn't determined among groups in terms of moisture ($p>0.05$). Of considered samples, whereas the highest crude protein% amount was determined with the group B cracker and paste (B) at 17.54±0.46%, respectively; the lowest crude protein% amount was determined with group A cracker at 12.50±0.50% (Table 1). Statistically significant difference was determined between samples in terms of crude protein% amount ($p<0.05$). Two groups displayed similarity in terms of fat amounts in cracker samples, others wasn't exhibited notable statistically significant difference among groups ($p>0.05$) (Table 1). Whereas the highest crude ash% percentage measured with crackers enriched with fish meat was estimated with group A at 2.25±0.25%; the lowest percentage was estimated with group B at 2.05±0.05%. In terms of crude ash% content of samples, statistically significant difference wasn't determined among groups ($p>0.05$). In terms of percentage of carbohydrate% content of prepared fish cracker samples, it was estimated with group A and B at 46.90±1.30% and 41.50±2.50%, respectively. For paste samples, the same Carbohydrate % value was estimated with group A and B at 17.00±1.00% and 15.14±1.14%, respectively (Table 1). In the statistical analysis of cracker samples enriched with fish meat with respect to their carbohydrate content, the differences among groups were found significant ($p<0.05$). In another study on cake paste, moisture %, crude ash %, crude fat % and crude protein % content percentages of mixture were reported as 58.32±0.70, 0.45±0.02, 2.58±0.37 and 4.23±0.50, respectively. These findings are similar to our findings. However, fat and protein amounts were found to be lower than the values found in our study [16]. This situation could be associated with the different proportions in paste mixture. As it could be seen from Table 1, sample crackers' moisture %, crude protein %, crude fat %, crude ash % and carbohydrate % values were measured at high levels as follows 7.50±0.50% (B), 15.00±1.00% (B), 32.50±0.50% (B), 3.50±0.50% (B) and 46.90±1.30% (A), respectively. According to another study in the literature, amounts of constituents in per 100 g of substance were determined measured; and ash%, moisture %, protein %, fat % and carbohydrate % percentages were reported as 2.55, 10.00, 11.68, 6.74 and 69.08, respectively [4]. In the same line, Yağmur *et al.* (2005), In these products, average moisture, protein fat, carbohydrate and ash were determined as 5.54%, 6.48%, 18.49%, 68.43% and 1.08%, respectively. These findings displayed similarity with our findings. As it was exhibited by Table 1, when 100 g. of each sample was analyzed on the basis of their energy values, group A and B samples were measured as 521.1±3.50 Cal/100 g and 518.5±2.50 Cal/100 g, respectively. The difference between groups was then found statistically significant in terms of energy value ($p<0.05$). According to another study, the respective value was reported as 466 Cal/100 g for prepared biscuit and similar wheat products [17].

Table 1: Food Composition of Cracker Samples

	Moisture %	CrudeProtein %	Crude Fat %	Crude Ash %	Carbohydrat %	Energy Value Kal/100g
Fish	70,50±0,50^{c}	19,33±1,66^{c}	6,85±0,85^{a}	1,14±0,05^{a}	2,17±0,26^{a}	-
A Paste	44,5±0,50^{b}	16,75±0,75^{bc}	19,50±0,50^{b}	2,05±0,25^{ab}	17,00±1,00^{ab}	-
B Paste	44,15±0,85^{b}	17,54±0,46^{bc}	21,12±2,12^{b}	2,05±0,05^{ab}	15,14±1,14^{ab}	-
A	6,50±0,50^{a}	12,50±0,50^{a}	30,50±0,50^{c}	3,10±0,30^{b}	46,90±1,30^{b}	521,1±3,50^{a}
B	7,10±1,50^{a}	15,00±1,00^{ab}	32,50±0,50^{c}	3,50±0,50^{b}	41,50±2,50^{b}	518,5±2,50^{b}

$^{a,b,c:}$ The difference between average values with different letters on the same column

Sample crackers were also evaluated by participants in terms of color, odour, taste, appearance and general like (Figure 2). Sample crackers were scored the same in two groups (A,B) in terms of their color (4,85±0.34-4,85±0.46) (Figure 3). When colors of samples were analyzed statistically, the differences among groups weren't found to be significant ($p>0.05$). When cracker samples were evaluated by participants in terms of their odour, the highest score was given to samples from group A (4.38±0.57), the lowest score was given to the samples from group B (4.28±0.82) (Figure 3). In statistical analysis of samples for sensorial perception regarding their odour, it was revealed that differences among groups weren't found to be statistically significant ($p<0.05$).As it was seen from Figure 3, in sensorial analysis of cracker samples for their flavour, whereas group A samples were given 4.57±0.58 score, group B samples were given 4.52±0.66. It was also determined that the differences among groups weren't statistically significant in terms of flavour sense ($p<0.05$). As it was exhibited in Figure 3, when sample groups were evaluated by respondents for their appearance, the difference among groups weren't found to be statistically significant in terms of their appearance ($p>0.05$). According to Figure 3, when samples were evaluated by respondents in terms of general acceptibility, it was seen that the highest score (4.81±0.39) was given to group A; and the lowest score (4.52±0.58) was given to group B. In statistical analysis of samples in terms of sensorial general acceptibility, the differences among groups were found significant ($p<0.05$). İzci and Bilgin, (2015) [18], determined in their study conducted on cracker that general acceptability score of the cracker as 8.09±0.25. Karaton Kuzgun and Gürel İnanlı, (2017) [19], determined in their study conducted on cracker that general acceptability score of the cracker as 4,75±0.43-4,00±0,00. This value coincides with our findings.

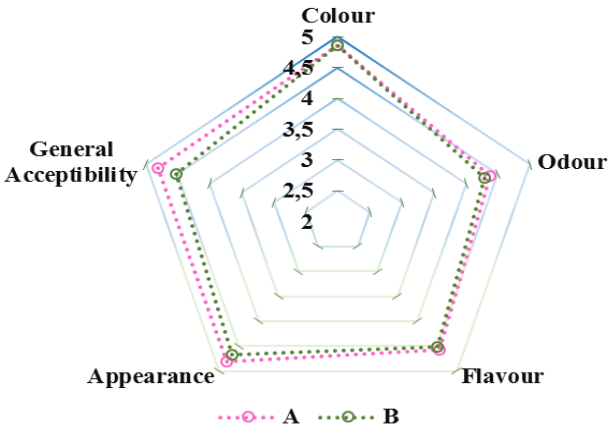

Figure 3: Sensory Change in Cracker Samples

Conclusion

Finally, it was concluded that crackers could be added meat of fish species studied in this research so that nutritious values of crackers could be enhanced and variety of products could be enriched, which eventually makes significant contribution into country economy. The effects on the quality of fish cracker may different depend on the fish species, and this might be the subject of a future study.

References

[1]. Anon, 1995.Tecnical consultation on Food Fortification. Technology and Quality Control. Rome, Italy 22-23 November.

[2]. Egemen, A., 1986. 'Vitaminlerin Sağlığımızdaki Önemi' Konulu Sempozyum Notları, İzmir 119 s.

[3]. Karagözlü, C., Akbulut, N., Ömeroğlu, S., 2000. Zenginleştirilmiş Süt ve Süt Ürünleri, Süt Mikrobiyolojisi ve Katkı Maddeleri VI. Süt ve Süt Ürünleri Sempozyumu, Tebliğler Kitabı. Tekirdağ, 595.

[4]. Özer, E. A., 2007. Ekstrüzyon yöntemi ile besleyici değeri yüksek çerez tipi fonksiyonel bir ürün geliştirme gıda, Çukurova Üniversitesi, Doktora tezi.

[5]. Rıchardson, D.P., 1990. Food Fortification, Proceedings of the Nutrition Society. 49, 39-50.

[6]. Ekşi, A., Karadeniz, F., 1996. Gıda Zenginleştirme Yaklaşımı ve Türkiye'de Uygulama Olanağı. Beslenme ve Diyet Dergisi, 25 (2), 45-51.

[7]. Obatolu V.A., Cole A.H., 2000. Functional Property of Complementary Blends of Soybean and Cowpea with Malted or Unmalted Maize. Food Chemistry (70), 147-153.

[8]. Huda, N., Leng, A. L., Yee, C. X., Herpandi. 2010. Chemical composition, colour and linear expansion properties of Malaysian commercial fish cracker (Keropok). Asian Journal of Food and Agro-Industry 3: 473-482.

[9]. AOAC, 2002a. Moisture content. 950.46. Official Methods of Analysis (17th ed.). Association ofnOfficial Analytical Chemists. Gaithersburg, Maryland.

[10]. AOAC., 2002. Official Metods of Analysis of the Association of Official Analytical Chemists (17 th ed.) Association of Official Analytical Chemists, Gaithersburg, Maryland.

[11]. AOAC, 2002b. Fat content in meat. 960.39. Official Methods of Analysis (17th ed.). Association of Official Analytical Chemists, Gaithersburg, Maryland

[12]. Gibson R.S., 1990. Principles of Nutritional Assessment. Oxford University Press.

[13]. Altuğ Onoğur, T., Elmacı, Y., 2011. Gıdalarda Duyusal Değerlendirme, Sidas Medya, İzmir.

[14]. Özdamar, K., 2001. SPSS ile Biyoistatistik. Yayın no: 3,4. Baskı. Kaan Kitabevi, Eskişehir, 452.

[15]. Karaton Kuzgun, N., 2014. Farklı esansiyel yağlar ve kitosan ile hazırlanan filmlerle ambalajlanmış Luciobarbus esocinus filetolarının 2±1°C'de raf ömrünün araştırılması, Doktora Tezi, 116.

[16]. Gürel Inanli, A., Karaton N., Emir Çoban Ö., 2011. Sensorial, chemical and microbiological quality of anchovy cake, African Journal of Biotechnology Vol. 10(48), pp. 9870-9874.

[17]. Yağmur C., Mazahreh A., Özer, E.A. 2005. Türkiye'de Üretilen Bazı Bisküvi ve Benzeri Tahıl Ürünlerinin Besin Değerleri (Protein, Yağ, Rutubet, Kül, Karbonhidrat ve Enerji Miktarları). Sendrom, 17(2), 76–80.

[18]. İzci L., Bilgin Ş., 2015. Sensory acceptability and fatty acid profile of fish crackers made from Carassius gibelio, Food Science and Technology, 35(4): 643-646.

[19]. Karaton Kuzgun N., Gürel Inanli, A., 2017. Sensory quality and food composition of fish crackers made from *Oncorhynchus mykiss*. International Conference on Advances and Innovations in Engineering (ICAIE, 10-12th May 2017). 1291p.