

Natural Moisturizer Based Formulation of Green Grass Jelly (*Cyclea Barbata Miers*) with *Aloe Vera* Addition

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ABSTRACT

Moisturizer is one of cosmetics used for dry skin care and can make skin become moist and soft. Natural material can be used to maintain water content in the skin and soften skin is *Aloe vera*. *Aloe vera* contains minerals, vitamins A, C, E and B12. In addition to *Aloe vera* to maintain antioxidants in the skin is green grass jelly because it has flavonoid content. Content contained in *Aloe vera* and green grass jelly can be used for making natural moisturizers because at this time many moisturizers that contain harmful chemicals. This observation was to analyze differences in concentration of *Aloe vera* and green grass jelly on moisturizers and analyze antioxidant activity of green grass jelly. Method used in making this moisturizer is mixing with green grass jelly formulation (2.5%; 5%; 7.5%) + *Aloe vera* (2.5%, 5%, 7.5%, 10%), and non-sample formulation treatment. Analysis of this experimental data was qualitative on moisturizers and quantitatively to calculate levels of flavonoids in green grass jelly. Results of this study indicate that difference in concentration of *Aloe vera* + green grass jelly greatly affects parameters of good moisturizer used, and greater addition of green grass jelly concentration greater flavonoid content in moisturizer.

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1. Introduction

The skin is the outermost part of the human body and serves to protect the body from outside influences. One that causes skin damage is free radicals [1]. Free radicals in the body are formed due to air pollution, ultraviolet light, unhealthy lifestyles and cigarette smoke. This can cause skin damage and the need for skin care such as the use of moisturizers [2].

Moisturizers are used to prevent the evaporation of water on the skin and make the skin moist and soft by forming a thin layer of fat on the surface of the skin [3]. The making of this moisturizer from natural ingredients namely green grass jelly and *Aloe vera*. The skin moisturizing formulation consists of *Aloe vera* to moisturize the skin, grass jelly leaves as an antioxidant, thickener, emulsifier and humectant so that it can maintain skin softness and moisture. The content of bioactive compounds in green grass jelly include polyphenols, flavonoids, chlorophyll, β -carotene, alkaloids, saponins,



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carbohydrates, tannins, steroids, and glycosides. Green grass jelly contains bioactive compounds that function as antioxidants, anti-inflammatory, antihypertensive, antidiabetic, antibacterial, and anticancer [4]. The flavanoid content of grass jelly significantly influences antioxidant activity and has a free radical effect [5]. In addition to green grass jelly, *Aloe vera* contains 99% of the total weight and contains 25% of the dry weight of monosaccharides and polysaccharides. *Aloe vera* also contains bradykinase, lignin, and vitamins, namely vitamins A, C, E, B12. The content of monosaccharides and polysaccharides is able to bind water in the air which functions as a humectant while lignin content of *aloe vera* gel has a high absorption ability into the skin making it easier to absorb the water content of *Aloe vera* extract to the skin and able to withstand the loss of liquid from the surface of the skin [6].

Aloe vera and green grass jelly extract have active ingredients that are expected to be a safe and effective moisturizing alternative for skin care.

2. Methods

2.1 Research Methodology

The research methodology used in this study is to use the complete random design Method 2 factors using 4 treatment variations of green grass jelly formula (2.5%; 5%; 7.5%; and 10%) + *Aloe vera* (5%, 10%, 15%, 20%, 25%) and 1 treatment of formulations without green grass.

2.2 Variable Research

2.3.1 Independent variable

The free variables that this research used are:

- Increase in green grass jelly concentrations: 0% 2.5%, 5%, and 7.5%
- Added *Aloe vera* concentration: 0% 2.5%, 5%, 7.5%, and 10%

2.3.2 Fixed variable

The fixed variables used were the temperature with the following values:

- Extraction temperature grass jelly: 50 °C
- Moisturizing manufacturing Temperature: 35 °C, 40 °C, and 70 °C

2.3.3 Dependent Variable

The dependent variable is the parameter that will be observed when all test series have been carried out. In this study the parameters to be observed are the quality of the moisturizer and the level of effectiveness at each moisturizing concentration.

2.3 Procedure Research

2.3.1 Green Grass Leaf Extraction

Making grass jelly powder begins with washing fresh jelly leaves with cold water, then dried with an oven 50°C for 18 hours or until dry. Then the dried leaves are blended or grinded until smooth and sieved with a 200 mesh sieve. Grass jelly powder weighed 25 grams then put into 1000 ml beaker glass and added 600 ml of distilled water to heat using a hot plate until the temperature reaches 90°C. Filter the grass jelly with cloth or filter paper, the results of the grass jelly extract are dried until then puree and grass jelly powder is put into the beaker.

2.3.2 *Aloe vera* Gel Extraction

Aloe vera is cleaned and brushing is then rinsed. *Aloe vera* base is cut about 1 cm, then the skin is peeled. The *Aloe vera* gel is then rinsed several times with running water. *Aloe vera* gel in a blender until there



are no lumps and then put in a plastic bottle and placed in the refrigerator.

2.3.3 Procedure of Moisturizing

The ingredients used were weighed using a digital scale, with the following composition: glycerin weighed as much as 10 grams, TEA weighed as much as 0.6 grams, and aquades as much as 169 ml using a 250 ml beaker (water phase or preparation 1), stearic acid 2.4 gram weighed, PEG-100 stearate glyceril monostearate weighed 4.8 gram, cetyl alcohol weighed 0.8 gram, isopropyl palmitate weighed 5 gram, using 100 ml beaker (phase of fatty acid or preparation 2) . Both preparations are heated to a temperature of 70-75°C while stirring periodically, then (preparation of water phase 1) put in (preparation of fatty acid phase 2), stirring until homogeneous. Homogeneous preparations are mixed and stirred with a stirrer reaching a temperature of 40°C (preparation 3). Preservatives (nipagin) and perfume (*Oil. Rosae*) are weighed and then put into preparation 3 at 35°C and then stirred again for approximately one minute. Grass jelly powder with a concentration of 2.5%, 5%, 7.5% and *Aloe vera* with a concentration of 2.5%, 5%, 7.5%, 10% homogeneous according to the formulation, by taking non-sample moisturizers 60 ml put into 250 ml beaker glass then samples of grass grass jelly leaves and *Aloe vera* are inserted and homogenized, then after a homogeneous grass jelly moisturizer + aloe vera is put into a bottle and then kept on the ice shelf.

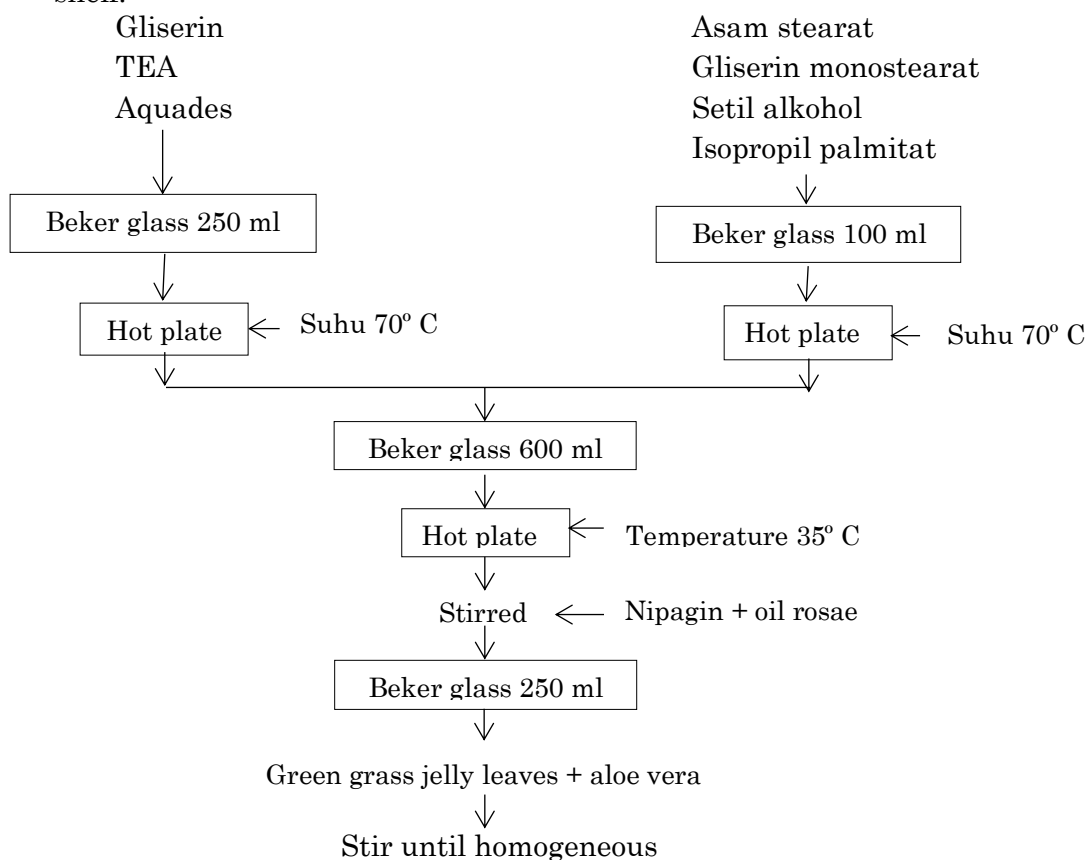


Figure 1. Flow chart of the moisturizing process

2.4 Analysis Research



2.4.1 Organoleptic Test

This test is carried out by giving questionnaires to 20 respondents to physically observe the moisturizer preparations that have been formulated using the senses. Moisturizers that have been formulated are observed from the aroma, texture and color.

2.4.2 Homogeneity

Homogeneity testing is done by placing a moisturizer between 2 petri dishes and note there are coarse homogeneous or homogeneous particles.

2.4.3 PH measurements

Moisturizer is put into a bottle, then the pH is measured using a pH strip indicator for acidic areas. The pH strip indicator is inserted into the moisturizer, then the results can be seen by matching the color of the strip with the reference color printed on the pH strip indicator packaging.

2.4.4 Coverage

Moisture as much as 0.5 grams on a petri dish which is repaired graph paper. Then each was given a weight of 0 g, 50 g, 100 g, 150 g and 200 g and left for 60 seconds. The diameter is distributed by measuring the diameter of several sides.

2.4.5 Emulsion Stability

The measurement of the emulsion material is inserted in the container and weighed as much as 2.5 grams, the container and materials are inserted into the oven with a temperature of 45°C for 1 hour, then inserted into the cooler temperature below 0°C for 1 hour and returned again to the oven with a temperature of 45°C for 1 hour. Then count the water that can not be mixed [7].

2.4.6 Density Analysis

The type weights are measured using a picnometer at 20°C. Measurement of the type of weight with a pycnometer with a thermometer as follows, weighed thoroughly the empty pycnometers (A), a picnometer containing water (B), and a picnometer containing the dosage (C). The weight of the dosage type is calculated with the following formula:

$$DA = \frac{C - A}{B - A}$$

2.4.7 Flavonoids Test

Quercetin standard solution with a concentration of 10 ppm, 20 ppm, 30 ppm, 40 ppm, 50 ppm that has been prepared. Then each concentration of the standard dispectophotometric solution to determine its wavelength and absorbance. Determination of flavonoid levels in green grass jelly extract was carried out by dissolving 2.5%, 5%, 7.5% extract with the addition of distilled water each volume up to 10.0 mL and homogenized. Next pipette 1.0 mL of the solution into a 50 mL erlenmayer for 3 replications. Each solution was added with 0.1 mL of potassium acetate solution, 0.1 mL of aluminum chloride solution and 10 ml of distilled water to be homogeneous. The solution that has been made is added and allowed to stand at room temperature for 30 minutes. After 30 minutes the solution was put into a cuvette tested on



spectrophotometry. Absorption is measured at a wavelength of 435 nm and the absorbance results are obtained. Total flavonoid levels were calculated from quercetin standard solution curves. The total flavonoid content is expressed as the equivalent mg amount of quercetin per gram of extract.

3. Results and Discussion

The study used the concentration influence of *Aloe vera* extract and green grass leaves in the manufacture of moisturizing formulations. The moisturizer produced is then performed organoleptic, homogeneity, pH measurement, dispersion, emulsion stability analysis and specific gravity analysis.

3.1 Organoleptik Test

Based on the results of the tests that have been done to 20 people who tried our products, obtained the following data:

Table 1. Organoleptic observation result (color)

No.	Formulation	Organoleptic (Color)			
		White	Light Green	Concentrated Green	Dark Green
1.	F(A)	20	-	-	-
2.	F(B)	-	2	15	3
3.	F(C)	20	-	-	-
4.	F(D)	-	6	12	2
5.	F(E)	-	1	8	11
6.	F(F)	-	-	2	18

Table 2. Organoleptic observation result (texture)

No.	Formulation	Organoleptic (Tekxture)			
		Very Dilute	Dilute	Thick	Very Thick
1.	F(A)	1	3	16	-
2.	F(B)	-	3	11	6
3.	F(C)	1	3	16	-
4.	F(D)	-	2	17	1
5.	F(E)	-	1	13	6
6.	F(F)	-	1	12	7

Table 3. Organoleptic observation result (scents)

No	Formulation	Organoleptic (Aroma)			
		Perfume	Perfume and <i>Aloe vera</i>	Perfume and Green Grass leaf	Perfume and distinctive both
1.	F(A)	19	-	1	-
2.	F(B)	-	1	19	-
3.	F(C)	10	9	1	-
4.	F(D)	-	-	10	10
5.	F(E)	-	-	10	10
6.	F(F)	-	3	8	9

Data obtained from organoleptic tests are color, aroma, and texture. The color organoleptic test results are F (A) without the addition of green grass jelly



and aloe vera has a white color. F (B) with the addition of 2.5% grass jelly is dark green because there is chlorophyll content in grass jelly so it makes physical changes to the moisturizing preparation. F (C) with the addition of grass jelly 0% and aloe vera 2.5% has a white color because the aloe gel is white and there is no discoloration. F (D) with the addition of 2.5% grass jelly and 5% aloe vera has a dark green color due to the chlorophyll content of grass jelly although the addition of aloe vera has no color effect because the aloe vera has a clear white color. F (E) with the addition of 5% grass jelly and 7.5% aloe vera has a deep green color because the concentration of grass jelly is quite large. F (E) with the addition of 7.5% grass jelly and 10% aloe vera has a dark green color because there is an addition to the concentration of grass jelly extract. From the color organoleptic test that samples F (A) and F (C) have a more attractive color.

Organoleptic texture test results are samples F (A) to sample F (B) all have a thick texture because of the composition of cetyl alcohol as an emulgator and the addition of grass jelly + aloe vera has no effect on the texture of moisturizing preparations. The organoleptic scent test results are F (A) non-sample moisturizers having a perfume aroma added during the moisturizing process. F (B) with the addition of 2.5% grass jelly and 0% aloe vera scented perfume and grass jelly because of the addition of grass jelly extract concentration. F (C) with the addition of 0% grass jelly and 2.5% aloe vera scented perfume because the concentration of aloe vera is inserted less so that the aroma of aloe vera is also lacking. F (D) with the addition of 2.5% grass jelly + 5% aloe vera and F (E) with the addition of 5% grass jelly + 7.5% aloe vera have the scent of grass jelly and the characteristic aroma of both is the grass jelly and aloe vera because there is no dominating aroma so the aroma is the same. F (F) with the addition of 7.5% grass jelly and 10% aloe vera has the characteristic aroma of both grass jelly + aloe vera. From organoleptic tests the preferred aroma is F (A) because the respondents think that the other formulations are thicker and the colors are less.

3.2 Homogeneity

From the experiments it can be seen that all samples made from green grass jelly moisturizers and the addition of aloe vera have homogeneous properties because the active ingredients in the moisturizing preparations have been spread evenly. In accordance (SNI-16-4399-1996) moisturizer that is the appearance of a moisturizer is homogeneous.

3.3 PH measurement

Based on the results of the tests obtained the following data:

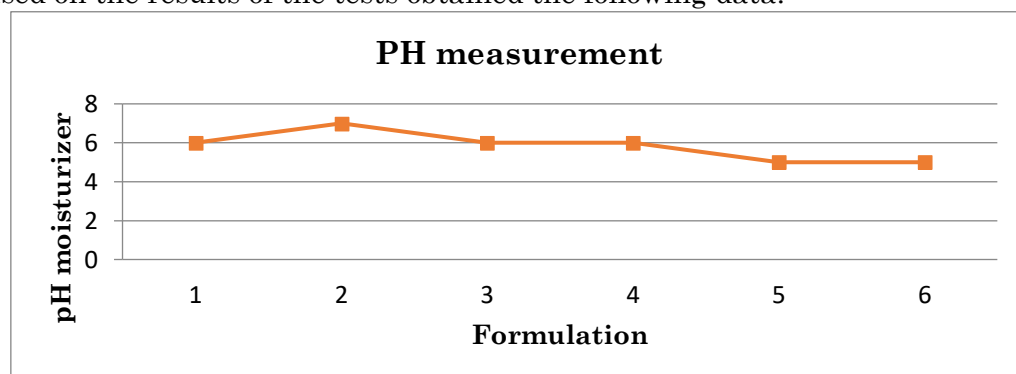


Figure 2. Chart of pH acidity degree test

Based on the graph that looks visible on the pH obtained in the range 5-7 in accordance with the provisions (SNI-16-4399-1996), namely 4.5-8.



The lowest pH measurements were obtained on F (E) and F (F) with varying concentrations of F (E) 5% green grass jelly + 7.5% aloe vera and 7.5% green grass jelly + 10% aloe vera while the value The highest pH was obtained at F (B) with a variation of green grass jelly concentration of 2.5%. The data above shows that the grass jelly moisturizer + aloe vera can be used and does not cause scaly skin or skin irritation.

3.4 Test Coverage

In the coverage test, each sample obtained the following data:

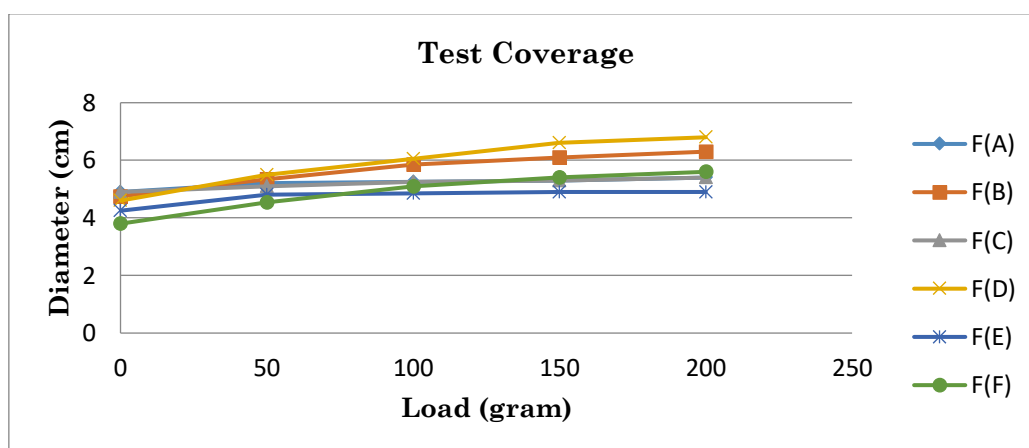


Figure 3. Scatter power graph

Table 4. Scatter power test results

No.	Formulation	Diameter(cm)					Average
		0 g	50 g	100 g	150 g	200 g	
1.	F(A)	4,9	5,2	5,25	5,3	5,4	5,21
2.	F(B)	4,75	5,35	5,85	6,1	6,3	5,67
3.	F(C)	4,9	5,1	5,25	5,3	5,4	5,19
4.	F(D)	4,6	5,5	6,05	6,6	6,8	5,91
5.	F(E)	4,25	4,8	4,85	4,9	4,9	4,74
6.	F(F)	3,8	4,55	5,1	5,4	5,6	4,89

From the data above shows that the greatest spread is on the formulation F (D), namely grass jelly 2.5% and aloe vera 5%, and the smallest spread is F (E), namely grass jelly 5% and grass jelly 7.5%. Samples F (E) and samples F (F) have a small value of the dispersal power because at the time of preparation the moisturizer is re-fused so that the viscosity is large. The difference in spreadability, due to the difference in viscosity factor in each preparation formula, the greater the viscosity, the smaller the spread of the moisturizing resistance. Therefore sample F (A) to sample F (D) has a fairly good dispersion. A good spread test is 5-7 cm [8].

3.5 Emulsion Stability Analysis

The measurement of emulsion stability in the experiment showed the same result that is 100%. The results showed no changes in the emulsion during storage at room temperature (30 ° C), including the separation between the dispersed phase and the dispersing phase, did not cause sediment, emulsion cracking and gel formation as well as the absence of aroma and color changes after the testing process emulsion stability is done. This is presumably because the resulting emulsion has room temperature storage so that the stability of the skin moisturizing emulsion produced is the same and shows signs of a stable emulsion.

3.6 Specific Gravity Analysis

Specific gravity testing for each sample obtained the following data:

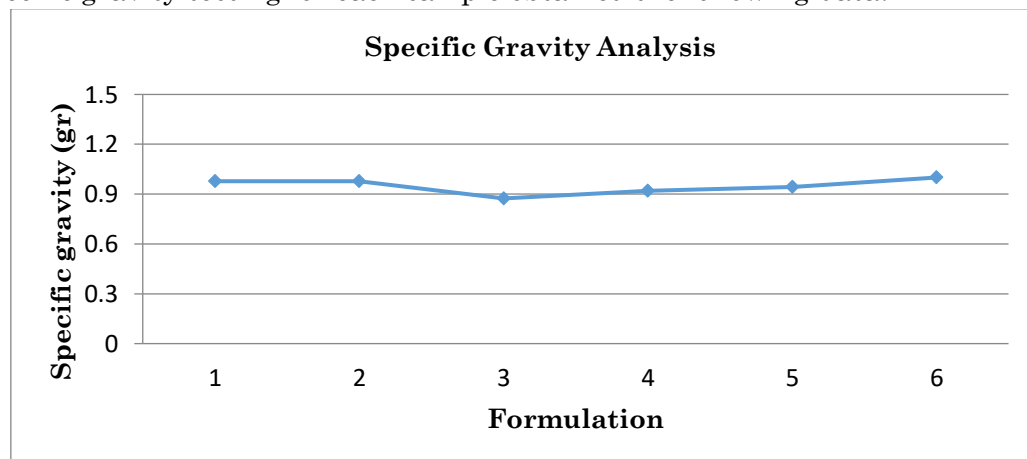


Figure 4. Specific gravity graph

Table 5. Specific gravity test results

No	Formulation	Specific Gravity (gr)
1.	F(A)	0,977
2.	F(B)	0,976
3.	F(C)	0,874
4.	F(D)	0,918
5.	F(E)	0,942
6.	F(F)	1,00

From the results above in the sample F (C) showed that the decrease in specific gravity due to the concentration of aloe which is added is relatively small in the moisturizing preparations so that the concentration also has a small effect on specific gravity. However, the samples F (D) to F (F) and samples F (A) - F (B) experienced an increase in specific gravity. The higher the concentration of grass jelly extract and aloe vera extract the greater the density value. Based on SNI 16-4399-1996 specific gravity has a standard that is 0.95-1.05 g / ml. Although the moisturizing preparations have increased in specific gravity, there are some moisturizing preparations which are not in accordance with SNI, namely F (C), F (D) and F (E) are still below the SNI value.

3.7 Flavanoid Test

Flavonoids are natural compounds with potential as antioxidants that can ward off free radicals. Determination of total flavanoid content, using quersetin



as a comparison solution. Quercetin will react with $AlCl_3$ so that the maximum wavelength shift occurs, it is necessary to determine the maximum wavelength by looking at the absorption spectrum. The maximum wavelength results obtained at 435 nm [9]. As well as the addition of potassium acetate which aims to maintain maximum wavelengths [10]. The following are the absorbance data obtained from the study:

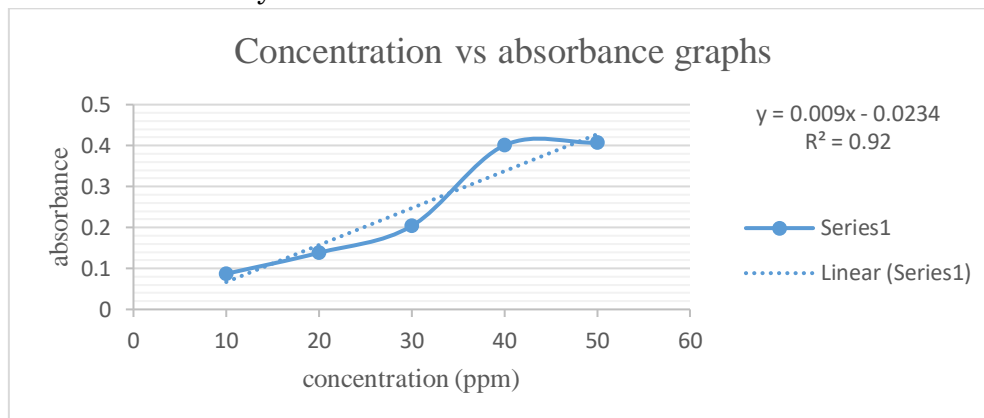


Figure 5. Specific gravity graph

Table 6. Quercetin absorbance results

No	Concentration (ppm)	Absorbance (A°)
1	10	0,087
2	20	0,1383
3	30	0,2036
4	40	0,4006
5	50	0,407

There is known equation that is $y = 0.009x - 0.0234$ and the correlation coefficient (R^2) = 0.92 to determine the strong, moderate, or weak relationship between the variables studied. Then look for absorbance data of green grass jelly samples using spectrophotometry, the absorbance results are entered into the equation $y = 0.009x - 0.0234$ as the value of y. The following is the absorbance value and the result of flavonoid levels:

Table 7. Green grass absorbancy and flavonoid content result data

No.	Concentration (%)	Absorbance (A°)	Flavonoid levels (ppm)
1	2,5	0,32	38,15556
2	5	0,55	63,71111
3	7,5	0,64	73,71111

The results of flavonoid levels were obtained at grass jelly concentrations of 2.5%, 5% and 7.5% obtained levels of flavonoids 38.15556, 63.71111, and 73.71111 mg of quercetin equivalent per gram of extract. Determination of total flavonoid levels was carried out to determine the amount of flavonoid contained in green grass jelly extract.

4. Conclusion

Based on the research results of moisturizers from green grass jelly with the addition of aloe vera on the quality of the moisturizer it can be concluded that:

1. Organoleptic test of all parameters (color, aroma, texture) found that the respondents preferred moisturizer and the best spread was moisturizer F (D) with a concentration of green grass jelly 2.5% and aloe vera 5%.
2. Moisture formulations F (A) to F (F) on the parameters of homogeneity, humidifying pH, and analysis of emulsion stability have met the SNI-16-4399-1996 quality requirements.
3. Moisturizers on specific gravity parameters that meet SNI-16-4399-1996 quality requirements are non-sample F (A) moisturizers, F (B) with green grass jelly concentrations of 2.5% and F (F) with green grass jelly concentrations of 7, 5% and aloe vera 10%
4. The largest flavanoid content in green grass jelly is a concentration of 7.5% with a flavanoid level of 73.11 mg equivalent to quercetin per gram of extract can act as an antioxidant.

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