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Gelatin Extraction From Fish Bone Waste in Pontianak City

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ABSTRACT: *This study examines the extraction of gelatin from some fish bone that usual found in Pontianak city. The study included gelatin extraction from some fish bones, such as mackerel fish bone, gutters fish bone and parrotfish bone. Characteristic gelatin based on UV-Vis spectroscopy. Gelatin yield obtained from mackerel fish bone was 0,77%, from gutters fish bone was 8,24%, from parrot fish bone was 0,5%. Three of them have similar characteristic of UV-Vis. The differencies of the absorption is because of bat chromic and a hips chromic effect. structure of the three of gelatin is not absolutely same. There were compounds from the gelatin make the diffrerent absorbtion.*
KEYWORDS*: gelatine, fish bones, mackerel, guttersfish, parrotfish*

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I. INTRODUCTION

The high potential of fishery products in West Kalimantan has caused the province to have high potential for fisheries waste, one of which is fish bones. Fish bone waste that is widely produced in West Kalimantan includes gutters, mackerel fish bones, and Parrotfish bones. The fish bone wastes are still a problem and have not been managed optimally. The fish bones contain up to 8% gelatin[1].

Gelatin is a type of protein produced through the extraction process from bones. the process of making gelatin is very easy, it only takes a long time both from the degreasing process to the stage of drying. So far many gelatin products have been produced using materials derived from animal bones such as cow bones, chicken claws, and even using pork bones[2,3]. The commercial gelatin found in the market is often doubted, because this gelatin is made using pig bone ingredients, while the packaging is not explained as long as the raw material is made.

The use of gelatin today is increasingly widespread in food products. In these food products, gelatin is often used in processed meat, which is useful for increasing the water binding capacity, consistency, texture and stability of sausage products, cornet etc., while in fruits that are useful as thin coatings that can coat fruit pores so as to avoid drought and damage by microbes) this can lead to maintaining freshness and durability in the fruit. In addition, gelatin can also be used to maintain quality in fishery products.

Fish bones are known to contain certain amounts of gelatin. Different types of fish bones will also vary the amount of gelatin contained in it. In this study gelatin was extracted from several types of fish bone waste which often met by authors in Pontianak city using the same method. That is the gelatin extraction method that refers to the method carried out by Idawati *et al.*[1]

II. METHODS

2.1 Materials

The sample used in the study came from several bone wastes that are often found in Pontianak City. The mackerel Fish bone waste originating from the Amplang cracker home industry in Pontianak City. Which is the one of Amplang mackerel crackers which is one of the typical souvenirs of West Kalimantan, the Fish Guttersfish bones obtained from the traditional market of Flamboyan Market, where consumers especially those who are entrepreneurs in the field use gutters as their raw materials, and Parrotfish bones from practicum waste are wrong one college located in Pontianak city, West Kalimantan. The ingredients used for extracting gelatin from fish bones include mackerel fish bones, gutters fish bones, parrotfish bones, aquades and 2% hydrochloric acid.

2.2 Equipments

The equipment used in this study include universal indicators, whatman paper 40, ordinary filter paper, Buchner filters, erlenmeyer, measuring cups, analytic balance, water bath, freeze drying, UV-Viss spectrophotometer.

2.3 Isolation and Characterization of Gelatine

Isolation of gelatin from fish bone namely fish bones cleaned from remnants of meat and fat that was still attached (degreasing) by soaking in water using a water bath at 80^{o}C for 30 minutes. Then the bones are cleaned with a brush and then drained and cut into small pieces (2–3 cm) to expand the surface. The raw material that has been cleaned is then soaked with HCl with a concentration of 2% in the Erlenmeyer glass for 60 hours (every 24 hours the solution is replaced) until ossein (soft bone) is formed, ossein is washed using tap water until the pH is neutral (pH 5–6)[4].

Ossein is put into an erlenmeyer glass and added with distilled water in a ratio of 1: 3 (b/b). Then extracted in a water bath at 70^{o}C for 7 hours, then filtered with whatman 40 filter paper. Filtrate obtained from the extraction then dried using a rotary evaporator followed by drying using freeze drying. The gelatin obtained was then weighed and the functional group was characterized using UV-Vis[5].

III. RESULTS AND DISCUSSION

Fish bone waste used in the research is Mackerel Fish Bone, Gutter Fish Bone, and Parrotfish Fish Bone. Tengiri Fish Bone Waste used is UKM waste of Amplang crackers which are widely found in Pontianak City, Nile Fish Bone Waste is obtained from practicum waste produced from one of the country's top universities in the city of Pontianak and gutters which are easily found in traditional markets as organic waste.

solation of gelatin from fish bones is done, namely fish bones cleaned from remnants of meat and fat that is still attached (degreasing) by soaking in water using a water bath at 80^{o}C for 30 minutes[1]. Then the bones are cleaned with a brush and then drained and cut into small pieces (2–3 cm) to expand the surface[6,7]. This clean fish bone is weighed as the initial weight of the bone. After depressing, the fish bones are then demineralized to remove minerals contained in the bone, by soaking the bones in a 2% HCl solution in an erlenmeyer glass for 60 hours (every 24 hours the solution is replaced) until the bones become soft (osein), ossein then washed using running tap water until the pH is neutral (pH 5–6)[8,9].

Gelatin was extracted from osein by soaking osesin in distilled water with a ratio of 1: 3 (b / b) at 70^{0}C for 7 hours. The extract obtained from the extraction was then dried using a rotary evaporator followed by drying using freeze drying. This dry gelatin is weighed as the weight of the gelatin yield. The yield of fish bone gelatin can be seen in table 1.

Table 1. The yield of gelatin for mackerel fish bone, parrotsfish bone and gutterfish bone

No	Fish bone	Gelatine yield (%)
1	Mackerel	0,77
2	Gutterfish	8,24
3	Parrotsfish	0,50

The solids of gelatin produced from these three bones have different colors. Gelatin color of brownish brown mackerel fish bone, gelatin color of golden yellow parrotfish while gelatin color of brownish yellow taro fish bone. The results of the analysis The color of the gelatin solid are shown in Figure 1.

Figure 1. Solids gelatin from the extraction process of a) Mackerel Fish b) parrots fish c) Gutter Fish

These fish bone gelatins are both mackerel fish bones, parrots fish bones and gutter fish bones which are then characterized using a UV-Vis spectrometer. Characterization of fish bone gelatin can be seen in Figure 2.

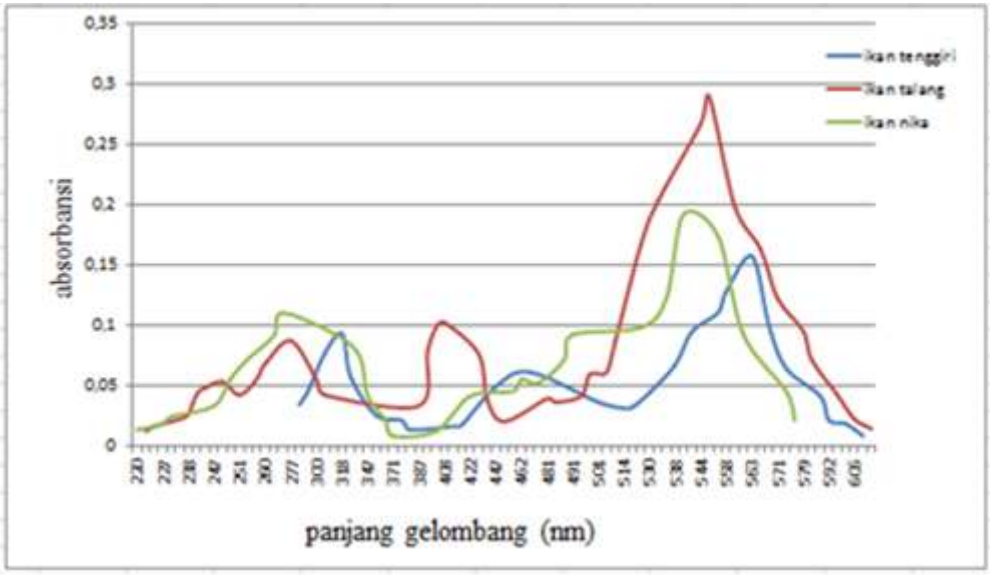

Figure 2. UV Vis bone gelatin spectra

Based on Figure 2 above it can be seen that the three gelatins have similar absorption patterns. The difference between the three wavelengths of the gelatin is caused by the batochromic and hipsochromic effects caused by the third gelatin of these compounds not the same. Different sources of compounds (different types of bones) will produce different gelatin structures. The presence of groups in the gelatin causes absorption to shift to higher or lower. Based on the chemical structure of gelatin, it is known that gelatin is a protein composed of amino-amino acids. In the uv vis spectra, the absorption at 220-290 nm wavelength showed the presence of phenyl alanine and tyrosine and tryptophan amino acids.

IV. CONCLUSION

The conclusions of this study are based on the results of gelatin yield obtained from mackerel fish bone was 0,77%, from gutters fish bone was 8,24%, from parrot fish bone was 0,5%. Three of them have similar characteristik of UV-Vis. The differencies of the absorbtion is because of batochromic anda hipsochromic effect. stuructur of the three of gelatin is not absolutely same. There were a compound from the gelatin make the diffrerent absorbtion.

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