Indonesian Journal of Pharmaceutical Science and Technology
Journal Homepage : http://jurnal.unpad.ac.id/ijpst/
Research Article

Formulation and Physical Stability Test Peel Off Mask from Kokang Leaf Extract (*Lepisanthes amoena* (Haask) Leenh) as an Antioxidant

Jati Pratiwi[1], Ika A. Mentari[1]
[1]Department of Pharmacy, Faculty of Pharmacy, Muhammadiyah University, East Kalimantan, Samarinda, Indonesia

Submitted 07 June 2023; Revised 07 June 2023; Accepted 16 June 2023; Published 31 July 2023
*Corresponding author: Iam856@umkt.ac.id

Abstract
Antioxidants are needed as an antidote to free radicals that can inhibit or neutralize the bad effects of free radicals and are formulated in the form of peel-off masks to remove dirt and dead skin cells. Kokang leaves (*Lepisanthes amoena* (Haask) Leenh) is a plant rich in antioxidants originating from East Kalimantan which contains alkaloids, flavonoids, saponins, and tannins. This study aims to determine the characteristics and physical stability as well as determine the antioxidant activity of peel off mask preparations of kokang leaf extract (*Lepisanthes amoena* (Haask) Leenh), experimentally using the DPPH method with a UV-Vis spectrophotometer. The results were that kokang leaf extract (*Lepisanthes amoena* (Haask) Leenh) peel off mask preparations 1 (0%), 2 (1%), 3 (2.5%) and 4 (5%) had physical characteristics and stability good tests (meet standard requirements) including organoleptic tests, pH, homogeneity, spreadability, adhesion, drying time, and viscosity. Testing the antioxidant activity using a concentration of 5%. Kokang leaf extract contains strong antioxidant activity with a value of 59,707 ppm, while kokang leaf extract peel off mask contains medium category antioxidant activity with an IC_{50} value of 102,945 ppm. The conclusion of the four formulations is the best and stable with has an IC_{50} value, namely formula 4 (5%) in the moderate category (102,945 ppm).
Keywords: kokang leaf, antioxidant, peel off mask, dpph, stability.

Formulasi dan Uji Stabilitas Fisik Sediaan *Peel Off Mask* dari Ekstrak Daun Kokang (*Lepisanthes amoena* (Haask) Leenh) sebagai Antioksidan

Abstrak
Antioksidan sebagai penangkal radikal bebas yang dapat menghambat atau menetralkan efek buruk dari radikal bebas dan diformulasikan dalam bentuk masker *peel off* untuk mengangkat kotoran dan sel kulit mati. Daun kokang (*Lepisanthes amoena* (Haask) Leenh) merupakan tanaman yang kaya antioksidan yang berasal dari Kalimantan Timur yang mengandung senyawa alkaloid, flavonoid, saponin, dan tanin. Penelitian ini bertujuan untuk mengetahui karakteristik dan stabilitas fisik serta mengetahui aktivitas antioksidan dari sediaan *peel off mask* ekstrak daun kokang (*Lepisanthes amoena* (Haask) Leenh), secara eksperimental menggunakan metode DPPH dengan alat Spektrofotometer UV-Vis. Hasil yang diperoleh adalah sediaan *peel off mask* ekstrak daun kokang (*Lepisanthes amoena* (Haask) Leenh) 1 (0%), 2 (1%), 3 (2,5) dan 4 (5%) memiliki karakteristik dan stabilitas fisik yang baik (memenuhi syarat standar) meliputi dari uji organoleptis, pH, homogenitas, daya sebar, daya lekat, waktu mengering, dan viskositas. Pengujian aktivitas antioksidan menggunakan konsentrasi 5%. Ekstrak daun kokang mengandung aktivitas antioksidan kategori kuat dengan nilai sebesar 59.707 ppm, sedangkan sediaan *peel off mask* ekstrak daun kokang mengandung aktivitas antioksidan kategori sedang dengan nilai IC_{50} sebesar 102.945 ppm. Kesimpulan dari keempat formula tersebut sediaan yang paling baik dan stabil dengan memiliki nilai IC_{50} yaitu formula IV dengan kategori sedang (102,945 ppm).
Kata Kunci: daun kokang, antioksidan, *peel off mask*, dpph, stabilitas.

1. Introduction

As a tropical country, Indonesia enjoys sunshine all year round. The benefits of sunlight include increasing the production of vitamin D in the body and improving blood flow. On the other hand, too long in the sun can cause skin problems such as wrinkles and dryness. Antioxidants are useful for counteracting the damaging effects of the sun, as they slow down the aging process and neutralize free radicals[1] .

Most of the free radicals in the universe come from the sun's UV rays. Humans are vulnerable to the harmful effects of radiation exposure. Ultraviolet (UV) radiation from sunlight is classified into three bands, each with slightly different effects on human skin: UVA (320–400 nm), UVB (290–320 nm), and UVC (200–290 nm)[2].

The skin is the most superficial layer of the body, making it vulnerable to UV rays. According to Alatas (2004), skin cell membranes are vulnerable to damage from ultraviolet (UV) rays, which are also known as the sunburn spectrum. The skin is burned and reddened, cells are damaged, and the skin's ability to repair itself is impaired. The process of melanogenesis, which occurs in response to skin exposure to free radicals or sunlight (ultra violet rays), is the skin's main defense mechanism against the harmful effects of UV radiation[3].

Antioxidants are chemicals that can delay, stop, or stop lipid oxidation. Antioxidants in this context are compounds that slow down or stop free radical processes associated with lipid oxidation[4]. Natural antioxidants are those formed through the extraction of naturally occurring compounds with free radical scavenging properties, while synthetic antioxidants are those derived from chemical synthesis[5]. Antioxidants are usually among the first molecules to react with free radicals, because they are easily oxidized or function as strong reducing agents[6].

Kokang leaf plants are rich in antioxidants and one of the plants that contain these antioxidants. Kokang leaves, native to Kalimantan plants, are used for various purposes, including but not limited to: removing black spots on the face, cleaning smallpox scars, acne scars, skin care and acne treatment; In addition, the leaves are used as sun protection by farmers[7]. Has significant antioxidant activity which is the result of high concentrations of alkaloids, flavanoids, saponins, and tannins of kokang leaves[8].

peel-off facial mask gel as a topical therapy to improve facial skin quality has been widespread[9]. Face masks made of leather are comfortable to wear because the elastic membrane allows them to be removed easily[10]. In addition to their benefits of shrinking pores, peel-off gel face masks can be used for general skin care, healing damaged skin, and reducing the appearance of fine lines and wrinkles[11]. They can be used as a facial cleanser or toner and to relieve facial muscle tension[12].

Based on the description above, this research was conducted with the topic of using kokang leaves as cosmetics, the title of this research work is "Formulation and Physical Stability Test for Making Peel Off Masks from Kokang (*Lepisanthes amoena* (Haask) Leenh) Leaf Extract) as an Antioxidant." The leaf in question comes from the genus Lepisanthes, which is commonly called "Kokang" in East Kalimantan.

2. Method

2.1. Tools

This study used a series of tools such as glassware, waterbath, porcelain cup, watch glass, pipette, spatula, stretcher spoon, analytical balance, buchi rotary evaporator, Uv-Vis spectrophotometer, Miyako blender, ionix pH meter, viscometer (viscoQC 100), micropipette, cuvette, vortex, stir bar, measuring cup, beaker glass, mortar, and stamper.

2.2. Materials

The materials used in this study were kokang leaves (*Lepisanthes amoena* (Haask) Leenh) taken from the Tenggarong region, East Kalimantan), Polyvinyl alcohol (PVA), HPMC, glycerin, methyl paraben, distilled water, DPPH (1,1-diphenyl -2-picrylhidrazil), methanol, 96% ethanol, aluminum foil, and

Table 1. Formula for Peel Off Preparations from Kokang Leaf Extract

Material	Function	Formulations			
		I	II	III	IV
Kokang Leaf Extract	Active substance	0%	1%	2.5%	5%
PVA	Filming Agent	5 g	7 g	9 g	10 g
HPMC	Gelling agent	2 g	2 g	2 g	2 g
Glycerin	humectants	10 g	10 g	10 g	10 g
Methyl Paraben	Preservative	0.2g	0.2g	0.2g	0.2 g
95% ethanol	Solvent	15 g	15 g	15 g	15 g
Cacao Oleum	Corrigen Odoris	qs	qs	qs	qs
Aquadest	Solvent	100 ml	100 ml	100 ml	100 ml

filter paper.

2.3. Procedure

The sample used in this study was the leaves of kokang (*Lepisanthes amoena* (Haask) Leenh) obtained from Bendang Raya village, Kutai Kartanegara Regency, East Kalimantan. The leaves were cleaned beforehand, chopped and dried in the sun until dry. Then crushed with a blender until they became fine powder.

Extraction was carried out by maceration method. Kokang leaf simplicia powder (*Lepisanthes amoena* (Haask) Leenh) as much as 500 grams soaked in 96% ethanol solvent for 1 x 24 hours in a closed meseration container stored in a place free from sunlight with occasional stirring. Then filtered, separated between dregs and filtrate The filtrate obtained was then collected, concentrated and the extract liquid was evaporated using a Rotary evaporator and a water bath to obtain a viscous extract and the yield was calculated. Then a phytochemical screening was carried out including tests for alkaloids, flavonoids, saponins and tannins.

2.3.1. Preparation of Kokang Leaf Extract Peel Off Mask Preparation Formulation

peel off mask preparation is presented in table 1. PVA was mixed with distilled water (80ºC) with constant stirring using a mechanical stirrer, then the HPMC was dispersed into the PVA solution (Mixture I). The extract was dissolved in 96% ethanol and methyl paraben dissolved in glycerin (Mixture II) before being added to the PVA and HPMC mixture, then added to Cacou oleum. Furthermore, the mixture is stirred until it is homogeneous to form a peel- off mask base.

2.3.2. Evaluation of Focal Stability of Peel Off Mask

Organoleptic Test: Color, odor, and texture checks were all carried out over 4 weeks[13].

pH test: To perform a pH test, simply dissolve 0.5 grams of product in distilled water, insert a pH meter, and record the reading of[13].

Homogeneity Test: Put some of the peel off gel mask preparations on the glass surface. Homogeneity can be determined by testing for the presence or absence of unmixed coarse grains[13].

Spreadability Test: It is common practice to put at least 0.5 gram of the herb in a clear glass. Weigh the mixture covered with another glass until it reaches 200 grams. Determine the diameter of the resulting ball[13].

Stickiness Test: Two glass objects are used to hold a 0.25 gram sample. Then, for 5 minutes, they pressed 1 kilogram. After the load is removed from the object glass, it is attached to the test equipment. The tool was filled with 80 grams, and the time the gel mask peeled off on the slide was recorded[14].

Dry Time Test: The back of the hand is used to test the drying time of the preparation. Estimate how long it will take for the medication to dry and peel off[13].

Viscosity Test: Viscometer is used in viscosity analysis. The viscometer instrument is mounted on a spindle, which in turn is mounted on a support. Gel masks that can be peeled off the face must be made and stored in a container. Just insert the spindle, placing it

from the bottom up. Put the viscometer to use and write down the reading[13].

2.3.3. Antioxidant Activity Test

Vitamin C was used as a comparison (positive control), prepared by weighing as much as 5 mg of vitamin C, put into a 10 mL volumetric flask, added sufficient amount of methanol PA and shaken until homogeneous, then added to the mark as the mother liquor. Comparison solutions were made with concentrations of 1 ppm, 2 ppm, 4 ppm, 6 ppm, 8 ppm.

DPPH was weighed as much as 5 mg dissolved in 10 mL PA methanol and then shaken until homogeneous then added to the mark of the 50 mL volumetric flask as mother liquor, then wrapped in aluminum foil. Kokang leaf extract and kokang leaf extract peel off mask preparations were made at concentrations of 25 ppm, 50 ppm, 100 ppm, 200 ppm, 400 ppm from each concentration, 3 mL was taken, then added with 3 mL of DPPH solution, then shaken with a vortex until homogeneous, then wrapped in aluminum foil and incubated for 30 minutes in a dark place protected from light. Then measured at a wavelength of 520 nm with Uv-Vis spectrophotometry. The IC_{50} value is calculated by the formula:

$$\%\text{Inhibition} = \frac{A\ Blanko - A\ Sampel\ Uji}{A\ Blanko}\ x\ 100\%$$

2.3.4. Sample Acceptance Test

Peel off mask preparation sample was carried out on 25 respondents who were willing to become respondents and answer some of the questions that had been provided.

3. Result

3.1. Simplicia and Kokang Leaf Extract

The results of maceration were carried out 3 repetitions of 500 g of kokang leaf simplicia powder which had been finely blended with 96% ethanol solvent and the extract results and yield values is 126.26 g (Condensed Extract Yield) and 25.85 % (Yield).

3.2. Phytochemical Screening of Kokang Leaf Extract

The results of the phytochemical screening of kokang leaf extract included 5 test stages including alkaloid test, flavonoid test, sapponin test, tannin test, and terpenoid/ steroid test. Can be seen in table 2.

3.3. Evaluation of Characteristics and Physical Stability of Peel Off Mask

Formulation peel off mask formulation were tested from organoleptic examination of the preparation, pH test, homogeneity test, spreadability test, adhesion test, viscosity test, drying time test and antioxidant activity test and sample acceptability can be seen in table 3 to table 4.

3.4. Antioxidant Activity Test

Tests were carried out with several different concentration variants in each sample. So that the results of antioxidant testing were obtained which can be seen in table 5.

4. Discussion

To formulate peel-off masks, this study tested their physical stability by measuring organoleptic properties, pH, homogeneity, adhesion, spreadability, viscosity, drying time, and antioxidant activity. In addition, scientists are interested in increasing the cosmetic application of kokang leaf extract (*Lepisanthes amoena* (Haask) Leenh), which

Table 2. Results of kokang leaf extract phytochemical screening

Compound Checker	Reactor	Observation result	Information
Alkaloids	Dragendrof	Orange	+
	Mayer	White Precipitate	
Flavonoids	Mg, concentrated HCl	Yellow	+
Saponins	Aquadest + HCl	Stable Foaming	+
Tannins	FeCl3 5%	Green/Blue Black	+

Information : Positive (+) : Positive metabolites, Negative (-) : Negative metabolites

Table 3. Results of Organoleptic Examination of Kokang Leaf Extract Peel Off Mask

Week to Formulation Examination	Organoleptic Examination Formulation 0% (F1)		
	Color	Smell	Texture
1	Clear White	Chocolate Special	Gel
2	Clear White	Chocolate Special	Gel
3	Clear White	Chocolate Special	Gel
4	Clear White	Chocolate Special	Gel
Week to Formulation Examination	**Organoleptic Examination Formulation 1% (F2)**		
	Color	**Smell**	**Texture**
1	Light green	Chocolate Special	Gel
2	Clear Chocolate	Chocolate Special	Gel
3	Clear Chocolate	Chocolate Special	Gel
4	Clear Chocolate	Chocolate Special	Gel
Week to Formulation Examination	**Organoleptic Examination Formulation 2.5% (F3)**		
	Color	**Smell**	**Texture**
1	Light green	Chocolate Special	Gel
2	Clear Chocolate	Chocolate Special	Gel
3	Clear Chocolate	Chocolate Special	Gel
4	Clear Chocolate	Chocolate Special	Gel
Week to Formulation Examination	**Organoleptic Examination Formulation 5% (F4)**		
	Color	**Smell**	**Texture**
1	Light green	Chocolate Special	Gel
2	Clear Chocolate	Chocolate Special	Gel
3	Clear Chocolate	Chocolate Special	Gel
4	Clear Chocolate	Chocolate Special	Gel

contains high antioxidants.

The people of Kalimantan use a leaf called kokang to treat various kinds of skin problems, including getting rid of black spots on the face, getting rid of smallpox scars, getting rid of acne scars, and getting rid of acne itself. In addition, farmers often use kokang leaves as a shield from the hot sun[7]. The research entitled "Formulation and Physical Stability of Peel Off Mask Preparations from Kokang Leaf Extract (*Lepisanthes amoena* (Haask) Leenh As Antioxidant)" was conducted to further investigate the characteristics and physical stability of the formulation, as well as its characteristics. antioxidant activity , in an effort to make better use of kokang leaves Peel off mask of kokang leaf extract (*Lepisanthes amoena* (Haask) Leenh).

The first stage in this investigation was taking samples in the form of rooster leaves from Bendang Raya Tenggarong Village, Kutai Kartanegara. To determine whether the sample belongs to the kokang leaf plant (*Lepisanthes amoena* (Haask) Leenh) it is necessary to determine the plant material. Laboratory of Ecology and Conservation of Tropical Forest Biodiversity, Mulawarman University, letter number 145/UN14.4.08/ LL/2022 the results of plant identification confirms that the plant in question is kokang leaf (*Lepisanthes amoena* (Haask) Leenh).

The next step, extraction, is performed on the sample. To separate two substances that are insoluble in each other , extraction is used. The two liquids used in this process are usually water and organic solvents. Maceration is one of the techniques used in the extraction process. The powdered plant material is macerated by thoroughly immersing it in a suitable solvent in a closed vessel at room temperature[15]. The benefit of maceration-based extraction is that it guarantees the integrity of the extracted active ingredients 16 . It is this pressure difference between the outside and inside of the cell that causes the cell wall and membrane to degrade during

Table 4. Results of Evaluation of Characteristics and Physical Stability of Peel Off Mask

Week to Formulation Examination	Results pH value				Parameters Standard
	0%	1%	2.5%	5%	
1	5,9	5,5	6,2	5,8	4,5-7
2	5,5	5,4	5,9	5,3	
3	5,3	5,2	5,5	5.0	
4	5.0	5,1	5.0	5.0	
Average	5,4	5,3	5,7	5,3	

Week to Formulation Examination	Homogenity Test				Information
	0%	1%	2.5%	5%	
1	+	+	+	+	Positive (+) = Homogeneous (stable)
2	+	+	+	+	
3	+	+	+	+	Negative (-) = Not homogeneous
4	+	+	+	+	

Formulation	Size(cm) Spreadability Tests	Parameters Standard	Stickiness (Seconds) Adhesiveness Test		Average Standard Parameters >1
	200 g		P1	P2	
1	4,3	5-7	240,26	120.32	180,29
2	6		60,30	90.00	75,15
3	5		60,38	98.00	79,19
4	5,6		60.00	63.00	61.05

Formulation	Room Temperature (Minute) Drying Time Test				Average (Standard Parameters 15-30)
	Week 1st	Week 2nd	Week 3rd	Week 4th	
1	15,25	17.30	15.50	16.45	16,13
2	16.40	17,47	18.35	17,10	17,33
3	18.25	17.30	17.45	18,15	18,18
4	18.40	19.50	21,10	20.35	20,25

Formulation	Viscosity(cps)				Average (Standard Parameters 2000-50000)
	Week 1st	Week 2nd	Week 3rd	Week 4th	
1	33.11	46.27	46.97	47.59	43,485
2	54.25	35.48	48.29	48.47	46,623
3	51.12	50.06	44.81	39.05	46,260
4	50.94	50.12	46.82	43.94	47,960

immersion, so that the secondary metabolites in the cytoplasm are released into organic solvents and dissolve .

The maceration of this study included soaking 500 grams of kokang leaf simplicia powder in 96% ethanol for three times 24 hours while stirring occasionally; The powder is then filtered off, and the solvent is evaporated in a rotary evaporator and dissolved in waterbuth to produce a viscous solution. The researchers used ethanol at a concentration of 96% because it is selective, non-toxic, has a good absorption rate and high dissolving capacity, enabling them to extract molecules with varying degrees of polarity. 96% ethanol solvent is more effective in penetrating the sample cell walls than low concentration ethanol solvent[18]. There is a yield of 25.85 % of the viscous extract which is equal to 126.26 g of extract material. The yield calculation aims to determine the ratio of the final dry weight of the product to the initial weight of the input material. Extract yield is determined by dividing the total mass (weight of extract produced) by total mass (weight of cell biomass consumed) and multiplied by 100%[19].

Furthermore, after obtaining the thick extract, a phytochemical screening was carried out to identify the content of a compound in the simplicia or plants tested[19]. Phytochemical screening in this study carried out several tests which included alkaloid test, flavonoid test, saponin test, tannin test,

and terpenoid/ steroid test. This test was carried out using a simple method, namely the tube test method to identify secondary metabolites based on the presence of color changes, constant foam and precipitate. The results obtained on the phytochemical screening of kokang leaf extract (*Lepisanthes amoena* (Haask) Leenh) contain secondary metabolites, namely alkaloids, flavonoids, saponins, tannins, and terpenoids/steroids. In alkaloid compounds, it is indicated by the presence of a white precipitate in Mayer's reagent , while the appearance of an orange color with dragendrof reagent. Flavonoid compounds are marked with yellow, orange and orange colors. The presence of saponins was indicated by stable foam after shaking. While the terpenoid/steroid compounds are marked with a brownish red color change. Alkaloid compounds, flavonoids, saponins, tannins contain antioxidants so they are able to ward off free radicals or UV rays[8].

Next, the preparation of the formulation of the kokang leaf extract peel-off mask (*Lepisanthes amoena* (Haask) Leenh) was carried out and then tested for its physical stability and antioxidant activity in the formulation. Preparation of kokang leaf extract peel-off mask formulations was made according to the procedures or steps that have been described. Furthermore, an evaluation of the physical stability of the formulation included organoleptic test, pH test, homogeneity test, adhesion test, spreadability test, viscosity test, drying time test, sample acceptance test and antioxidant activity test on kokang leaf extract peel-off mask preparations.

The organoleptic examination was carried out for 4 weeks (1 month) which included observing the color, smell and texture of the peel off preparations during the storage process at room temperature. The results obtained in formulations 1 (0%), 2 (1%), 3 (2.5%) and 4 (5%) did not change color, smell or texture, but in formulas 2, 3, 4 there was a change The color ranges from light green to transparent clear brown. This happened because there was the addition of kokang leaf extract and hpmc which resulted in a change in color and became a transparent gel. However, the four formulations remained in good and stable condition.

Furthermore, pH testing is carried out to see whether a preparation is alkaline or acidic. Check the pH using a pH meter brand ionix. The results of the pH test showed that all peel-off preparations met the normal skin pH standards, namely in the range of 4.5 -7. Topical preparations are expected to have a pH that is at normal skin pH because if the pH is too alkaline it will cause scaly skin, whereas if the skin is too acidic it can trigger skin irritation[20]. Testing the pH of this study was carried out for 4 weeks (1 month) with the results obtained in formulations 1 (0%), 2 (1%), 3 (2.5%), and 4 (5%) each obtaining an average value average 5.4; 5.3; 5.7, and 5.3 which meet the standard pH of the skin.

Furthermore, testing for homogeneity by placing the preparation on the object glass which is overlaid with another glass object and seeing whether there are fine particles in the preparation. The homogeneity test is intended to determine whether or not the ingredients in the peel off preparation are mixed or not . The results obtained in formulations 1 (0%), 2 (1%), 3 (2.5 %), and 4 (5%) are homogeneous, meaning that the ingredients are evenly dispersed and mixed.

In addition, spreadability and adhesion experiments were carried out, with the first involving placing 0.5 g of the sample on a transparent glass, followed by placing another glass on top of it, and finally adding a 200 g weight. The average values of the spreadability test in this study were 4.3, 6.0, and 5.6 centimeters for formulations 1, 2, 3, and 4 respectively (0%, 1%, 2.5%, and 5%). Spread up to about 7 centimeters is possible with the formulation of high quality peel-off facial masks. The orientation results are used to calculate this range, taking into account that the subsequent spreadability can make the preparation easier to apply without applying a lot of pressure and can stay on the skin for a longer period of time[21] . Semisolid can be semistiff (5 cm) or semifluid (5-7 cm) in terms of its spreadability (Sulastri, 2018). Increase the spreadability of a mixture of glycerin

and gelatin by increasing the concentration of the two ingredients[10] . Higher viscosity results in less spreadability. This means that the resultant of the spreading power test can be accepted, except for Formula 1 which is included as part of the semistiff spreading power.

The durability of the peel off gel mask preparation on the skin surface was evaluated by the adhesion test. The longer the contact between the preparation and the skin as measured by the stickiness value, the faster the drug diffuses into the body[22]. As for the adhesion test, the results obtained in Formulas 1, 2, 3, and 4 (at concentrations of 0%, 1% , 2.5 %, and 5%) respectively were 180.29, 75.15, 79.19, and 61.05 seconds. The stickiness of the peel off gel mask formula was evaluated by the adhesion test. The adhesion test showed that all formulations and those added with extracts had spreadability within the expected standard parameters, which were greater than 1 second[23].

And for the next 4 weeks, we monitored the drying period of peel off preparations made from rooster leaf extract (1 month). The time required for the preparation to dry, in this case the time required to produce a film layer, was calculated and used as the dependent variable in an experiment that applied the circumference formula. It takes 15-30 minutes for the peel-off gel mask to dry after being prepared (Saputra et al., 2019). Tests showed that formulations 1 (0%), 2 (1%), 3 (2.5 %), and 4 (5%) took 16.13, 17.33, 18.18 and 20 respectively. 25 minutes to dry. That is, the typical drying time for a peel off mask is usually between 15 and 30 minutes. The purpose of the drying time test is to find out how long it takes for a peel-off gel mask to dry after being applied to the skin to form a film. The most important aspect affecting the filming performance of peel off face masks is the concentration of PVA. The drying time for peel off preparations is influenced by the use of room temperature which varies from time to time[22].

In addition, spindle no. 4 on the viscoQC 100 tool is used to carry out the viscosity test. The experiment lasted for a total of 4 weeks (1 month). For best results when making a gel peel off mask, it is important to do an initial viscosity test. When the viscosity of a preparation is too low, the active components do not have sufficient time to make contact with the skin, and when it is too high, the active ingredients stay on the skin longer but are more difficult to spread[22]. Gel preparations have a viscosity value of between 2,000 and 50,000 centipoise (cps), as determined by the Indonesian National Standards Agency (BSNI/BSN/SNI), in its standard SNI 16-4399-1996. Formula 1 (0%), Formula 2 (1%), Formula 3 (2.5%), and Formula 4 (5%) were tested for viscosity, and the results were 43,485 cps, 46,623 cps, 46,260 cps, and 47,960 cps, respectively -respectively. Week to week fluctuations are too small to notice. The longer the preparation is exposed to environmental factors such as air, the lower the viscosity will be 7 . Extract acids, fluctuations in PVA concentrations and storage time all play a role in this[24]. This shows that the spreading power of the ethanol extract of kokang leaves increases as the viscosity decreases. The viscosity of the gel drops as a result. The viscosity of the gel has decreased, but is still within acceptable limits[25].

Kokang leaf extract (*Lepisanthes amoena* (Haask) Leenh) has the highest content, namely 5%, and has been used in testing extracts and peel off mask formulations for its antioxidant properties. wherein a UV-Vis spectrophotometer was used to perform the DPPH (1,1-diphenyl-2-picrylhydrazyl) test. This approach is ideal for testing because it requires little sample or reagent, is easy, and can be completed quickly. The aim of this method is to identify the concentration parameter that produces half of the effect of antioxidant activity (IC_{50})[26]. The DPPH method involves measuring the time it takes for the color of DPPH to decrease from purple to yellow, which is done by reacting antioxidant chemicals with DPPH radicals through a hydrogen atom donation mechanism, resulting in stable and harmless free radicals[27]. Antioxidant potency is measured using the IC_{50} value, which

Table 5. Antioxidant Activity Test Results

Sample	IC50 value	Category
Vitamin C	5,401	Very strong
Kokang Leaf Extract	59,707	Strong
Peel Off Mask Kokang Leaf Extract	102,945	Currently

ranges from very strong (50 ppm) to strong (50-100 ppm) to moderate (101-250 ppm) to weak (250-500 ppm) to none (inactive). In particular above 500 parts per million[28]. Antioxidants consist of several different types of chemicals, including alkaloids, flavonoids, saponins, tannins, and terpenoids.

Table 4.10 shows the findings of antioxidant activity data using vitamin C as a positive control, and the IC_{50} value of 5.401 ppm, indicating that vitamin C has a very high value of antioxidant activity. Vitamin C is used as a reserve because it is readily available, has strong antioxidant activity, and does not require a special diet to be effective. The hydroxyl group of vitamin C is free to roam and neutralize harmful free radicals[29]. Meanwhile, rooster leaf extract obtained an IC_{50} value of 59.707 ppm, placing it in the category of strong antioxidant value; On the other hand, the IC_{50} value of 102.945 ppm places the rooster leaf extract peel-off mask preparation in the medium category. The difference in the IC_{50} value of kokang leaf extract and kokang leaf extract peel off mask preparation is caused by the time span for making the formulation by testing the antioxidant activity, besides that it is also caused by various manufacturing processes that can result in reduced or lost antioxidant compounds, one of which is when dissolving the extract with ethanol 96% so that evaporation of the active substance occurs. The same thing happened in Nur Zakiyah's research (2019) the results of bay leaf extract had an IC_{50} value of 1.678 ppm, while the peel-off preparation was 25.21 ppm.

The results showed that when the concentration of the extract increased, the absorbance of the sample decreased and the inhibition increased. When the DPPH electrons combine with the sample electrons, the color of the solution changes from dark purple to bright yellow, resulting in a decrease in absorbance[27]. According to Green's statement (2004), the value of the level of inhibition increases with increasing sample concentration because there are more antioxidant chemicals in the sample to fight free radicals.

In testing the acceptance of the sample, it was carried out by taking 25 respondents voluntarily to apply the peel-off mask preparations with each respondent getting a sample of different concentrations and applying it to the back of the hand which was left for 15-30 minutes, then observing whether it had any symptoms or effects. redness and itching of the skin. Furthermore, the respondents filled out a questionnaire sheet in which there were several questions that had been presented. The results obtained in formulations 1 (0%), 2 (1%), 3 (2.5 %) and 4 (5%) are moisturizing, dry easily, do not itch or redness, easily peel off, attractive color appearance and aroma which smells

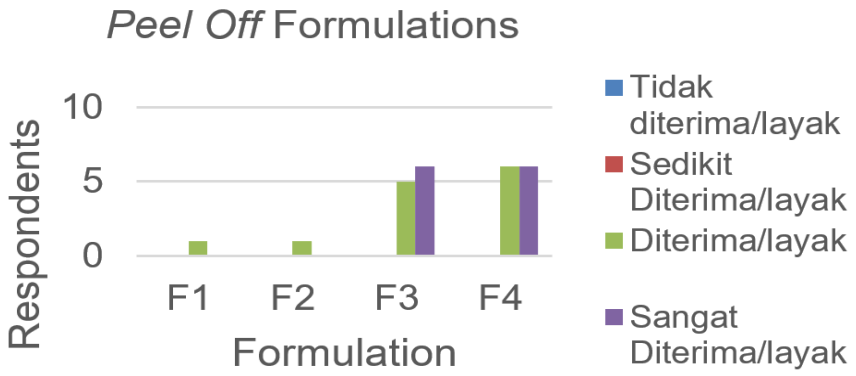

Figure 1. Graph of the acceptance of kokang leaf extract peel off masks

like chocolate. While the acceptability of peel off mask preparations (*Lepisanthes amoena* (Haask) Leenh) from 25 respondents, that is, the number of formulations 3 (2.5 %) and 4 (5%) received .

Based on the results of the research that has been done, it can be concluded that the formulation of peel off masks (*Lepisanthes amoena* (Haask) Leenh) 1 (0%), 2 (1%), 3 (2.5 %) and 4 (5%) have characteristics and good physical stability during the testing process. At a concentration of 5% the extract and formulation had antioxidant activity of 59,707 ppm (strong) and 102,945 ppm (moderate) respectively. At a concentration of 4 (5%) the extract has an antioxidant activity of 59,707 ppm (strong). Meanwhile, among the four formulas that have been physically tested and evaluated, the best and most stable preparation is formulation 4 (5%) with an IC_{50} result of 102,945 ppm (moderate).

5. Conclusion

Based on the results of this study, several conclusions can be drawn as follows: The formulation of the kokang leaf extract peel-off mask (*Lepisanthes amoena* (Haask) Leenh) has met the standard requirements for characteristics and physical stability, namely organoleptic examination (color, odor, and texture), preparation homogeneity, pH, spreadability, adhesion, viscosity and drying time kokang leaf extract peel off mask preparation.Extracts and formulations of kokang leaf extract peel-off masks (*Lepisanthes amoena* (Haask) Leenh) with a concentration of 5% have antioxidant activity with a strength IC_{50} value of 59,707 ppm (strong category) and 102,945 ppm (moderate category).Acceptance of samples of kokang leaf extract (*Lepisanthes amoena* (Haask) Leenh) peel off mask formulations was widely accepted in formulations 3 and 4.

Acknowledgement

The researcher would like to thank profusely to both parents who have always supported the researcher. The researcher also thanks the supervising lecturers who always guide during the work of this research.

References

1. Damogalad, V., H.J. Edy, H.S. Supriati. Formulasi Krim Tabir Surya Ekstrak Kulit Nanas (Ananas comasus L. Merr.) dan Uji In Vitro Nilai Sun Protecting Factor (SPF). Pharmacon Jurnal Ilmiah Farmasi UNSRAT. 2013. 2(2): 39-44.
2. Pratiwi, S., & Husni, P. Farmaka Artikel Tinjauan: Potensi Penggunaan Fitokonstituen Tanaman Indonesia Sebagai Bahan Aktif Tabir Surya. Farmaka. 2017. Volume, 15(4), 18–25.
3. Wijaya, D. P. Edukasi Melindungi Kulit Dari Sinar Uv Dan Pemanfaatan Tumbuhan Pachyrhizus Erosus Sebagai Tabir Surya Di Desa Pulau Semambu Indralaya. Jurnal Pengabdian Sriwijaya. 2019.7(3), 840–843. https://doi.org/10.37061/jps.v7i3.10223
4. Handayani, V., Ahmad, A. R., Sudir, M., Etlingera, P., & Sm, R. M. Uji Aktivitas Antioksidan Ekstrak Metanol Bunga dan Daun Patikala (Etlingera elatior (Jack) R. M. Sm) Menggunakan Abstrak. Pharm Sci Res. 2014 1(2), 86–93.
5. Isfahlan, A. J., Mahmoodzadeh, A., Hassanzadeh, A., Heidari, R., & Jamei, R. 'Antioxidant and antiradical activities of phenolic extracts from Iranian almond (Prunus amygdalus L.) hulls and shells'. Turkish Journal ofBiology. 2010. 34(2), 165–173.
6. Khaira Kuntum. Meangkal Radikal Bebas dengan Antioksidan. In Jurnal Sainstek. 2010. Vol. 2, pp. 183–187.
7. Warnida, H., & Sukawati, Y. Formulasi Ekstrak Daun Kokang (Lepisanthes amoena (Hassk.) Leenh.) dalam Bentuk Gel Anti Acne Formulation of Kokang (Lepisanthes amoena (Hassk.) Leenh.) Leaves Extract in Anti-acne Gel. Indonesian Journal On Medical Science. 2016. 3(2).
8. Warnida, H., & Nurhasnawati, H., Efektivitas Ekstrak Daun Kokang (Lepisanthes Amoena) Sebagai Tabir Surya Eksplorasi Kearifan Lokal Kalimantan Timur, Jurnal Penelitian Ekosistem Dipterokarpa. 2017. Vol.3 No.2

9. Yeom G, Yun DM, Kang YW, Kwon JS, Kang IO, Kim SY. Kemanjuran klinis masker wajah yang mengandung yoghurt danOpuntia humifusaRaf.(F-YOP). J.Cosmet Sci. 2010;62(5):505-14.
10. Rahmawanty D, Yulianti N, Fitriana M. Formulasi dan evaluasi masker peel off mengandung quercetin dengan variasi konsentrasi gelatin dan gliserin. Pertanian Med. 2015;12(1):17-2
11. Grace F, Dariska C, Sowmya KV, Suganya K, Shanmuganathan S. Persiapan dan evaluasi masker wajah peel off herbal. Apakah J PharmTech Res. 2015;5(4):333-6.
12. Vieira RP, Fernandes AR, Kaneko TM, Consiglieri VO, Pinto CA, Pereira CS, dkk. Evaluasi stabilitas fisik dan fisikokimia formulasi kosmetik yang mengandung: ekstrak kedelai difermentasi oleh Bifidobacterium animalis. Braz J. Pharm Sci. 2009;45(3):515-25.
13. Darajat AR, N. Z., Fitriani, N., & Rusli, R. Formulasi Masker Gel Peel Off dari Ekstrak Etanol Daun Salam (Syzygium polyanthum) Sebagai Antioksidan dengan Metode DPPH. Proceeding of Mulawarman Pharmaceuticals Conferences. 2019. 16–17.
14. Wijayanti, Astuti, Prasetia, I. G. N., Darayanthi, M. Y., Nesa, Wedarini, & Adhiningrat. Profil Stabilitas Fisika Kimia Masker Gel Peel-Off Ekstrak Kulit Buah Manggis (Garcinia mangostana L.). Jurnal Farmasi Fakultas MIPA Udayana. 2015. 4(1): 99-103
15. Tetti, M. Ekstraksi, Pemisahan Senyawa , dan Identifikasi Senyawa Aktif. Jurnal Kesehatan. 2014. 7 (2): 361-367.
16. Pratiwi, E. Perbandingan Metode Maserasi, Remaserasi, Perkolasi Dan Reperkolasi Dalam Ekstraksi Senyawa Aktif Andrographolide Dari Tanaman Sambiloto (Andrographis paniculata Nee). Skripsi. Tidak dipublikasikan. Fakultas Teknologi Pertanian, Institut Pertanian Bogor, Bogor. 2010
17. Novitasari, A.E. dan D.Z. Putri. Isolasi dan identifikasi saponin pada ekstrak daun mahkota dewa dengan ekstraksi maserasi. Jurnal Sains. 2016. 6(12):10-14.
18. Wendersteyt, N. V., Wewengkang, D. S., & Abdullah, S. S. Uji Aktivitas Antimikroba Dari Ekstrak Dan Fraksi Ascidian Herdmania Momus Dari Perairan Pulau Bangka Likupang Terhadap Pertumbuhan Mikroba Staphylococcus aureus, Salmonella typhimurium DAN Candida albicans. Pharmacon. 2021. 10(1), 706.https://doi.org/10.35799/pha.10.2021.32758
19. Dewatisari, W. F., Rumiyanti, L., & Rakhmawati, I. Rendemen dan Skrining Fitokimia pada Ekstrak Daun Sanseviera sp. Jurnal Penelitian Pertanian Terapan. 2018. 17(3), 197. https://doi.org/10.25181/jppt.v17i3.336
20. Siva, J., & Afriadi, A. Formulasi Gel dari Sari Buah Strawberry (Fragaria X ananassa Duchesne) sebagai Pelembab Alami. Jurnal Dunia Farmasi. 2019. 3(1), 9–15. https://doi.org/10.33085/jdf.v3i1.441
21. Sari, Nimas Ayu., Santoso, Rahmat., Mardhiani, Yanni, Dhiani. "Formulasi Masker Gel Peel-Off Ekstrak Rimpang Jahe Merah (Zingiberis officinale var. Rubrum) Sebagai Antijerawat". Jurnal Farmasi Galenika. 2017. Volume 4 Edisi Khusus SemNas TOI. Sekolah Tinggi Farmasi Bandung. 44.
22. Saputra, S. A., Lailiyah, M., & Erivina, A. Formulasi Dan Uji Aktivitas Anti Bakteri Masker Gel Peel-Off Ekstrak Daun Pacar Air (Impatiens balsamina linn.) Dengan Kombinasi Basis PVA dan HPMC. Jurnal Riset Kefarmasian Indonesia. 2019. 1(2), 114–122. https://doi.org/10.33759/jrki.v1i2.20
23. Istiqomah, N. M. Pengaruh Penggunaan Hidroksi Propil Metil Selulosa (HPMC) sebagai Gelling Agent terhadap Sifat Fisik Masker Peel off Ekstrak Daun Sirih (Piper betle L.). Jurnal PENA. 2018. Vol.32 No.2
24. Setianingsih, D. Uji Efektivitas Dan Uji Stabilitas Formulasi Masker Gel Peel-Off Ekstrak Metanol Kulit Biji Pinang Yaki (Areca vestiaria Giseke). Indonesia Natural Research Pharmaceutical

Journal. 2020. 5(1), 80–93. https://doi.org/10.52447/inspj.v5i1.1832
25. Sulastri, L., & Zamzam, M. Y. "Formulasi Gel Hand Sanitizer Ekstrak Etanol Daun Kemangi (Ocinum sanctum L.) konsentrasi 1,5%, 3%, Dan 6% Dengan Gelling Agent." Karya Tulis Ilmiah. Sekolah Tinggi Farmasi Muhammadiyah Cirebon. 2019. 1(1), 31–44.
26. Ikhrar, M. S., Yudistira, A., & Wewengkang, D. S. Uji Aktivitas Antioksidan Stylissa Sp. Dengan Metode Dpph (1,1-difenil-2-pikrilhidrazil). Pharmacon. 2019. 8(4), 961. https://doi.org/10.35799/pha.8.2019.29376
27. Ulaan, G. A. K., Yudistira, A., & Rotinsulu, H. Uji Aktivitas Antioksidan Ekstrak Etanol Alga Ulva Lactuca Menggunakan Metode Dpph (1,1 diphenyl-2-picrylhydrazyl). Pharmacon. 2019. 8(3), 535. https://doi.org/10.35799/pha.8.2019.29327
28. Sari, A. T., Annisa, N., & Rusli, R. Potensi Kombinasi Ekstrak Daun Kokang dan Kersen Sebagai Tabir Surya Secara In Vitro. Proceeding of Mulawarman Pharmaceuticals Conferences. 2019. 10, 58–63.https://doi.org/10.25026/mpc.v10i1.361
29. Isnindar. Isolasi dan Identifikasi Senyawa Antioksidan Daun Kesemek (Diopyroskaki Thunb) dengan Metode DPPH. Majalah Obat Tradisional. 2011. 16 (3) : 157-164.