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Formulation and Evaluation of Avocado Leaf Extract (*Persea americana* Mill.) Cream Based on Variations Stearic Acid Concentration

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ABSTRACT

Avocado leaves (Persea americana Mill.) contain flavonoid compounds as much as 8.11 mg, so they have potential in the acne healing process. The aim of this research is to create a formulation and evaluate an avocado leaf extract cream preparation. The method used is experimental. Avocado leaf extract cream preparations are made based on varying stearic acid concentrations of 5%, 10% and 15Evaluation of the preparation includes organoleptic tests, homogeneity tests, pH tests, spreadability tests, adhesion tests and viscosity tests. Based on the organoleptic evaluation, the results showed that FI was slightly runny and contained bubbles, FII was slightly thick and FIII was thick. The FI color is brownish white, FII is yellowish white, and FIII is white, and all formulations have a characteristic creamy odor. The homogeneity test shows that all formulas have the same preparation homogeneous. The pH test of the cream preparation showed the same pH value, namely 6. The spreadability test resulted in good spreadability of the cream, namely between 5-6.8 cm. The cream adhesion test has an adhesion between 00.53-01.38 seconds. And finally, the viscosity test has a viscosity value between 4500-8900 mpas. From the results of this research, avocado leaf extract cream can be used as a cream preparation with the best stearic acid concentration being 15%.

Keywords : Formulation, cream, Stearic Acid, Avocado Leaf Extract.

INTRODUCTION

Cream is a semi-solid preparation in the form of an emulsion containing not less than 60% water and is intended for external use. The general characteristic of cream preparations is that they are able to stick to the surface where they are applied for quite a long time before the preparation is washed or removed (Anwar, 2012). One of the conditions that must be met for a good cream preparation is that it is physicochemically stable. Based on the above then Research needs to be carried out to make a cream preparation of ethanolic extract of avocado leaves that meets the physical and stability requirements cream and has antioxidant activity based on reducing DPPH radicals (Rahmah, Ramdan, and Lestari 2023) , by comparing the concentrations of tween 80 and span 80 emulsifiers.

Cream functions as a carrier for medicinal substances for skin treatment, as a lubricant for the skin, and as a protector for the skin, namely preventing skin surface contact with aqueous solutions and skin stimulation (Rahmah et al. 2023). Creams are formulated to be miscible with skin secretions (Sry wardiyah, 2015). Cream has two types, namely O/A and O/A. The general characteristic of cream preparations is that they are able to stick to the surface where they are applied for quite a long time before the preparation is washed off or removed. Cream can provide a shiny, oily, moisturizing effect, and is easy to spread evenly, easily penetrating the skin (Ikhsanudin, 2012).

In general, making or compounding cream preparations includes melting and emulsification processes. Components that do not mix with water, called the fat phase such as oil and wax, are melted together in a water bath at a temperature of 70-75ºC. while the water phase is a water-soluble component heated to the same temperature as the fat component. Then, the aqueous solution is slowly added to the liquid fat mixture and stirred constantly, while the temperature is maintained for 5-10 minutes to prevent crystallization of the wax or fat. Next, the mixture is slowly cooled with continuous stirring until it thickens. If the aqueous solution is not at the same temperature as the melted fat, some of the wax will become solid, resulting in a separation between the fat phase and the liquid phase (Widodo, 2013)

The physical stability of a cream preparation can be influenced by factors that influence the chemical stability of emulsifiers, suspending agents, antioxidants, preservatives and other active ingredients. Symptoms that are indicators of emulsion damage include creaming,

flocculation, coalescence, inverse (Tri Setiawan, 2010), (A.v Juwita, 2013). Evaluation of cream preparations includes pH measurement, spreadability test, stickiness test, viscosity test, temperature stability test (Avish d Maru et al, 2018).

Avocado (Persa Americana Mill) is a fruit that is often found in tropical areas and belongs to the Lauraceae family. Avocados have complete nutritional content. Avocados are rich in oil content in the form of monounsaturated fatty acids such as palmitic acid, palmitoleic acid, stearic acid, oleic acid, linoleic acid and linolenic acid (Sunil et al, 2015), (Segovia et al, 2018). Avocado contains carotenoids, vitamins, minerals, lecithin, B-sitsterol, polyphenols and flavonoids. Based on research that has been conducted, avocado extract has antioxidant, sunscreen and antimicrobial activity (Ramadan, 2019), (De Oliveira, 2013). Avocado leaves are extracted through a simple extraction process using a solvent with several stirrings at room temperature. The procedure is carried out by soaking the simplicia in a suitable solvent in a closed container. Stirring can increase the extraction speed. Extraction by maceration is carried out at room temperature (27ºC), so it does not cause degradation of metabolites that are not heat resistant (Depkes RI, 2006).

TOOLS AND MATERIALS

The materials used in this research were dry avocado leaf powder, avocado leaf extract, stearic acid, cetyl alcohol, glycerol, triethanolamine (TEA), methylparaben, propylparaben, distilled water, methanol, magnesium metal. The tools used are laboratory glassware, analytical scales, water bath, viscometer, pH meter.

METHODS

Each ingredient is weighed, melt the oil phase (stearic acid, cetyl alcohol and propylparaben) over a water bath with a temperature of 65^{o}-70^{o}C, then heat the water phase (TEA, Glycerol, Methylparaben, and Aquadest) over a water bath while Stir at a temperature of 65^{o}-70^{o}C, then heat the mortar and stamper, then the oil phase, pour it into the hot mortar, then add the water phase, grind until a cream base is formed, after that add avocado leaf extract to the cream base and stir until homogeneous. The evaluation of cream preparations is as follows:

a. Organoleptic Test

Cream preparations can be seen by observing the shape, smell and color of the preparation. The quality parameters of a good cream are a semi-solid dosage form, the cream has a characteristic odor of the extract used and is colored like the extract.

b. Homogeneity Test

The cream preparation is smeared on a piece of glass or other suitable transparent material and see whether there are lumps or not. The preparation is said to be homogeneous if there are no lumps in the preparation. A homogeneous preparation will give good results because the drug ingredients are evenly dispersed in the base material. So that each part of the preparation contains the same amount of medicinal ingredients.

c. pH Measurement Test

A total of 1 gram of avocado leaf extract cream was added to 5 ml of distilled water, then measured with a pH meter. The pH value of a good cream is 4.5-6.5 or in accordance with the pH value of human skin.

d. Spreadability Test

Take 0.5 gram of cream, place it on a round glass with a diameter of 15 cm, then place another glass on top and leave for 1 minute. Then measure the diameter of the cream spread after giving it an additional 100 gram load and leaving it for 1 minute, and measure the constant diameter. The spreadability of 5-7 cm shows a semi-solid consistency which is comfortable to use. Good dispersing power causes extensive contact between the drug and the skin, so that absorption of the drug into the skin occurs quickly.

e. Adhesion Test

Take 1 gram of cream, apply it to a piece of glass on the adhesion measuring device, then attach the second glass plate until the plates are together and give a load of 1 kg then let it sit for 5 minutes, then give a release load of 80 grams, record the time until the two plates come off. . A cream is said to be good if it has great adhesion to the place being treated (eg skin), because the drug does not come off easily so it can produce the desired effect.

f. Viscosity Test

Take the cream preparation, put it in a beaker glass, then insert spindle number 4 until the immersion limit, then set the spindle speed at 12 rpm. The viscosity value is known by observing the stable or constant number displayed on the screen.

RESULTS

Avocado leaf extract is made using a simple blended method, weighing 400 grams, then soaking it in a glass container with 3,400 ml of 70% ethanol solvent, changing the solvent every 24 hours with occasional stirring. The extract obtained was 13.80 grams with a yield of 3.45%.

Table. 1 Homogenity test of cream formulation avocado leaf extract (*Persea americana* Mill.)

Replication	FI	F II	FIII	Negative Control	Positive Control (+)
1	Homogenous	Homogen	Homogen	Tidak Homogen	Homogen
2	Homogenous	Homogen	Homogen	Tidak Homogen	Homogen
3	Homogenous	Homogen	Homogen	Tidak Homogen	Homogen

FI : Formulation with stearic acid concentration 5%
F II : Formulation with stearic acid concentration 10%
FIII : Formulation with stearic acid concentration 15%

Table.2 pH test of cream formulation avocado leaf extract (*Persea americana* Mill.)

Replication	FI	FII	FIII	Negative ontrol	Positive control
1	6	6	6	5	7
2	6	6	6	5	7
3	6	6	6	5	7
ANerage	6	6	6	5	7

Table.3 Viskositas test result of avocado leaf extract cream

Replication	FI	FII	FIII	Negative control	Positive control
1	4880 mPa.s	7900 mPa.s	8900 mPa.s	450 mPa.s	5600 mPa.s
2	4870 mPa.s	7890 mPa.s	7900 mPa.s	450 mPa.s	5600 mPa.s
3	4500 mPa.s	7600 mPa.s	8600 mPa.s	450 mPa.s	5600 mPa.s
Average	4750 mPa.s	7796 mPa.s	8466 mPa.s	450 mPa.s	5600 mPa.s

Table.4 Spreadabilitytest result of avocado leaf extract cream

Replication	FI	FII	FIII	Negative control	Positive control
1	6,8 cm	6,6 cm	6,4 cm	9	5
2	7 cm	6,6 cm	6,5 cm	9	5
3	6,6 cm	6,7 cm	6,8 cm	9	5
Average	6,8 cm	6,6 cm	6,5 cm	9	5

Table.5 Adhsion test result of avocado leaf cream extract

Replication	FI	FII	FIII	Negative Control	Positive control
1	01.38 detik	00.52 detik	00.66 detik	00.53 detik	01.18 detik
2	01.18 detik	01.58 detik	01.17 detik	00.51 detik	01.21 detik
3	01.18 detik	00.92 detik	00.53 detik	00. 53 detik	01.19 detik
Average	01.24 detik	01.00 detik	00.78 detik	00.52 detik	01.19 detik

DISCUSSION

The yield results obtained were not in line with research conducted in 2016 which stated that the yield of ethanolic extract of avocado leaves was 16.9% thick extract. (Dina Mailana, 2016). The cream preparation consists of 3 formulas based on variations in the stearic acid base. The results of the evaluation of cream preparations include organoleptic tests, homogeneity tests, pH tests, spreadability tests, stickiness tests, and viscosity tests on avocado leaf extract cream preparations (Persea americana Mill.).

The results of the organoleptic test showed that the cream preparation was slightly runny and contained bubbles for formulation I, slightly thick for formulation II and thick for formulation III. The differences in shape in each formulation are due to differences in the concentration of the base. Based on the homogeneity evaluation contained in the table.I it is known that formulations I. II and III show homogeneous results, which are characterized by the absence of lumps or coarse particles contained in the cream.

Homogeneous preparations provide good results because the drug ingredients are evenly dispersed in the base material. So that each part of the preparation contains the same amount of medicinal ingredients. Based on the pH test results in table 2, it shows that all cream formulations have a pH of 6, which means they are suitable for topical preparations. The pH value of a good cream is in accordance with the pH value of human skin, namely between 4.5-6.5. So from the evaluation results it was found that variations in stearic acid concentration had no effect on pH.

Spreadability evaluation showed in the table... it is known that the spreadability of all formulations of avocado leaf extract cream (Persea americana Mill.) shows a range between 5-6.8 cm. Thus, all formulations are within the predetermined threshold limit, namely around 5-7 cm, which means that the cream preparations produced show a semi-solid consistency that is comfortable for use on the skin and meets standards.

The results of the adhesion evaluation results are in the table... it is known that formula I ranges between 01.18 – 01.38, formula II ranges between 00.52 – 01.58, formula III ranges between 00.53 – 01.17, control (-) ranges between 00.51-00.53, and control (+) ranges between 01.18-01.21. The results obtained are in line with previous

research which states that there is an influence or relationship between stearic acid and the adhesive power of cream preparations, where the smaller the concentration of stearic acid used, the smaller the adhesive power produced.

CONCLUSION

Based on the research results, it can be concluded that the formulation of avocado leaf extract cream (Parsea americana Mill.) based on a variety of stearic acid bases with concentrations of 5%, 10% and 15% can meet the evaluation test standards that have been carried out. Formulation I is the best preparation based on the results of preparation evaluation tests that have been carried out including pH, spreadability, adhesiveness and viscosity tests. Formulations I, II and III Based on the results of the evaluation test, they have met the standards for the homogeneity test, pH test, spreadability test, adhesion test and viscosity test.

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