

Formulation And Antioxidant Test Of Body Lotion Etanol Extract Of Young Papaya Fruit (*Carica papaya* L) By DPPH Methods

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Young papaya and ripe papaya are often only used as side dishes at certain events, but only the flesh is used. In other words, papaya skin is only used as waste. This research aims to formulate ethanol extract of young papaya peel (*Carica papaya* L) into a body lotion preparation and test the antioxidant activity of body lotion in ethanol extract of young papaya fruit peel (*Carica papaya* L) using the DPPH method. In this research, 4 formulas were made with varying concentrations of young papaya peel extract (*Carica papaya* L). In the physical stability test, test parameters include organoleptic, pH, homogeneity, spreadability, stickiness, hedonics and irritation. The results of research based on physical stability tests showed that organoleptically, pH, homogeneity, spreadability, stickiness, hedonic and irritation for the 4 formulas were stable during storage. Based on the antioxidant activity test of body lotion, ethanol extract of young papaya fruit skin (*Carica papaya* L), it was found that body lotion F1 with a concentration of 2.5% had an IC50 value of 251.99 which was in the weak antioxidant category, body lotion F2 with a concentration of 3% had an IC50 value of 251.99. 202.86 and body lotion F3 with a concentration of 3.5% has an IC50 value of 162.36, where it can be concluded that body lotion F2 and F3 are in the moderate antioxidant category.

Key words: Young papaya skin, Body Lotion, Antioxidant

1. Introduction

The skin is the body's main defense system as it is the outermost layer of the human body. One of the causes of skin damage is free radicals. Environmental factors such as vehicle exhaust fumes, polluted water and ultraviolet rays from sunlight create free radicals that can accelerate the aging process. This can be overcome by the presence of antioxidants. Using cosmetics that contain antioxidant compounds can prevent premature aging of the skin caused by free radicals [1].

Antioxidants are compounds that have a molecular structure that can provide electrons to free radical molecules without disturbing their function at all and can break the chain reaction of free radicals [2]. Phenolic compounds and flavonoids are believed to have the ability to prevent the formation of free radicals and lipid peroxidation due to UV exposure so that they have activity as antioxidants.

Lotions are usually the most widely used for topical dermatology use because they have excellent absorption qualities and can be formulated into elegant cosmetic products, easily spread evenly, easier to clean or wash with water [3]. Free radicals can be counteracted with compounds that contain antioxidants, one of which can be obtained from natural ingredients.

One of the plants that can be used as traditional medicine is papaya (*Carica papaya* L). The abundant use of papaya in Indonesia certainly creates a large amount of waste in the form of skin, because Indonesian people immediately ignore papaya and throw it away after eating the fruit. Meanwhile, the total production of papaya in Indonesia in 2017 was 875,112 tons (Central Bureau of Statistics of Annual Fruit and Vegetable Crops, 2017). In Lamunre Village itself, young and ripe papayas

are often used as side dishes at certain events, but only the flesh of the fruit is used. In this sense, the papaya fruit skin is only used as waste.

Based on research Hikma et al., (2015) papaya fruit peel has a higher content of chemical substances, vitamins that are important in neutralizing free radicals, types of minerals, 0.5 grams of protein, 12.20 grams of fat and carbohydrates, flavonoids, alkaloids, and phenols. Papaya peel has strong antioxidant properties comparable to benzophenone [4].

Based on the description above related to the benefits of the skin for papaya (*Carica papaya* L) which is only considered as garbage waste that eventually rots, as well as the importance of using Body Lotion for the body, a study was conducted to make innovative Body Lotion preparations from young papaya skin extract (*Carica papaya* L).

2. Methodology

This research was conducted in September-October 2023 at the Solid Preparation Technology Laboratory, Pharmacy Study Program, Faculty of Health Sciences, University of Muhammadiyah Palopo.

Research variables

Independent Variable: Formulation of Body Lotion preparation of ethanol extract of young papaya fruit peel (*Carica papaya* L)

Dependent Variable: Organoleptical test, pH test, Homogeneity test, Spread Data Test, Hedonic Test, Irritation Test, Antioxidant Activity Test

Tools and materials

The tools used are analytical scales, blender, knife, basin, sieving tools, mortar, stamper, magnetic stirrer, horn spoon, sudip, porcelain cup, hotplate, gecep, analytical scales, parchment paper, measuring cup, spoit, petri dish, and lotion container. The materials used were young papaya (*Carica papaya* L) peel powder, stearic acid, triethanolamine, cetyl alcohol, glycerin, liquid paraffin, methyl paraben, propyl paraben, oleum, and distilled water.

Research Procedures

Extract Preparation

The extraction process was carried out by maceration method. 450 grams of young papaya (*Carica papaya* L) fruit peel simplisia powder was soaked using 1500 ml of 96% ethanol solvent and soaked for 3x24 hours in a container (jar) with occasional stirring. The results of the soak were filtered using flannel cloth to separate the extract from the phytate. The resulting phytate is then aerated using a fan at room temperature to produce a thick extract [5].

Making Body Lotion

Making Body Lotion preparations begins with weighing each ingredient according to the dose. The oil phase (Stearic acid, Cetyl alcohol, and Propyl paraben) is put into a porcelain cup and heated on a waterbath until it melts. The water phase (TEA, Glycerin, Liquid Paraffin, and Methyl paraben) is put into a porcelain cup and heated on a waterbath until it melts. After the water phase and oil phase are melted, put the oil phase into a mortar while stirring with fast and constant stirring until the preparation is homogeneous. Enter the water phase into the oil phase in the mortar little by little, stirring quickly until homogeneous. Add distilled water little by little while stirring until it forms a good lotion mass and reaches the desired volume. Finally

add perfume (Oleum Greentea) as a fragrance little by little to the base (F0). Do the same for F1, F2, and F3. Add the young papaya fruit peel extract (*Carica papaya* L) from the maceration results into the lotion base F1 with a concentration of 2.5%, F2 with a concentration of 3%, and F3 with a concentration of 3.5%. Put it into the lotion container.

Antioxidant Activity Test

Preparation of DPPH Master Solution. Weighed as much as 5 mg of DPPH and then dissolved in methanol PA until the limit mark using a 50 ml volumetric flask, having a concentration of 100 ppm after that the volumetric flask is then wrapped in aluminum foil and homogenized, incubated for 30 minutes [6].

Preparation of Blank Solution. 1 ml of DPPH solution and 3 ml of methanol PA were pipetted into the tube and homogenized. Let stand for 30 minutes and measured the absorbance at a wavelength of 517 nm [6].

Preparation of Vitamin C Comparator Solution. Comparison solution was made by making vitamin C mother solution. Vitamin C was weighed as much as 1 mg which was then dissolved with methanol as much as 10 ml and shaken until homogeneous. After that, the test tube was covered with aluminum foil until there were no parts exposed to light. Furthermore, vitamin C concentrations were made with various concentrations, namely 0.6 ppm, 1 ppm, 1.3 ppm, 2 ppm, and 2.6 ppm. The vitamin C series solution was made by pipetting the vitamin C mother solution and then adding methanol to a volume of 2250 μ l and then adding 750 μ l DPPH (0.02%) [7].

Preparation of Test Solution. Weighed 5 mg of sample dissolved in a 5 ml volumetric flask and added methanol PA to the limit mark to obtain a sample mother solution with a concentration of 100 ppm. Dilution of each formula sample with a concentration of (50 ppm, 100 ppm, 150 ppm, 200 ppm, 250 ppm). Each test solution was pipetted as much as 1 ml, 1 ml DPPH and 2 ml methanol then homogenized and incubated for 30 minutes [6].

Antioxidant Activity Measurement. Antioxidant activity testing with DPPH method is done by pipetting 1 ml of DPPH solution, 2 ml of PA methanol, and 1 ml of sample ocean into a recitation tube that has been closed using aluminum foil. This test was carried out for each of the concentrations that had been made. Then incubate for 0-5 minutes. The absorbance was then measured using a UV-Vis Spectrophotometer at a wavelength of 517 nm [6].

The IC₅₀ value is determined by making a linear curve between the concentration of the test solution (x-axis) and the % inhibition result (y-axis) obtained by the equation $y = a + bx$ which in this case can be calculated the IC₅₀ value using the following formula [8].

$$IC_{50} = \frac{(50-a)}{b}$$

3. Result and Discussion

3.1. Preparation of Young Papaya Fruit Peel Extract (*Carica papaya* L) by Maceration Method

The extraction method used is the maceration method. The maceration method was chosen because this method does not use heating so that negative influences that can affect the active compounds in the extract and then damage the chemical components contained in the sample can be avoided. In addition, maceration is also an easy extraction process because it uses simple

equipment. The maceration process uses containers made of glass because glass is more stable than plastic and metal so as to avoid chemical reactions between solvents and chemical compounds with containers. The container is always closed during the maceration process to avoid oxidation with outside air. The maceration process is carried out in a closed room to avoid the influence of sunlight on the stability of chemical compounds to be taken. During the maceration process several times stirring is done so that the solvent rotation occurs so that the extraction process will occur optimally. In the maceration extraction process, 96% ethanol solvent was used. The use of 96% ethanol as a solvent is because 96% ethanol is more selective, prevents mold, is non-toxic, neutral and absorbs well. In addition, 96% ethanol solvent can produce thicker extracts because the water content in 96% ethanol is less.

The yield is the ratio of the amount of extract produced from the sample extraction, the yield obtained indicates the value of the extract produced more and more. The yield value shows the amount of bioactive compound content contained in the extract (Rosa & Madiun, 2023) The greater the yield value indicates the more extract value produced. The requirement for the yield of thick extracts is not less than 10%. The yield obtained from papaya leaf extract (*Carica papaya* L.) is 20.7%, which means it has met the requirements of a good yield %.

3.2. Antioxidant Activity Test of Body Lotion Ethanol Extract of Young Papaya Fruit Peel (*Carica papaya* L)

In the antioxidant test, the DPPH method is used because it is a simple, easy, fast, sensitive method and only requires DPPH, comparative compounds (Vitamin A, Vitamin E and Vitamin C), solvents and samples in small quantities. The parameters of the DPPH method on antioxidant activity are based on the results of IC₅₀ (Inhibition Concentration 50%) IC₅₀ is the effective concentration needed to reduce free radical activity by 50%. The smaller the IC₅₀ means the greater the antioxidant activity. A small IC₅₀ value means that the potential antioxidant activity is the greatest because at small concentrations it is able to reduce free radicals by 50%. IC₅₀ can be calculated with a linear regression curve (Habiba, 2021). In the antioxidant test, Vitamin C is used as a positive control or comparison because Vitamin C has strong antioxidant properties. The results of the antioxidant activity test of Body Lotion young papaya fruit peel extract (*Carica papaya* L) and Vitamin C can be seen in the table below.

Table 1. antioxidant activity test of Body Lotion young papaya fruit peel extract (*Carica papaya* L) and Vitamin C

Samples and Comparisons	Concentration	Absorbance	Blanko	IC ₅₀
F1	50 ppm	0,514	0,232	251,99
	100 ppm	0,529	0,232	
	150 ppm	0,434	0,232	
	200 ppm	0,135	0,232	
	250 ppm	0,138	0,232	
F2	50 ppm	0,089	0,232	202,86
	100 ppm	0,078	0,232	
	150 ppm	0,063	0,232	
	200 ppm	0,106	0,232	
	250 ppm	0,157	0,232	
F3	50 ppm	0,185	0,232	162,36
	100 ppm	0,341	0,232	
	150 ppm	0,081	0,232	

Vit C	200 ppm	0,153	0,232	5,28 µg/ml [8]
	250 ppm	0,145	0,232	
	0,66 ppm	0,643	0,653	
	1 ppm	0,621	0,653	
	1,33 ppm	0,602	0,653	
	2 ppm	0,567	0,653	
	2,66 ppm	0,506	0,653	

The table above shows that the results obtained in the antioxidant activity test show that Vitamin C as a comparator has an IC₅₀ value of 6.99 which is classified as very strong, while the IC₅₀ value in F1 is 251.99 and F2 is 202.86 which is classified as weak, and in F3 has an IC₅₀ value of 162.36 which is classified as moderate.

In making a blank solution, the DPPH solution must be allowed to stand first (Operating Time). Operating Time or operational time is the time when the compound that absorbs light has a stable absorption. The measurement time of the DPPH method according to some recommended literature varies greatly, namely 5 minutes, 10 minutes, 20 minutes, 30 minutes and 60 minutes. In this study, 5 minutes was used.

Antioxidant activity test on UV-Vis spectrophotometry with a wavelength of 517 which is the maximum wavelength of DPPH. This maximum wavelength gives the most absorption and provides the greatest sensitivity.

4. Conclusion

- Based on the research that has been done, it is concluded that young papaya can be formulated into body lotion because it can meet good physical stability standards including organoleptical tests, homogeneity, spreadability, adhesion, pH, hedonic and irritation tests.
- From the evaluation of physical stability, it was found that the body lotion preparations made (F0, F1, F2 and F3) have met the requirements of a good body lotion. In the hedonic test, it was found that the percentage level really liked more, namely the F2 preparation compared to the F3 preparation.
- Based on research conducted on the antioxidant activity test of Body Lotion ethanol extract of young papaya fruit peel (*Carica papaya* L), the results obtained are the preparation of body lotion F1 has an IC₅₀ value of 251.99 which can be concluded that the preparation of body lotion F1 is included in the weak antioxidant category. While the preparation of body lotion F2 has an IC₅₀ value of 202.86 and the preparation of body lotion F3 has an IC₅₀ value of 162.36 which can be concluded that the preparation of body lotion F2 and F3 is included in the category of moderate antioxidants.

5. Acknowledgement

It is expected that in further research, young papaya fruit peel extract (*Carica papaya* L) can be formulated in various dosage forms. And it is expected that in future studies to add the concentration of extracts to the preparation to get better antioxidant results.

6. Reference

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