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**Nguyen Phuoc Minh**
*Tra Vinh University, Vietnam*

**Correspondence:**
**Nguyen Phuoc Minh**
Tra Vinh University, Vietnam

# Production of the instant edible salted dried seabass (*Dicentrarchus labrax*)

## Nguyen Phuoc Minh

**Abstract**
The white flesh, mild flavour and low fat content of sea bass are major attributes sought by the consumer. We decide to investigate some technical factors influencing to production of the instant edible salted dried seabass (*Dicentrarchus labrax*) such as the thickness of seabass fillet (0.5-0.7 cm, 1.0-1.2 cm, 1.4-1.6 cm); salt concentration during soaking (8%, 10%, 12%), soaking time (30 minutes, 45 minutes, and 60 minutes), drying time (50 $^{o}$C, 55 $^{o}$C, 60 $^{o}$C) to product quality. Our results show that fillet thickness 0.5-0.7 cm, salt 10%, soaking 30 minutes, drying at 55 $^{o}$C will give the best dried seabass.

**Keywords:** Dicentrarchus labrax, fillet thickness, salt concentration, soaking time, drying time, edible dried seabass.

## 1. Introduction
Wild sea bass (*Dicentrarchus labrax*), which is an economically important fish, is generally preserved through frozen storage. The most abundant amino acids in sea bass fillets were aspartic acid, glutamic acid and lysine. Methionine, tyrosine and histidine were in lower concentrations than the other amino acids during the frozen storage (Gulsun Beklevik et al., 2005). Frozen storage is a commonly used method for preserving fish. However, the texture, flavour and colour of fish flesh change during long-term frozen storage. Quality loss of fish flesh takes place due to a variety of changes caused by hydrolysis, polymerization, deamination, decarboxylation and oxidative process during the frozen storage (Sylvia et al. 1995; De Koning et al., 1991; Grosch et al., 1987; Blinski et al., 1978). The freezing-thawing affects on the meat quality of whole, gutted and fillets of sea bass (Dicentrarchus labrax). The length of the thawing process caused quality changes such as dryness of the skin and undesirable odor formation (Baygar et al., 2013).
Seabass is also preserved in ice and salt storage. The quick preservation is a very important factor to control bacterial load in the preserved fish (Rahman et al., 2012). Marination technology has also been spreading to some reared fish, like gilthead sea bass (Giuffrida *et al*., 2007, Tacnur Baygar et al., 2012**).**
High-pressure is an innovative non-thermal food preservation technology. The effect of high-pressure treatment up to 500 MPa-5min on physical characteristics of sea bass fillets after 0, 7 and 14 days of refrigerated storage was investigated (Romuald Chéret et al., 2005). Color results exhibited an increase of lightness and a slight change of hue, which might be imperceptible in cooked fish. High-pressure treatment induced a decrease of exudation and water-holding capacity. Pressure treatment above 300 MPa provoked fish hardness higher after storage than untreated sample, proving the ability of high-pressure to improve textural quality of chilled stored fish fillet. These assessments were corroborated with microstructure observation. We showed that high-pressure treatment at 500 MPa allowed, after 7 days of storage, a total aerobic count equivalent to that of untreated fresh fish fillet to be obtained. Thus, high-pressure might be considered to be a technology able to improve safety and textural quality of fresh fish fillets.
The effect of different modified atmosphere packaging (MAPs) on physical, chemical, microbiological and sensory changes of sea bass fillets when stored at 4 °C and standard light conditions was investigated (Laura Provincial et al., 2010; Hulya Turan et al., 2013)
The meat of fish effects from physical and environmental factors rapidly from harvesting point, because of its sensitivity to degradation. Fish are affected by the quality loss rapidly when the unsuitable storage conditions, unconscious transportation rules, wrong processing

methods and insufficient cold chain implementations are used. These quality losses occur more especially at the restaurants and the households.The fish that launched and bought are put up for sale as whole fish, gutted or filleted. The fish that bought in these ways, if they are not consumed immediately are kept in a refrigerator (+4˚C) and forgotten. The wrong treatments and storage conditions which applied at the households cause spoilage in a short time (Yunus Alparslan et al, 2012).

The processing technologies which had developed for this aim show diversity and the aim of these technologies to maintain the existing quality as much as possible and to protect consuming of the fish for a long time. Purpose of our research is to investigate different factors influencing to the edible salted dried seabass fillet.

## 2. Material & Method

### 2.1 Material

Fresh Seabass (*Dicentrarchus labrax*) material is bought in Tra Vinh, Soc Trang, Vinh Long and Bac Lieu province, Vietnam. It is then filleted to remove bone and fat. The edible part is used for experiments.

**Fig 1:** Seabass fillet

### 2.2 Research method

#### 2.2.1 Effect of fillet thickness

Experiment is randomly arranged with 1 factor and two replications. Factor A: fillet thickness (A1: 0.5-0.7 cm; A2: 1.0-1.2 cm; A3: 1, 4-1, 6 cm). Checking parameters include moisture content and sensory (aroma, color, structure) of dried seabass fillet.

#### 2.2.2 Effect of salt concentration and soaking time to product quality

Experiment is randomly arranged with 2 factors and two replications. Factor B: salt concentration (B1: 8%, B2: 10%, B3: 12%). Factor C: soaking time (C1: 30 minutes, C2: 45 minutes, C3: 60 minutes). Checking parameters include salt concentration and sensory (taste and structure) in dried product.

#### 2.2.3 Effect of drying temperature to drying time and product quality

Experiment is randomly arranged with 1 factor and two replications. Factor D: drying temperature (D1: 50 $^{o}$C, D2: 55 $^{o}$C, D3: 60 $^{o}$C). Checking parameters include moisture content, sensory (aroma, color, structure).

#### 2.2.4 Recovery efficiency

Recovery efficiency is based on the determination of the initial raw material weight compared to the finished product weight at 14-15% moisture.

### 2.3 Statistical analysis

All data are processed by ANOVA (Startgraphics) to check the significant difference via LSD.

## 3. Result & Discussion

### 3.1 Basic composition in seabass

**Table 1:** Composition in farm raised seabass

| Composition, w/w | Percentage |
|---|---|
| Moisture | 76.72 |
| Protein | 3.39 |
| Lipid | 4.81 |
| Ash | 1.23 |

From table 1, we can see the lipid content in seabass fillet is quite high so it's necessary to pay attention to drying regime to avoid oxidation.

### 3.2 Effect of fillet thickness to moisture reduction during drying

**Table 2:** Moisture reduction during drying by different fillet thickness

| Drying time, hours / Thickness, cm | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 |
|---|---|---|---|---|---|---|---|---|
| 0.5 - 0.7 | 76.72 | 63.08 | 52.57 | 37.56 | 27.05 | 20.04 | 14.97 | 12.92 |
| 1.0 – 1.2 | 76.72 | 66.15 | 56.40 | 43.75 | 34.25 | 25.85 | 24.06 | 22.77 |
| 1.4 – 1.6 | 76.72 | 68.29 | 60.64 | 50.30 | 42.87 | 37.35 | 34.93 | 33.71 |

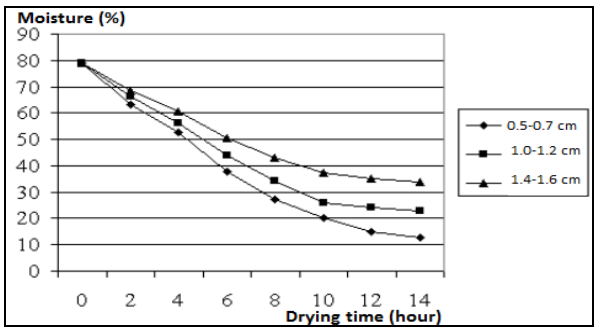


**Fig 2:** Moisture reduction during the drying time by fillet thickness

**Table 3:** Sensory score by fillet thickness

| Fillet thickness (cm) | Structure | Aroma | Color |
|---|---|---|---|
| 0.5 – 0.7 | 3.9[a] | 4.3[a] | 3.8[a] |
| 1.0 – 1.2 | 3.2[b] | 3.4[b] | 2.9[b] |
| 1.4 - 1.6 | 2.6[c] | 2.2[c] | 2.2[c] |
| F = 14.91 | | P = 0.0000 | |

Sample having the thickness 0.5-0.7 cm gives the good structure, aroma compared to other samples so we choose this value for further experiments.

### 3.3 Effect of salt concentration and soaking time to product quality

**Table 4:** Effect of salt concentration and soaking time to salt content in product (g/100g)

| Salt concentration (%) | Soaking time (minutes) | | |
|---|---|---|---|
| | 30 | 45 | 60 |
| 8 | 3.90 | 4.53 | 4.88 |
| 8 | 3.92 | 4.55 | 4.90 |
| Average | 3.91[a] | 4.54[c] | 4.89[e] |
| 10 | 4.44 | 4.91 | 5.15 |
| 10 | 4.46 | 4.93 | 5.17 |
| Average | 4.45[b] | 4.92[e] | 5.16[g] |
| 12 | 4.60 | 5.01 | 5.36 |
| 12 | 4.62 | 5.03 | 5.38 |
| Average | 4.61[d] | 5.02[f] | 5.37[h] |
| | F = 1914.50 | P = 0.0000 | |

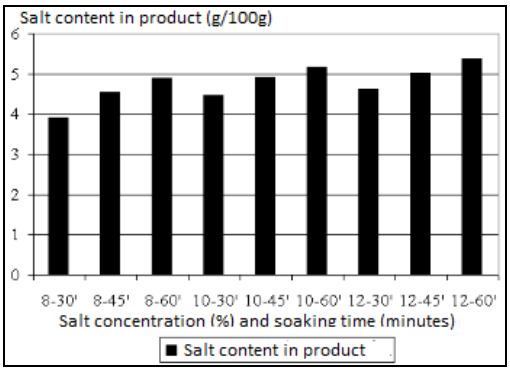


**Fig 3:** Effect of salt concentration and soaking time to salt content in product

**Table 5:** Effect salt concentration and soaking time to sensory in product

| Salt concentration (%) | Soaking time (minutes) | Taste | Structure |
|---|---|---|---|
| 8 | 30 | 3.4[c] | 3.1[a] |
| 8 | 45 | 3.6[c] | 3.7[ab] |
| 8 | 60 | 3.5[c] | 3.5[ab] |
| 10 | 30 | 4.5[d] | 4.1[b] |
| 10 | 45 | 3.3[bc] | 3.4[a] |
| 10 | 60 | 3.4[c] | 3.6[ab] |
| 12 | 30 | 3.1[abc] | 3.7[ab] |
| 12 | 45 | 2.4[a] | 3.6[ab] |
| 12 | 60 | 2.6[ab] | 3.7[ab] |
| | | F (Taste) = 5.11 | F (Structure) = 1.34 |

At 10% salt concentration and soaking time 30 minutes, dried product has a pleasant taste and good Structure so we choose this value for further experiments.

### 3.4 Effect of drying temperature and drying time to product quality

**Table 6:** Effect of drying temperature and drying time to product moisture (%)

| Drying time (hour) / Drying temperature (°C) | 0 | 2 | 4 | 6 | 8 | 10 | 12 |
|---|---|---|---|---|---|---|---|
| Control | 375.06 | 151.07 | 83.79 | 54.18 | 41.64 | 34.59 | 30.38 |
| 50 | 375.06 | 213.28 | 124.32 | 75.04 | 44.93 | 31.80 | 24.83 |
| 55 | 375.06 | 186.20 | 101.73 | 61.11 | 32.28 | 21.65 | 15.74 |
| 60 | 375.06 | 165.67 | 91.42 | 59.46 | 38.12 | 27.06 | 21.51 |

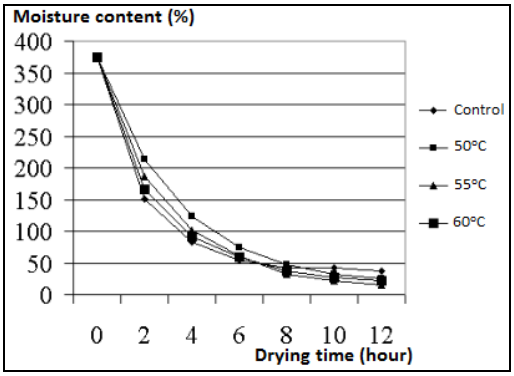


**Fig 4:** Effect of drying temperature and drying time to product moisture (%)

**Table 7:** Sensory score of the dried product by different drying times

| Drying temperature ($^0$C) | Aroma | Structure | Color |
|---|---|---|---|
| 50 | $2.9^{ab}$ | $2.9^{a}$ | $3.5^{b}$ |
| 55 | $4.0^{c}$ | $4.4^{c}$ | $4.2^{c}$ |
| 60 | $3.5^{bc}$ | $3.7^{b}$ | $3.1^{b}$ |
| Control | $2.4^{a}$ | $2.3^{a}$ | $2.2^{a}$ |
| F (Aroma) = 17.33 | | P (Aroma) = 0.0000 | |
| F (Structure) = 9.84 | | P (Structure) = 0.0001 | |
| F (Color) = 15.11 | | P (Color) = 0.0000 | |

Sample dried at 55 $^0$C shows the best sensory characteristics so we choose this temperature for drying.

### 3.5 Product recovery efficiency

**Table 8:** Product recovery efficiency

| No | Raw material weight (g) | Product weight (g) | Recovery efficiency (%) |
|---|---|---|---|
| 1 | 375 | 92 | 2453 |
| 2 | 385 | 93 | 24.15 |
| 3 | 315 | 80 | 25.39 |
| **Average** | | | 24.69 |

**Table 9:** Nutrient composition in the instant edible salted dried seabass

| Description | Percentage (%) |
|---|---|
| Moisture | 14-15 |
| Protein | 72 |
| Lipid | 8 |
| $NH_3$, mg/100 g | 7 |

From table 9, we see the moisture content in dried seabass fillet is 14-15% suitable for preservation.

## 4. Conclusion

Seabass is generally consumed as fresh. The white flesh, mild flavour and low fat content of sea bass are major attributes sought by the consumer. These attributes have made seabass popular and high valued around the world. In Vietnam an increasing in production of this species as an aquaculture product has raised its importance of keeping it in good quality for long periods of time. In this situation after harvesting, it must be consumed in a short time or if it is not possible it should be conserved in various ways and be protected.

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