

## Formulation And Testing Of The Physical Properties Of Moringa Oleifera Leaf Extract Essence Preparations As An Antioxidant

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### Abstract

This research was carried out as a form of preserving natural ingredients used as antioxidant essence, namely the Moringa leaf plant (*Moringa oleifera*) which contains flavonoid compounds, saponins, alkaloids, steroids, polyphenols and essential oils. This research aims to determine the antioxidant activity in the essence formulation of Moringa oleifera Lam leaf extract using the DPPH method in protecting the skin from free radicals. This research was conducted at the Pharmacy Laboratory of the Muhammadiyah University of Palopo in August 2023. This research used experimental research, taking samples, making essence preparations, testing the physical quality of essence preparations, testing antioxidant activity with 3 results obtained since the research were found in antioxidant activity tests with different concentrations, where the most effective essence preparation was in the F1 formulation, namely 23.74042 µg/mL which was included in the category of very strong antioxidant activity.

Keywords: Moringa leaves (*Moringa oleifera*); Essence; Antioxidant activity.

### 1. Introduction

The face and entire human body include parts covered by skin. Facial skin must be taken care of because apart from being a symbol of identity, having a face Healthy is the dream of all humans. The characteristics of a healthy face are no acne, even, soft, radiant and firm skin tone. A number of Factors that make facial skin unhealthy include: 1) lack of rest, 2) lack of physical activity, 3) consumption of unhealthy food, 4) outside activities a room that exposes facial skin to free radicals such as smoke Cigarettes, dust, sunlight and air pollution are what cause problems on the skin of the face like premature aging and dullness on the skin up to the skin loss of elasticity and wrinkles appear. These reasons give rise to problems with facial skin. Efforts to overcome skin problems, namely facial care [4].

A well-known and widely used facial treatment is Essence because Essence is not a new type of facial treatment. This preparation contains water as a basic ingredient and serves to protect the skin, moisturize, and improve overall skin health. Essence preparations are very popular on the market because consumers want to minimize the time they use facial care daily. Essence has a liquid-like form that is a bit runny, a little more so Thicker than toner but lighter than serum.

Beauty products with natural extracts are popular because it is considered safer for the skin. In this research, antioxidants were used natural, namely Moringa leaf extract (*Moringa oleifera*). The most prominent on Moringa plant contains antioxidant compounds, especially its leaves high antioxidant. In research conducted by Susanti and friends The antioxidants in Moringa leaves are shown by an IC50 value of 4.286. [12].

One method that can be used to test antioxidant activity namely the 1,1- diphenyl-2-Picrylhydrazyl (DPPH) method [12]. DPPH is a free radical compound that is stable, so if it

will used as a test reagent in testing sufficient antioxidant activity dissolved. The DPPH absorbance value ranges from 515 – 520 nm [6].

Based on the description above, Moringa leaves contain antioxidant. From these ingredients, Essence preparations are made , selected as the form preparation because it is more practical, economical and easy to apply.

## **2. Methodology**

### **2.1. A. Type of Research**

This research was carried out using experimental methods in a pharmaceutical laboratory, at Palopo Muhammadiyah University.

### **2.2. Time and Place of Research**

This research will be carried out in July – August 2023 and carried out at the Pharmacy Laboratory, Faculty of Health Sciences, University Muhammadiyah Palopo.

### **2.3. Tools and Materials**

The tools used in this research were a blender, measuring cup, beakers, test tubes, analytical balances, aluminum foil, porcelain dishes, water heater, mortar, stamfer, porcelain cup, stirring rod, spatula, spatula, plastic pot, dropper pipette, water bath, UV-Vis spectrophotometer, cuvette, and filter.

The materials used are Moringa leaves (*Moringa oleifera* L), butylene glyco;, glycerin, ethanol 70%, nipagin, distilled water, PEG-40, perfume, foilbag, and DPPH.

### **2.4. Research Procedures**

#### **Extraction Sample Preparation**

The first thing you need to prepare first is fresh and young Moringa leaves which is located near the shoots and is light green, as much as 4 kg. then dried, the dried Moringa leaves are blended until forms a fine powder. Next is the maceration stage, 500 gr Moringa leaf powder is put into 2500 ml of 70% ethanol all submerged, stir well, stir then store and let sit room temperature without occasional exposure to sunlight stirring for 5 x 24 hours and filtered using filter paper. Part Another dose of solvent is added and the extraction is repeated until the final extract colorless [12].

#### **Making essence sheet masks**

Dissolved Xanthan gum dissolved in distilled water in a mortar. Add butylene glycol and glycerin and grind until homogeneous (mixture I). Nipasol and nipagin are dissolved in a portion of hot water (mixture II). Extract Moringa leaves and PEG-40 were dissolved in a portion of distilled water (mixture III). Mixture I and mixture II are mixed little by little until form a homogeneous mass, then mix again with mixture III crushed until homogeneous. Added perfume and 70% ethano the mixture is then homogenized [9].

### **2.5. Evaluation of preparations**

Essence preparations were evaluated for stability and physical characteristics in terms of organoleptics, viscosity and pH.

*Organoleptic Test.* Observations of preparations in organoleptic tests include aroma, color, and the texture of each preparation formula.

*Viscosity Test.* Viscosity testing is carried out to determine the level of viscosity The sheet mask that is made will later be tested for viscosity with Brookfield type viscometer [13].

*Use pH.* pH testing is carried out using an existing pH meter calibrated. The pH meter is dipped into the diluted sample.

**Spreadability Test.** The spreadability test is carried out by applying 1 mL of essence to The glass is then covered with glass and then given a weight of 100 g and left to rest for 1 minute, then measure the diameter of the smear [10].

## 2.6 Stability test

The sheet mask preparation was stored at room temperature for 8 weeks while observing physical changes such as clarity, settling and phase separation. The most stable preparation is used for activity tests antioxidant [2].

## 2.7 Irritation Test

A total of 14 panelists were selected with the criteria of age 20-35 years, no have previous skin problems, and are willing to participate in study. The irritation test is carried out by applying the preparation to the skin rear ear with a diameter of 2 cm, left open for 2 hours and observed what happened. A positive irritation reaction is characterized by redness, itching, or swelling and roughness of the skin on the inside of the hands probandus who were treated (Sumbayak et al., 2018).

## 2.8. Test antioxidant activity

Preparation of DPPH mother liquor

A total of 5 mg (0.005 gr) DPPH was weighed and then dissolved in a 50 ml volumetric flask with methanol PA up to the mark, with a concentration of 100 ppm after which the solution was stored in a glass bottle dark colored then homogenized and then incubated for 30 minutes [11].

Production of lambda ( $\dot{y}$ ) DPPH

Pipette 1 ml of the vitamin C comparison solution then add 1 ml of DPPH solution, put in a 5 ml measuring flask, enough volume with methanol PA up to the limit mark, then homogenize then incubate in a dark place for 30 minutes. Measure the absorbance with UV-Vis spectrophotometry at maximum wavelength [11].

Preparation of blank solution

A total of 1 ml of DPPH solution was pipetted into a 5 ml volumetric flask, Add 3 methanol PA until the limit mark then homogenize. Leave it for 30 minutes then measure the absorbance on the length 517 nm wave [3].

Preparation of Vitamin C comparison solution

A total of 10 mg of vitamin C was weighed, then dissolved in a flask Measure 50 ml then add methanol PA until obtained concentration 1000 ppm. Each graded dilution was carried out Vitamin C concentration pipetted 2 ppm, 4 ppm, 6 ppm (0.1 ml, 0.2 ml, 03 ml) from the vitamin C stock solution, dissolve into a 5 ml volumetric flask. every The concentration is taken as 1 ml then 1 ml of solution is added DPPH and 2 ml methanol PA were then homogenized and allowed to stand for 30 minutes. Measure the absorbance using UV-Vis spectrophotometry wavelength 517 nm [3].

Preparation of test solution

Each gel concentration was then weighed at 10 mg dissolved with 50 ml methanol PA in a volumetric flask and obtained concentration of 1000 ppm then homogenize by vortexing for 2 minutes. From each concentration, 1 ml was taken then Add 1 ml of DPPH solution and

2 ml of methanol PA. Incubate at temperature 37°C for 30 minutes then place in a cuvette. Measure the absorption using UV-Vis spectrophotometry with a wavelength of 517nm. Calculate the percentage of inhibition to obtain the IC50 analysis value [11].

$$\text{inhibition} = \frac{\text{DPPH blank absorbance} - \text{Sample absorbance}}{\text{Absorb DPPH blank}} \times 100\%$$

Sample concentration and inhibitory presentation are plotted on the x and y axes on the equation  $y = bx \pm a$  [7].

### 3. Result and Discussion

#### 3.1. Sample Preparation of Moringa Leaves (*Moringa oleifera*)

Moringa leaf samples were taken in Jalajja Village, East Luwu Regency, Sample harvesting was carried out in the morning and the Moringa leaves were harvested After harvesting the old Moringa leaves, the Moringa leaves are washed thoroughly until there are no more After harvesting the old Moringa leaves, the Moringa leaves are washed thoroughly until there are no more After harvesting the old Moringa leaves, the Moringa leaves are washed thoroughly until there are no more Next, drying is carried out by airing it at temperature space for  $\pm 5$  days. The purpose of drying is to obtain Simplicia is not easily damaged, so it can be stored for a long time long. According to [15] the purpose of drying is to removes or removes water from a sample through energy absorption removes or removes water from a sample through energy absorption.

Table 1. Simplicia Standardization

Treatment	Results	Condition	Information
Water Rate	3%	<10%	Meet the standards
Shrink Drying	10%	>10%	Meet the standards

The dried samples were then ground to make it easier to process extraction process. According to [11] the finer the sample will be forms a larger surface, the interaction of the extraction fluid substances will The larger it is, the more effective the extraction process will be. Results Standardization of the quality of Moringa leaf simplicia obtained standardization values for water content of 3%, this is in line with the literature [14] which states that the water content in simplicia is not more than 10%, from the inspection results The water content shows that the simplicia used is in accordance with the parameters. states that the drying shrinkage value must be greater than the value water level.

Table 2. % Soakment Test

Extract Type	Simplisia weight	Extract Weight	%Rendamen
Condensed Extract	500 gr	35,5 gr	7,1%

The dried samples were then ground to make it easier to process extraction process. According to [11] the finer the sample will be is simple and does not require warming up to very small the possibility of the sample becoming damaged or decomposed, so this method is very suitable for extracting non-resistant antioxidant active substances against heat. Besides that, working on this method requires a lot of time long time and in a stationary state so that it allows many compounds to be released will be extracted [5]. Maceration extraction was carried out 2 times maceration times, due to the extract obtained in the first extraction maceration times, due to the extract obtained in the first extraction first obtained a concentrated extract as much as 21.9

grams while in The second maceration produced a thick extract of 35.5 grams with a yield percentage of 7.1%.

### 3.2. Organoleptic Test

Table 3. Organoleptic Test

Formula	Sunday	Form	Color	Smell
F0	1	Thick	Clear	Greentea
	2	Thick	Clear	Greentea
	3	Thick	Clear	Greentea
F1	1	Thick	Green Brownish	Greentea
	2	Thick	Green Brownish	Greentea
	3	Thick	Green Brownish	Greentea
F2	1	Thick	Green Brownish	Greentea
	2	Thick	Green Brownish	Greentea
	3	Thick	Green Brownish	Greentea
F3	1	Thick	Green Brownish	Greentea
	2	Thick	Green Brownish	Greentea
	3	Thick	Chocolate	Greentea

Organoleptic tests are carried out to describe shape, color and the smell of the preparation that has been made. Organoleptic tests are carried out by: testing or assessing the quality of preparations using human senses, namely sight, smell and touch. Color of preparations in this study influenced by the drying process, this is in line with National Standards Indonesia, which states that the normal color of simplicia is green brownish which is influenced by the drying process where the color is green In leaves, chlorophyll is oxidized to a brown color, The more Moringa leaf extract added to the preparation, the better the color the preparation will become increasingly brown. Meanwhile, the smell or aroma of the preparation influenced by the green tea essence which is added during manufacture preparation to disguise the distinctive smell of Moringa leaf simplicia.

### 3.3. pH Test

Table 4. pH Test

Formulation	Week 1	Week 2	Week 3	Range
F0	6	6	6	pH Essence
F1	5	5	5	according to
F2	5	5	5	namely 4,5 - 6,5
F3	4	4	4	(Asanah <i>et al.</i> , 2013).

pH measurements were carried out using a universal pH. In table 4.2 shows that the higher the concentration of Moringa leaf extract added to the preparation, the lower the resulting pH, so the preparation is safe to use on facial skin. This is marked with Essence pH requirements are 4.5 – 6.5 [1]. The pH becomes wrong an important indicator in preparations because pH can determine a preparation stable or not. A pH that is too acidic will cause irritation while the pH which is too alkaline will cause exfoliation on the skin. From the results Research that has been carried out has found that the higher the concentration extract in the preparation, the lower the pH in the preparation. This is in line with research conducted by (Yulis, 2019) which states that The higher the concentration of extract given, the lower the results The pH affects facial skin because there is more Moringa leaf extract in it contains phenol which is zero acid.

### 3.4. Viscosity Test

Table 5. Viscosity Test

Formulation	Time	Viscosity	Range
F0	Week 1	253.0 cPs	
	Week 2	420.0 cPs	

F1	Week 3	324.0 cPs	Standard viscosity according to [1] namely 230 - 1150 cPs
	Week 1	132.0 cPs	
	Week 2	444.0 cPs	
F2	Week 3	168.0 cPs	
	Week 1	132.0 cPs	
	Week 2	252.0 cPs	
F3	Week 3	240.0 cPs	
	Week 1	324.0 cPs	
	Week 2	492.0 cPs	
	Week 3	384.0 cPs	

Viscosity testing is carried out by observing the viscometer needle Brookfield Ametek® with spindle number 2 and speed 64s, test carried out in the 1st week to the 3rd week. Viscosity test results shows that the three preparations meet the viscosity value requirements namely 230 – 1150 cPs [1]. Increase and decrease in value The viscosity of essence preparations can be influenced by temperature differences during storage. The viscosity results can be seen in table 4.3 where the value obtained by this essence preparation is still included in the viscosity value good.

### 3.5. Stability Test

The physical stability test of the preparation can be seen from the durability of the essence preparation during storage. The physical stability test was carried out from week 1 to week 3, this test includes an oroleptic test, pH test, and viscosity test The essence preparation can be said to be stable when the properties of the preparation are still the same as at the time of manufacture. Stability testing is also a link between preparations with storage time [1]. From the first week Until the third week there was no change in color or smell. That matter which is a parameter that the material used can dissolve so that The dosage remains stable during storage.

### 3.6. Spreadability Test

Table 6. Spreadability Test

Formulation	Test Results	Range
F0	5 cm	According to (Montenegro <i>et al.</i> , 2015) a good spreadability for topical preparation is 4 - 7,5 cm.
	5,1 cm	
	5,5 cm	
F1	5,3 cm	
	5,1 cm	
	5 cm	
F2	5 cm	
	5,4 cm	
	5,3 cm	
F3	5 cm	
	5,7 cm	
	5,9 cm	

Spreadability is used to become one of the stock indicators Essence can be said to be a preparation that is easy to apply. The aim of this dispersion power test is to find out how much fast distribution of the preparation on facial skin. Based on the results obtained from table 4.6 states that formulation 0 – formulation 3 is satisfactory condition. This is in line with research conducted by [8] which states that the spreadability is good for topical preparations namely 4 – 7.5 cm.

### 3.7. Irritation Test

Irritation testing was carried out on 14 volunteers, this calculation was carried out by purposive sampling and using the Slovin technique according to [12] The F0 preparation was not tested for irritation because the F0 preparation did not contains Moringa leaf extract.

### 3.8. Antioxidant Activity Test

Table 7. Antioxidan Activity Test

Samples & Comparison	Concentration	%inhibition	Absorbance Blank	IC50	Category
F1	50 ppm	-90.8661	0.255333	18.92877	Very Strong
	100 ppm	-43.6031			
	150 ppm	-53.9164			
	200 ppm	-47.2585			
	250 ppm	-55.0914			
F2	50 ppm	-429.896	0.255333	18.92877	Very Strong
	100 ppm	-442.82			
	150 ppm	-425.196			
	200 ppm	-396.997			
F3	250 ppm	283.812	0.255333	4.879368	Very Strong
	50 ppm	-419.321			
	100 ppm	-415.796			
	150 ppm	-408.355			
	200 ppm	-439.295			
Vitamin C	2 ppm	0,259	0.255333	14,535	Very Strong (Ramadan, 2022)
	4 ppm	0,216			
	6 ppm	0,188			

The objective of testing the antioxidant activity of Moringa leaf essence preparations to determine the antioxidant activity in essence preparations Moringa leaves. From the results obtained it can be seen that the higher The concentration of the extract, the higher the antioxidant activity. This is proven by the antioxidant activity values obtained from the essence preparation with the addition of a 20% concentration of Moringa leaf extract has greater antioxidant activity, namely 4.8779368 compared to with Essence preparations with the addition of 10% Moringa leaf extract and 15%.

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