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Original paper

STUDY ON THE QUALITY AND OMEGA-3 FATTY ACIDS COMPOSITION OF SUPER DRIED CATFISH (*Arius talassinus*)

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ABSTRACT

Study on the quality and omega-3 fatty acids composition of dried fish was conducted in order to observe the sensory value, proximate composition, and omega-3 fatty acid content of catfish dried by traditional and mechanical dryer. Experimental laboratories method using t-test resulted that both methods of drying fish were available to be implemented. The evaluation of data of appearance using t-test showed that $t_{account}$ *=3.631>*$t_{tab(0.05)}$*(6)=2.447. This indicated that the appearance between two products were significantly different. But in general there are no significant differences in odor, taste and texture of products. The product was accepted organoleptically by the panellists with the values of 7.64-8.29. Protein composition of catfish was relatively high : 17.47% and lipid content of 0.73. DHA and EPA values of dried fish using mechanical dryer were 13.8% and 5.1%; whereas traditional dryer were percentage of 12.8% and 7.7%..*

Key words : Quality, Omega-3 fatty acid, Dried catfish

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BACKGROUND

In some countries where drying has evolved as the most common traditional method of preserving fish, like Indonesia, the action of the sun and the wind has been used to affect evaporative drying. Recently, controlled artificial dehydration has been developed in some industrial countries so that fish can be dried regardless of weather conditions.

One of the most popular dried fish nowadays is the production of super quality dried catfish, processed by modification of fermentation during salting, which has longer time in brine than traditional method and the fish is washed several times until it is absolutely clean. The advantages of super dried fish are better appearance, odor, texture and packaging compared to the traditional product. Consequently it is highly accepted by the consumer, with quite high of selling price.

OBJECTIVE

This study was aimed to determine the quality of super dried catfish organoleptically (i.e: appearance, odor, taste and texture) and proximately (i.e: composition of protein, lipid, moisture and

ash) produced by sun drying and mechanical drying. Omega-3 fatty acid (DHA and EPA) of the product was also investigated in order to obtain the effect of drying method to the quality and omega-3 fatty acid composition of dried fish.

MATERIALS AND METHODS

Twenty kilos of catfish (53.4 cm average total length; 2 kg average weight) were divided into two part (10 kg each) and butterfly filleted. One part was then dried in the mechanical dryer with temperature of 30-40°C for about 24 hours and another part was dried in sun drying with temperature of 29-34°C for about 36 hours. Sensory test was carried out using Score Sheet Organoleptic provided by Directorate General of Fisheries (1992). Proximate composition and omega-3 fatty acid content was analysed by AOAC procedure as carried out by Pomeranz and Meloan (1987).

RESULTS AND DISCUSSIONS

Raw Material

The organoleptic values of catfish used in this study was in the range of 7,64-8,29. This indicated that the sample was fresh with characteristics of bright color, clean, specific fresh odor and elastic texture. The result of sensory values is presented on Table 1.

Table 1. Organoleptic/Sensory values of Catfish.*

Panellists	Specification					
	Eye	**Gill**	**Slime**	**Flesh & Belly**	**Odor**	**Texture**
1.	8.00	8.50	9.00	8.00	8.50	8.50
2.	7.50	8.00	9.00	8.50	8.50	8.50
3.	8.50	8.00	9.00	8.00	8.50	9.00
4.	8.00	8.00	7.00	7.50	7.00	7.00
5.	8.50	8.00	8.00	8.00	7.50	8.00
6.	6.00	7.50	8.00	6.50	7.50	6.00
7.	7.00	7.50	8.00	7.00	7.50	7.50
Average	**7.64**	**7.93**	**8.29**	**7.64**	**7.71**	**7.79**

* EEC recommended method, 1979.

Organoleptic values of super dried catfish Sensory evaluation of super dried catfish is presented on Table 2. The result shows that the product was accepted by the panelist with average values of traditional and mechanical drying method were 72.25 and 72.02, respectively.

Table 2. Average Sensory Evaluation of Dried Catfish given by 7 panellists

Specification	Sun Drier	Mechanical Drier
Appearance	6.88±0.05	6.73±0.05
Odor	8.07±0.08	8.17±0.02
Taste	6.45±0.02	6.67±0.05
Texture	7.50±0.06	7.24±0.02
Average	**72.25±0.06**	**72.02±0.04**

Note : The value was taken in three replication.±SD

The average value of both products seems similar, but oven drier gives a little bit brown color. The quality of super dried catfish was affected by continuous washing after fermenting process and the effectiveness of drying using mechanical dryer. The odor of both products were good, provided by highest values compared to the other sensory values. Product resulted by mechanical drying method has higher odor and taste value than that of the traditional method; but appearance (see Table 3) and texture values were lower . In general there was no significant difference between the two products.

Table 3. Difference Test of Appearance of Dried Catfish

n	Sun Drier	Mechanical (Oven)	(D_i)	($D_I - X_D$)
1	6	5	1	0.020
2	6	5	1	0.020
3	7	7.5	-0.5	1.841
4	7.5	6.5	1	0.020
5	8	6.5	1.5	0.413
6	7.5	6.5	1	0.020
7	8	7	1	0.020
			6	2.354

Statistical evaluation using t-test has beed done and the result can be described as follows :

$$X_D = \frac{6}{7} = 0.857$$

$$S_D = \sqrt{\frac{\sum (D_i - X_D)}{n}} = \frac{2.354}{7} = \ldots\ldots..$$

$$= 0.579$$

$$t_{acc} = \frac{X_D - 0}{S_D/\sqrt{n-1}} = \frac{0.857 - 0}{0.579\sqrt{6}} = 3.631$$

$t_{acc} = 3.631 > t_{tab(0.05)}(6) = 2.447$

Conclusion : there is a difference of appearance of the products.

The odor, taste, and texture were also investigated by using difference test, and the result is as follows :

1. t-test of odor; $t_{acc} = 1.706 < t_{tab} = 2.447$ → means, there is no difference of odor of the products
2. t-test of taste; $t_{acc} = 0.568 < t_{tab} = 2.447$ → means there is no difference of taste of the products
3. t-test of texture; $t_{acc} = 1.00 < t_{tab} = 2.447$ → means there is no difference of texture of the products.

Chemical composition and omega-3 fatty acids content of Arius spp.

The proximate composition of catfish presenting on Table 4 seems to be reasonable, as its variability is influenced by fishing ground, breeding season, sex, maturity, etc. (Suzuki, 1981).

Table 4. Chemical composition and omega-3 fatty acids of *Arius spp*

%	Raw Fish	Dried Fish	
		Sun	Mech
Prot	17.47±0.06	34.63±0.08	32.67±0.56
Lip	0.73±0.72	1.92±0.14	2.44±0.66
Moist	80.43±0.12	17.26±0.40	19.33±0.40
Ash	1.25±0.08	13.49±0.44	10.46±0.67
EPA	4.757±0.05	7.719±0.12	5.106±0.11
DHA	8.150±0.06	12.844±0.21	13.803±0.18

*Values are means of three replication ±SD

Study by Meilani W (2002) found that the protein, lipid, moisture and ash content of *Arius spp* are 19.05 %, 0,58 %, 79.02 % and 1.25 % respectivelly.

The percentage of DHA in mechanical dried catfish seems to be higher compared to the sun dried catfish. But, on the other side, the percentage of EPA in mechanical dried catfish was lower than that of sun dried catfish. Study by Teruaki Murase and Hiroaki Saito (1996) found that the composition of DHA in *Thunnus alalunga* was about 14.2-31.1%. While Agus Sutino (1997) found that the DHA of smoked *Rastrelliger spp* was 18.21-20.36%.

The composition of EPA was a little bit higher (7,7%) in the traditional dried fish compared to the mechanical dried fish (4.7%). According to Frankel (1998) the EPA value of fish is normally between 5-12% depending on the lipid content of the fish. While study by Pigott and Tucker (1987) found that the composition of EPA in fish was in the range of 3.3-10,6%.

Distribution of catfish can be detected almost along Indonesian estuarine, especially Java, Sumatera, Kalimantan, East Sulawesi, North Sulawesi, Arafura, Indian coastal, Thailand and South Cina Sea (Kriswantoro and Sunyoto,1986).

CONCLUSSION

Both of traditional and mechanical drier enable to be implemented in drying fish with very similar quality especially based on the organoleptic values. But, mechanical drier possibly has better impact in maintaining the quality of dried fish in general as the drying process can be managed properly and easily by the processor.

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