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Effect of Salt Concentration and Salting Time on Salting Catfish (*Clarias gariepinus*)

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Abstrak

Pengolahan ikan asin kering oleh masyarakat masih secara tradisional sehingga penggunaan konsentrasi dan lama penggaraman berbeda berdasarkan individu. Tingkat penerimaan atau kesukaan konsumen terhadap ikan lele asin kering ini perlu diperhatikan. Penelitian ini bertujuan untuk menganalisis pengaruh garam pada pengeringan ikan dengan sinar matahari untuk menguji ketahanan dan kualitas pada ikan. Terdapat dua faktor perlakuan yang dikombinasikan yaitu konsentrasi garam (15 %, 25 %, 35 %) dan lama penggaraman (5 jam, 7 jam, 9 jam). Uji hedonik dilakukan dengan metode Kruskal-Wallis dan SPSS 16 untuk melihat nilai tekstur, kenampakan dan aroma dan apabila berbeda nyata dilanjutkan dengan uji lanjut Duncan. Untuk melihat produk terbaik menggunakan metode Bayes. Hasil penelitian menunjukkan bahwa produk terbaik untuk pengolahan ikan lele asin kering yaitu perlakuan konsentrasi garam 15 % dan lama penggaraman 7 jam yang memperoleh nilai organoleptik 7 dengan spesifikasi mutu kenampakan utuh, bersih, agak kusam, mutu rasa sangat enak, spesifik jenis, tanpa rasa tambahan, mutu tekstur tidak terlalu keras dan tidak rapuh.

***Kata kunci*:** *Ikan Lele, Ikan Asin, Penggaraman, Nilai Hedonik*

Abstract

The community's processing of dried salted fish is still traditional, so the use of concentration and duration of salting differs based on the individual. The consumer acceptance or preference level for this dried salted catfish must be considered. This study aimed to analyze the effect of salt on drying fish in the sun to test the resistance and quality of fish. There were two combined treatment factors: salt concentration (15%, 25%, 35%) and salting time (5 hours, 7 hours, and 9 hours). The hedonic test was carried out using the Kruskal-Wallis method and SPSS 16 to see the texture, appearance, and aroma scores. It was continued with Duncan's further test if it was significantly different. To see the best products use the Bayes method. The results showed that the best product for processing dried salted catfish was the 15% salt concentration treatment and 7 hours of salting time, which obtained an organoleptic score of 7 with quality specifications for appearance intact, clean, slightly dull, taste quality very good, species-specific, without additional taste. , the quality of the texture is not too hard and not brittle.

Keywords: Catfish, Salted Fish, Salting, Hedonic Score

1. INTRODUCTION

Fish drying is one way of preserving fish by reducing the fish's water content so that the activity of microorganisms can be reduced. Preservation by drying is intended to extend the shelf life of fish (Darmanto & Setyoko, 2017; Ernawati, 2012). Fish bodies usually contain 56-80% water, so this water content must be reduced. It aims to eliminate and kill bacterial metabolism. At 40%, the bacteria are dead, but the spores are still alive. These spores will return to the body if the water content increases. Therefore, some fish are always salted before drying, so the spores cannot grow properly (Puspitasari et al., 2021; Putalan et al., 2022). There are two types of drying techniques, namely natural and artificial drying. Natural drying is usually done on a rack installed at a slight angle according to the arrival of the wind and left under constant sunlight (Dewi et al., 2010; Yasar et al., 2020). Usually, this drying is done 8 hours/day for three days in areas of high sunlight intensity. This drying job is also accompanied by turning 2-3 times daily. Artificial drying is usually done mechanically

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(Chandra et al., 2017; Nurhayati et al., 2022). This mechanical advantage is that the temperature, humidity, and wind speed can be adjusted. However, this method is still rarely used in the community because the cost of the mechanism is relatively more expensive. This dryer is usually in the form of an oven, aisle, and a dryer with infrared rays.

One of the fish that is often dried is catfish. Catfish (Clarias gariepinus) is one of the fishery commodities that is quite popular in the community (Meylani & Putra, 2018; Pramono et al., 2018). This catfish came from the African continent and was first brought to Indonesia in 1984. Catfish or catfish, 5 is a type of fish that lives in freshwater. The standard length is 5-6 times the height, and the ratio of the standard length to the length of the head is 1: 3-4. This catfish is a fish that lives in public waters and has economic value, so it is very popular with the public. This catfish came from the African continent and was first brought to Indonesia in 1984. Catfish or catfish, 5 is a type of fish that lives in freshwater. The standard length is 5-6 times the height, and the ratio of the standard length to the length of the head is 1: 3-4. This catfish is a fish that lives in public waters and has economic value, so it is very popular with the public (Laheng & Widyastuti, 2019; Tajerin, 2009). This catfish is also one of the nutritious foods that are easily available as a side dish. The nutritional content of catfish is comparable to other fish meat, so this catfish is very good for consumption (Muntikah & Wahyuningsih, 2016; Ngadiarti et al., 2013).

Several types of fish, including catfish, contain very high protein and are better than animal meat (Sudadi & Suryono, 2020; Suryaningrum et al., 2016). In addition, the nutritional value of catfish will also increase if catfish is processed properly. In addition, compared to other animal products, the advantage of this catfish is that it is richer in lysine, which is needed for child growth and maintains nitrogen balance (Aunurrofiq et al., 2019; Pajarianto, 2019). Rokan Hulu Regency, Riau Province, cultivates catfish with Biofloc. With biofloc cultivation, they can harvest up to approximately 3 tons. Harvesting is carried out according to market demand, as much as 1.3 tons, while for the needs of the local market around the district. Ujungbatu, the Berkah Bersama group, releases a harvest of 300 Kg per day. And the market demands from outside the Regency, the Berkah Bersama Group produces a harvest of 1 ton per week.

One way to increase public consumption of catfish species is to diversify food types into dried salted fish because generally salted fish are widely known and easy to process (Aunurrofiq et al., 2019; Pajarianto, 2019; Wahyudi & Uslianti, 2016). Processing dried salted fish by the community is still traditional, so the use of concentration and duration of salting varies by individual. The level of consumer acceptance or preference for dried salted catfish needs to be considered because consumer acceptance is one factor that influences the consumption of a food ingredient. Therefore, it is necessary to research testing the level of preference (hedonic test) on dry salted catfish (Clarias gariepinus) which is processed with different concentrations and duration of salting.

Drying of catfish can be done in the sun by drying the fish for ± three days if the weather is sunny and flipping the fish 4-5 times so that the drying is evenly distributed. The problem or weakness is that the cleanliness of the dried fish is very lacking because when drying is carried out in the open, it is easy for dust and flies to settle, and microorganisms can thrive (Dewi et al., 2010; Yasar et al., 2020). Research states that dried fish exposed to the sun has poor quality because it is more easily contaminated by contaminant microbes, especially those that can produce mycotoxins (Rizki et al., 2020). It can endanger the health of consumers. It can endanger the health of consumers.

This catfish has nutrients such as a source of energy, fat, protein, calcium, phosphorus, iron, and vitamins that are needed by the body. Other research findings also reveal that catfish is the type of fish most in demand and consumed by the people of Indonesia (Meylani & Putra, 2018; Pramono et al., 2018). Other studies have also revealed

that processed catfish have a delicious taste and sufficient nutritional content, so humans need it very much (Mervina et al., 2012; Rifqi et al., 2021). It causes the utilization of catfish to be optimized properly so that it can help the community's nutrition. This study aimed to analyze the effect of salt concentration and salting time on the hedonic score of dried salted milkfish and to determine the appropriate salt concentration and salting time in the processing of dried salted milkfish.

2. METHODS

The main ingredients used were 54 catfish weighing ± 250 g/head and table salt with 95% NaCl content. Fresh catfish were weighed, then weeded, washed, and split. Giving salt to the fish, then drying it after being stored during salting. The dried salted milkfish were tested for hedonic organoleptic (SNI 01-2346-2006) to determine the selected product. The flow of activities is presented in Figure 1.

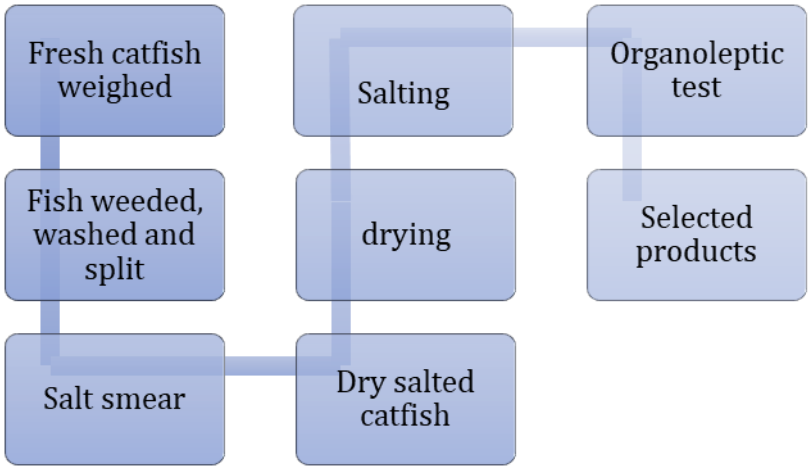

Figure 1. The flow of research activities

Equipment for processing salted catfish are containers, knives, scales, and zinc or winnowing. In the main research, dried salted milkfish was processed based on a combination of two treatment factors: salt concentrations of 15%, 25%, and 35% and salting time of 5 hours, 7 hours, and 9 hours.

3. RESULTS AND DISCUSSION

Result

Texture can be formed through natural and artificial processes. The texture is visible. Its presence can affect the appearance of an object visually and sensationally or based on an impression of feeling. In simple terms, textures can be grouped into real coarse textures, which can be in the form of natural and artificial textures and pseudo-coarse textures. The texture is closely related to the water content of food ingredients. In dried salted fish, the texture is affected by water content. Low water content makes the consistency of salted fish better. The average level of preference of the panelists for the texture of salted snakehead fish tends to increase with increasing salt concentration and soaking time. This treatment causes the salted fish to look drier because of the low water content. The use of hygroscopic salt in salted fish causes the texture of the fish to become compact and dense. The results of the Kruskal-Wallis analysis are presented in Figure 2.

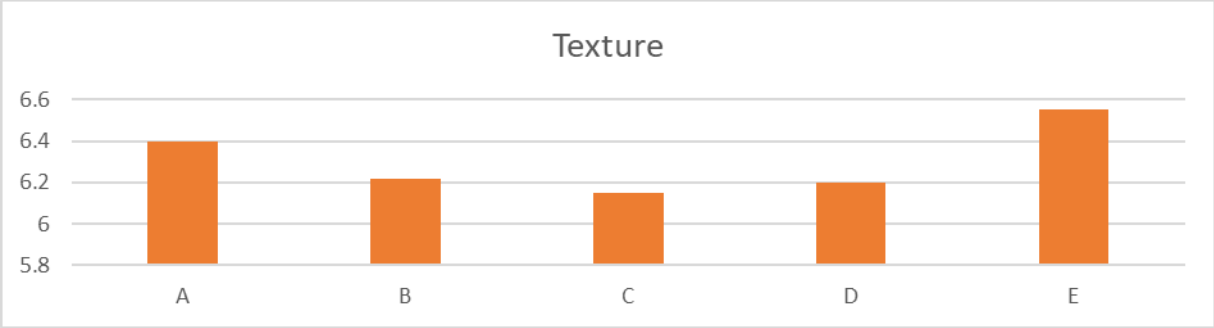

Figure 2. The average score of hedonic test texture parameters.

The Kruskal-Wallis analysis showed that the effect of salt concentration and salting time was not significantly different on the texture of dried salted catfish ($P < 0.05$). The average score of panelist acceptance on the hedonic test shows that the panelists' assessments are almost the same, and the range of scores is not too far for each treatment. However, the panelists' assessment increases with increasing salt concentration and salting time. The lower water content occurred due to the increase in salt concentration and duration of salting, so the fish's texture became dense and compact and affected the panelists' acceptance of the texture of dried salted milkfish. The average score of the hedonic test for the appearance of dried salted milkfish is presented in Figure 3.

Figure 3. Average Score of Hedonic Test Appearance

The average score of the hedonic test for the appearance of dried salted milkfish (Figure 3) shows that the panelists' acceptance rate ranges from 5.48 to 6.56 with the criteria of somewhat liking to liking. Treatment D (slightly like) had the lowest score with the quality criteria intact, not clean, slightly dull, and the highest score was found in Treatment B (like) on the quality criteria intact, clean, slightly dull. The results of the Kruskal-Wallis hedonic test for appearance showed that the effect of concentration and duration of salting did not give a significant difference to the appearance of dried salted milkfish ($P<0.05$). Aroma is a reaction from food that will affect consumers before consumers enjoy the food. Consumers can smell the food. The aroma of dried salted fish is often influenced by the fat hydrolysis process that occurs in the drying process. When there is the hydrolysis of fat. The average score of the hedonic test aroma is presented in Figure 4.

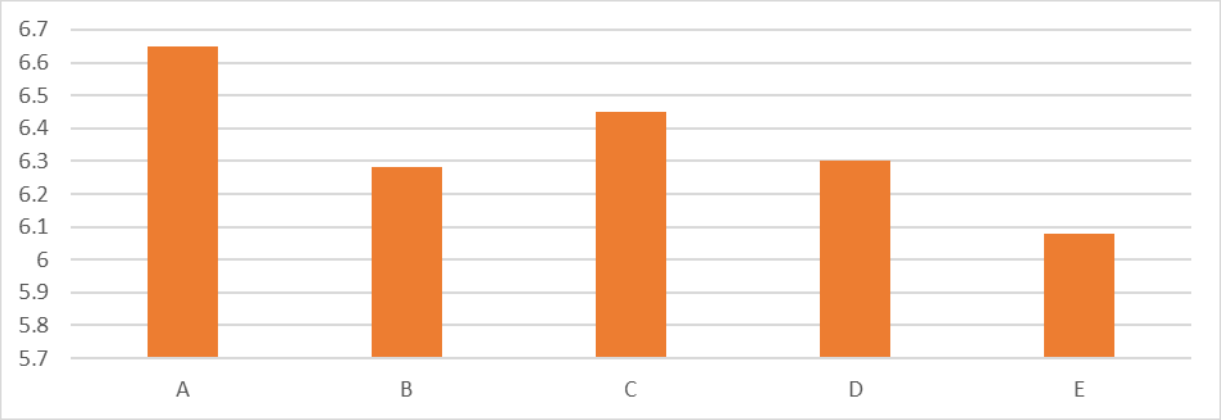

Figure 4. Average Score of Hedonic Test Aroma.

The results of the analysis stated that salt concentration and salting time did not significantly differ from the aroma of dried salted catfish. The most preferred hedonic quality characteristics of salted catfish chips are chips using the traditional drying method with texture, taste, and aroma. The ranking of several observed parameters based on the importance index is presented in Figure 5.

Figure 5. Ranking of Several Parameters

NO	Parameters	Interest Index
1.	Texture	3
2.	Appearance	4
3.	Aroma	2

Discussion

Foods salted and followed by drying often experience fat oxidation, especially if they have a high-fat content. The fat oxidation process will change the fish's color so that consumers will like it less (Putalan et al., 2022; Rizki et al., 2020). The high concentration of salt in salted fish processing and repeated salting will cause the salted fish to become whiter due to the presence of salt crystals (Puspitasari et al., 2021; Putalan et al., 2022). The higher the salt concentration and the duration of salting, the more salt grains in salted fish. In salting foodstuffs followed by drying, browning often occurs due to fatty oxidation in fish, reducing the panelists' acceptance of appearance. Fat oxidation, protein degradation, and other components can cause damage to meat cells so that the physical appearance of fish will change (Puspitasari et al., 2021). Oxygen molecules that come into contact with the product will immediately enter the chain reaction and cause fat oxidation, damage to vitamins, proteins, and pigment oxidation, resulting in a color change in the product.

Based on the results of hedonic testing on the aroma of dried salted catfish, it was seen that treatment A had the highest acceptance score. With increasing salt concentration and salting time, the authors' assessment increased. The cause is thought to be due to the oxidation process that has not continued, so the rancidity process is hampered. In addition, these salted catfish have not been stored, so the fat breakdown process by enzymes has not occurred. The treatment of salt concentration and soaking time did not give a significant difference to the author's level of preference for the aroma of salted catfish because it was possible that salt did not have much influence on the aroma of salted fish.

4. CONCLUSION

Based on the study's results, it was concluded that salted fish that was dried for more than 12 hours of heating in the sun produced products acceptable to consumers, while drying under 8 hours produced products that consumers did not accept. Based on the Indonesian National Standard for water content, foreign catfish products dried in the sun above 8 hours have good quality. There is a need for further testing on the shelf life and the need for the use of hygienic packaging. Based on the analysis, the salt concentration and salting time did not significantly affect the texture and aroma. But it has a significant effect on the taste of dried salted catfish.

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