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Preparation of Moisturizing Lotion from Combination Extract of *Clitoria ternatea* Flower and Dragon Fruit Peels

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Abstract

Background: The skin is the organ that covers the entire human body and serves to protect the body from outside influences, so that the skin needs to be protected. The process of destruction of the skin characterized by the appearance of wrinkles, dried and cracked. Skin damage can occur due to the sun's rays. Antioxidants are needed to prevent, inhibit structural damage of the skin. This study aims to determine the best concentration from a combination of *Clitoria ternatea* L. flower extract and dragon fruit (*Hylocereus Polyrhizus* (F.A.C. Weber) Britton & Rose) peel extract in lotion formulation. The research was conducted by making extract preparation and formulate in lotion by differentiating its concentration F1 (5%:5%), F2 (3%:6%), F3 (7%:3.5%). **The results:** Lotion of combination *Clitoria ternatea* L flower and dragon fruit peel extract with concentration F3 (7%:3.5%), showed the best effect, because it gives higher moisture increase compared to initial conditions, from 32.6% become 65.2% after 4 weeks of usage. **The conclusion:** Combination *Clitoria ternatea* L. flower and dragon fruit peel extract can be formulated as a moisturizing lotion and with best combination in 7%: 3.5%.

Keywords: Lotion, Combination, Extract, Flower *Clitoria ternatea*, Dragon Fruit Peels

INTRODUCTION

The skin is an organ that covers the entire human body and functions to protect the body from external influences, so the skin needs to be protected and maintained its health. The process of skin destruction is characterized by the appearance of wrinkles, scales, dryness, and cracks. One of them is caused by free radicals. Antioxidants are needed that function to complement the electron deficiency of free radicals so as to inhibit the chain reaction¹.

Lotion according to Indonesian Pharmacopoeia III is a liquid preparation in the form of a suspension or dispersion, used as an external drug. It can be in the form of a solid suspension in the form of a fine powder with a suitable suspending agent or an oil in water type emulsion (o/w or w/w) with a suitable surfactant². One of the plants that are known to have health benefits and are widely used as cosmetics are *Clitoria ternatea* L. flowers³. The parts of flower (*Clitoria ternatea* L.) which are commonly used are flowers and leaves. *Clitoria ternatea* L. flowers can treat red eyes, tired eyes, throat, skin diseases, urinary disorders and are anti-toxins. *Clitoria ternatea* L. flower contains antioxidants, this can be seen from the color of the crown because it contains anthocyanins. Anthocyanins are pigments from flavonoids which is antioxidant⁴.

While the Red Dragon Fruit Skin (*Hylocereus Polyrhizus* (F. A. C. Weber) Britton & Rose) has compounds namely antioxidants that can also inhibit oxidation reactions, by binding free radicals and also smoothing and moisturizing the skin. Dragon fruit can be used as food and beverage coloring. In addition to being a food and beverage coloring agent, red dragon fruit skin contains very large antioxidants so that it can be used as a basic ingredient in cosmetics regarding the manufacture of red dragon fruit skin lotion formulations as lotions and gel⁵. The combination is done to improve the quality of the lotion preparation. The concentrations used for the Flower Extract (*Clitoria ternatea* L) and Red Dragon Fruit Skin (*Hylocereus polyrhizus* (FAC Weber) Britton & Rose) are (5% : 5%), (3% : 6%), (7%: 3.5%). In a previous study "Test Antioxidant Activity of Ethanol Extract 70% flower (*Clitoria ternatea* L.) stated that flavonoid levels and DPPH radical inhibitory activity with the highest content were found in 70% ethanol extract⁶.

MATERIALS AND METHODS

The samples in this study were *Clitoria ternatea* L. flower in full bloom, fresh and purple in color obtained from the city of Medan, Helvetia and dragon fruit peel (*Hylocereus polyrhizus*) which is fresh and red in color obtained from the Medan Dragon Fruit Garden.

Procedure

Preparation of *Clitoria ternatea* L. Flower Extract

A total of 300 grams of flower powder was put into a dark vessel, then added 2250 ml of 70% ethanol (comparison of simplicia and solvent (1:10) until all simplicia was submerged, closed, left for 5 days protected from light while stirring frequently. After 5 days, filter using filter paper (filtrate I), then the residue is soaked again with 750 ml of 70% ethanol for 2 days and filtered. Filtrate I and II are then evaporated using a rotary evaporator, until the thick extract was obtained⁷.

Preparation of Dragon Fruit Peels Extract

300 grams of dragon fruit peel simplicia was put into a dark vessel, then 2250 ml of 70% ethanol was added (comparison of simplicia and solvent (1:10) until all simplicia was submerged, closed, left for 5 days protected from light while stirring frequently. days filtered using filter, collect using maserate (filtrate I), then the residue is soaked again with

750 ml of 70% ethanol for 2 days (filtrate II), filtrate I and II then evaporated on a rotary evaporator, obtained a thick extract⁷.

Preparation of Lotion Formulation

Prepare tools and materials, weighed all the materials needed. Separate the ingredients into two groups, namely the oil phase and the water phase. The oil phase consists of stearic acid, liquid paraffin (mass I). The aqueous phase consisted of glycerin, TEA and methyl paraben (dissolved in hot water at 70°C) (mass II). Put mass I into a hot mortar, then add mass II little by little, grind until a lotion mass is formed. After taking the form of a lotion mass, the extract of *Clitoria ternatea* L. flower and dragon fruit peel (*Hylocereus polyrhizus*) was added little by little, adding olive oil perfume while grinding, until homogeneous⁸. Concentration were varied into 3 comparison (5:5), (3:6), and (7:3.5) part of *Clitoria ternatea* L. flower and dragon fruit peel.

Tabel 1: Formulation of Lotion

| Components | Concentration (gram) | | | |
|-------------------------------------------|----------------------|--------|--------|--------|
| | F0 | F1 | F2 | F3 |
| Extract Flower <i>Clitoria ternatea</i> L | - | 5 | 3 | 7 |
| Extract Dragon Fruit Peels | - | 5 | 6 | 3.5 |
| Stearic Acid | 2.5 | 2.5 | 2.5 | 2.5 |
| Triethanolamine | 1 | 1 | 1 | 1 |
| Liquid Paraffin | 7 | 7 | 7 | 7 |
| Glycerin | 5 | 5 | 5 | 5 |
| Methyl Paraben | 0.1 | 0.1 | 0.1 | 0.1 |
| Perfume | qs | qs | qs | qs |
| Aquadest ad | 100 mL | 100 mL | 100 mL | 100 mL |

Evaluation of Body Lotion

a. Determination of physical appearance

Organoleptic test

Organoleptic examination aims to determine the appearance of the lotion in the form of color, aroma and texture of the preparation which is carried out visually⁹.

pH Test

pH test is the degree of acidity used to state the level of acidity and alkalinity possessed by a preparation. pH testing is carried out to check and ensure that the pH of the lotion preparation that has been made is in accordance with the pH meter, before the preparation is dipped, the tool is calibrated first. good pH for skin is 4.5 – 6.5¹⁰.

Irritation Test

Irritation test on the skin of volunteers Irritation test was carried out on the lotion preparation with the aim of knowing that the lotion preparation made could cause irritation to the skin or not. Irritation test was carried out on 15 volunteers^{9,11}.

Viscosity Test

The results of the viscosity test are carried out to determine the amount of a viscosity of the preparation, where the viscosity value states the resistance of a liquid to flow. The viscosity required by Indonesian National Standard (SNI) 16-4399-1996 is 2,000 cp-50,000 cp (26)⁸.

b. Moisture effectiveness test

The activity test was carried out by visual observation, and using a skin analyzer, 15 volunteers who had been grouped were measured for moisture content using a skin analyzer before the treatment was done. The lotion was applied on the back of the volunteer's hand which had been marked every week for 4 weeks. Changes in skin condition were observed and re-measured every week on the skin of volunteers using a skin analyzer to see the increase in skin moisture levels and the results were recorded^{10,12}.

RESULT

Organoleptic Result

The organoleptic test was carried out by visual observation which included the shape, color, and odor. The results showed that the lotion preparation had an olive oil smell that derived from the perfume added, color varied in concentration and had a semi solid consistency.

Table 2: Organoleptic of Lotion

| No. | Formula | Shape | Color | Odor |
|-----|-------------|------------|------------|-------|
| 1 | F0 | Semi Solid | White | Olive |
| 2 | F1 | Semi Solid | Blue | Olive |
| 3 | F2 | Semi Solid | Light Blue | Olive |
| 4 | F3 | Semi Solid | Light Blue | Olive |
| 5 | Control (+) | Semi Solid | White | Olive |

Description:

F0 : Blank lotion (negative control)

F1 : Lotion of ethanol extract of *Clitoria ternatea* flower and dragon fruit skin 5% : 5%F2 : Lotion of ethanol extract of *Clitoria ternatea* flower and dragon fruit skin 3% : 6%F3 : Lotion of ethanol extract of *Clitoria ternatea* flower and dragon fruit skin 7% : 3.5%

From the results of observations of the homogeneity of body lotion extract of *Clitoria ternatea* flower and dragon fruit skin, it shows that all substances have been well distributed in semi-solid dosage forms, with uniform color, no coarse were obtained on the glass object, and there is no separation between the aqueous phase, oil phase and extract used.

Therefore, all lotion preparations were declared homogeneous.

pH Lotion

The pH test aims to determine the safety of the lotion to be used for the skin.

Table 3: pH value of Lotion

| No. | Formula | pH | | | Average |
|-----|-------------|-----|-----|-----|---------|
| | | 1 | 2 | 3 | |
| 1 | F0 | 5.8 | 6.4 | 6.5 | 6.2 |
| 2 | F1 | 5.8 | 6.5 | 6.4 | 6.2 |
| 3 | F2 | 6.0 | 6.0 | 5.9 | 5.9 |
| 4 | F3 | 6.0 | 6.0 | 5.7 | 5.9 |
| 5 | Control (+) | 5.9 | 5.0 | 5.2 | 5.3 |

Description:

F0 : Blank lotion (negative control)

F1 : Lotion of ethanol extract of *Clitoria ternatea* flower and dragon fruit skin 5% : 5%F2 : Lotion of ethanol extract of *Clitoria ternatea* flower and dragon fruit skin 3% : 6%F3 : Lotion of ethanol extract of *Clitoria ternatea* flower and dragon fruit skin 7% : 3.5%

Determination of pH is carried out using a pH meter; the pH meter is calibrated with a neutral standard buffer solution (pH 7.01) and an acidic pH buffer solution (pH 4.01) to show the pH value. The sample was weighed as much as 1 gram of the preparation and dissolved with 100 ml of distilled water. Then the electrode is immersed in the solution. The instrument is left to show the pH value until it is constant.

The number shown by the pH meter is the pH of the preparation.

Irritation Test

The results of the irritation test on the skin of volunteers were carried out by applying lotion to the skin behind the ear. The results of the irritation test can be seen as follows:

Table 4: Irritation Test Observation Data on Panelist

| No | Result | Panelist | | | | | | | | | | | | | | |
|----|------------|----------|---|---|----|---|---|----|---|---|----|---|---|-------------|---|---|
| | | F0 | | | F1 | | | F2 | | | F3 | | | Control (+) | | |
| | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 1 | Redness | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 2 | Itchy Rash | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 3 | Swollen | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |

Description:

F0 : Blank lotion (negative control)

F1 : Lotion of ethanol extract of *Clitoria ternatea* flower and dragon fruit skin 5% : 5%F2 : Lotion of ethanol extract of *Clitoria ternatea* flower and dragon fruit skin 3% : 6%F3 : Lotion of ethanol extract of *Clitoria ternatea* flower and dragon fruit skin 7% : 3.5%

Based on the results of the data in the table for 15 panelists who were divided into four groups of preparations, it shows that all panelists gave negative results on the irritation reaction parameters and it can be concluded that the lotion preparations that were formulated were safe to use. The parameters observed were the presence of red skin, itching or swelling. Can be concluded that Lotion preparations that

are formulated are safe to use because they do not cause irritation such as skin redness, itching and swelling.

Viscosity Lotion

The results of viscosity testing carried out using a Brookfield viscometer at a speed of 60 rpm with an L-4 spindle can be seen as follows:

Table 5: Viscosity Result

| Formula | Viscosity with three repetitions | | | Description | Average |
|---------|----------------------------------|------|------|-------------|---------|
| | 1 | 2 | 3 | | |
| F0 | 2529 | 2619 | 2829 | Qualify | 2659 |
| F1 | 3255 | 3543 | 3967 | Qualify | 3588 |
| F2 | 4298 | 4481 | 4603 | Qualify | 4460 |
| F3 | 5191 | 5492 | 5823 | Qualify | 5502 |

Description:

F0 : Blank lotion (negative control)

F1 : Lotion of ethanol extract of *Clitoria ternatea* flower and dragon fruit skin 5% : 5%

F2 : Lotion of ethanol extract of *Clitoria ternatea* flower and dragon fruit skin 3% : 6%

F3 : Lotion of ethanol extract of *Clitoria ternatea* flower and dragon fruit skin 7% : 3.5%

Moisture test

Skin moisture testing was carried out on 15 volunteers. The test is carried out on the skin area of the forearm. Then, all volunteers were first measured the initial skin condition /

before treatment by using a moisture content device (moisture). This aims to be able to see how much influence water content has on the preparation of ethanol extract of *Clitoria ternatea* L. flower and dragon fruit peel on skin moisture.

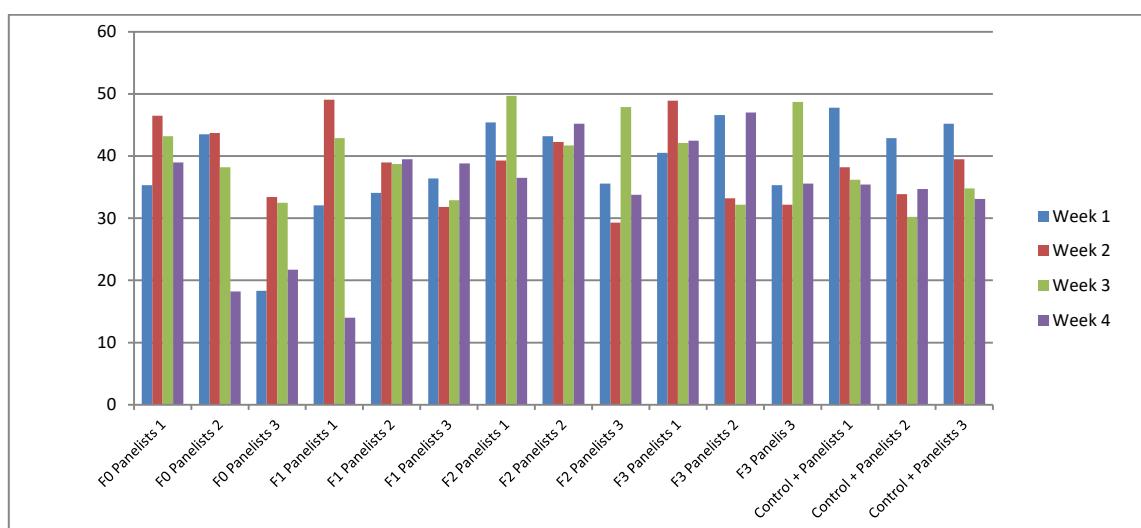


Figure 1: Oil Level Measurement Result

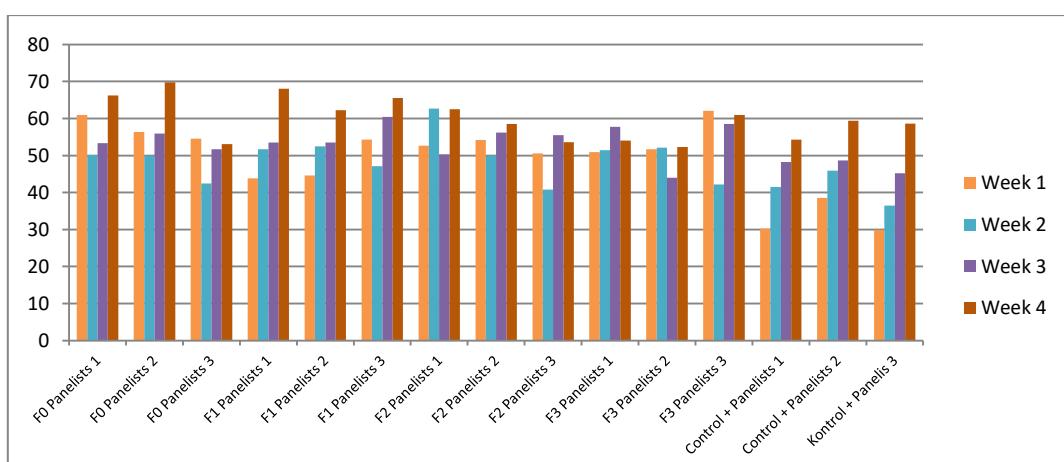


Figure 2: Skin Moisture Measurement Result

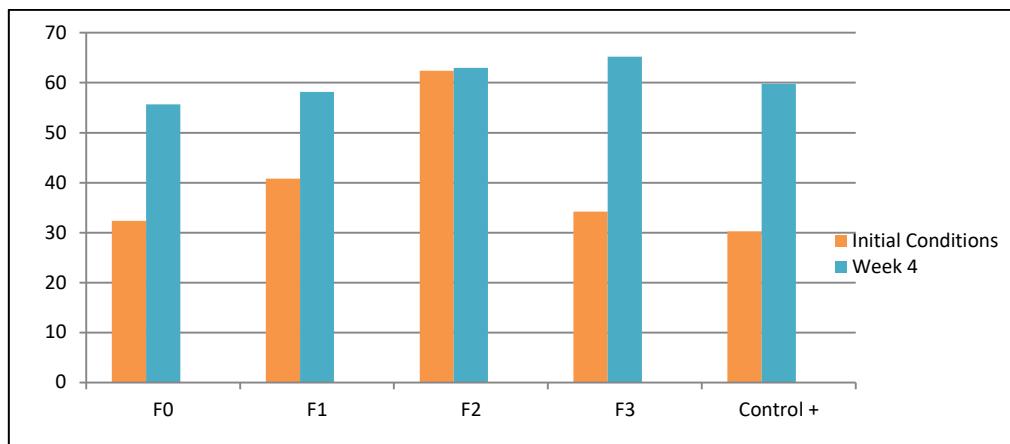


Figure 3: Skin moisture after 4 weeks

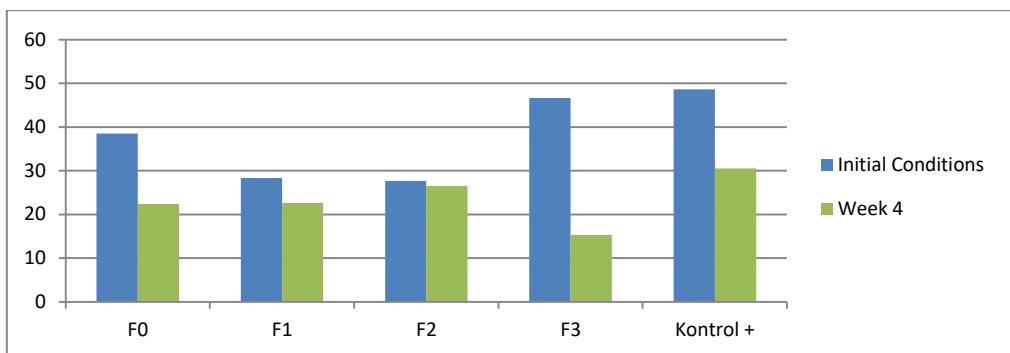


Figure 4: Oil levels on the skin after 4 weeks

DISCUSSION

Organoleptic test

Organoleptic formulations are very important as an aesthetic value to attract the attention and interest of consumers¹³. The resulting lotion meets the requirements of the color derived from the *Clitoria ternatea* flower and dragon fruit peel, namely weak blue, light blue and bright blue from these three colors, none of which is a dominant color and there is no dominant odor.

Homogeneity test

The homogeneity of the formulations of extracts of flower *Clitoria ternatea* L. and dragon fruit peel showed that all substances were well distributed in semi-solid dosage forms, with uniform color, no lumps were obtained on the glass object, and there was no separation between the aqueous phase, oil phase and extract used. All body lotion formulations produce homogeneous preparations. Homogeneous body lotion will be evenly distributed, so that when applied to the body provides the properties of the substances contained in the formulation so that it is easily absorbed into the skin and provides a moisturizing effect on the skin more quickly^{10,11}.

pH test

Formulation with a pH that matches the skin's pH does not irritate the skin when used. If the pH of the body lotion is low, it can irritate the skin, otherwise if the pH of the preparation is too high, it will cause the skin to become dry. The results of the pH test on all lotion formulations showed that they met the standard not less than 4.5 and not more than 6.5^{9,12}. Based on research conducted by Angriani Lisa (2019), the pH of the dried extract *Clitoria ternatea* L. flower was 4-5 which indicated that the extract was acidic. Therefore, the higher

the concentration of *Clitoria ternatea* L. flower extract, the lower the pH of the preparation obtained¹⁴.

Viscosity

The viscosity for body lotion required by the Indonesian National Standard 16-4399-1996 is 2,000 cp (centipoise) - 50,000 cp (centipoise). It can be seen that the lotion preparations of *Clitoria ternatea* L. flower extract and dragon fruit peel meet the requirements for viscosity value, a good viscosity greatly affects the effectiveness of a preparation because a lotion that is too runny will give a long enough time to absorb into the skin so that the lotion preparation will take longer to provide a moisturizing effect on the skin and does not fall into good viscosity if the lotion is too runny^{8,13}.

Skin Moisture test

Skin moisture test was performed on 15 volunteers. All volunteers were first measured the initial skin condition / before treatment by using a moisture checker^{11,12}. The lotion was applied twice a day for 4 weeks on the back hand of volunteers. The measurement results showed that there was an increasing of the water content on the volunteers' skin after treatment. The flavonoid content in *Clitoria ternatea* L. flower provides antioxidant activity. Flavonoid compounds have antioxidant properties, antioxidants are compounds that can prevent or inhibit skin structural damage. Therefore, the antioxidants contained in the flavonoid compounds in the *Clitoria ternatea* L. flower and dragon fruit peel can provide a moisture effect and maintain healthy skin. The higher the concentration of extract, will increase the moisture in the lotion preparation. Because the combination is done to improve the quality of moisture in the lotion preparation, with the highest concentration in 7% *Clitoria ternatea* L. flower and 6% dragon fruit peel^{4,5}.

From graph 1 above, it shows that during 4 weeks of treatment with regular lotion preparations, all panelists experienced an increase in the water content of the skin, especially in Formula F3 panelists 3 which had an average increase in water content higher than F1, and F2. From the initial condition of 32.3% to 65.2% in the fourth week, while the lowest increase was obtained from the F1 panelist formula 1 where the initial condition of the panelist's skin was 40.8% to 55.7% after 4 weeks. Based on this, lotion preparations from extract *Clitoria ternatea* L. flower and dragon fruit peel are known to have the potential to increase skin moisture. Oil content measurement data showed that some of the oil content in the panelists' skin decreased from the initial condition to the fourth week. The highest level of decline was in F3 Panelist 2 which experienced a decrease in oil content of 15.3% from the initial condition of 46.6% in the fourth week. While the oil content in panelists F1 and all panelists F2 increased, the difference was influenced by the skin condition of each panelist when applying lotion preparations.

CONCLUSION

Based on the research, it can be concluded that the extract of *Clitoria ternatea* L. flower and dragon Fruit (*Hylocereus polyrhizus* (F. A. C. Weber) Britton & Rose) peel can be formulated as a body lotion, and F3 provides the best moisturizing activity with an increase of humidity up to 65.2 %.

CONFLICT OF INTEREST

All authors have nothing to declared

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