THE EFFECT OF ADDITION OF SKIM MILK AND NATRIUM ALGINATE TO THE QUALITY OF CRUDE ALBUMIN FISH CORK (*Ophiocephalus striata*) (Drying with Vacuum Drying)

Moh. Imam Hidayat and Eddy Suprayitno

Department of Fisheries Processing Technology, Brawijaya University, Indonesia

DOI: 10.29322/IJSRP.9.05.2019.p8922
http://dx.doi.org/10.29322/IJSRP.9.05.2019.p8922

Abstract

Fish Cork (Ophiocepalus striatus) is a fish that belongs has a high content of albumin. High albumin levels in fish Cork makes this fish is known for its utilization in the world of health as HSA (Human Serum Albumin). In General esktrak albumin has a fishy scent so that processing into powder is considered a proper way. the use of penyalut skim milk and a alginat natrium to reduce the fishy odor and maintains albumin albumin powder during the drying process. The purpose of this research is to know the influence of interaction of skim milk and a alginat natrium to quality crude albumin powder by using a vacuum drying. The methods used in this study, namely the method of experimentation. Experiment design in the research was Complete Random Design (RAL) factorial using skim milk dan natrium alginat for 25 treatment and 2 times repeats. Test parameters included albumin level, protein content, moisture content, fat content, ash content, water absorption, yield, organoleptic scoring test, amino acid profile and fatty acid profile. The test data were analyzed using ANOVA, if the effect was significantly continued by the Tukey test, while the organoleptic data were analyzed using Kruskal-Wallis. Determination of the best treatment using the De Garmo method. The results showed the best results in the treatment of skim milk 7% and 4.75% natrium alginat with quality includes the value of albumin levels of 2.8%; protein 22.3%; 1.05% water content; fat content 2.3%; the rate of 9.15% ash; 4.25% water absorption; 25.15% yield. skoring 4.7 scent (not fishy); and skoring 4.77 color (not brown) which is generally favored by panelists. In addition with the highest content of amino acid Glutamic acid of 4.55% and Aspartic acid of 2.00%, and highest fatty acids Palmitic Acid of 19.39%.

Keywords: albumin's powder, skim milk, natrium alginat

I. INTRODUCTION

Albumin is the highest plasma protein in the amount of about 60% and has a function as forming new cell tissue and restoring damaged body tissue and managing fluid balance in blood vessels with fluid in the interstitial cavity within normal limits, blood albumin levels 3,5- 5 g / dl (Nugroho, 2012). As long as albumin is used as a therapy taken from human serum HSA (Human Serum Albumin) which has a price of around 1.3-1.5 million per 200 cc or each pounch (Erwin *et al*., 2015). Therefore it is necessary to have an alternative source of albumin that is cheaper but has the same clinical aspects. One alternative that can be used as a source of albumin is cork fish. Cork fish is one type of freshwater fish that has a high albumin protein content that has benefits that can increase albumin content and endurance (Suprayitno *et al*., 2013).

Albumin extract is usually consumed in a liquid and fishy form so that not everyone likes it, so an alternative is needed to reduce the fishy odor on albumin extract by drying so that it produces powdered albumin extract which is expected to be accepted by everyone for consumption. Albumin is a protein that is easily damaged by heat so we need a coating material that can resist the denaturation of albumin protein from heat. one of the coating materials that can be used as coating material in vacuum drying, namely skim milk and natrium alginate (Sumanti *et al*, 2016). The use of skim milk in making albumin powder is to function as a coating material that can increase yield, increase volume, form a rounded coating surface with a smooth surface. (Khasanah *et al*, 2015). In addition to skim milk ingredients that can be used as coating material in the manufacture of crude albumin powder are natrium alginate which is able to protect the active components from factors that can affect stability (Halim *et al*., 2010).

The drying method is carried out by means of a vacuum dryer. Vacuum drying is drying by vacuum air method with a pressure of 1 atm. Vacuum drying is used in the manufacture of crude albumin powder because the drying method is fast, the temperature and pressure can be adjusted so that it can maintain the quality of the dried product so that this method is suitable for use in drying food ingredients.(Suprayitno, 2013).

II. MATERIALS AND METHODS

2.1 Materials

The material used in this study consists of three parts, namely. Raw materials, materials for making crude albumin powder and materials for chemical analysis. The raw material used in this study was live cork fish (Ophiocephalus striata) obtained by Malang Big Market. The ingredients used for the manufacture of crude albumin powder are skim milk and natrium alginate, and the ingredients used for chemical analysis are silica gel, aquades, blemish, biuret and NaOH.

2.2 Albumin Analyze

According to Suprayitno (2014), albumin levels were determined using the spectrophotometric method. that is. A sample of 2 ml added to the reagent was added with biuret and heated at 37 ° C for 10 minutes. Cooled then measured with electronic 20 and absorbance recorded with a length between 350-2200 nm, then calculated the albumin level with the formula.

$$\text{(\%) albumin level} = \frac{\text{ppm x 25}}{\text{sample weight x } 10^6} \text{ X100}$$

2.3 Protein Analyze

Protein content analysis was carried out using the Spectrophotometric method. Measurement of protein levels was carried out by taking 0.9 ml of protein samples, first applying it with the addition of crystal ammonium sulfate. Then centrifuged for 10 minutes, separated the clear part (supernatant). The precipitate which is a protein is then reconstituted with acetic acid buffer pH 5 to 10 ml. In the test tube, 0.9 ml of each sample was added, 0.8 ml of biuret reagent was added and 1.3 ml of an acetic acid buffer solution was added. Let stand for 10 minutes, read the absorbance at the maximum wavelength on the detection screen.

$$\text{(\%) protein content} = \frac{\text{Vstandar – Vblanko x Nstandar x 14 x 6,25 x}}{\text{6,25 x 100\%}}$$

2.4 Water Analyze

The method of analyzing water content was carried out by means of a dry oven method (thermogravimetric method). According to Aventi(2015), Water content analysis using the termogravimetro method can be done by weighing the initial weight of the sample (gram), place it in the oven tray Drying chamber is approximately 110oC, put the oven tray containing the sample into the oven, leave it for 2 hours after 2 hours, until the sample is completely dry homogeneous constant. This is known from the constant weight, then calculated by the formula

:

$$\text{(\%) water content} = \frac{\text{(itial weight – final weight)}}{\text{Itial weight}} \text{ X 100\%}$$

2.5 Fat Level Analyze

Analyze fat content according to Shahidi (2001), done by the goldfisch method by transferring the sample and then put it into the thimble and installed in a buffer tube which at the bottom has a hole, then the solvent is placed on the back of the buffer tube, when bekerglas is heated the solvent will rise and cooled by a condenser so the material will be moistened with solvent in lipids it will be extracted and then it will be accommodated in bekerglas again, after extraction is complete (3-4 hours), the heater is turned off and the following sample is buffered. The heater is turned back on so that the solvent will be evaporated again and condensed and floated into the tank which is installed at the bottom of the condenser. Thus the floating solvent can be used for other extractions, the residue in the bekerglas installed on the heater is then dried in an oven 100oC until a constant weight is obtained. This residual weight is expressed as oil or fat in the material

.:

$$\text{(\%) Fat Level} = \frac{\text{A + B - C}}{\text{B}} \text{ X100\%}$$

2.6 Ash Content Analyse

The method used in the analysis of ash content is the kiln method. According to Nugraha (1997), the steps to be taken are first the cup is dried in an oven at 85 ° C overnight, cooled in a desiccator until it reaches a new room temperature then weighs its empty weight (G). Approximately 2 grams of standard / dry sample material is weighed into a cup with known weight (W). The cup containing the sample was placed into the kiln and burned at 550 ° C for 16

hours (Method A), and at 600 ° C for 3 hours. The burned material is cooled in a desiccator (containing silica gel) to room temperature. Then weighed using a balance sheet. Calculation:

`

$$\text{Ash Content (\%)} = \frac{\text{Ash weight (g)}}{\text{Sample weight (g)}} \text{ X } 100\%$$

2.7 Water Absorption jTest

Test of moisture absorption is carried out to determine the resistance of crude albumin powder to a moisture or air in the storage space. This is based on the hygroscopic powder properties so that it is necessary to test moisture absorption as a characteristic of crude cork albumin powder. Absorption of water vapor is inversely proportional to water content. The lower the water content, the more absorbent the moisture, the ability of the powder to absorb water depends on the product to be produced (Sari dan Kusnadi, 2015).

2.8 Rendemen

The purpose of calculating the yield of crude cork albumin powder is to determine the effect of the concentration of a combination of skim milk and natrium alginate and the efficiency of making crude cork albumin powder. The rendement calculation can be done based on the method carried out by Sunardi et al., (2008), the formula used to calculate the yield as follows:

$$\text{Rendemen} = \frac{\text{Output}}{\text{Input}} \text{ X100\%}$$

2.9 Organoleptic Analyse

Organoleptic testing can be done by scoring. Organoleptic testing with an autoleptic test scoring test method was carried out by giving a score on texture parameters such as taste, aroma and elasticity in each sample based on the numerical parameters chosen by the panelists, and drinking as a neutralizer after each sample test. Panelists were asked to fill out the form by stating the scent score as an example very very fishy = 7, very fishy = 6, not fishy = 5, rather fishy = 4, and somewhat fishy = 3, fishy = 2, very fishy = 1. (Suradi, 2007).

2.10 Amino Acid Profile Analyse

Analysis of amino acid profiles using HPLC consists of four stages, namely: the stage of making protein hydrolyzate by means of weighing 0.1 gram of sample and being crushed, then added with 10 mL HCl 6 and heated in an oven at 100oC for 24 hours. Then the drying phase of the sample aims to make the sample completely clean apart from the solids. The filter was taken as much as 30µL and added 30µL of the drying solution. The drying solution is made from a mixture of methanol, picotiocyanate and triethylamine (Babu et al., 2002). 30 µL of derivatization solution was added to the results of drying, then mixed with methanol, natrium acetate and triethylamine, then diluted by adding 20 ml of 60% acetonitrile or 1 M natrium acetate buffer, then left for 20 minutes. Then injection into HPLC was carried out by taking 40 µL of liquid to be injected into the HPLC, then calculating the amino acid concentrations present in the material was carried out by making a standard chromatogram using ready-made amino acids which experienced the same treatment as the sample (Bartolomeo dan Maisano, 2006).

2.11 Analysis Of Fatty Acid Profile

Analysis of fatty acid profiles can be done using the GC-MS method (Gas chromatography-mass spectrophotometry). Setyastuti et al., 2015). The fatty acid profile analysis procedure, which weighs approximately 150 mg of oil sample, is then dissolved in 2 ml of 0.5 N KOH in methanol. Then reflux for 5 minutes. 2 ml of acid catalyst was added, namely boron triflouride (BF3) methanol 15% which was mixed with the sample and refluxed at 40oC for 1 hour on the hot plate. Added 5ml of anhydrous Na2SO4 and Na2SO4 solution to taste and then reflux is cooled at room temperature. After that it is put into a separate flask and added distilled water, then extracted with the addition of n-hexane. After forming 2 layers where the bottom layer containing glycerol is separated and the top layer containing methyl ester is extracted again with n-hexane, then distilled water is added to neutral pH again, then anhydrite Na2SO4 is added to remove water that is likely to remain in solution. Furthermore, separation is carried out and the filtrate obtained is evaporated with an evaporator buchi. The methyl ester mixture obtained is injected using a simple piston pump tool such as a closed test syringe or syringe and analyzed using GC-MS to identify fatty acid profiles. Calculation of weight% for each sample component is calculated by the following formula (Manduapessy, 2017).

$$\%\text{component weight} = \frac{\text{LPS x BST x 100}}{\text{LPST x BS}} \%$$

3.1 Albumine

Albumin with the addition of 7% skim milk concentration and 4.75% natrium alginate which is 2.8 g / dL. albumin levels increase with increasing concentrations of skim milk and natrium alginate. This is presumably due to the addition of natrium alginate which is inert to the core material which is coated and cohesive to skim milk which has a small moisture content so that it can reduce damage to the core material during the drying process. According to Lin, Lin, and Hwang (1995), optimal efficiency can be produced from a matrix combination between protein and carbohydrates that is able to provide protection against microcapsules, higher efficiency than the use of one

encapsulation as a filler because of the ability of encapsulants to interact to form granules that can overlay better encapsulated components. According to Fransiska and Murdinah (2009), Natrium alginate is a cohesive coating material for coating materials that is combined and is able to maintain integrity in the core material. While skim milk is a coating material that has a low water content can prevent ballooning or bubbling during the drying process due to high moisture content so that it can damage the core components due to cracks （Rizqiati *et al*., 2009）.

3.2 Protein

Protein results with the addition of 7% skim milk and 4.75% natrium alginate which is equal to 22.3%. The protein content in crude cork albumin powder is higher along with the increase in the addition of skim milk and natrium alginate. This is presumably because the addition of natrium alginate which contains quite a lot of protein and skim milk also contains high levels of protein so that when the two coating ingredients are united they will increase the protein content of the product, besides natrium alginate which is inert towards the coated core material and cohesive to skim milk which has a small water content so that it can reduce the damage to protein in the material during the drying process, besides the use of drying temperatures below 50oC does not significantly affect protein damage. According to Mulyani et al., (2017), natrium alginate has a high protein content that can provide an increase in protein in the products produced, besides skim milk containing high protein also contributes the largest protein in the formula for the manufacture of products.

3.3 Water

Analysis of water content with the addition of 7% skim milk concentration and 4.7% natrium alginate which is equal to 1.05%. The water content in crude albumin powder of cork fish decreases along with the increasing addition of skim milk and natrium alginate. This is presumably due to the addition of inert natrium alginate to the core material which is coated and cohesive to skim milk which has a small moisture content so that it can reduce damage to the core material during the drying process and the addition of skim milk which has a considerable influence on viscosity in the powder before drying can cause a decrease in water content. According to Sumanti et al., (2016), the use of skim milk as coating material can cause a decrease in water content in food because the addition of skim milk is related to the higher viscosity of the material which causes the decrease in water content plus the use of drying methods that can affect decrease in water content.

3.4 Fat

The results of the analysis of fat content with the addition of 7% skim milk concentration and 4.75% natrium alginate were 2.3%. The fat content in crude powder of cork albumin fish decreases along with the increasing addition of skim milk and natrium alginate. This is presumably due to the addition of natrium alginate which is inert to the core material which is coated and cohesive to skim milk which has a low water content. When skim milk and natrum alginate are combined it will increase viscosity because it is aided by the presence of natrium alginate which can cause a decrease in water content in food. A little water content in food will increase the concentration of radicals which can help the process of fat oxidation plus also using the temperature of vacuum drying which can oxidize and damage fat in food. According to Lin, Lin, and Hwang (1995), optimal efficiency can be produced from a matrix combination between protein and carbohydrates that is able to provide protection against microcapsules, higher efficiency than the use of one encapsulation as a filler because of the ability of encapsulants to interact to form granules that can overlay better encapsulated components

3.5 Ash Level

The results of the analysis of ash content with the addition of 7% skim milk concentration and 4.75% natrium alginate that is equal to 9.15%. ash content increases with increasing concentration of skim milk and natrium alginate. This is presumably due to the addition of natrium alginate which has a high enough mineral content which allows increased ash content in crude powder of cork fish albumin. skim milk also has high protein and mineral content which can contribute to increasing the ash content in the product. When skim milk and natrum alginate are combined it will increase the ash content in the food produced. According to Lin, Lin, and Hwang (1995), optimal efficiency can be produced from a matrix combination between protein and carbohydrates that is able to provide protection against microcapsules, higher efficiency than the use of one encapsulation as a filler because of the ability of encapsulants to interact to form granules that can overlay better encapsulated components.

3.6 moisture Absorption

The results of the analysis of moisture absorption with the addition of 7% skim milk concentration and 4.75% natrium alginate which is 4.25%. The absorption of water vapor in crude powder of cork fish albumin is increasing along with the increasing addition of skim milk and natrium alginate. This is presumably due to the addition of natrium alginate which is inert to the core material which is coated and cohesive to skim milk which has a low water content. When skim milk and natrium alginate are combined it will increase viscosity because it is aided by the presence of natrium alginate which can cause a decrease in water content in food so that the absorption of moisture will increase. According to Mulyani et al., (2017), a combination of skim milk and natrium alginate can increase the viscosity of the

product and can increase the water binding capacity of the product. Increasing the binding capacity of water on the product can increase the taste and texture of the product produced.

3.7 Rendemen

The results of the yield analysis with the addition of 7% skim milk concentration and 4.75% natrium alginate were 25.15%. The yield of crude cork albumin powder increases with increasing addition of skim milk and natrium alginate. This is presumably because the addition of skim milk which has a high mineral content including Ca will interact with natrium alginate and filtrate to produce a liquid with high viscosity and form more crosslinking with the tip of the molecule of gluronate in natrium alginate and deposition resulting in the yield of powder crude albumin if cork will increase. According to Maharani et al., (2017) the increase in yield of a product occurs because of the viscosity of the raw material. Increasing the viscosity of the material will increase the yield of the product produced.

3.8 Aroma Scoring

Scoring scents with the addition of 7% skim milk and 4.75% natrium alginate showed scent scoring results of 4.73 (not fishy). scent scoring of crude powder of cork albumin fish increased along with the increase in the addition of skim milk and natrium alginate. This is presumably because the addition of skim milk and natrium alginate will form hydrocolloids formed from proteins binding to alginate which is composed of pollimanuronate and gluronic acid whose functional groups depend on the ratio of gluronic and manuronic groups which are known to bind free water. Volatile compounds can be dissolved in water and evaporate quickly because they have a light molecular weight so that the presence of hydrocolloids formed from proteins mixed with alginate can trap volatile compounds in crude powder of cork fish albumin. According to Koesoemawardani and Ali (2016), hydrocolloid compounds formed from proteins and alginates are composed of polimanuronat and guluronic acid whose functional groups depend on the ratio of gluronic and manuronic acids known as hydrophilic compounds that can bind water, so that natrium alginate is used as a compound that can binding to volatile compounds dissolved in water.

3.9 Color Scoring

Color scoring of 4.77 (not brown) in the 7% skim milk concentration and 4.75% natrium alginate. Color scoring of crude powder of cork albumin fish increased along with the increase in the addition of skim milk and natrium alginate. This is presumably because the addition of skim milk and natrium alginate has almost the same color tendency, namely in the white skim milkwhile in natrium algnat is yellowish white so that when the two coating ingredients are combined it will produce a yellowish-white color, besides that yellowish white produced on albumin powder occurs because albumin from cork fish contains amino acids. According to Mulyani (2017), natrium alginate is yellowish white which affects the color of the product and is able to increase the preference of the panelists for the color produced. Skim milk has white color because it comes from the same livestock and does not affect the color produced on the product (Krisnaningsih dan Efendi, 2015).

3.10 Amino Acid Profile

Table 1. Results of Analysis of Amino Acid Powder of Cork Fish Albumin

No.	Amino Acid Type	Level (%)
1.	Aspartic Acid	2.00
2.	Glutamic Acid	4.55
3.	Serine	1.23
4.	Histidine	0.57
5.	Glycine	0.96
6.	Threonine	1.00
7.	Arginine	0.88
8.	Alanine	1.08
9.	Tyrosine	0.90
10.	Methionine	0.61
11.	Valine	1.36
12.	Phenylalanine	1.26
13.	I-leucine	1.18
14.	Leucine	2.15
15.	Lysine	1.57
	Total	21.29

Source : data processed , 2018

From the table above, the highest amino acid content is glutamic acid, the high content of glutamic acid in crude cork albumin powder because the albumin content produced from cork fish is glutamic acid because the amino acid glutamate is an amino acid making up albumin. This is supported by Nugroho's research (2013), the components of albumin are glutamate and aspartic acid. While the amino acids composing albumin according to Pratari et al., (2017) the components of amino acid making up albumin are dominated by amino acids in the form of glutamic acid, aspartic acid, leucine, and arginine. The high amino acid glutamate in albumin occurs because of the deamination process

between amino acids glutamine and asparagine, where asparagine is an analog of aspartic acid with the replacement of carboxyl groups by neutral carboxamide groups in water solvents, the results of the deamination process can increase glutamic acid in meat (Sari et al., 2017). The lowest amino acid in crude albumin powder is methionine which is equal to 0.01%. The low methionine content is thought to be due to the drying and extraction process in the process of making crude cork albumin powder that uses high temperatures so that some amino acid content with low levels and is susceptible to high temperatures is damaged. The low content of methionine or methionine according to Annisa et al. (2017), each food has a limiting amino acid, where limiting Mino acid is an amino acid that has the lowest value. The limiting amino acid for composing albumin is methionine, so it is necessary to add a type of food that has a higher amino acid content to increase the amino acid content of food ingredients. The essential amino acids found in crude albumin powder are valine, methionine, isoleucine, leucine, phenylalanine, lysine, histidine. This is supported by the results of research by Suprayitno (2014), albumin produced from cork fish contains essential amino acids in the form of threonine, valine, methionine, isoleucine, leucine, phenylalanine, lysine, histidine, and arginine, while non-essential amino acids are aspartic acid, serine, glutamate, glycine, alanine, cysteine, tyrosine, hydroxylline, ammonia, hydroxyproline, proline.

3.11 Fatty Acid Profile

Table 2. Results of Analysis of Fatty Acid Profile of Cork Fish Albumin Powder

No.	Fatty Acid Type	Level (%)
1.	Capric Acid, C10:0	0.05
2.	Lauric Acid, C12:0	0.23
3.	Tridecanoic Acid, C13:0	0.22
4.	Myristic Acid, C14:0	2.88
5.	Myristoleic Acid, C14:1	0.07
6.	Pentadecanoic Acid, C15:0	1.73
7.	Palmitat Acid, C16:0	19.39
8.	Palmitoleic Acid, C16:1	5.90
9.	Heptadecanoic Acid, C17:0	1.42
10.	Cis-10-Heptadecanoic Acid, C17:1	0.74
11.	Stearic Acid, C18:0	5.06
12.	Elaidic Acid, C18:1n9t	0.21
13.	Oleic Acid, C18:1n9c	14.31
14.	Linolelaidic Acid, C18:2n9t	0.03
15.	Linoleic Acid, C18:2n6c	2.77
16.	Arachidic Acid, C20:0	0.21
17.	γ-Linolenic Acid, C18:3n6	0.24
18.	Cis-11-Eicosenoic Acid, C20:1	0.29
19.	Linoleic Acid, C18:3n3	1.18
20.	Heneicosanoic Acid, C21:0	0.06
21.	Cis-11,14-Eicosedienoic Acid, C20:2	0.24
22.	Behenic Acid, C22:0	0.15
23.	Cis-8,11,14-Eicosetrienoic Acid, C20:3n6	0.23
24.	Arachidonic Acid, C20:4n6	0.54
25.	Tricosanoic Acid, C23:0	0.04
26.	Lignoserin Acid, C24:0	0,10
27.	Cis-5.8.11.14.17- Eicosapentaenoic Acid. C20:5n3	0.20
28	Nervonic Acid, C24:1	0.04
29	Cis-4,7,10,13,16,19-Docosahexaenoic Acid, C22:6n3	0.51
	Total	58.77

Source : data processed , 2018

From the table above shows the highest fatty acid content is palmitic acid fatty acids of 19.39%, palmitic fatty acids are saturated fatty acids which have a single bond in the hydrocarbon chain which is stable to heat (Jacoeb et al., 2014). The lowest fatty acid in crude powder of cork fish albumin is linolelaidic fatty acid which is 0.03% complete. The low linolelaidic fatty acid content is suspected because linolelaidic is a type of unsaturated fatty acid which is easily damaged by heat during the process of making crude albumin powder. According to Kapitan (2013) Essential fatty acids contained in crude powder cork albumin from unsaturated fatty acids MUFA (monounsaturated fatty acids) palmitoleic fatty acids (C16: 1), elaidic acid (C18: 1), cis-11-eicosanoic acid (C20: 1) Whereas from the class of PUFAs (polyunsaturated fatty acids) linoleic acid (C18: 2n6c), linolenic acid (C18: 3n3), eicosapenoic acid (C20: 3n6), aracidonic acid (C20: 4n6), Eicosapentaenoic acid (C20: 5n3), acid Docosahexaenoic (C22: 6n3). While SFA saturated fatty acids (saturated fatty acids) myristic acid (C14: 0), pentadecanoic acid (C15: 0), palmitic acid (C16: 0), stearic acid (C18: 0), arachidic acid (C20: 0), behenic acid (C22: 0), margarous acid (C17: 0). The presence of n-3 and n-6 in fish indicates essential fatty acids, which means that they are obtained from fish food intake in the form of micro-chorella,

diatome, dinoflagellata. The different fatty acid content between freshwater fish and sea water fish is located in PUFA. Freshwater fish contain n-6 PUFAs, while those in sea water contain n-3 PUFAs. The PUFA content of cork fish is linoleic essential fatty acid (C18: 2n6c) which is an omega-6 forming other unsaturated fatty acids such as linoleic acid (C18: 3n6) and arachidonic acid (C20: 4n6), through a desaturation system that is the formation of double bonds and elongation of chains (Kaban and Daniel, 2005).

IV. CONCLUSION

The addition of 7% skim milk concentration and 4.75% natrium alginate obtained results that were albumin levels of 2.8%, protein content of 22.3%, 2.3% fat content, 1.05% moisture content, 9 ash content, 15%, yield 25.15, moisture absorption 4.25%. While the organoleptic scent scoring test showed 4.7 (not fishy) and color scoring of 4.77 (not brown)

REFERENCES

Annisa, S., Y. S. Darmanto., dan U. Amalia. 2017. Pengaruh perbedaan Spesies Ikan Terhadap Hidrolisat Protein Ikan dengan Penambahan Enzim Papain. *Jurnal Saintek Perikanan*. **13** (1):24-30.

Aventi. 2015. Penelitian Pengukuran Kadar Air Buah. Pusat Penelitian dan Pengembangan Permukiman. Seminar Nasional Cendekiawan. 12-26.

Babu, S.V. S., M.M.Shareef, A., P. K. Shetty, *and* K. T. Shetty. 2002. *HPLC Method For Amino Acids Profile In Biological Fluids And Inborn Metabolic Disorders Of Aminoacidopathies*. Clinical Biochemistry Unit, Department of Neurochemistry National Institute of Mental Health and Neurosciences, Bangalore-560029. Indian Journal of Clinical Biochemistry, **17** (2): 7-26.

Bartolomeo, M. P., dan F. Maisano. 2006. *Validation of a Reversed-Phase HPLC Method for Quantitative Amino Acid Analysis*. Milano Research Centre, Bracco Imaging SpA, Milan, Italy. JouRnAl oF BiomoleculAR Techniques, **17** (2): 131-136.

Halim, A. Zilfia, dan M. D. Octavia. 2010. Karakterisasi Alginat Dari Gangga Coklat (*Sargassum crassifolium Mont.*) Hasil Proses Isolasi Menggunakan CaCl2 8%. Universitas Andalas, Padang. Jurnal Farmasi Higea, **2** (2): 119-125.

Khasanah, L. U., B. K. Anandhito, T. Rachmawaty, R. Utami, dan G. J. Manuhara. 2015. Pengaruh Rasio Bahan Penyalut Maltodekstrin, Gum Arab, Dan Susu Skim Terhadap Karakteristik Fisik Dan Kimia Mikrokapsul Oleorisin Daun Kayu Manis (*Cinnamomum burmannii*). Jurusan Teknologi Hasil Pertanian, Universitas Sebelas Maret, Jalan Ir. Sutami 36 A, Ketintang, Semarang. AGRITECH, **35** (4): 414-420.

Lin, C., S. Lin, dan L. S. Hwang. 1995. *Microencapsulation of Squid Oil with Hydrophilic Macromolecules for Oxidative and Thermal Stabilization. Institute of Food Science and Technology, National Taiwan University. JOURNAL OF FOOD SCIENCE*, **60** (1): 36-38

Manduapessy, K. R. W. 2017. Profil Asam Lemak Ikan Layang Segar (*Decapterus macrosoma*). Balai Riset dan Standardisasi Industri Ambon, Jl. Kebun Cengkeh Ambon. Majalah BIAM **13** (01): 42-46.

Mulyani, M.E., dan Sukesi. 2011. Analisis proksimat Beras Merah (Oryza sativa) Varietas Slegreng dan Aek Sibundong. Jurusan Kimia, Fakulta Matematika dan Ilmu Pengetahuan Alam. Prosiding Kimia FMIPA-ITS.

Nugraha, E. 1997. Modifikasi Faktor Suhu Dan Waktu Pada Metoda Penetapan Kadar Abu. Balai Penelitian Ternak Ciawi, P .O. Box 221, Bogor 16002. 16

Prastari, C., S. Yasni, dan M. Nurilmala. 2017. Karakteristik Protein Ikan Gabus Yang Berpotensi Sebagai Antihiperglikemik. Departemen Ilmu dan Teknologi Pangan Fakultas Teknologi Pertanian, Institut Pertanian, Bogor. JPHPI, **20** (2): 413-422.

Rizqiati, H., B.S.L. Jenie, N. Nurhidayat, dan C.C. Nurwitri. 2009. Karakteristik Mikrokapsul Probiotik *Lactobacillus plantarum* Yang Dienkapsulasi Dengan Susu Skim Dan Gum Arab. Fakultas Peternakan UNDIP, Kampus Baru UNDIP Tembalang, Semarang. J.Indon.Trop.Anim.Agric. **34** (2): 139-143.

Sari, V. R., dan J. Kusnadi. 2015. Pembuatan Petis Instan (Kajian Jenis Dan Proporsi Bahan Pengisi) Making Instant Paste (Study Type and Proportion of Filler). Jurusan Teknologi Hasil Pertanian, FTP Universitas Brawijaya Malang Jl. Veteran, Malang 65145. Jurnal Pangan dan Agroindustri **3** (2): 381-389.

Sumanti, D. M., I. Lanti, I. Hanidah, E. Sukarminah, dan A. Giovanni. 2016. Pengaruh Konsentrasi Susu Skim dan Maltodekstrin Sebagai Penyalut Terhadap Viabilitas dan Karakteristik Mikroenkapsulasi Suspensi Bakteri Lactobacillus plantarum menggunakan metode freeze drying. Universitas Padjadjaran, Bandung. Jurnal Penelitian Pangan, **1** (1): 7-12.

Sunardi, Fatriani, dan H. Chotimah. 2008. Pengaruh Pola Pengeringan Terhadap Rendemen Dan Kualitas Minyak Atsiri Daun Nilam (*Pogostemon calbin Benth*). Program Studi Teknologi Hasil Hutan, Fakultas Kehutanan, Universitas Lambung Mangkurat Banjarbaru, Banjarbaru. Jurnal Hutan Tropis Borneo No. 22. : 7-16.

Suprayitno, E. 2014. *Profile albumin fish cork (Ophicephalus striatus) of different ecosystems.* Fakultas Perikanan dan Ilmu Kelautan, Universitas Brawijaya, Malang, Indonesia. Int.J.Curr.Res.Aca.Rev, **2** (12): 201-208. ISSN: 2347-3215.

Suradi, K. 2007. Tingkat Kesukaan Bakso dari Berbagai Jenis Daging Melalui Beberapa Pendekatan Statistik. Fakultas Peternakan Universitas Padjadjaran. JURNAL ILMU TERNAK, **7** (1): 52 – 57.