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Formulation and Physical Stability Test of Essence Sheet Mask Preparation from Kokang Leaf Extract (*Lapisanthes amoena*)

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ABSTRACT

Kokang leaf ethanol extract contains secondary metabolite compounds such as phenolics, flavonoids, tannins, steroids, and saponins that have antioxidant and antibacterial effects and play a role in wound healing. Seeing the potential in kokang leaves (*Lepisanthes Amoena*) until now the use of kokang leaves is still very lacking, therefore the need for innovation in the use of leaves, one of which is by developing a formulation of essence sheet mask preparations from kokang leaf extract (*Lepisanthes Amoena*). Formulations in the form of essence sheet masks are currently the latest developments in cosmetic preparations. The purpose of this study was to formulate and test the physical stability of the essence sheet mask preparation from the extract of kokang leaves. The preparation is made as many as 3 formulas, the leaf extract used is 0.1% (F1), 0.3% (F2), and 0.5% (F3). The evaluation carried out includes organoleptic tests (color, aroma, and texture), homogeneity tests, pH tests, room temperature stability tests, viscosity tests, and hedonic tests (favorability and irritation). The results showed that the preparation of the essence sheet mask was a thick solution with a characteristic green and homogeneous odor. The preparation of the essence sheet mask is stable at room temperature without any change. The pH value of the preparation essence sheet mask 5 – 6. Viscosity with a viscosity of 2,217 cP. A hedonic test of 12 panelists showed that the average favorability of all categories was superior to F2 (0.3%) and there was no irritation to the entire formula.

Keywords : Formulation, Stability, Essence, Mask

ABSTRAK

Ekstrak etanol daun kokang mengandung senyawa metabolit sekunder seperti fenolat, flavonoid, tanin, steroid, dan saponin yang memiliki efek antioksidan dan antibakteri serta berperan dalam penyembuhan luka. Melihat potensi yang ada pada daun kokang (*Lepisanthes Amoena*) hingga saat ini pemanfaatan daun kokang masih sangat kurang, oleh karena itu perlu adanya inovasi dalam pemanfaatan daunnya, salah satunya dengan mengembangkan formulasi sediaan *essence sheet mask* dari ekstrak daun kokang. (Lepisanthes amoena). Formulasi berupa *essence sheet mask* saat ini merupakan perkembangan terbaru dalam sediaan kosmetik. Tujuan dari penelitian ini adalah untuk memformulasi dan menguji stabilitas fisik sediaan *essence sheet mask* dari ekstrak daun kokang. Sediaan dibuat sebanyak 3 formula, ekstrak daun yang digunakan adalah 0,1% (F1), 0,3% (F2), dan 0,5% (F3). Evaluasi yang dilakukan meliputi uji organoleptik (warna, aroma, dan tekstur), uji homogenitas, uji pH, uji stabilitas suhu ruang, uji viskositas, dan uji hedonik (kesukaan dan iritasi). Hasil penelitian menunjukkan bahwa sediaan *essence sheet mask* berupa larutan kental dengan ciri khas berwarna hijau dan bau yang homogen. Sediaan *essence sheet mask* stabil pada suhu kamar tanpa adanya perubahan. Nilai pH sediaan *essence sheet mask* 5 – 6. Viskositas dengan viskositas 2,217 cP. Uji hedonik terhadap 12 panelis menunjukkan bahwa rata-rata kesukaan semua kategori lebih suka dengan formula F2 (0,3%) dan tidak terdapat iritasi pada seluruh formula.

Kata Kunci: Formulasi, Stabilitas, Essence, Masker

INTRODUCTION

Medicinal raw materials come from different biological resources and are spread in various regions, including Kalimantan. The specific drugs that are most often used are plants that contain various properties for treating diseases. Efficacious elements, especially those found in plants, require extensive research because they often have substances whose activity is unknown before being used to make products, especially in the food, pharmaceutical, and cosmetic industries. One of the plants that has benefits for beauty care is the leaves of the (Lepisanthes amoena). Empirically, dayak people use kokang leaves as a cold powder (pupur) which is used to treat skin and scars (Hidayah et al., 2013). In addition, dayak people use kokang leaves to treat skin problems such as, overcoming dark blemishes on the face, smallpox scars and also acne scars. In addition, according to research on the potential of kokang leaf extract (*Lepisanthes amoena (Haask) Leenh*) as a wound medicine, kokang leaves have good activity and impact to treat skin problems. In research (Kuspradini et al., 2012) at a dose of 30 mg/ml, it has been found that leaves can stop the growth of Propionibacterium acne bacteria. (Hidayah et al., 2013) mentioned that kokang leaf ethanol extract contains secondary metabolite compounds such as phenolics, flavonoids, tannins, steroids, and saponins which have antioxidant and antibacterial effects and play a role in wound healing. Seeing the potential in kokang leaves (*Lepisanthes Amoena*) until now the use of kokang leaves is still very lacking, therefore the need for innovation in the use of leaves, one of which is by developing a formulation of essence sheet mask preparations from kokang leaf extract (*Lepisanthes Amoena*). Formulations in the form of essence sheet masks are currently the latest developments in cosmetic preparations. The Occlusive Dressing Treatment (ODT) mechanism used by sheet masks has superior absorption and penetration characteristics, as well as effective and hygienic packaging. The sheet mask will work by providing good moisture and is concentrated on the skin. Sheet mask can be filled with essence according to skin needs (Mardhiani et al., 2018). In application, this preparation has the advantage of good absorption and penetration for the skin, so that its application is very easy to use without having to rinse. In addition to the innovative advantages of the kokang leaf extract essence sheet mask preparation (*Lepisanthes Amoena*), it is also supported by the lack of literature and information that discusses the use of kokang leaves as cosmetic preparations. Therefore, this research is very important to be carried out for innovation in the development of essence preparations from kokang leaf extract (*Lepisanthes Amoena*) which hopefully can become a natural-based skincare by utilizing typical East Kalimantan plants.

METHODS

Materials

Porcelain mortar, pestle, porcelain cups, Petri dishes, glass cups, stirring rods, spatulas, plastic pots, pipettes, water baths, analytical scales, pH indicators, Rotary Evaporators, maceration bottles, glass objects, homogenizers, and Brookfield viscometers. The main ingredient used is dried leaves. Supporting materials glycerin, PEG-40, butylene glycol, methylparaben, sheet mask, foil bag, xanthan gum.

The Course of Research

Extraction preparation

Extraction is carried out by maceration. First, 500 g of dried kokan leaves containing 96% ethanol are added. The maceration bottle is sealed and kept away from sunlight until it is lifted. Soak until dried leaf is extracted and strain until the solution is clear. Then it is filtered, separated the precipitate from the filtrate, and evaporated the extract inside the rotary evaporator (Senja, 2014).

Formulation and manufacturing procedure

Standard formula used (Surjanto. et al., 2016)

R/	Vitamin B3	1-5%
	Provitamin B5	1-5%
	PEG-40 Hydrogen Castor Oil	0,1%
	Butylene glycol	5%
	Glycerin	5%
	Sodium Polyacrylate	0,2%
	Metyl paraben	0,2%
	Etanol	3,0%
	Parfum	1 drop
	Distilled water ad	100%

Modified Formula

Developed xantan gum little by little with the addition of a portion of aquadest in mortar (Mixture I). Dissolved nipagin in hot water (Mixture II). Mixture II is mixed into Mixture I slowly in a lump (Mixture III). In an evaporative dish, PEG-40 Hydrogenated Castor Oil, glycerin,

and propylene glycol are combined and homogenized (Mixture IV). Mixture IV is mixed into Mixture III and then homogenized (Mixture V). The leaf extract is dissolved by the addition of a portion of aquadest according to predetermined variations into the essence base of the mask sheet (Mixture VI). Mixture VI added 96% ethanol then homogenized.

Table 1. Dosage Formulation of Kokang Leaf Extract Essence Sheet Mask (*Lapisanthes amoena*)

No.	Materials	Formulation			
		Blanks	I	II	III
1	Kokang leaf extract	-	0,1%	0,3%	0,5%
2	PEG-40 Hydrogen Castor Oil	0,1%	0,1%	0,1%	0,1%
3	Butylene glycol	5%	5%	5%	5%
4	Glycerin	5%	5%	5%	5%
5	Xantan gum	0,2%	0,2%	0,2%	0,2%
6	Metyl paraben	0,2%	0,2%	0,2%	0,2%
7	Etanol 96%	3,0%	3,0%	3,0%	3,0%
8	Aquades	Ad 100	Ad 100	Ad 100	Ad 100

Physical Stability Test of the Preparation

Organoleptic test

To perform organoleptic testing, check for separation, unpleasant odor, and discoloration (Elya. et al., 2013).

Homogeneity test

The composition of the preparation should be homogeneous and free of coarse particles when placed in the amount of 0.1 grams on a sheet of glass or other suitable transparent material. (Muflihunna et al., 2019).

Stability test

According to (Ansel, 2008) stability observations were made at room temperature storage. Each prepared formulation is taken and placed in a plastic pot and stored, inspected weekly for 4 weeks of storage. Physical testing of masks includes monitoring changes in aroma, color and shape (consistency) for four weeks at room temperature 25°C (Ditjen POM RI., 1985).

pH Test

pH is checked by pH measurement and displayed color compared to color standards calibrated accordingly in the appropriate pH (Nisak, 2016).

Viscosity test

The sample is placed in a Brookfield Viscometer to test the viscosity measuring the torque required by a spindle immersed in fluid to rotate. Results will be indicated by pointers and displays in digital (Septiani et al., 2012).

Hedonic test

Hedonic test is a product acceptance test related to respondents' assessment of preparations (Laksana et al., 2017). The parameters of the hedonic test include organoleptic (color), smell, shape and general assessment such as humidity. The moisturizing effect on this test has a status such as hydrated skin is not dry and unlined. The hedonic test was carried out using 12 panelists.

RESULT AND DISCUSSION

Kokang Leaf Extraction Results (*Lapisanthes amoena*)

The viscous extract produced during the maceration process of deep green color contains 500 grams of dried leaf with a viscous extract mass of 79.58 grams and an amendment yield of 15.9%. The amendment is the percentage of the main raw material (dried leaf) that becomes the final product (extract) that indicates the quality of the extract and indicates the maximum amount of solvent used for grating.

Table 2. Kokang Leaf Extraction Results (*Lapisanthes amoena*)

Simplician Powder Weights	Weight of Viscous Extract	Rendemen Value
500 gram	79,58	15,9%

Test Results of Physical Properties of Preparations

Organoleptic test

The organoleptic examination stability test showed that the color of the kokang leaf extract essence sheet mask is green to solid green due to the difference in extract concentration. The intensity of the resulting color increases with the degree of its intensity and the shape of a viscous liquid with a characteristic smell of kokang.

Table 3. Organoleptic Test Results

No.	Formulation	Four weeks on average		
		Color	Smell	Shape
1	F0	Colorless	Odorless	Viscous liquid
2	F1	Green	Odorless	Viscous liquid
3	F2	Green	Odorless	Viscous liquid
4	F3	Green	Odorless	Viscous liquid

Information: F0 (Blanks); F1 (Extract Concentration 0,2%); F2 (Extract Concentration 0,3%); F3 (Extract Concentration 0,5%)

Homogeneity rest results

There were no coarse particles in the formulation indicated by a leaf essence concentration of 0.5% (F3). This implies that the extract base and essence are uniformly dispersed in formulas 1, 2, and 3, which have a homogeneous arrangement.

Table 4. Homogeneity Test Results

No.	Formulation	Four weeks on average			
		I	II	III	IV
1	F0	Homogeneous	Homogeneous	Homogeneous	Homogeneous
2	F1	Homogeneous	Homogeneous	Homogeneous	Homogeneous
3	F2	Homogeneous	Homogeneous	Homogeneous	Homogeneous
4	F3	Homogeneous	Homogeneous	Homogeneous	Homogeneous

Information: F0 (Blanks); F1 (Extract Concentration 0,2%); F2 (Extract Concentration 0,3%); F3 (Extract Concentration 0,5%)

Physical stability test results

The results of the physical stability test showed that the kokang leaf essence sheet mask preparation remained stable at room temperature storage for 4 weeks the results of the organoleptic examination stability test showed that the color of the kokang leaf extract essence sheet mask was green to solid green due to differences in extract concentration. The intensity of the resulting color increases with the degree of its intensity.

Table 5. Physical Stability Test Results

No.	Formulation	Four weeks on average											
		I			II			III			IV		
		A	B	C	A	B	C	A	B	C	A	B	C
1	F0	-	-	-	-	-	-	-	-	-	-	-	-
2	F1	-	-	-	-	-	-	-	-	-	-	-	-
3	F2	-	-	-	-	-	-	-	-	-	-	-	-
4	F3	-	-	-	-	-	-	-	-	-	-	-	-

Information: F0 (Blanks); F1 (Extract Concentration 0,2%); F2 (Extract Concentration 0,3%); F3 (Extract Concentration 0,5%); A (odor Changes), B (Discoloration); C (Deformation); + (Changes); - (No Change)

The shape of the viscous liquid with the characteristic smell of has no change in this physical stability test.

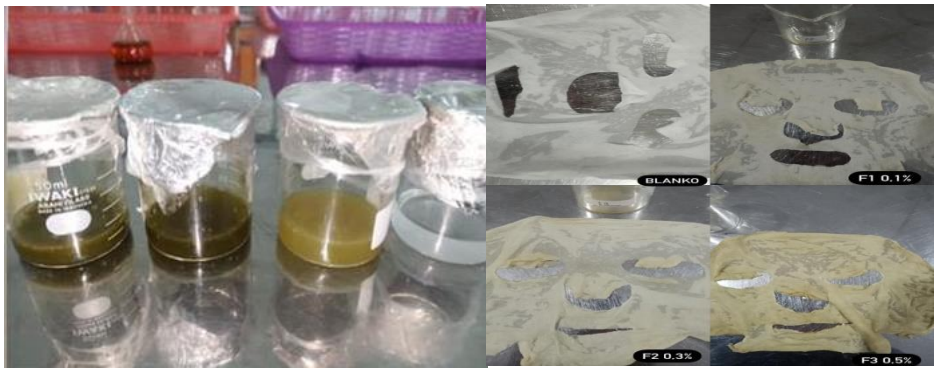

Figure 1. Kokang Leaf Essence Preparation

pH test results

A pH test of the leaf essence sheet mask with an indicator for pH was used in this investigation. For four weeks, the preparation is tested once a week.

Table 6. pH Test Results

No.	Formulation	Four weeks on average			
		I	II	III	IV
1	F0	5	5	5	5
2	F1	5	5	5	5
3	F2	5	5	5	5
4	F3	6	6	6	6

Information: F0 (Blanks); F1 (Extract Concentration 0,2%); F2 (Extract Concentration 0,3%); F3 (Extract Concentration 0,5%)

The purpose of the pH test is to ascertain the amount of acidity of the preparation that caused the irritation of the skin. The danger of irritation and pain on the skin of the face increases if the pH does not match the pH of the skin. Based on Table 6 pH test results show safe results for sensitive skin for all formulas with susceptible pH 5 – 6 (Ambarwati et al., 2022).

Viscosity test results

The sample is placed in a brookfield viscometer to test for viscosity. measures the torque required by a spindle immersed in fluid to rotate. Results will be indicated by pointers and displays in digital. In this study using ViscoQC 100 obtained a result of 22.17 Poise, when converted into a centipoise of 2,217 cPs. A good essence preparation should have a viscosity with a viscosity susceptible between 2000 – 5000cs (Wulansari et al., 2023).

Hedonic test results

Hedonic test aims to find out the most preferred formulation of sheet mask preparations by panelists. In Table 7, you can see the panelists' average assessment of humidity, texture, aroma, attractiveness and feasibility of sheet mask preparations. The score range used in this test is between values of 1 (one) to 4 (four). A value of 1 represents a category of very, very dislike, while a value of 4 represents a very, very like-for-like category. From Table 7 can be seen in the parameters of humidity, texture, attractiveness, and feasibility of F2 obtained the highest score (3.75 and 3.50 respectively) which means the product is favored by panelists, while on the aroma parameter group F3 (3.50). Result Friedman test statistics showed no significant difference (0.750>0.05) between treatment group. An image of the average distribution of favorability test ratings can be seen in Figure 2 between treatment group.

Table 7. Result Hedonic Test

No.	Parameters	Sample Hedonic Test Mean Value		
		F1	F2	F3
1	Moisture	3.50±0.577[a]	3.75±0.500[a]	3.00±0.000[a]
2	texture	2.75±0.500[a]	3.75±0.500[b]	3.00±0.000[a]
3	Attractiveness	3.25±0.500[a]	3.50±0.577[a]	3.00±0.000[a]
4	smell	3.25±0.500[a]	3.25±0.500[a]	3.50±0.577[a]
5	Feasibility	3.25±0.500[a]	3.50±0.577[a]	3.25±0.500[a]

Information : A,b= similar letter notation means there is no real difference in the test level Manny- Whitney has a value of 5%.

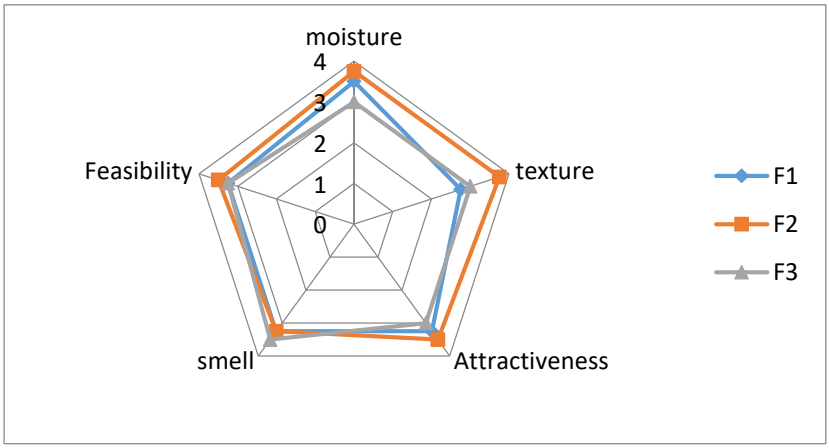

Figure 2. Average Distribution of Kokang Leaf Sheet mask Favorability Test Score Value
Information: F1 (Extract Concentration 0,2%); F2 (Extract Concentration 0,3%); F3 (Extract Concentration 0,5%)

CONCLUSION

Kokang leaf extract (Lepisanthes amoena) can be formulated in the preparation of essence sheet mask. The physical stability test result of homogeneous essence preparation, stable in room temperature storage, has a pH of 5-6, and has a good viscosity of 2,217 cPs. panelists fondness for the parameters of humidity, texture, attractiveness, and feasibility of F2 obtained the highest score (3.75 and 3.50 respectively) while on the aroma parameter group F3 (3.50)

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