

Short communication

A traditional food: 'fish baked in a salt crust'

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Abstract

'Fish in a salt crust' is a traditional fish product that is produced from covering with mixture including rocksalt, egg whites and water of fish like grouper, sea bass, porgy and common sea bass in a baking tray. Following that, the 'fish in a salt crust' is baked. Using a hammer or wooden spoon, strike crust is cracked and the fish is served. In the present study, it was aimed to inform about preparation steps of rainbow trout (*Oncorhynchus mykiss*) baked in a salt crust. Additionally, proximate composition, energy value and salt content of the fish baked in a salt crust were investigated. Moisture, crude protein, crude lipid, crude ash, carbohydrate, energy and salt values of raw material and the baked fish in a salt crust were determined as 70.33-62.45%, 20.66-24.36%, 2.65-10.23%, 0.81-1.64%, 5.56-1.42 g/100 g, 128.69-194.81 kcal/100 g and 0.01-0.06%, respectively. The salt and carbohydrate values were not found to be significantly different ($p>0.05$), however the other values were significantly different ($p<0.05$).

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Introduction

It is reputed to be Egyptians may be the first civilization that preserved the meat and fish in salt. It is reported that the earliest Chinese record regarding with preservation in salt of fish is goes back to B.C. 2000 and salted fish and bird meat is found in aboriginal Egypt graves (Kurlansky, 2002). Traditional foods that form part of tradition, history and cultural heritage are food products differ distinctly from other foods by the reason of having specific properties and typical composition, using traditional raw materials, ingredients and methods for their production (Gursoy *et al.*, 2008).

One of the products that can be supposed as traditional dish is 'fish baked in a salt crust'. 'Fish in a salt crust' is a product that is produced from covering with mixture including rocksalt, egg whites and water of fish like grouper, sea bass, porgy and common sea bass (generally weighing 2-3 kg) in a baking tray. Nowadays, mostly it is produced at homes by people who know its preparation, in restaurants or small plants. In some restaurants, the salt crust is burned by sprinkling alcohol before crack and the fish baked in a salt crust is presented within flames before serving.

There is a preliminary study that is applied on *Barbus grypus* (Olgunoglu and Inceyol, 2011). In Hatay province, the same cooking method is applied for chicken too. 'Chicken baked in a salt crust' is known as a traditional dish peculiar to Hatay. It

is named as the chicken stuffed in a salt crust in Ottoman period. It is regarded as that the baking in a salt crust method that is also applied in Chinese it on fowl has been moved to Anatolia through migrations (Internet, 2013).

Nowadays, the 'baking in a salt crust' is a cooking method that is known in so many countries. The fish has a specific flavor because it is baked by covering a special mixture that is prepared with the rocksalt. In the present study, it was aimed to inform about preparation steps of rainbow trout (*Oncorhynchus mykiss*) baked in a salt crust. Additionally, proximate composition, energy value and salt content of the fish baked in a salt crust were investigated.

Material and Methods

Material

Rainbow trout (*Oncorhynchus mykiss*), with 44 cm length and 1441 g weight were purchased from a local fisherman in Sinop. The other ingredients were: 3250 g rocksalt, 300 ml water, 2 egg whites, 1 large sweet onion, 4-5 sprigs of flat leaf parsley, 2-3 pieces of lemon slice, 3-4 pieces of fresh bayleaf and some vegetable oil.

Production of 'fish baked in a salt crust'

The rainbow trout was gutted (but not scaled, head and tail intact) and then it was washed. The slices of onion and lemon, parsley and bay leaf were inserted into the fish's body and this line (part) was covered

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with aluminium foil to prevent absorption of the salt. Some vegetable oil was spreaded exterior surface to the fish. In other place, the mixture for covering of the fish in a salt crust was prepared by using rocksalt, egg whites and water. Some of the mixture was spreaded onto the baking tray and the fish was placed on it. The surface of the fish was covered with the mixture completely. The covered fish was baked until golden brown at 180°C for 45 min. The fish was left at room temperature for a while and then the salt crust was cracked using a knife. The skin was removed and the baked fish in a salt crust was ready to serve.

Proximate composition analyses

Crude protein, crude lipid and crude ash analyses were carried out according to AOAC methods (AOAC, 1980). Moisture content was determined by the method of Ludorf and Meyer (Ludorf and Meyer, 1973). The carbohydrate value was calculated by [Carbohydrate value = 100 - (Moisture + Protein + Lipid + Ash)] formula and then, the energy value was calculated according to Atwater method: [Energy (kcal) = (Lipid * 9) + (Protein * 4) + (Carbohydrate * 4)] (Falch *et al.*, 2010).

Salt analysis

The salt analysis was made according to Mohr method (Tolgay and Tetik, 1964). 10 g of fish flesh with addition of some distilled water was homogenized in a homogenizer (IKA Yellow Line DI 25 Basic). Then, it was completed with distilled water to 250 ml and waited for 45 min in a boiling water bath. The sample was left at room temperature for 15 min. It was filtered through a filter paper (Whatman no:1). 25 ml of the filtrate was taken into an erlenmeyer. As an indicator, 1 ml of 5% potassium chromate (K_2CrO_4) was added onto it. It was titrated with 0.1 N silver nitrate ($AgNO_3$) solution until it acquires a brick red color and the salt content (%) was calculated according to following formula:

$$NaCl (\%) = [(\text{exerted } AgNO_3(\text{ml}) * 0.00585) / \text{sample amount (g)}] * 100$$

Statistical analysis

The t-test was made by using Minitab 15 (Minitab Inc. USA) to search the differences between the proximate composition, energy value and salt content of the raw material and the fish baked in a salt crust. The results were shown as mean \pm SE. A level of significance was set at $p < 0.05$.

Table 1. Proximate composition of the raw material and the fish baked in a salt crust

Proximate composition	Raw	Fish baked in a salt crust
Moisture (%)	70.33 \pm 0.40 ^a	62.45 \pm 0.04 ^b
Crude protein (%)	20.66 \pm 0.31 ^a	24.36 \pm 0.17 ^b
Crude lipid (%)	2.65 \pm 0.75 ^a	10.23 \pm 0.52 ^b
Crude ash (%)	0.81 \pm 0.27 ^a	1.64 \pm 0.03 ^b
Carbohydrate (g/100 g)	5.56 \pm 1.72 ^a	1.42 \pm 0.29 ^a
Energy (kcal/100 g)	128.69 \pm 1.07 ^a	194.81 \pm 2.54 ^b
Salt content (NaCl%)	0.01 \pm 0.00 ^a	0.06 \pm 0.02 ^a

n=3

Values are shown as mean \pm standard error.

Within the row, values with different superscript letters are significantly different ($p < 0.05$)

Result and Discussion

The results of proximate composition, energy value and salt content of the raw material and the fish baked in a salt crust are shown in Table 1. When the raw material and the fish baked in a salt crust were compared, it was seen that moisture and carbohydrate values decreased from 70.33% to 62.45% and from %5.56 to %1.42, respectively; while the other values increased. When the results were investigated statistically, it was pointed out that the salt and carbohydrate values were not found to be significantly different ($p > 0.05$), however the other values were significantly different ($p < 0.05$).

The salt content of the raw material was determined as 0.01%, when it was 0.06% after baked. The differences between these values were not found to be significantly ($p > 0.05$). Even though, sensory scoring test was not made in our study, the flavor of the fish baked in a salt crust was tested by few trained panelists. The panelists indicated that the salt content of the fish baked in a salt crust was sufficient in terms of sensory characteristic. Even, some of them consumed it by adding extra salt. Due to these reason it may be said that, the product can be consumed easily by people who avoid salty products because of various illnesses like hypertension.

We could see only one study with regard to fish baked in a salt crust during our literature search. So, we could not compare to other studies. Olgunoglu and Inceyol (2011) were investigated to *Barbus grypus* in terms of sensory properties. According to sensory analysis results, it was found that the skinned *Barbus grypus* scores higher than skinless in terms of appearance, odor, chewiness, juiciness, saltiness, flavor and general admiration.

Conclusion

It has been thought that, using of the salt that can be

provided easily and cheaply nowadays in comparison to ancient times, for cooking of fish, chicken or other meat products contribute to both obtaining attractive flavor for the consumers and consumption variety of especially seafood. Additionally it may be said that, development of the fish baked in a salt crust that is known by only a few people nowadays and so can be found consumption possibility at limited places like homes and restaurants, as a commercial product would be beneficial scientifically and economically to the processed seafood sector.

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