Natural Moisturizer Based Formulation of Green Leaf Jelly (*Cyclea Barbata Miers*) with Bengkoang Addition (*Pachyrhizus Erosus*)

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ABSTRACT

This study is aimed to know the use of green grass as a healthy alternative in preventing the occurrence of diseases caused by carcinogens and related to skincare. Sun exposure can cause various problems, especially on the skin, such as dry skin. Natural moisturizers can be the solution. Formulations of green grass jelly and bengkoang leaves can be an alternative use of natural moisturizers. One of the ingredients in green grass jelly leaves is the content of polyphenols and flavonoids contained in green grass jelly leaves can function as antioxidants. The research uses a draft of 2-Factor complete randomized design (RAL) type by using 4 treatment variations of green grass jelly formula (2.5%; 5%; 7.5%; and 10%) + Bengkoang (0%, 2.5%, 5%, 7.5%, 10%) and treatment of formulations without green grass. The results of the study are moisturizer based on green grass with the addition of bengkoang that has been made to meet the pH standard. Based on SNI-16-4399-1996, all samples that have been made meet the existing standards and the formulation samples that comply with the standard are F (D), ie green grass jelly concentration of 2.5% and Bengkong 5%.

1. Introduction

Moisturizers are the most common skin care products that are often used to reduce dry skin conditions by softening the skin, filling skin pores, and minimizing friction that is about the skin[1].

Moisturizing preparations are used to prevent the evaporation of water on the skin and cause the skin to become moist and soft by forming a thin layer of fat on the surface of the skin. Everyone has different skin types. This is due to several factors both from outside and in the body, for example: dry air, scorching sunlight, age, race, and skin diseases can often cause the skin to become more dry due to the loss of water by evaporation that we do not feel, so that the surface of the skin becomes more scaly and the lines on the wrinkles will look

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clearer and can cause itching The body has natural moisture power, where the skin secretes natural Lubrication (sebum) to keep the skin surface soft, tender and protected [2]. Flavanoid itself is a compound that has pharmacological activity as an anti-inflammatory. The role of Flavanoid as an anti-inflammatory is to decrease the number of leukocytes and reduce the complement activity thereby lowering leukocyte adhesions to the endothelial and resulting in decreased inflammatory response. This study is aimed to know the use of green grass as a health alternative in preventing the occurrence of diseases caused bycarcinogens and related to skin care[3]

Bengkoang contains vitamin C, flavonoids and saponins which are natural sunscreen to prevent the skin from being damaged by free radicals and phenolic substances in Bengkoang quite effectively inhibit the process of melanin formation, so that pigmentation due to hormones, sunlight and acne scars can be prevented and reduced. Bengkuang starch is a starch from the tuber bengkoang obtained from the Deposition of Bengkoang [4].

2. Methods

2.1 Research Methodology

The research uses a draft of 2-Factor complete randomized design (RAL) type by using 4 treatment variations of green grass jelly formula (2.5%; 5%; 7.5%; and 10%) + Bengkoang (0%, 2.5%, 5%, 7.5%, 10%) and treatment of formulations without green grass.

2.2 Variable Research

2.2.1. Independent Variable

A free variable is a variable that is thought to have an influence on the bound variables studied. In this study, free variables used are differences in the concentration of the addition of green grass extract and bengkoang leaves with a variation of the following values:

A. The addition of green grass: 0%, 2.5%, 5%, 7.5%, and 10%
B. Bengkoang Enhancer: 0%, 2.5%, 5%, 7.5%, and 10%

2.2.2. Fixed Variables

A fixed variable is a variable whose value is constant for each sample. In this study, the fixed variables used were the temperature. The temperatures used in this process are as follows:

A. Extraction Temperature Cincau: 50^{o}C
B. Bengkoang extraction temperature: 78^{o}C
C. Moisturizing manufacture temperature: 35^{o}C, 40^{o}C, and 70^{o}C

2.2.3. Variables Bound

A bound variable is a parameter that will be observed when all test sets have been enforced. In this study, the parameters to be observed are the level of effectiveness in each moisturizing concentration

2.3. Procedure Research

2.3.1 Green Grass leaf extraction

The making of the powder is started by washing the fresh grass with cold water, then dried with oven 50oC for 18 hours or drying from 08.00 to 15.00 for three days (total 21 hours). The method of extraction of pectin carried out without heating treatment, green grass jelly powder as much as 25 grams plus 600 ml aquadest in a glass cupker 1000 ml, diaduk-aduk to flat by using a magnetic stirrer until the temperature of 90oc then done filtering by using a filter cloth, so obtained filtrate.

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Then filtrate grass jelly is dried in the oven so that it is desicator to obtain constant weight 2.3.2 Bengkoang Extraction

The potatoes are washed clean and cut into small pieces. Small cut bengkoang soaked in ethanol 96% in maceration vessel protected from sunlight, allowed for 5 days. After that, the Bengkoang blend until smooth and then filtered with a filter cloth to get liquid from the Bengkoang. Once obtained by Bengkoang fluid, the next step is to remove ethanol using the distillation method. To eliminate ethanol it takes about 6 hours with a temperature of 78^{o}C

2.3.4. Procedure of Moisturizer

The materials used are 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 the aquadest weighed as much as 169 grams by using a glass beker 250 ml (water phase or 1 preparation), the stearic acid weighed as much as 2.4 gram, glyceryl monostearic PEG-100 stearate weighed as much as 4.8 grams, the alcohol cetyl weighed as much as 0.8 grams , using the porcelain cup 100 ml (oil phase or 2 preparations). Both preparations are heated to a temperature of 70-75 °c while stirring periodically, then the oil phase (dosage 2) is inserted into the water phase (1), stirring until homogeneous. Preparations that have been homogeneous mixed and stirred with the stirrer to 40 ° C (dosage 3). Preservatives (Nipagin) as much as 0.5 grams and 2 drops of perfume weighed and inserted into the dosage of 3 at 35 °c Then, the stirring is returned for approximately one minute. Pectin samples weighed in concentration, then homogenized with a slight preparation to homogeneous, then mixed into the overall dosage.

2.4. Moisturizing Testing

2.4.1. Organoleptical Test

Organoleptical observation can be seen by the separation of phases or rupture of cream, aroma and discoloration. In our moisturizing test, there are three aspects of organoleptical test, namely Tektur, color, and aroma [2]

2.4.2. Test homogeneity

The testing of homogeneity is done by placing the dosage between 2 glass objects The preparations tested were seen whether to gather at one point or not [2]

2.4.2. pH Measurements

The cream is inserted into the container, then the pH is measured using the pH strip indicator for the acidic area. The pH strip indicator is inserted into the cream, then the result can be seen by matching the color of the strip with the color of the reference printed on the indicator packaging pH strips[2].

2.4.3. Test coverage

Cream as much as 0.5 grams over the watch glass coated with graph paper. It was then loaded with the same watch glass for 60 seconds, and was given each load weighing 50 g, 100 g, 150 g and 200 g and left for 60 seconds. The spread diameter is calculated by measuring the average diameter of multiple edges using graph paper [2]

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2.4.4. Emulsion Stability Test

Measurement of samples of emulsion material inserted in the container and weighed weighing. The containers and materials were inserted in the oven with a temperature of 45 °c for 1 hour and then inserted into the coolant at a temperature below 0 °c for 1 hour and returned again to the oven at a temperature of 45 °c for 1 hour. Observations were made against the possibility of separation of water from emulsions. In case of separation, the emulsion is said to be unstable and its stability level is calculated based on the integral phase percentage of the overall emulsion.

2.4.5. Test the Weight Type 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:

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

2.4.5. Test Flavonoids

The standard solution used is kuersetin with a concentration of 10 ppm, 20 ppm, 30 ppm, 40 ppm, 50 ppm. Determination of flavonoids levels in green grass extract is done by dissolving 2.5%, 5%, 7.5% of the extract with the aquadest volume chopped up to 10.0 mL and homogenized. Next it is 1.0 mL of the solution into the Erlenmayer 25 mL for 3 replication. Each solution was added with 0.1 mL of potassium acetate solution, 0.1 mL Aluminium chloride solution, 10 ML of aquadest whipped until homogeneous. Pre-made solution is added to the room temperature for 30 minutes. Absorption is measured at a wavelength of 435 nm. Total flavonoids levels are calculated from the default curve of Kuersetin. Total flavonoids content is expressed as the number of MG equivalently kuersetin per gram of extract.

3. Results and Discussion

3.1. Organoleptical Test

Table 5. Organoleptic observation Result (color)

No.	Variation treatment	Organoleptic (color)			
		white	Light Green	Dark green	Concentrated Green
1.	F(A)	20	-	-	-
2.	F(B)	-	2	17	1
3.	F(C)	20	-	-	-
4.	F(D)	-	4	16	-
5.	F(E)	-	-	5	13
6.	F(F)	-	1	1	20

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Table 6. Organoleptic observation Result (texture)

No.	Variation treatment	Organoleptic (texture)			
		Very dilute	Dilute	Thick	Very thick
1.	F(A)	2	3	15	-
2.	F(B)	-	2	13	5
3.	F(C)	3	5	19	3
4.	F(D)	-	4	14	1
5.	F(E)	1	4	11	4
6.	F(F)	2	3	5	9

Table 7. Organoleptic (Aroma) Observation Results

No.	Variation treatment	Organoleptik (Aroma)			
		Perfume	Perfume and Bengkoang	Perfumes and Cincau leaves	Perfumes and specialties are both
1.	F(A)	20	1	-	-
2.	F(B)	1	-	20	-
3.	F(C)	6	14	-	-
4.	F(D)	1	3	11	7
5.	F(E)	-	3	13	6
6.	F(F)	-	-	15	5

Sample F (B) can be concluded that with a moisturizer with grass jelly 2.5% and Bengkoang 0% obtained has a scent of perfume and grass grass jelly, with a thick texture and dark green color. Sample F (C) can be concluded that with a moisturizer with grass jelly 0% and Bengkoang 2.5% obtained has a scent of perfume and bengkoang, with a thick and white texture. Sample F (D) can be concluded that with a moisturizer with grass jelly 2.5% and Bengkoang 5% obtained has a distinctive aroma perfume and green grass, with a thick texture and dark green color. Sample F (E) can be concluded that with a moisturizer with grass jelly 5% and Bengkoang 7.5% obtained has a distinctive aroma of perfume leaves and green grass leaves, with a thick texture and a thick green color. Sample F (F) can be concluded that with a moisturizer with grass jelly 7.5% and bengkoang10% obtained has a distinctive aroma of perfume and green grass, with a very thick texture and a thick green color.

3.2. Test homogeneity

The preparation of a Bengkuang starch moisturiser meets the requirement of moisturizing homogenization, which is a homogeneous produced and no coarse grain. The requirements of moisturizing homogenities are intended to allow the active ingredient in an evenly distributed gel. Also so that the gel does not irritate when applied in the skin

From the experiments carried out can be seen that moisturizer based on green grass jelly and the addition of Bengkoang has homogeneous properties because the active ingredient in the moisturizing preparations has been spread evenly.

3.3. Test pH Measurement

At Indonesian national standard (SNI-16-4399-1996) Measurement of pH Gel using pH meter tool, topical dosage pH range 4-8.

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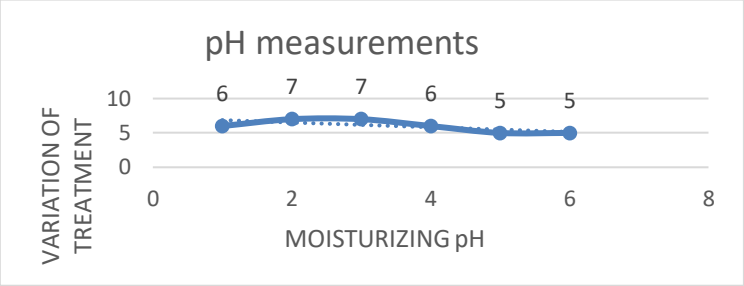

Fig. 4. Natural Moisturiser (pH) degree measurement

The lower the pH due to the increasing number of green bengkoang and grass jelly compositions which are added to the preparation of the moisturizer, resulting in lower pH levels.

3.4. Coverage Test

Table 10. Scatter Power Test Results

No.	Variasi Perlakuan	Diameter(mm)				
		0	50	100	150	200
1.	F(A)	49	52	52,5	53	54
2.	F(B)	47,5	53,5	58,5	61	63
3.	F(C)	56	58	59	60	61
4.	F(D)	52	59	63	67	70
5.	F(E)	40	46,5	48	48,5	48,5
6.	F(F)	46	52,5	56,5	70	72

. When the viscosity is low, the spread of cream will be greater because the cream will be more easily flowing and spreading on the surface of the skin. In the table can be seen that the sample F (C) and F (D) have a low viscosity so that it has a wide coverage. As for the other samples, it has a high viscosity so that the power is also low.

3.5. Emulsion stability Test

. Table 11. Emulsion stability test Result

No	Variations of treatment	Stability
1.	F(A)	30,2%
2.	F(B)	36,24%
3.	F(C)	44,16%
4.	F(D)	48,08%
5.	F(E)	51,72%
6.	F(F)	52,2%

Judging from the table above the stability level of the sample will be more stable influenced by each sample composition. Increasing the concentration of moisturizing preparations, making the moisturizing dosage more stable.

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3.6. Type Weight Test

The type weight is a comparison of the substance weight to water with the same volume weighed in the air at the same temperature. In the test the type of weight in each sample obtained the following data:

Table 12. Weight test Result type

No	Variations	Weight type
1.	F(A)	0,977
2.	F(B)	0,976
3.	F(C)	0,879
4.	F(D)	0,929
5.	F(E)	0,972
6.	F(F)	0,975

Skin moisturizers that comply with SNI 16-4399-1996 standard that is 0.95-1.05 g/ml. In the formulation of F (C) to F (F) There is an increase in research (Manikam et al, 2017) the higher the concentration of Bengkoang extract, the greater the value of density. But the formulation of F (C) is 2.5% Bengkoang and 0% green grass jelly is not compliant with SNI because of the possibility of higher concentrations of bengkoang.

3.7. Uji Flavonoid

Determine the total level of flavonoids from grass jelly green by comparing the standard solution to the comparison of Kuersetin. In the measurement of total flavonoids compounds, sample solution added AlCl3 that can form complex, so that there is a shifting wavelength in the direction visible (visible) which is characterized by a solution resulting in a more yellow color. And the addition of potassium acetate aimed at maintaining the wavelength of the visible area. Here are the data obtained from the research:

Table 13. Kuersetin Absorbansi Result Data

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

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From the data above is data from the solution Kuersetin for as a comparison solution, and obtained graphs and equations to calculate the absorption as follows:

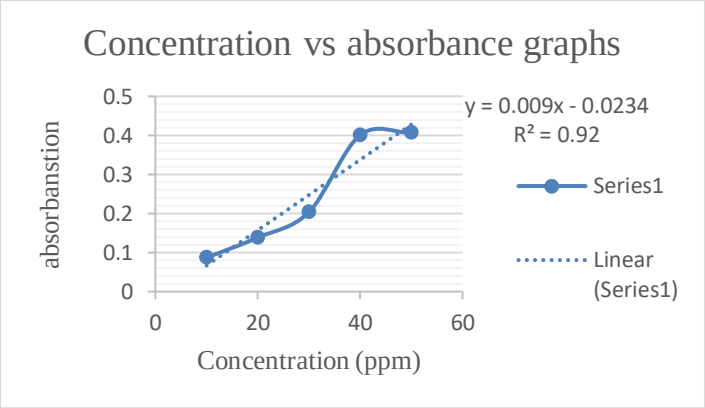

Figure 6. Absorbansi Kuersetin Result Chart

From the above graph can be known equation, namely y = 0, 009x – 0.0234 and Coefficiencies correlation (R2) = 0.92 to know the strong, moderate, or weak relationship between the variables studied. Then look for the data absorbance from a sample of grass jelly green and obtained the following data:

Table 14. Green Cincau absorbancy Result Data

No	Concentration(%)	Absorbantion (A°)
1	2,5	0,32
2	5	0,55
2	7,5	0,64

Once the data is obtained from grass jelly green, it is inserted into the equation y = 0, 009x – 0.0234 as the Y value and obtained flavonoids levels as follows:

Table 15. Data results of Flavanoid levels

No	Absorbantion (A°)	Flavonoids levels (ppm)
1	0,32	38,15556
2	0,55	63,71111
3	0,64	73,71111

From the data it is obtained at a concentration of grass jelly 2.5%, 5% and 7.5% obtained flavonoids levels of 38.15556, 63.71111, and 73.71111 ppm.

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4. Conclusion

Based on the research results of the creation of natural moisturizer based on green grass with the addition of Bengkoang can be concluded that:

1. Moisturizer based on green grass with the addition of Bengkoang that has been made to meet the PH standard according to the (SNI-16-4399-1996) in the range of 4.5-8

2. More addition of green grass leaf extract and bengkoang that added coverage will be lower
3. In the type of analysis, the sample F (C) does not meet (SNI-16-4399-1996) due to low bengkoang density.

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