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INDONESIAN FERMENTED FISH PRODUCT (BEKASAM) REVIEW

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ABSTRACT

Traditional products produced by fisheries that are very popular by the people of Indonesia, one of which is used. The purpose of this article is to review traditional Indonesian fish processed products in terms of the manufacturing and development process. Based on the results of a review of several literacy articles obtained information that the principle of making used products consists of three stages, namely the preparation of raw materials (fish), the addition of salt - a source of carbohydrates and anaerobic fermentation. The development of the manufacture of bekasam can be carried out with the addition of a lactic acid bacteria starter to reduce the use of high amounts of salt and increase its functional value.

INTRODUCTION

Bekasam is a processed fish product that is fermented with spotan, there is no addition of bacterial inoculum. One of the stages denatured processing of used fish is the provision of salt. So, the bacteria that play a role in the fermentation are natural bacteria found in fish that are resistant to the salty environment. According to Kalista et al (2012), bacteria that develop in the fermentation of bekasam are lactic acid bacteria from the amyloidotic group. In the processing of used fish, in addition to the addition of salt there is also the addition of carbohydrate source ingredients. The purpose of adding this source ingredient carbohidrat to stimulate the growth of lactic acid bacteria. Sources of carbohydrates used in the manufacture can be rice, roasted rice, cassava, glutinous tape, flour, and so on. Lactic acid bacteria will decompose starch into simple compounds, namely lactic acid, acetic acid, propionic acid, and ethyl alcohol. These compounds are useful as preservatives and sour tasters in used products (Nuraini et al., 2014)

Bekasem is a traditional fish processed product. The taste is typical because it is sour and slightly salty. This product is very preferred by the people of Indonesia teruma in central Java, Sumatra and Kalimantan (Marantika et al., 2020). A distinctive feature of traditional products is that the quality of the products produced is very diverse because the processing procedures are also diverse, for example in the provision of salt. All types of fish both marine fish and freshwater fish, can be used as raw materials for making bekasam. Freshwater fish that are commonly processed into scraps are catfish, goldfish, tawes, cork fish, tilapia and mujair. Marine fish commonly used for bekasam are mackerel, kurisi fish and anchovies.

The purpose of this article is to review traditional Indonesian fish processed products in terms of the manufacturing and development process.

DISCUSSION

Used Manufacturing Procedures.

The manufacture of Bekasam carried out in the Indonesian community is in the same principle, namely fish wedding, the addition of salt and carbohydrate source materials and then fermented in an anaerobic environment. The difference occurs only in the amount of salt given, the type of carbohydrate source ingredients and the amount of carbohydrate source and the length of the fertility process. The product bekasam manufacturing procedure is as follows :

Fish preparation

Fish that will be processed into scars are discarded head, stomach contents, gills, scales, and fins. Then it is cleaned with running water to remove blood and dirt that sticks to the body of the fish. After that the fish is stored in a container for 15 minutes so that the water that is still attached to the surface of the fish drips or disappears from the surface of the fish's body.

Salt and carbohydrate source ingredients

The next step after the preparation of fish is the provision of salt and carbohydrate sources. . The amount of salt added between processors varies. Generally the amount of salt added ranges from 10% to 40% of the weight of the fish. After that added carbohydrate sources such as rice, tapioca flour or wheat flour. Generally the source of carbohydrates used is rice because it is easy to obtain. The amount of rice used also varies, ranging from 5% to 40% of the weight of the fish. After that the fish, salt and rice are mixed evenly.

The added salt is intended to obtain a controlled condition, namely the condition of salty substrate. Salt-resistant microbes are microbes from the obligate group of halophilic bacteria alone that can live in the salted fish. The provision of carbohydrate sources such as rice is intended for the growth substrate of amylolytic lactic acid bacteria. Rice contains amylase compounds. According to Kalista et al (2012) various types of monosaccharides and disaccharides and polysaccharides can be hydrolyzed by lactic acid bacteria.

Fermentation

After the fish, salt and rice are mixed evenly; then put in a jar and closed tightly. This stage is the stage of anaerobic fermentation. The duration of fermentation also varies between processors, generally ranging from 1-2 weeks. Lactic acid bacteria will decompose starch into simple compounds, namely lactic acid, acetic acid, propionic acid, and ethyl alcohol. These compounds are useful as preservatives and sour tasters in used products (Nuraini et al., 2014).

Used Product Quality

Used quality products can be judged by organoleptic characteristics and their proximate characteristics. Both characteristics are strongly influenced by the type of fish, the concentration of salt and the concentration of carbohydrate source ingredients. Various studies have been conducted related to the influence of fish types, salt concentrations and concentrations of carbohydrate source ingredients on the quality of used products.

Characteristics of Organoleptic Bekasam

Generally organoleptic parameters that are assessed from a food product including the former are aroma, color and texture. The results of research Marantika et al (2020) reported that the level of salt concentration in the manufacture of used fish kurisi affects the level of preference for aroma, color and texture of the former. The higher the concentration of salt added to the aroma, the color and texture of the resulting bekasam is preferred. Puspita et al (2019) also informed the results of his research that the higher the

concentration of salt given to the manufacture of catfish bekasam powder (Clarias batrachus) aroma, color and texture of the resulting used powder the more preferred.

The preferred aroma of used products is a scent that is not so strongly smelled. According to Estiasih (2016) the aroma in bakasam products is caused by volatile compounds resulting from protein degradation by enzymes released by salt-resistant microbes. Odors in used products are typical of methyl ketone compounds, butyl aldehydes, amino and amino compounds produced by the degradation of proteins and fats (Puspita et al., 2019). The higher the salt level in the former, the halophilic bacteria are limited so that compounds such as methyl ketones produced are also limited and the aroma released is not so strong.

The preferred color of used products is pale. The paler the more favored. The more salt added the color of the used product the whiter it is. This happens because salt is able to fade the original color of fish (Tumbelaka et al, 2013). The use of salt in the process of making bekasam causes the water contained in fish meat to decrease, affecting the appearance of the product.

The preferred used product has a rather hard texture. When compared with fresh fish (raw materials) the texture of used products is harder. According to Rahmani et al (2007) Increased texture is influenced by the use of high salt in salting causing the texture of fish to become harder due to low water content. In addition, changes in texture in fish marks are also caused by salt that pulls out water from the fish meat due to the osmosis process. The texture of foodstuffs is closely related to the water content of these foodstuffs. The use of high salt concentrations causes water from inside the meat to come out. Salt causes coagulation and denaturation of proteins and enzymes, thereby causing incitement to fish meat, as a result of which water is squeezed out.

The results of various studies related to the amount of salt use against the preferred level of used organoleptic as found in Tables 1 and 2.

Table 1. Amount of Salt Use Against The Favorability Level of Used Organoleptic.

Salt Concentration	Average value Organoleptic favorability level			Information
	Texture	Color	Aroma	
20 %	2,3	2,27	1,93	1. Very dislike 2. Very dislike 3. Dislikes 4. Kind of like 5. Likes 6. Very Liked
25 %	3	2,87	2,7	
30 %	4	3,9	3,77	
35 %	5,2	4,77	4,43	
40 %	5,87	5,87	5,5	

Source : Source: Marantika et al (2020)

Table 2. Amount of Salt Use Against The Favorability Level of Used Organoleptic

Salt Concentration	Average value Organoleptic favorability level			Information
	Texture	Color/ appearance	Aroma	
10 %	7,7	7,47	7,3	1. Very dislike 2. Very dislike 3. Somewhat dislike 4. Dislikes 5. Likes 6. Kind of like 7. Dislike 8. Very Like 9. Very Fond
15 %	7,7	7,6	7,68	
20 %	7,67	7,5	7,7	

Source : Puspita, et al (2019)

Various studies have also reported that the organoleptic quality of used products is also influenced by the addition of the type and amount of carbohydrate ingredients. Research reported by Sari et al (2013) states that the addition of sangria rice in the manufacture of tilapia fish as a source of carbohydrates produces a yellowish color, the distinctive taste of fermentation is sour-salty, sour smell and slight smell of alcohol, and the texture is dense, compact and chewy.

Another study also reported by Hutabarat et al (2018) is that the addition of carbohydrate sources from palm sugar by 5% produces the most preferred organoletic characteristics compared to the addition of 10 and 15%. Its organoleptic value is as follows: attractive appearance, clean and brownish color. Chewy , dense and compact texture. Aspecific roman aroma of bekasam and fresh typical of the former. Rasa acid, salty and specific traces.

Proximate Characteristics of Bekasam

The proximate quality of the bekasam assessed is aimed primarily at the moisture and protein content. Generally, the lower the water content and the higher the protein content of used products, the better the quality. The amount of salt used in the manufacture of bekasam affects the moisture content and protein content of the bekasam products produced (Marantika et al 2020 and Puspita et al 2019). The more amount of salt used in the manufacture of the bekasam, the bekasam products produced have a lower water content and higher protein levels. So the proximate quality of used products can be produced through the cultivation of a lot of salt.

Low water content in used products with more and more salt added because salt is hygroscopic and there is a difference in osmotic pressure between salt and fluid in the body of fish, so the water is pulled out of these foodstuffs. According to Puspita et al (2019), salt will increase the osmotic pressure of the substrate, resulting in the withdrawal of water from the foodstuffs out. The impact of water content in fish meat decreases because the cells will lose water and experience grinding so that microbes that cannot withstand salt cannot grow.

The results of various studies related to the amount of salt use of water and bekasam protein as contained in Tables 3 and 4.

Table 3. Amount of Salt Use Against Exproctu Proximate Content

Salt Concentration	Proxy content	
	Water Content (%)	Protein Content (%)
20 %	59,85	14,087
25 %	57,81	14,093
30 %	56,86	14,107
35 %	53,27	14,114
40 %	51,06	14,121

Source: Marantika et al (2020)

Table 4. Amount of Salt Use Against Proximate Content of Used Flour

Salt Concentration	Proxy content	
	Water Content (%)	Protein Content (%)
10 %	9,18	26,6
15 %	7,02	27,67
20 %	4,36	28,57

Source: Puspita, et al (2019)

The proximate quality of used products is also influenced by the type of carbohydrate source. Kalista et al (2012) stated that N-amino levels in used products are influenced by the type of carbohydrate source. The use of rice flour can increase the levels of N-amino used products compared to glutinous flour.

Quality development of used products

The amounts produced from the use of salt at high concentrations up to 40% of the weight of the fish can lead to a high salt content in the resulting bekasam products. The salty taste of used products can be limiting in the consumption of these products. The high salt content in used products is feared to be a stimulus of high blood pressure disease for people who consume it. Therefore, some research is done to reduce the use of this high salt, namely through the addition of lactic acid bacteria.

Hadiyanti and Wikandari (2013) reported that the use of salt 7.5% of the weight of fish in the manufacture of bekasam produced the preferred product, a lactic acid bacterial starter culture added in the process of 106 CFU / g. Other research also reported by Lestari et al (2018) namely the use of salt at 15% of the weight of fish and the addition of starter culture L. acidophilus as much as 107 CFU / mL produced used products whose protein content is not real different from the addition of L acidophilus stater more than 107 CFU / mL.

The use of lactic acid bacteria in the process of making used acid can also increase the functional value of bekasam as a food product. According to Lestari et al (2018) lactic acid in the fermentation process produces bioactive components, namely anti-cholesterol and antihypertensive. The resulting anti-cholesterol compound is lovastatin which is also known as monaco K or mevinolin. Lovastatin acts as a competitive inhibitor for the enzyme HMG-KoA (3-hydroxy-3 methylglutaryl Coenzyme A) reductase, which is the enzyme that determines cholesterol biosynthesis so that it can help lower cholesterol levels in the blood. Lovastatin can lower blood cholesterol levels by 11%-32% and triglyceride levels by 12%-19%.

Conclusion

Based on the results of a review of several literacy articles, I obtained information that the principle of making used products consists of three stages, namely the preparation of raw materials (fish), the addition of salt - a source of carbohydrates and anaerobic fermentation. The development of the manufacture of bekasam can be carried out with the addition of a lactic acid bacteria stater to reduce the use of high amounts of salt and increase its functional value.

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References

[1] Estiasih, T and Ahmad. 2016. Food Processing Technology. Earth Characters. Jakarta
[2] Hadiyanti MR and Wikandari PR. 2013. Effect of Concentration and Addition of Asa Lactate Bacteria Lactobacillus plantarum B1765 As A Starter Culture On the Quality of Used Bandeng Products (Chanos-chanos). Journal of Chemistry. 2 (3) : 136 – 143.
[3] Hutabarat, S. R., Ira Sari, N., & Leksono, T. 2018. The effect of adding palm sugar (Arenga pinnata) to the quality of tilapia (Oreochromis niloticus). Journal of the Faculty of Fisheries and Marine Affairs, University of Riau Pekanbaru.
[4] Kalista, A., A. Supriadi, and S.H. Rachmawati. 2012. Used Dumbo Catfish (Clarias gariepinus) with The Use of Different Carbohydrate Sources. Fisheries Products Technology Study Program, Sriwijaya University. FishtecH Journal. Vol 1 (1): 102–110.
[5] Lestari, S., Rinto., Siti Balqis H. 2018. Improved functional properties of the former using a starter lactobacillus acidophilus. Jurnal Pengolahan Hasil Perikanan Indonesia 21 (1) : 179-187
[6] Nuraini, A., Ratna I., and Laras R. 2014. The effect of adding concentration of carbohydrate sources from rice and brown sugar is different to the quality of red tilapia (Oreochromis niloticus). Journal of Fisheries, 10 (1): 19-25
[7] Marantika, N.A., Haryati, S and Sudhatinah. 2020. Salt Concentration Against Chemical, Physical and Organoleptic Properties of Kurisi Fish bekasam (Nemipterus nemathophorus). Journal of Food Technology and Agricultural Products 15 (1): 40-46
[8] Puspita, D.A., Agustini, TW and Purnamayati L. 2019. Effect of Difference in Salt Concentration on Glutamic Acid Levels in Catfish bekasam Powder (Clarias batracus). Journal of Food Technology. 3 (1) : 110-115.
[9] Tumbelaka, R.A., Asri, S.N. and Faiza, A.D. 2013. Effect of Gram Concentration and Salting Length on The Hedonic Value of Dried Salted Milkfish (Chanos chanos). Scientific Journal of Fisheries and Marine Affairs., 1(1):48-54.
[10] Rahmani, Yunianta and Martati, E. 2007. Effect of Wet Salting on the Characteristics of Cork Salted Fish Products (Ophiocephalus striatus). Journal of Agricultural Technology 8(3). 1- 6
[11] Sari NI, Dahlia and Octavian. 2013. Quality Characteristic Fermented Tilapia (Oreochromis niloticus) Different Carbohydrate Source. Journal of Fisheries and Marine Affairs 2(08): 76-85