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Protein Profile Euthynnus Affinis Fish Submerse Alum Solution Based on Sodium Dodecyl Sulfate Polyacrylamide Gel Electrophoresis (SDS-PAGE)

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***Abstract*—*Euthynnus affinis* and other fish product are *perishable food* because they have protein and water more in order to long savings and high quality so food additive one of alum solution. Alum is used for high quality contents. It is a heavy metal. The aluminum has negative effect for health in particular enzymatic system and tissue. Liver and kidney first tissue has impacted because of the detoxification of the organ. This study aims for analyzing the protein profile of *Euthnnus Affinis* fish submerge alum solution 0%, 10%, 20% dan 30% by SDS-PAGE method. The study object used Euthynnus Affinis fish submerge alum solution by concentration 0% (X_0), 10% (X_1), 20% (X_2), dan 30% (X_3) as long as 1 hour. The result of this study showed sample X_0 (without alum) protein band mayor cunted in 225 kDa, 139 kDa, 107 kDa, 71 kDa, 40 kDa, 36 kDa, 25 kDa, 25 kDa and minor protein 23 kDa, 23 kDa, 21 kDa, 19 Kda, 15 kDa. Sample X_1 (10% Alum) showed protein band mayor cunted in 104 kDa dan 44 kDa. and minor protein 38kDa, 35 kDa, 29 kDa, 24 kDa, 22 kDa, dan 15 kDa. Sample X_2 (20% Alum) and X_3 (30% Alum) showed same character protein band minor 29 kDa, 24 kDa dan 22 kDa. The change of the sub unit protein is because of the increasing alum solution, it then changed into band protein.**

Keywords*—*Euthynnus Affinis, Alum Solution, Protein Profile, SDS-PAGE

I. INTRODUCTION

Tuna (*Euthynnus affinis*) and other fishery products are perishable food because they contain of high enough protein and water, therefore special treatment is required after the cobs are caught. Added food additives in food aims to improve appearance, taste, texture and extend shelf life. In addition, it can increase the nutritional value such as protein, minerals and vitamins. There are two kinds of food additives, namely natural and artificial food additives or synthetic [1]

Regulation of the Minister of Health of the Republic of Indonesia No. 33 of 2012 explains that BTP is not a material that normally used for food, has no nutritional value, intentionally added to food for technological purposes on manufacture, processing, packing, packaging, storage or transport of food to produce a component or affect the typical properties of the food [8]

Preservation process is needed in the fishery industry. It aims to maintain the quality and freshness of fish in the long term. In addition, it can also inhibit or kill microorganisms that can cause the process of decay in fish, especially during the large production and widen the marketing range of fish. It also aims to increase the income of fishermen and fishery industry entrepreneurs [7]

One of the fishery industry is vapor fish processing in Bandarharjo Urban Village, North Semarang Sub district. This industry is nearby the Tanjung Mas Semarang International port. The informal sector of the household industry in this village is able to absorb the local workforce up to more than 217 people, and this industry is the largest industry in the village. Types of fish that are used as raw material for curing are *tuna, manyong, pari,* and *songot* [7]

The process of curing the fish after washing is soaked it into water containing alum (Al2 (SO4) 314H2O). The practice of the use of alum has been going on for generation to

generation. The use of alum in the process of fish immersion solution is to make the fish cleaner and chewier [7]

Haribi and Yusrin, [4] said that the reason to use alum is because alum is easy to obtain and more affordable. The function to soak fish in alum water is to make it whiter, compact, tighter and chewier. Especially for *tuna* that has a bitter taste, it can reduce the bitter taste of the fish.

According to Haribi R et al [3] the use of alum used can decrease the quality of food. It contains heavy metal ions aluminum that can cause health problems, especially enzymatic systems and tissues. The liver and kidneys are the detoxifying organs as the first tissues affected.

Protein is very important for the body, because this substance has a function as a builder substances, regulators and burner substances in the body. Proteins as building agents function to form new tissues for growth, replace damaged tissue, and reproduce. Proteins as regulating substances play a role in the formation of enzymes and guard hormones and regulate various metabolic processes in the fish body. As a burner, because the carbon element contained in it can function as a source of energy when energy needs are not met by carbohydrates and fats [5]

II. METHOD

The method of this research is descriptive. It used tuna that was soaked with alum solution with 0%, 10%, 20%, and 30% concentration for 1 hour. The results obtained are tabulated and presented in narrative form. The tools used in this research are: Electrophoresis room, micro pipette, power supply, vortex, gloves, biological disposal place, centrifuge, water bath, rotator, mortar plate, spectrophotometer, beaker glass and erlenmeyer. Materials to be used are tuna fish, alum, acrylamide and bisacrylamide (electrophoresis grade), TEMED, APS, Bromophenol Blue, Coomassie Brilliant Blue, NaCl, PBS, dH2O, protein marker.

III. RESULT AND DISCUSSION

Protein analysis was done by SDS-PAGE method on *tuna* that was soaked in alum solution with concentration variation. The result showed as follows: Sample X0 showed the results of major protein band pattern with molecular weight of 225 kDa, 139 kDa, 107 kDa, 71 kDa, 40 kDa, 36 kDa, 25 kDa, 25 kDa and there is a minor protein band 23 kDa, 23 kDa, 21 kDa, 19 KDA , 15 kDa. Sample X1 showed the yield of major protein bands 104 kDa and 44 kDa. Minor protein bands 38kDa, 35kDa, 29kDa, 24kDa, 22kDa, and 15kDa. Sample X1 shows the yield of major protein bands 104 kDa and 44 kDa. Minor protein bands 38kDa, 35kDa, 29kDa, 24kDa, 22kDa, and 15kDa. The major proteins in the X1 sample have reduced and have transformed into a minor protein. It indicated that alum can precipitate proteins in tuna. Samples X2 and X3 have the same protein band character that has 3 subunits of minor protein 29 kDa, 24 kDa and 22 kDa.

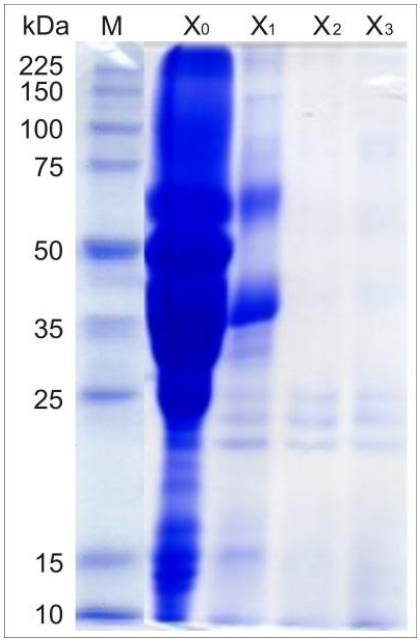

Fig. 1. Electrophoresis Results of SDS-PAGE

Fig. 2. Visualization of protein band representation

Information :
M = Marker
X0 = Tuna without soaked in alum solution
X1 = Fish soaked alum solution 10%
X2 = Fish soaked alum solution 20%
X3 = Fish soaked alum solution 30%

The composition of biorad reagents is phosphatic acid, methanol and Coomasie Brilliant Blue (CBB) solution which is used in reading the reddish spectrophotometer. When they are reacting with aromatic amino acids that have cationic elements, the color will be changed into blue color.

Protein in fish is contained of amino acids, one of them is aromatic amino acids tryptophan, phenylalanine and arginine.

They are more digestible than proteins from other animal sources.

Geopharmaceutically the fish curing industry is located in Bandarharjo urban village, North Semarang district. Before the fish is smoked, it usually soaked first by using alum solution. The result is the texture of the fish becomes more supple and tighter. It can also prevent from the spread of microorganisms.

Haribi R and Yusrin [4] stated that the taw-soaked *tawas* contains aluminum heavy metal (Al). When it is consumed continuously in a long period of time, it will disrupt the metabolic system in the body. The alum content can also agglomerate the protein on the fish, thus it altered the protein profile in the fish [6]

The proteins can be separated by the separation process. The molecules of the protein will migrate from the negative pole to the positive pole aided by the flow of electricity. Separation of protein molecules based on migration rate and molecular weight in an electric field [6]

The results obtained showed that the profile of *tawol* fish, the protein soaked alum with different concentration variations. Sample X0 shows the results of major protein band pattern with molecular weight of 225 kDa, 139 kDa, 107 kDa, 71 kDa, 40 kDa, 36 kDa, 25 kDa, 25 kDa and there is a minor protein band 23 kDa, 23 kDa, 21 kDa, 19 KDA , 15 kDa. Sample X1 shows the yield of major protein bands 104 kDa and 44 kDa. Minor protein bands 38kDa, 35kDa, 29kDa, 24kDa, 22kDa, and 15kDa. The major proteins in the X1 sample are reduced and transformed into a minor protein, it indicates that alum can precipitate proteins in *tuna*. Samples X2 and X3 have the same protein band character that has 3 subunits of minor protein 29 kDa, 24 kDa and 22 kDa. In the X2 and X3 samples the protein sub units are smaller and there is no major protein. Changes in protein sub-units are caused by the addition of alum so that the result of protein bands have changed. Swordfish protein will precipitate if soaked in alum solution so that at different concentration sub unit protein band will be changed [2]

IV. CONCLUSION

Based on research on protein profile of tuna that soaked in aluminum with SDS-PAGE-based concentration variation on sample X0 shows the result of major protein band pattern with molecular weight of 225 kDa, 139 kDa, 107 kDa, 71 kDa, 40 kDa, 36 kDa, 25 kDa , 25 kDa and there are 23 kDa, 23 kDa, 21 kDa, 19 KDa, 15 kDa minor protein bands. Sample X1 shows the yield of major protein bands 104 kDa and 44 kDa. Minor protein bands 38kDa, 35kDa, 29kDa, 24kDa, 22kDa, and 15kDa. Sample X1 shows the yield of major protein bands 104 kDa and 44 kDa. Minor protein bands 38kDa, 35kDa, 29kDa, 24kDa, 22kDa, and 15kDa. In the X2 and X3 samples the protein subunits are smaller and there is no major protein.

Of all the studies conducted, a 0% sample has many major protein bands because it is not precipitated by heavy metals contained in alum.

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