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Formulation and Stability Test of Eel Fish (Anguilla marmorata (Q.) GAIMARD) Oil Extract Cream

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Abstract
Eel fish (Anguilla marmorata (Q.) Gaimard) on Silver eel phase contains unsaturated fatty acids such as omega-3, omega-6, EPA, DHA and vitamin A which is known to overcome various functions of body tissues. The high content of fatty acids will facilitate oxidation, making it difficult for storage and causing rancidity, thus creating a new innovation such as being formulated into cream. This study aims to formulate the silver eel (Anguilla marmorata (Q.) Gaimard.) Oil extracts in the form of cream dosage preparations and evaluates the cream dosage using physical test parameters to maintain the quality of the cream produced. This study used laboratory experimental methods and the cream formulations were made in 4 formulas, they are F0, F1, F2 and F3 with the respective concentrations of stearic acid emulsifier 6%, 8%, 10% and triethanolamine 2%, 2%, and 3.5. %, and F0 as negative controls. The result obtained test showed that the F3 positive control cream preparation met the organoleptic requirements, the result of homogeneity test was homogeneous and there were mo coarse particles, the dispersion of the cream was 6.87 cm (5-7 cm), adhesion of the cream was 4.21 seconds (>4 seconds), cream pH was 6.25 (4.5-6.5). The F3 formula gave a significant value to the characteristics of the cream.

Keywords: Fish oil extract, Anguilla marmorata (Q.) Gaimard, Stearic Acid, Triethanolamine, Amino Acid

Key Messages:
- Eel fish (Anguilla marmorata Q. Gaimard) oil cream preparation

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1. Introduction

Eels are found in the rivers of Central Sulawesi. The eel consists of several phases including glass eel, yellow eel and silver eel, with their respective sizes, the yellow eel phase 6-50 cm and the silver eel phase larger than 50 cm. In the yellow eel phase, the eel can be said to have matured and is characterized by yellow pigmentation and underdeveloped genital organs. Furthermore, the eel grows and the stomach changes color to silver or it is said to be silver eel (1). In addition, eel has a high nutritional content such as vitamin A which can help the formation of body tissues, amino acids that function to repair damaged tissue and fatty acids that can help the immune system. The silver eel phase has a high amino acid content, this is supported by research that the silver eel phase has 9 types of amino acids and based on research that The content of vitamin A in the silver eel phase is higher than the glass eel and yellow eel phases while the yellow eel phase has a high fatty acid content(2).

Eel fish oil as much as 15% can be used as a pharmaceutical preparation in the form of oral preparations or

topical preparations that are useful for treating various diseases, one of which is wound healing 16) on the use of snakehead fish oil as much as 15%, wound healing occurs faster than concentrations of 5% and 10%. The choice of fish oil concentration of 15% can show better stability to the separation because of emulsions with higher oil concentrations, the droplets become more compact so that there is an increase in viscosity and interactions between droplets, thereby reducing the rate of separation (3).

Fish oil is formulated into cream preparations because it has a high fatty acid content which causes it to be easily oxidized, making it difficult for storage and causing a rancid odor. The cream is the preferred emulsion because of its dispersion that distinguishes it from other topical preparations, has a lighter consistency and absorbs into the skin more quickly, and works better when on a large area. Cream preparations consist of an oil phase and a water phase as well as emulsion preparations, emulsion stability can be achieved by adding a single emulsifier or a combination according to the HLB value of the cream type, which can balance the mixture of lipophilic and hydrophilic emulsifiers (4). Stearic acid and triethanolamine are anionic emulsifiers that are often used in dermatology for topical use and have the ability to stabilize emulsions by forming a single layer of ions or molecules that are adsorbed at the oil or water interface, and these surfactants can ionize so that there are droplets with a strong charge and repulsion (5). This will increase the stability of the emulsion. Anionic surfactants have the advantage of penetrating the skin well because they can interact well with skin fats and proteins protein.

To maintain the quality of a cream product, several cream stability tests can be carried out, one of the studies that have been carried out (6) that there are several stability test factors that can be done to see the stability of a formula including the freeze-thaw test, cycling test and the centrifugation method which looks at the effect of a temperature on the product during storage (5). In the centrifugation method, test parameters were carried out to see the phase separation, while in the cycling test method the test parameters consisted of organoleptic, homogeneity, pH, dispersion, and adhesion (7).

Based on previous studies that fish oil is easily oxidized but contains many chemical compounds such as fatty acids that can be efficacious in healing wounds and stability tests that affect the quality of a cream product, the formulation of fish oil cream (*Anguilla marmorata* (Q.) Gaimard) on silver eel phase was carried out, then its stability was observed through the cycling test method with evaluation parameters consisting of organoleptic, homogeneity, pH, dispersion and adhesion..

2. Methods

Materials

Laboratory standard glassware (Iwaki Pyrex), porcelain dish, parchment paper, pH meter (WalkLAB), analytical balance Ohaus PA214, refrigerator (Polytron), desiccator, stirring rod, object glass, round bottom flask (Pyrex), oven (Memmert), thermometer, homogenizer (YYCHEM), ointment pot, horn spoon, spatel, soxhlet Gerhard, funnel, rotary evaporator (B one RE300), transparent glass, petri dish, 1 kg weight, stopwatch, blender, stirring rod, hotplate (Denville ®). Fish oil extracts (Anguilla marmorata (Q.) Gaimard.) silver eel phase from Palu River, solvent diethyl ether (Supelco), aqua destilata (OneMed), glycerin (Merckmillipore), triethanolamine (MERCK 108379), stearic acid (Chemicals Arganta), cetyl alcohol (Merck Millipore), propyl paraben (Sigma-aldrich), methyl paraben (Sigma-aldrich), BHT (Sigma-aldrich), parchment paper, aluminum foil, filter paper.

Analysis Procedures

Eel is the raw material used in this study with fresh conditions and taken based on purposive sampling technique, and then sample preparation was carried out by cleaning and washing the sample using running water, then cut into smaller pieces, then baked and put into an oven then blended. The sample that has been powdered is then weighed as much as 15 grams and put into a fat sleeve, then 150 ml of diethyl ether is added to a round bottom flask and the extraction process is carried out at a temperature of 60°C for 5 hours.

Furthermore, the extracted oil was purified using 3% bentonite adsorbent, then stirred at 29°C for 20 minutes using a magnetic heater stirrer, then centrifuged at 6500 rpm at 10°C for 10 minutes. The cream is made by weighing the ingredients to be used, then in the formulation of the cream, stearic acid and triethanolamine are used as emulsifiers in different proportions. In the oil phase formulation consisting of eel fish oil extract, cetyl alcohol, stearic acid, BHT and propyl paraben, it was put into a porcelain dish, then heated at a temperature of 70-75°C which was measured using a thermometer over a water bath while stirring until homogeneous. In the aqueous phase formulation, triethanolamine, methyl paraben, glycerin, and aquadest were prepared in a porcelain

dish, then heated on a water bath at a temperature of 70-75°C measured with a thermometer while stirring until homogeneous.

Table 1. The Formula of Eel Fish Oil Cream on Silver Eel Phase

Ingredients Name	Function	Concentration %			
		F0	FI	F2	F3
Extract	Active substance	-	15	15	15
VCO	Negative control	15	-	-	-
Cetyl Alcohol	*Stiffening Agent*	2	2	2	2
Glycerin	Humectants	10	10	10	10
TEA	*Emulsifying agent*	2	2	2	3.5
Stearic Acid	*Emulsifying agent*	8	6	8	10
Methylparaben	Preservative	0.02	0.02	0.02	0.02
Propylparaben	Preservative	0.05	0.05	0.05	0.05
BHT	Antioxidant	0.1	0.1	0.1	0.1
Aquadest	Solvent	Ad 100	Ad 100	Ad 100	Ad 100

Cream Evaluation

The organoleptic examination includes the shape, color, and smell that are observed visually. Cream specifications that must be met are having a soft consistency, homogeneous preparation color, and fragrant (8). The test of the adhesiveness of the preparation was carried out by means of 0.5 g of cream placed on one side of the slide with a rope attached to the lower side to bind the load. Then affixed to another glass object. The load used is 80 g for 5 minutes. Then observe the time it takes the load to separate the two glasses (8). Cream for each type and concentration was prepared, and then the pH was measured using a pH meter. The pH value of each formula was recorded. The pH value of the cream preparation corresponds to the skin pH, which is 4.5-6.5 (9).

The cream was weighed as much as 1 gram, then placed in the middle of transparent glass and left for 1 minute. Then added 200 grams of additional load, and left for 1 minute. The standard value of the dispersion test is 5-7 cm (9). A homogeneity examination was carried out to see the mixture of cream preparation ingredients. 1 gram of cream is smeared on a piece of transparent glass. Then it was observed that the preparation must show a homogeneous arrangement and no coarse grains are seen (10).

Stability Test

Cycling test is one way to speed up the evaluation of physical stability was carried out for 6 cycles. The cream was stored at a cold temperature of ± 4°C for 24 hours and then removed and placed at a temperature of ± 40°C for 24 hours (1 cycle). The physical conditions of the cream are organoleptic, homogeneity, pH, dispersion and adhesion during the cycling test compared to the previous results (11).

Data Analysis

Changes in the physicochemical properties of the cream were also evaluated statistically using ONE WAY ANOVA with a probability level of P <0.05 considered significant and followed by Duncan's Multiple Range Test (DMRT) with a significant level of 95% to determine the level of difference in values between treatments (12)..

3. Results

The Organoleptic Test Cream of Eel Fish Oil Extract (*Anguilla marmorata* (Q.) Gaimard) on Silver Eel Phase

The organoleptic test aims to see the appearance or physical appearance of the preparation which includes consistency, color and odor; with the organoleptic test it can give an indication of rot, deterioration of quality, and other damage to the preparation. Organoleptic testing has high relevance to the quality of preparation because it is directly related to consumer tastes. The results of the organoleptic tests carried out on the silver eel fish oil extract cream can be seen in the following table 2.

Table 2. The results of organoleptic test of cream of eel fish oil extract (*Anguilla marmorata* (Q.) Gaimard) on silver eel phase

Formula	Time	Color	Smell	Consistency
F0	Day 1	White	Typical	Thick, soft, not sticky
	Day 12	White	Typical	Thick, soft, not sticky
F1	Day 1	Light yellow	Typical	Thick, soft, not sticky
	Day 12	Yellow	Typical	Thick, soft, not sticky,
F2	Day 1	Light yellow	Typical	Thick, soft, not sticky
	Day 12	Yellow	Typical	Thick, soft, not sticky
F3	Day 1	Light yellow	Typical	Thick, soft, not sticky
	Day 12	Yellow	Typical	Thick, soft, not sticky

Informations:

Formula 0: Negative control without active substance, AS 8%, TEA 2%

Formula 1: Extract 15%, AS 6% and TEA 2%

Formula 2: Extract 15%, AS 8% and TEA 2%

Formula 3: Extract 15%, AS 10% and TEA 3.5%

The Homogeneity Test of Eel Fish Oil Extract (*Anguilla marmorata* (Q.) Gaimard) on Silver Eel Phase

The homogeneity test aims to see and know the mixture of the ingredients of the preparation evenly. If preparation is homogeneous, it will produce good quality because it shows the drug ingredients are dispersed in the base material evenly so that in each part of the preparation contains the same amount of drug The results of the homogeneity test on the silver eel fish oil extract cream can be seen in the following table 3.

Table 3. The results of homogeneity test of eel fish oil extract cream (*Anguilla marmorata* (Q.) Gaimard) on silver eel phase

Formula	Homogeneity	
	Day 1	Day 12
F0	Homogeneous, no coarse particles	Homogeneous, no coarse particles
FI	Homogeneous, no coarse particles	Homogeneous, no coarse particles
F2	Homogeneous, no coarse particles	Homogeneous, no coarse particles
F3	Homogeneous, no coarse particles	Homogeneous, no coarse particles

Information:

Formula 0: Negative control without active substance, AS 8%, TEA 2%

Formula 1: Extract 15%, AS 6% and TEA 2%

Formula 2: Extract 15%, AS 8% and TEA 2%

Formula 3: Extract 15%, AS 10% and TEA 3.5%

The Test of Dispersion, Adhesion and pH of Cream of Eel Fish Oil Extract (*Anguilla marmorata* (Q.) Gaimard) on Silver Eel Phase

The dispersion test aims to determine the extent of the dispersion of the cream when applied to the skin. The stickiness test aims to determine the time it takes for the preparation to stick to the skin, the longer the time needed, the longer the drug's working power. The pH test aims to see the level of acidity produced from the cream preparation to ensure that the preparation will not cause irritation to the skin. The results of the test of dispersion, adhesion and pH of the silver eel fish oil extract cream can be seen in the following table 4.

Table 4. Test results of dispersion, adhesion and pH of cream extract of eel fish oil (*Anguilla marmorata* (Q.) Gaimard) on silver eel phase

Formula	Dispersion (cm)		Adhesion (seconds)		pH	
	Day 1	Day 12	Day 1	Day 12	Day 1	Day 12
F0	6.70±0.020	6.88±0.020	226.66±3.511	259.33±1.527	7.65±0.015	7.46±0.010
F1	6.91±0.010	7.19±0.020	185.00±2,000	229.33±2.081	6.62±0.015	6.50±0.020
F2	6.55±0.026	6.68±0.032	225.66±1.527	240.33±1.527	6.52±0.015	6.41±0.020
F3	6.60±0.005	6.83±0.010	236.33±2.516	261.66±7,371	6.38±0.015	6.25±0.015

Information:

Formula 0: Negative control without active substance, AS 8%, TEA 2%

Formula 1: Extract 15%, AS 6% and TEA 2%

Formula 2: Extract 15%, AS 8% and TEA 2%

Formula 3: Extract 15%, AS 10% and TEA 3.5%

The Cycling Test of Eel Fish Oil Extract Cream (*Anguilla marmorata* (Q.) Gaimard.) on Silver Eel Phase

The cycling test stability test aims to determine whether the preparations that have been produced remain stable during the specified storage time limit. The results of the silver eel phase cycling test extract of fish oil cream can be seen in the following table 5.

Table 5. Stability test results of cycling test of eel fish oil extract cream (*Anguilla marmorata* (Q.) Gaimard) on silver eel phase

Formula	Color Observation		Separation Phase
	Day 1	Day 12	
F0	White	White	No separation
F1	Light yellow	Yellow	No separation
F2	Light yellow	Yellow	No separation
F3	Light yellow	Yellow	No separation

Information:

Formula 0: Negative control without active substance, AS 8%, TEA 2%

Formula 1: Extract 15%, AS 6% and TEA 2%

Formula 2: Extract 15%, AS 8% and TEA 2%

Formula 3: Extract 15%, AS 10% and TEA 3.5%.

The dispersion test was carried out to determine the extent of the dispersion of the cream when applied to the skin. The results of the dispersion test observations can be seen in table 4 and figure 1 below.

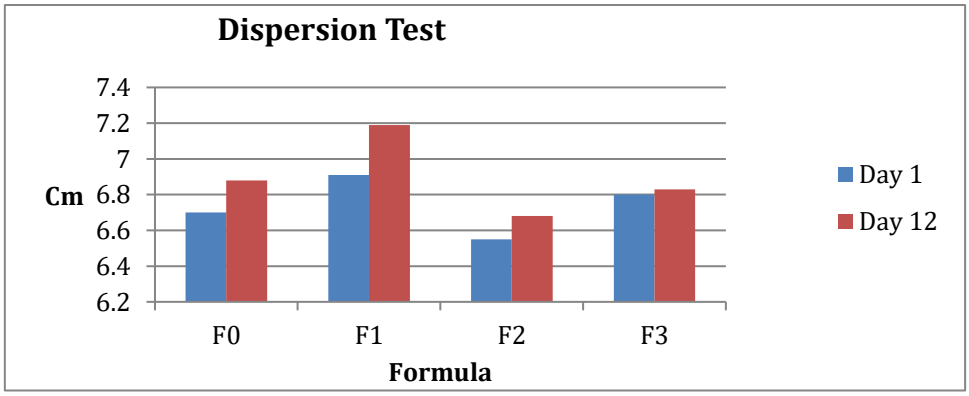

Figure 1. The results of the dispersion test of eel fish oil extract cream (*Anguilla marmorata* (Q.) Gaimard.) on silver eel phase

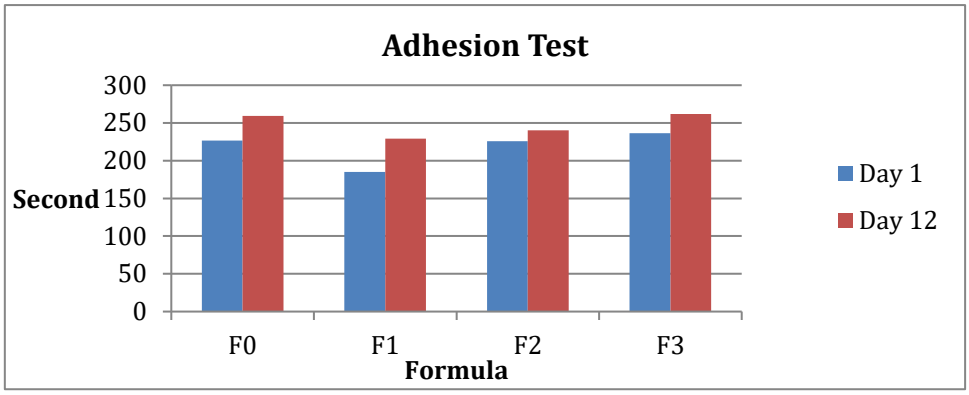

Figure 2. The results of the stickiness test of eel fish oil extract cream (*Anguilla marmorata* (Q.) Gaimard.) on silver eel Phase

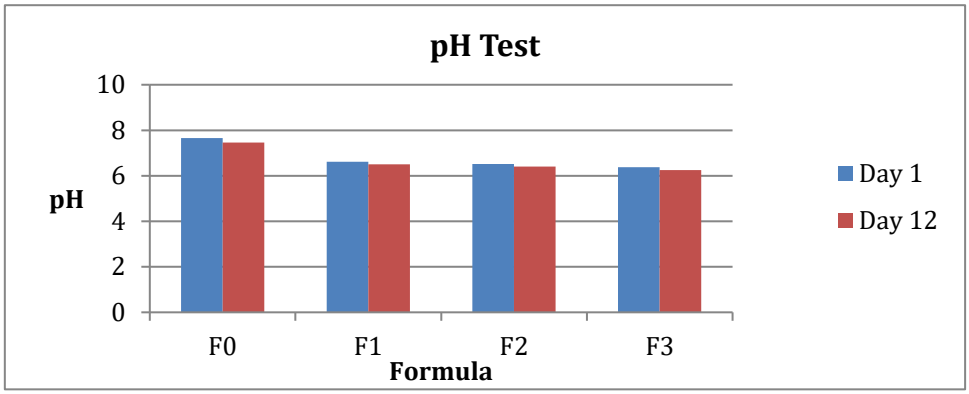

Figure 3. The pH test results of eel fish oil extract cream (*Anguilla marmorata* (Q.) Gaimard.) on silver eel phase

4. Discussion

This study was conducted to determine and compare the stability of the preparation of eel (*Anguila marmorata* (Q.) Gaimard.) on silver eel extract cream physically and chemically with different concentrations of emulsifier, in order to obtain a formula with the best stability. Eel has a high nutritional content including vitamins A, D, E and contains fatty acids and amino acids. The selection of the silver eel phase was because the silver eel has high amino acid content so that it can help repair the formation of damaged body tissues and the vitamin A content is higher than the glass eel and yellow eel phase. The dominant fatty acid content in eel is DHA (*docosahexanoic fatty acid*) and PUFA (*linoleic fatty acid*) (13).

The method used to obtain eel (*Anguilla marmorata* (Q.) Gaimard.) on silver eel oil extract in the silver eel phase in this study was soxhletation. Preparation of eel (Anguilla marmorata (Q.) Gaimard.) on silver eel extract using Diethyl ether solvent at 60°C for 5 hours5 (13) research on optimization of eel oil extract (*Anguilla marmorata* (Q.) Gaimard.) using the soxhletation method with various types of solvents and solvent temperature of 60°C Diethyl ether for 5 hours resulted in the largest yield of eel with % yield of 36,489% in the sample of eel powder as much as 15.0 grams and the percentage of fatty acids free (FFA) produced is the lowest at 60°C. (13) also produced the best quality fish oil, which is golden brown to brownish in color using the soxhletation method. The result of oil extraction obtained is brownish yellow oil, and has a distinctive aroma of eel fish oil, which has a sharp fishy smell but does not smell rancid. From the results obtained that the oil extract produced is according to standards, this is based on that the quality of fish oil can be seen from several tests, one of which is the organoleptic test, it is the clarity of oil, and the color produced is brownish yellow or reddish yellow and fish oil aroma. In addition (14).

Fish oil derived from the extraction still contains impurities and compounds that trigger oxidation reactions that can cause a higher oxidation reaction than fish oil that has been purified. Research from Dari et al., (2018) stated that DHA contained in fish oil causes fish oil to be easily oxidized due to the presence of oxygen. Hydrolysis that occurs in fish oil causes fatty acids to be released or Free Fatty Acid (FFA), with increasing FFA, fish oil has the

potential to reduce quality and trigger oil damage which can affect the aroma of fish oil. Therefore, fish oil purification was carried out to remove unwanted components and stabilize the characteristics of fish oil. Purification was carried out using bentonite as an adsorbent, The selection of bentonite as an adsorbent was based (15) & (16) that by using a concentration of 3% bentonite added to crude oil, then stirring at a temperature of 29°C for 20 minutes in a magnetic heater stirrer, then centrifuged at a speed of 6,500 rpm at a temperature of 10°C for 10 minutes to obtain pure oil and the selection of bentonite is the best adsorbent and in accordance with the maximum limit set by the International Fish Oil Standard/IFOS, IFOMA and Pharmacopoeia Standards as food quality fish oil. The results obtained in the supporting journal are 50.30% free fatty acids, 49.77% peroxide and 30.92% iodine. Bentonite is a type of adsorbent that is useful for removing unwanted odors, make the color of the oil clearer and extend the shelf life of the oil (13). After refining, eel fish oil has physical characteristics such as reddish brown in color, with a reduced fishy aroma (slightly fishy) (17). that the resulting oil extract changes color and aroma, this is due to the use of bentonite during the purification process, bentonite is able to absorb color components and separate free fatty acids from fish oil. If the resulting oil is cloudy, the oil is influenced by the high content of free fatty acids, the amount and type of adsorbent used, the temperature, and the required processing time (17).

Formulating cream requires active substances, emulsifiers, humectants, stiffening agents, preservatives, additional antioxidants and distilled water. The formula for eel fish oil extracts cream (*Anguilla marmorata* (Q.) Gaimard.) on silver eel phase produced four formulas including one cream formula as a negative control without added eel fish oil extract and the other three formulas as a positive control with eel fish oil extract as the active substance. These four formulas use anionic emulsifiers, as stearic acid and triethanolamine, which have the ability to stabilize emulsions by forming a single layer of adsorbed ions or molecules at the oil or water interface. The selection of this emulsifier (17) regarding the use of emulsifiers that have the best stability between nonionic and anionic emulsifiers, The results showed that the use of anionic emulsifiers had good physical stability based on the results of organoleptic observations, emulsion type, viscosity, dispersion, pH and on the results of storage of preparations at high and low temperatures the resulting preparations remained stable (18) which states that anionic emulsifiers are able to penetrate the skin well against skin fats and proteins. The fish oil extract used in this formulation was 15% (19) which states that anionic emulsifiers are able to penetrate the skin well against skin fats and proteins. The fish oil extract used in this formulation is 15%. Which states that anionic emulsifiers are able to penetrate the skin well against skin fats and proteins. The fish oil extract used in this formulation was 15% that fish oil with a concentration of 15% showed better stability to the separation because of the emulsion with a higher concentration, the droplets became more compact so that there was an increase in viscosity and interactions between droplets. Thus it can reduce the rate of separation (19).

Organoleptic test can see whether there are changes that occur so that it can affect the physical appearance of the preparation during accelerated storage (cycling test). The results of the organoleptic test can be seen in table 2 that storage time and hot temperature during cream storage affect the color of the resulting preparation to be yellower, this is due to the oxidation of the fish oil. On day 1 it showed that the three positive control formulas had a soft, non-sticky and thick texture, this was due to the selection of additional ingredients based on the appropriate reference and the amount of concentration used according to the guidelines used and the distinctive smell of eel fish oil with color intensity as easy yellow, because the color of the oil obtained after refining is brownish yellow. After accelerated storage, it was found that all positive control formulas changed the color of the preparation to become more yellow and the consistency became thicker, especially in F3 (20). That cream with a higher concentration of stearic acid causes the consistency of the viscosity of the preparation to be higher. In the negative and positive control formulas after 12 days of storage there was no significant change and in the three positive control formulas the cream color changed to yellow. Organoleptic testing can help in health, especially the preparations needed must comply with organoleptic test standards in order to see the proper quality of the product to achieve the maximum expected effect.

The homogeneity test aims to see and know the mixing of the ingredients of the cream preparation. Homogeneous preparations will give good results because the active ingredients are evenly dispersed in the base material. The results of the observation of the homogeneity test of the cream can be seen in table 3 that there is no change before and after the cycling test test, which is homogeneous, it can be seen from the absence of lumps or coarse particles in the cream preparation, this is because the method of making cream such as the process of

mixing emulsion into cream according to the specified speed of 450 rpm for 15 minutes. The requirement for the preparation of the cream is that if it is applied to a piece of glass there is no separation between the components that make up the emulsion (21). Well-dissolved solids make the preparation softer and easier to mix homogeneously. If a preparation produced is not homogeneous, then the effect of a preparation in the resulting healing process is not optimal (21).

The results of the dispersion test in table 4 shows that there is an increase in diameter size in all formulas, this is due to the high concentration of the stearic acid emulsifier, so it is inversely proportional to the dispersion produced and Figure 1 above shows that the greater the concentration of stearic acid used, the smaller the dispersion produced, and vice versa the smaller the concentration of stearic acid used, the greater the dispersion produced. On day 1 the results obtained were the three positive control formulas in accordance with the standard test for the dispersion of cream preparations which ranged from 5-7 cm. After accelerated storage, there was a change in F2 and F3 there was an increase in dispersion but still according to standards. that the more stearic acid used, the smaller the dispersion power, conversely the less stearic acid used, the greater the dispersion produced. So that in F1 the resulting dispersion is even greater because the concentration of stearate used is the smallest concentration among the three formulas, which is 6%. The negative control formula is still included in the standard range.

The stickiness test aims to determine the time it takes for the preparation to stick to the skin, the longer the time it takes, the longer the drug works. The requirement for good adhesion time for topical preparations is not less than 4 seconds (21). The results of the adhesion test in table 4 shows that there is an increase in the value of adhesion, this is due to the high concentration of stearic acid oil phase emulsifier, which affects the high value of adhesion before and after the stability test and Figure 2 above shows that the higher the concentration of stearic acid, the consistency of the resulting viscosity is higher and as well as the adhesive power produced, and vice versa, the lower the concentration of stearic acid used, the consistency of the viscosity of the preparation produced is lower and the adhesive power produced is also lower. Since the 1st day to the 12th day the time produced from the three formulas was in accordance with the requirements for adhesion and increased or the resulting time was longer, that the cream with a high concentration of stearic acid has a higher viscosity consistency so that the stickiness of the three formulas has increased the adhesion time. In the negative control formula has the appropriate adhesion requirements.

The pH test aims to see the level of acidity produced from the cream preparation to ensure that the preparation will not cause irritation to the skin. The skin pH standard is 4.6-6.5 and based on SNI (Indonesian National Standard number 16-4399-1996) the recommended pH for skin moisturizer quality is between 4.5-8.0. The level of acidity or pH in the preparation greatly affects the reactions caused to the skin, if there is a difference in pH in the cream preparation with the physiological pH of the skin, the greater the negative impact**.** The results of the adhesion test in table 4 show that there is a decrease in the pH of the cream preparation due to the content of stearic acid which causes the number of acid groups contained so that the resulting pH is low and Figure 3 above shows that the greater the pH value produced, the more alkaline and alkaline the preparation is. The reaction caused to the skin is in the form of dry and scaly skin, on the contrary if the pH value is smaller, the preparation is acidic and the reaction caused to the skin is irritation (22). On day 1 to day 12 the resulting pH decreased, this is because the pH of the preparation is influenced by the amount of emulsifier used in the formula, the pH will be low due to the large number of acid groups contained in stearic acid (23).

The cycling test aims to determine whether the preparations that have been produced remain stable during the specified storage time limit. This experiment was carried out for 6 cycles at a temperature of 4°C and 40°C. The results of observations can be seen in table 5 that there is no separation during storage, because the method of mixing the emulsion into cream according to the reference and the use of an emulsifier that works by forming a layer around the dispersed droplets so as to prevent the separation of the dispersed liquid (24). If a cream preparation occurs on phase separation, there will be instability of a preparation, which can cause damage to the quality of the cream, so that it does not meet the cream requirements according to the test standard.

5. Conclusion

The eel fish oil extracts (*Anguilla marmorata* (Q.) Gaimard) on Silver phase can be formulated in the form of cream preparations with various concentrations of stearic acid and triethanolamine emulsifiers. The cream preparations of eel fish oil extract (*Anguilla marmorata* (Q.) Gaimard) with various concentrations of emulsifier

stearic acid and triethanolamine affect the physical stability of cream preparations such as organoleptic, homogeneity, dispersion which has increased diameter size, adhesion which has increased adhesion. and decreased pH. The best formula is F3 which meets the requirements of organoleptic, homogeneity, 6.83 cm cream dispersion, 04.21 seconds cream stickiness, and 6.25 pH cream.

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References

1. Suseno, SH, Syari, C., Zakiyah, ER, Jacoeb, AM, Izaki, AY, Saraswati., & Hayati, S. Low Temperature Extraction and Quality Of Oil From Spotted Sardinella (Sardinella gibbosa). World Journal of Fish and marine Science 6 (5):435-440.ISSN.20784589.DOI:10.5829/idosi.Wjfms;2014.06.05.863. DOI:http://www.idosi.org/wjfms/wjfms6 (5) 14/8.pdf.
2. Jamaluddin, Widodo, A., & Mufliha, N. Vitamin A eel (*Anguilla marmorata*) from Palu River and Poso Lake. 2 (1), 24-30. ISSN. 2435-2440; 2018. DOI :Https://Doi.Org/10.22487/J24428744.2016.V2.I2.5967
3. Husni, P., Hisprastin, Y., & Januarti, M. Formulation and Physical Stability Test for Oil Emulsion Preparations. 10. ISSN. 2085-4714. DOI ; 2019 https://doi.org/10.22487/j24428744.2020.v6.i2.15013
4. Anindhita, MA, Arsanto, CJ. Cream Formulation of Kersen Leaf Extract (Muntingia Calabura L.) with Variations Combination of Span 60 and Tween 80 as Emulgator.9(2). ISSN. 327124612. DOI ; 2020. https://doi.org/10.30591/pjif.v%vi%i.2034
5. Syamsuddin, A., Zulkarnain, I., & Hasyim, N. Emollient Lotion Formulation from Ants Nest (Myrmecodia pendens) Ethanol Extract Using Anionic and Nonionic Emulgators. 4. ISSN. 3863-3875; 2016. DOI :Https://Doi.Org/10.32382/Mf.V16i1.1408
6. Latif, AR, Sugihartini, N., & Guntarti, A. Physical Properties of A/M Type Cream with Variations in Concentration of Moringa Leaf Ethanol Extract (Moringa Oliefera) Using Emulgator Tween 80 And Span 80. Pharmaceutical Media, 16(1), 9. ISSN. 2358-2095; 2020. DOI:Https://Doi.Org/10.32382/Mf.V16i1.1408
7. Dewi, RK (nd). Optimization of Microemulsion Formulation for Testosterone Undecanoate Hormone Preparation [Thesis]. Faculty of Mathematics and Natural Sciences, Syarif Hidayatullah State Islamic University, Jakarta; 2010
8. Engelina N., Fahrurroji, A., Pratiwi, L. Optimization of White Swallow's Nest Cream (Aerodramus fuciphagus) Type M/A with Emulsifier Variation as Skin Lightening Using Simplex Lattice Design. 1-9. ISSN. 12110901. DOI; 2013. https://doi.org/10.22146/agritech.47039
9. Simangunsong, FMP, Mulyani, S., Hartiati, A. 2018. Evaluation of the Characteristics of Turmeric Extract Cream (Curcuma domestica) in Various Formulations. J. Engineering and Agroindustry 6, 11 – 21. Bandung. ISSN. 2065-2101; 2018. DOI :https://doi.org/10.7454/psr.v1i3.3484
10. Suseno, SH, Syari, C., Zakiyah, ER, Jacoeb, AM, Izaki, AY, Saraswati., & Hayati, S. Low Temperature Extraction and Quality Of Oil From Spotted Sardinella (Sardinella gibbosa). World Journal of Fish and marine Science 6 (5):435-440.ISSN.20784589.DOI:10.5829/idosi.Wjfms;2014.06.05.863. DOI:http://www.idosi.org/wjfms/wjfms6 (5) 14/8.pdf.
11. Dewi, RK (nd). Optimization of Microemulsion Formulation for Testosterone Undecanoate Hormone Preparation [Thesis]. Faculty of Mathematics and Natural Sciences, Syarif Hidayatullah State Islamic University, Jakarta; 2010
12. Sheikh, KA, Baie, SH, & Khan, GM. Haruan (Channa Striatus) Incorporated Palm-Oil Creams: Formulation And Stability Studies. 18, 6. ISSN. 3683-3751; 2005. DOI :http://www.ejournal-s1.undip.ac.id/index.php/jpbhp.

13. Nurbayasari, R., Bandol Utomo, BS, Basmal, J., & Hastarini, E. Purification of Catfish Oil From By-Products of Fish Smoking. Journal of Postharvest and Marine and Fisheries Biotechnology, 11(2), 171. ISSN. 2541-3651; 2017. DOI:Https://Doi.Org/10.15578/Jpbkp.V11i2.224.
14. Putri, DN, Wibowo, YMN, Santoso, EN, & Romadhani, P. Physicochemical Properties and Fatty Acid Profile of Fish Oil from the Head of Red Snapper (Lutjanus malabaricus). agriTECH, 40(1), 31. ISSN. 2407-2354; 2020. DOI :https://doi.org/10.22146/agritech.47039.
15. Nurbayasari, R., Bandol Utomo, BS, Basmal, J., & Hastarini, E. Purification of Catfish Oil From By-Products of Fish Smoking. Journal of Postharvest and Marine and Fisheries Biotechnology, 11(2), 171. ISSN. 2541-3651; 2017. DOI:Https://Doi.Org/10.15578/Jpbkp.V11i2.224.
16. Suseno, SH, Syari, C., Zakiyah, ER, Jacoeb, AM, Izaki, AY, Saraswati., & Hayati, S. Low Temperature Extraction and Quality Of Oil From Spotted Sardinella (Sardinella gibbosa). World Journal of Fish and marine Science 6 (5):435-440.ISSN.20784589.DOI:10.5829/idosi.Wjfms;2014.06.05.863. DOI:http://www.idosi.org/wjfms/wjfms6 (5) 14/8.pdf.
17. Ayu, DF, & Diharmi, A. Fish Oil Characteristics From Byproduct Abdominal Fat. JPHPI, 22(1), 187–197. ISSN. 26473221. DOI; 2019. https://doi.org/10.1016/S0378-8741(99)00184-1
18. Safitri, NA, Puspita, OE, & Yurina, V. Optimization of the Formula for Strawberry Extract Cream (Fragaria X Ananassa) as an Anti-Aging Cream. 1, 12. ISSN. 1979-5971; 2014
19. Husni, P., Hisprastin, Y., & Januarti, M. Formulation and Physical Stability Test for Oil Emulsion Preparations. 10. ISSN. 2085-4714. DOI ; 2019 https://doi.org/10.22487/j24428744.2020.v6.i2.15013
20. Engelina N., Fahrurroji, A., Pratiwi, L. Optimization of White Swallow's Nest Cream (Aerodramus fuciphagus) Type M/A with Emulsifier Variation as Skin Lightening Using Simplex Lattice Design. 1-9. ISSN. 12110901. DOI; 2013. https://doi.org/10.22146/agritech.47039
21. Azkiya, Z., Ariyani, H., & Nugraha, TS. (Evaluation of Physical Properties Cream from Red Ginger Extract (Zingiber officinale Rosc var rubrum) As Anti Pain). 1(1), 7. ISSN. 2598-2095; 2017. DOI:Https://Doi.Org/10.31227/Osf.Io/Wcg98.
22. Luthfiyana, N., Nurjanah, Nurilmala, M., Anwar, E., & Hidayat, T. Porridge Ratio of Eucheuma cottonii and Sargassum sp. As a Sunscreen Cream Formula. Journal of the Department of Aquatic Products Technology, IPB, 183-195. ISSN. 2088-3943; 2016. DOI :https://Doi.Org/10.17844/jphpi.2016.19.3.183
23. Engelina N., Fahrurroji, A., Pratiwi, L. Optimization of White Swallow's Nest Cream (Aerodramus fuciphagus) Type M/A with Emulsifier Variation as Skin Lightening Using Simplex Lattice Design. 1-9. ISSN. 12110901. DOI; 2013. https://doi.org/10.22146/agritech.47039
24. Devi, IA, Mulyani, S., & Suhendra, L. Effect of Hydrophile-Lipophile Balance (HLB) and Type of Extract on the Characteristics of Turmeric-Aloe vera (Curcuma domestica Val.-Aloe vera) Cream. Scientific Journal of Agricultural Technology, 54-61. ISSN. 25354656. DOI ; 2019. Https://Doi.Org/10.22487/Bioceb.V14i1.15089.