Effectiveness Test Of White Skin Extract Cream From Red Watermelon (*Citrullus Lanatus*) On Increasing Elasticity, Sebum And Hydration In White Mice (*Mus Musculus*) Skin

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Abstract.
Skin moisturizing gel can provide a moisturizing effect on the skin. One of the natural ingredients that can be made into gel preparations is the white peel of watermelon (Citrullus Lanatus) because it contains a lot of citrulline, vitamin A, vitamin B2, vitamin B6, vitamin E, vitamin C, and protein, beta-carotene, lycopene, and water. The purpose of this study was to determine the activity of the ethanol extract of watermelon rind on increasing elasticity, sebum, and hydration in the skin of male white mice. This study used the Pretest-Posttest Control Group Design method. The stages of the research were sample collection, extraction, formulation of various concentrations of moisturizing gel preparations (0, 2.5%, 5%, and 10%). Tests were carried out on the skin of male mice for 4 weeks by measuring levels of elasticity, sebum, and hydration. The results of the phytochemical screening extracts contained flavonoids, saponins, steroids, triterpenoids, and glycosides. The evaluation results showed that all formulas met good preparation parameters and did not irritate the skin. The measurement results in the fourth week of each cream preparation group showed an increase in the levels of elasticity, sebum and hydration and differed significantly from the blank group ($p < 0.05$) and the highest increase occurred in cream with watermelon rind extract concentration 10 %. The results of this study indicate that the cream preparation of ethanol extract of watermelon rind can increase the levels of elasticity, sebum, and hydration of the skin.

Keywords: *Skin, Watermelon, Elasticity, Sebum, Hydration, and Anti-Aging*

I. INTRODUCTION

External factors (free radicals, sunlight, and pollutants) and internal factors (health, reduced structure of elastin and collagen in the skin, immune system, hormonal changes) which will eventually cause damage to skin cells and will also affect wrinkling and aging of the skin (aging) [1][2]. The aging process is a physiological process that always occurs in every living thing since the skin is the part of the body that is most often exposed to external factors [3].Indonesia as a tropical country will be exposed to ultraviolet light throughout the year, so it is very susceptible to skin aging in the population, especially in extrinsic skin aging due to long-term exposure to ultraviolet light [4]. Premature aging can occur at productive age, which is characterized by symptoms such as dry, rough scaly skin accompanied by the appearance of wrinkles, sagging quickly, and black spots or spots [5]. Skin aging caused by internal factors is defined as natural aging and is stimulated by changes in skin elasticity. Collagen is a protein found in the top layer of the skin that serves to attach connective tissue that is found in the extracellular matrix (ECM). If this protein is damaged, it causes changes in the composition of skin tissue so that it can cause the aging process [6]. External factors of the aging process mostly come from free radicals. These free radicals will induce the formation of ROS (Reactive Oxygen Species).

To build and achieve individual self-confidence with prevention and aging of the skin, WHO states that successful aging is not only getting old physically healthy, but also being mentally and socially healthy, including being happy and satisfied with oneself [7].There are many ways to prevent and treat skin aging, from using photoprotector materials, topical medications containing retinoid acid or hydroquinone, to more aggressive therapies such as chemical peels, microdermabrasion, botox injections, filler injections, and laser therapy [4][8][9]. Before carrying out prevention and treatment, it is very important to know about the

pathophysiology and clinical features of skin aging as a basis for selecting these therapeutic modalities.At present the awareness to look better, one of which is having healthy and youthful-looking facial skin, has become a necessity and has an impact on one's quality of life [10]. Skin disorders due to the aging process that were previously considered not a cosmetic problem are now often complained about and worried about by the public. In the United States tens of millions of dollars are spent each year on care and treatment with antiaging products [11]. One way to protect the skin from oxidative damage and the aging process is to use antioxidants which can be consumed through food such as vitamins A, C, E from vegetables or fruits [12] and come from natural ingredients which are owned by watermelon, the part of the fruit is the white skin of the watermelon.Watermelon (*CitrulusLanatus*) is a plant that contains high antioxidants, so it can be relied upon as a neutralizer for free radicals and reduces cell damage in the body [13].

On the white layer of watermelon which is underutilized contains substances that are important for health and needed by the body, one of which is citrulline. Citrulline is an antioxidant substance that is beneficial for skin health [13].The antioxidant content found in watermelon rind includes vitamin A, vitamin B2, vitamin B6, vitamin E, vitamin C, and quite a lot of protein. Meanwhile, beta-carotene and lycopene found in watermelon rind can be used as antioxidants and tighten facial skin and prevent wrinkles on the face [14]. Watermelon fruit contains a lot of water (about 92%) and contains 48.8% lycopene [15]. The content of total antioxidant compounds in the white skin layer of watermelon is 29.25 [13]. From the results of testing the antioxidant activity carried out in sunscreen cream from red watermelon peels, the IC50 value was 87.579 ppm [16]. Utilization of watermelon rind as a cosmetic cream preparation is an innovation in which cream with concentrate of watermelon rind extract is safer to use because it comes from natural ingredients and contains antioxidant activity.Based on the above, the authors are interested in conducting research on the formulation of anti-aging cream from red watermelon white rind extract.

II. METHODS

The type of research conducted was non-experimental and experimental research using a pre-test post-test control group design. Non-experimental research included determination of watermelon fruit, extraction, and preparation of anti-aging cream preparations using red watermelon rind white extract at concentrations of 2.5%, 5%, and 10%. Experimental research includes testing the anti-aging activity of male white mice.The research variables used are as follows: Independent variable (white extract of red watermelon rind). Dependent variable (moisture content and collagen content) and controlled variable (sex of mice, food and drink of mice, area of back of mice smeared with red watermelon white rind extract). The time of the research was carried out from May 2019 – June 2019.

The research location was at the Pharmacist White Rat Laboratory, Jalan Ngumban Surbakti, Elisabeth Nurse Academy Simpang, Medan.The sample in this study was mice (Mus musculus) obtained from the White Rat laboratory, Medan. The mice that were sampled had a body weight of about 25-30 grams per head, with ages ranging from 11-12 weeks. The overall sample size used in this study was 24 individuals. The sample is calculated by the Federer formula. Of the 24 mice, they were divided into 4 test groups, each of which consisted of 6 mice.The tools used in this study are tools for manufacturing simplicia, tools for making powders, tools for maceration, tools for making cream base and skin analyzer. The materials used were distilled water, glacial acetic acid, 2N hydrochloric acid, concentrated sulfuric acid, 96% ethanol, 10% FeCl3, isopropanol, Bouchardat reagent, Dragendorff reagent, Meyer reagent, Molisch reagent, lead (II) acetate, white skin on red watermelon.

Preparation of Red Watermelon White Bark Extract

The red watermelon is split open, then the red flesh and white skin are separated. The white skin is sliced into small pieces while the outer skin is discarded. After that, the white skin of the watermelon was dried in an oven for 2×24 hours at 48^{o}C, then crushed using a blender, then the fine samples were ready for extraction.The method of preparation is as much as 10 parts of red watermelon simplicia powder (1 kg of simplicia powder) soaked in 75 parts of 70% ethanol extract (7.5 liters) in a maceration vessel then closed, left for 5 days protected from light while stirring every day. The maserate was filtered, then the filtrate was macerated again with 25 parts of 96% ethanol solvent (2.5 liters) in a closed vessel, left in a cool place,

protected from light for 2 days then filtered. The maserate obtained was concentrated with a rotary evaporator at a temperature of 400-500 C until a thick extract was obtained [17].

Phytochemical Screening

1. Alkaloids

Each simplicia and extract were weighed ± 0.5 g and then added 1 ml of 2 N hydrochloric acid and 9 ml of distilled water, heated over a water bath for 2 minutes, cooled, and filtered. The filtrate obtained will be used for alkaloid tests. Take 3 test tubes, then put 0.5 ml of filtrate into them. In each test tube: Added 2 drops of Mayer's reagent, added 2 drops of Bouchardat's reagent, Added 2 drops of Dragendorff's reagent. Alkaloids are positive if sediment or turbidity occurs in two of the three experiments above [18].

2. Tanin

Each simplicia and extract were weighed ± 0.5 g, extracted with 10 ml of distilled water and then filtered, the filtrate was diluted with water until colorless. Take 2 ml of the solution and add 1-2 drops of 1% iron (III) chloride reagent. If a blue or green-black color occurs, it indicates the presence of tannins [19].

3. Saponins

± 0.5 g of each simplicia and extract was weighed and put into a test tube, then added 10 ml of hot water, cooled, then shaken vigorously for 10 minutes. If foam is formed as high as 1-10 cm which is stable for not less than 10 minutes and the foam does not disappear with the addition of 1 drop of 2 N hydrochloric acid indicates the presence of saponins [18].

4. Flavonoids

± 0.5 g of each simplicia and extract was weighed and added to 20 ml of hot water, boiled for 10 minutes, and filtered hot, to 5 ml of filtrate added 0.1 g of magnesium powder and 133 ml of concentrated hydrochloric acid and 2 ml of amyl alcohol, shaken, and allowed to separate. Flavonoids are positive if red, yellow, orange colors occur in the amyl alcohol layer [19].

5. Triterpenoids

± 1 g of each simplicia and extract was weighed, macerated with 20 ml of hexane for 2 hours, then filtered. The filtrate was evaporated in an evaporating cup and the Liebermann-Burchard reagent was added to the rest through the cup wall. If a purple or red color is formed which changes to blue purple or blue green, it indicates the presence of triterpenoids/steroids [19].

6. Glycosides

± 3g of each simplicia and extract was weighed and extracted with 30 ml of a mixture of technical ethanol and water (7:3) refluxed for 10 minutes, cooled, and filtered. Then 20 ml of the filtrate was taken, added 25 ml of distilled water and 25 ml of 0.4 M lead (II) acetate, then shaken, allowed to stand for 5 minutes, and then filtered. The filtrate was extracted with 20 ml of a mixture of chloroform and isopropanolol (3:2), repeated 3 times. The collected water extract is evaporated at a temperature not exceeding 50^0C. The remainder is dissolved in 2 ml of methanol. The remaining solution used for the experiment was put in a test tube and evaporated over the water bath. To the residue, 2 ml of water was added with 5 drops of molish reagent. Then slowly added 2 ml of concentrated sulfuric acid through the tube wall, a purple ring was formed at the boundary of the two liquids, indicating the presence of sugar bonds [18].

Table 1. Red Watermelon White Skin Extract Moisturizing Gel Formula

Matrial	Formulas			
	F0	F1	F2	F3
Red Watermelon White Peel Extract (%)	0	25	5	10
Stearic Acid (%)	15	15	15	15
Cetyl Alcohol (%)	10	10	10	10
Vaseline (%)	10	10	10	10
Mineral Oil (%)	12	12	12	12
Isopropyl Palmitate (%)	12	12	12	12
Glycerin (%)	5	5	5	5
Triethanolamine (%)	1	1	1	1

Deodorizer (%)	q.s	q.s	q.s	q.s
Preservative (%	q.s	q.s	q.s	q.s
Distilled Water (%)	100	100	100	100

The data on the anti-aging activity of red tomato fruit extract were analyzed using the SPSS 25 program. The data were tested for normality with the Shapiro-Wilk test and for homogeneity with the Levene's test. If the data is normal and homogeneous, then the data will then be tested with the Repeated Anova Test, followed by the Pearson correlation test and Multiple Linear Regression. If the data is not normal, then the test uses the Kruskal-Walli's test analysis followed by the Mann-Whitney test and the Multiple Linear Regression Test.

III. RESULTS AND DISCUSSION

The results of the phytochemical screening showed the presence of flavonoids, tannins, saponins, terpenoids, glycosides and alkaloids. The results of the phytochemical screening of the ethanol extract of red watermelon rind can be seen in the table below

Table 1. Results Of Phytochemical Screening Of Ethanol Extract Of Red Watermelon Rind

No	Secondary Metabolites	Results
1	Flavonoids	+
2	Tannins	-
3	Saponins	+
4	Steroids	+
5	Terpenoids	+
6	Glycoside	+
7	Alkaloids	-

Cream Formulation Results

Anti-aging cream preparations are made using the standard Schmitt formula which has been modified by removing several ingredients and adding ethanol extract of red watermelon rind [20]. The ethanol extract of red watermelon rind used in this cream is a concentration of 2.5%, 5% and 10%. The preparations obtained were in the form of brownish cream, homogeneous and odorless.

Anti-Aging Activity Test Results

The anti-aging effectiveness test was divided into 4 groups: the control group (blank), the group given watermelon rind ethanol extract at a concentration of 2.5%, the group given watermelon rind ethanol extract at a concentration of 5%, and the group given watermelon rind ethanol extract at a concentration of 10 % using the EH 900 U skin analyzer, where the test parameters included measuring the levels of elasticity, sebum and hydration in the skin of male mice. Measurement of anti-aging activity begins by measuring the initial skin condition before treatment, this aims to be able to see whether there is a change in the skin condition of male mice after basting using blanks and watermelon rind ethanol extract cream so that it is known how much influence the cream used in recovering. male mice skin that has undergone aging conditions.

Elasticity Level

Elasticity is the ability of the skin to stretch and return to its original shape. Measurements were carried out for 4 weeks by comparing the initial conditions (before applying the cream) between the group given the blank cream preparation (the control group), the group given the cream preparation of ethanol extract of watermelon rind with a concentration of 2.5%, 5% and 10% with the condition the skin of male mice after being given the application of blank cream preparations, watermelon rind extract cream preparations with concentrations of 2.5%, 5% and 10%. This was done to see the ability of blank cream preparations, cream preparations of ethanol extract of watermelon peels with concentrations of 2.5%, 5% and 10% whether they were able to increase the skin elasticity of male mice. The data obtained were tested for normality using the Kolmogorov-Smirnov test followed by the parametric One Way ANOVA test followed by the Tukey test to see whether there was a difference between the control group (blank) and the cream preparation group of watermelon rind ethanol extract with a concentration of 2.5%, 5 %, and 10%.In the initial conditions, the blank group had an average value of 47.17 ± 1.47. The cream group with a concentration of 2.5% watermelon rind ethanol extract had an average value of 48.00 ± 0.89 and had no

difference with the blank group (p>0.05). The cream group with a concentration of 5% watermelon rind ethanol extract had an average value of 48.50 ± 1.05 and had no difference from the blank group (p>0.05). Whereas in the cream group with a concentration of 10% watermelon rind ethanol extract, the average value was 47.33 ± 1.63 and there was no difference with the blank group (p>0.05). Measurements in the first week the average value in the blank group experienced a slight increase, with an average value of 47.50 ± 1.05. In the cream group with a concentration of 2.5% watermelon rind ethanol extract, there was an increase with an average value of 49.50 ± 0.55 and had no difference with the blank group (p>0.05). The cream group with a concentration of 5% watermelon rind ethanol extract had an average value 53.33 ± 1.21 and had a difference with the blank group (p <0.05).

The cream group with a concentration of 10% watermelon rind ethanol extract had an average value of 53.50 ± 2.43 and differed from the blank group (p <0.05).Measurements in the second week of the average value in the group the blank experienced a slight increase with an average value of 48.00 ± 0.89. In the cream group with a concentration of 2.5% watermelon rind ethanol extract, there was an increase with an average value of 51.50 ± 1.38 and had a difference with the blank group (p <0.05). The cream group with 5% watermelon rind ethanol extract concentration had an average value of 57.00 ± 0.89 and differed from the blank group (p<0.05). The cream group with a concentration of 10% watermelon rind ethanol extract had an average value of 58.67 ± 2.81 and differed from the blank group.(p<0.05).Measurements in the third week of the average value in the blank group experienced a slight increase with an average value of 48.83 ± 1.17. In the cream group with a concentration of 2.5% watermelon rind ethanol extract, there was an increase with an average value of 53.50 ± 1.87 and had a difference with the blank group (p <0.05). The cream group with a concentration of 5% watermelon rind ethanol extract had an average value of 61.00 ± 0.89 and had a difference with the blank group (p <0.05). The cream group with a concentration of 10% watermelon rind ethanol extract had an average value of 63.33 ± 4.23 and differed from the blank group (p<0.05).Measurements in the fourth week the average value in the blank group experienced a slight increase, with an average value of 48.83 ± 0.75. In the cream group with a concentration of 2.5% watermelon rind ethanol extract, there was an increase with an average value of 55.50 ± 0.55 and had a difference with the blank group (p <0.05). The cream group with a concentration of 5% watermelon rind ethanol extract had an average value of 62.67 ± 1.21 and differed from the blank group (p<0.05). The cream group with a concentration of 10% watermelon rind ethanol extract had an average value of 68.33 ± 5.05 and had a difference with the blank group (p <0.05).

From the above review it can also be seen that the cream with a concentration of 10% watermelon rind ethanol extract had the highest percentage increase, namely 44.36%, followed by the cream group with a 5% concentration of watermelon rind ethanol extract, which was 29.25%, then cream group with a concentration of 2.5% watermelon rind ethanol extract, which is 15.66%. Meanwhile, the lowest percentage increase was for the blank group, which was 3.58%.Signs of premature aging can be classified into four main categories from wrinkles/texture, lack of elasticity, blood vessel disorders and pigmentation [21]. Skin elasticity often appears as wrinkles where there is damage to the basal cell structure and degradation of the protein matrix [22]. Collagen has a close relationship with skin elasticity.One of the factors that can affect skin elasticity is the exposure of the skin to free radicals. Free radicals as the cause of skin aging comes from UV radiation from the sun. In living cells, solar UV radiation produces free radicals which can cause various chemical photo risks such as photo isomerization and photo oxidation. Photo-oxidation reactions occur due to the release of Reactive Oxygen Species (ROS) in the form of: superoxide anions (O2), hydrogen peroxide (H2O2) and hydroxyl radicals (OH) by chromophores that absorb ultraviolet light [23].The most extraordinary ingredient in watermelon skin is the citrulline compound. These compounds are said to provide antioxidant effects that protect the body from damage caused by free radicals. In addition, in the body citrulline can also be converted into arginine, an amino acid that is very important for the circulatory and immune systems [24].

Sebum Levels

The results of measuring sebum levels in each group started from the initial conditions until after giving watermelon rind extract for 4 weeks. The data obtained were tested for normality using the

Kolmogorov-Smirnov test, followed by the non-parametric Kruskall-Wallis test followed by the Mann-Whitney test to see whether there was a difference between the control group (blank) and the cream preparation group of watermelon rind ethanol extract with a concentration of 2.5 %, 5%, and 10%.Initial conditions in the blank group had an average value of 3.50 ± 0.55. The cream group with a concentration of 2.5% watermelon rind ethanol extract had an average value of 4.00 ± 0.89 and had no difference with the blank group ($p>0.05$). The cream group with a concentration of 5% watermelon rind ethanol extract had an average value of 4.5 ± 0.55 and differed from the blank group ($p>0.05$). Whereas in the cream group with a concentration of 10% watermelon rind ethanol extract, the average value was 4.00 ± 0.89 and had no difference with the blank group ($p>0.05$).Measurements in the first week the average value in the blank group experienced a slight increase with an average value of 3.67 ± 0.82. In the cream group with a concentration of 2.5% watermelon rind ethanol extract, there was an increase with an average value of 4.5 ± 1.05 and had a difference with the blank group ($p <0.05$). The cream group with a concentration of 5% watermelon rind ethanol extract had an average value of 5.33 ± 0.82 and differed from the blank group ($p <0.05$).

The cream group with a concentration of 10% watermelon rind ethanol extract had an average value of 5.33 ± 1.03 and differed from the blank group ($p<0.05$).Measurements in the second week the average value in the blank group experienced a slight increase, with an average value of 3.50 ± 0.55. In the cream group with a concentration of 2.5% watermelon rind ethanol extract, there was an increase with an average value of 4.50 ± 1.05 and had no difference with the blank group ($p>0.05$). The cream group with a concentration of 5% watermelon rind ethanol extract had an average value of 6.00 ± 0.63 and differed from the blank group ($p <0.05$). The cream group with a concentration of 10% watermelon rind ethanol extract had an average value of 5.83 ± 1.72 and differed from the blank group ($p<0.05$).Measurements in the third week the average value in the blank group experienced a slight increase, with an average value of 4.00 ± 0.89. In the cream group with a concentration of 2.5% watermelon rind ethanol extract, there was an increase with an average value of 4.67 ± 1.03 and had no difference with the blank group ($p>0.05$). The cream group with a concentration of 5% watermelon rind ethanol extract had an average value of 6.67 ± 0.52 and differed from the blank group ($p <0.05$). The cream group with a concentration of 10% watermelon rind ethanol extract had an average value of 6.00 ± 1.41 and differed from the blank group.($p<0.05$).Measurements in the fourth week the average value in the blank group experienced a slight increase, with an average value of 4.00 ± 0.89.

In the cream group with a concentration of 2.5% watermelon rind ethanol extract, there was an increase with an average value of 5.33 ± 1.21 and had no difference with the blank group ($p>0.05$). The cream group with a concentration of 5% watermelon rind ethanol extract had an average value of 7.17 ± 0.75 and differed from the blank group ($p <0.05$). The cream group with a concentration of 10% watermelon rind ethanol extract had an average value of 6.83 ± 1.60 and differed from the blank group ($p<0.05$).From the above review it can also be seen that the cream with a concentration of 10% watermelon rind ethanol extract had the highest percentage increase, namely 70.56%, followed by the cream group with a 5% concentration of watermelon rind ethanol extract, which was 60.00%, then cream group with a concentration of 2.5% watermelon rind ethanol extract, namely 35.00%. Meanwhile, the lowest percentage increase was for the blank group, which was 13.89%.Sebum is produced by the sebaceous glands. This gland is very sensitive to androgen hormones. This hormone causes the sebaceous glands to increase in size and increase sebum production [25]. Sebum reaches the skin surface via the pilosebaceous duct. On the surface of the skin, sebum mixes with other fats, originating mainly from the epidermis and together they form the surface fats of the skin. These skin surface fats are complex compounds consisting of squalene, waxes, esters, sterols, triglycerides, free fatty acids, monodiglycerides and cholesterol. Squalene, wax esters, triglycerides mainly come from the sebaceous glands, while sterol esters, cholesterol, polar lipids come from the epidermis [26].

Hydration Content (Water)

Hydration (water content) plays a role in premature aging. The importance of binding water in the skin is needed to keep the skin moist and prevent the skin from becoming dry. During the aging process, the barrier function decreases. Under certain circumstances, low temperature weather with low relative humidity,

the bond between ceramide and water will crystallize so that the skin becomes dry, rough and dull. In each group, measurements were taken starting from the initial condition where the skin had not been given any treatment and continued with measurements until the fourth week.Measurements were made every week for 4 weeks to determine the percent increase in hydration levels in the skin of male white mice. Measurements were made to see whether there was a change in the skin that had been treated in both the blank group and the cream preparation group of ethanol extract of watermelon rind with a concentration of 2.5%, 5% and 10%.The data obtained were tested for normality using the Kolmogorov-Smirnov test followed by the parametric One Way ANOVA test followed by the Tukey test to see whether there was a difference between the control group (blank) and the cream preparation group of watermelon rind ethanol extract with a concentration of 2.5%, 5 %, and 10%.The initial conditions in the blank group had an average value of 25.17 ± 1.17. The cream group with a concentration of 2.5% watermelon rind ethanol extract had an average value of 26.00 ± 0.89 and had no difference with the blank group ($p>0.05$). The cream group with a concentration of 5% watermelon rind ethanol extract had an average value of 26.50 ± 1.87 and had no difference from the blank group ($p>0.05$). Meanwhile, in the cream group with a concentration of 10% watermelon rind ethanol extract, the mean value was 26.50 ± 1.64 and there was no difference from the blank group ($p>0.05$).

Measurements in the first week the average value in the blank group experienced a slight increase with an average value of 26.17 ± 1.17. In the cream group with a concentration of 2.5% watermelon rind ethanol extract, there was an increase with an average value of 29.50 ± 1.05 and had a difference with the blank group ($p <0.05$). The cream group with a concentration of 5% watermelon rind ethanol extract had an average value of 31.00 ± 2.00 and differed from the blank group ($p<0.05$). The cream group with a concentration of 10% watermelon rind ethanol extract had an average value of 31.67 ± 2.16 and differed from the blank group ($p<0.05$).Measurements in the second week the average value in the blank group experienced a slight increase, with an average value of 27.00 ± 0.89. In the cream group with a concentration of 2.5% watermelon rind ethanol extract, there was an increase with an average value of 33.67 ± 1.75 and had a difference with the blank group ($p <0.05$). The cream group with a concentration of 5% watermelon rind ethanol extract had an average value of 34.83 ± 2.71 and had a difference with the blank group ($p <0.05$). The cream group with a concentration of 10% watermelon rind ethanol extract had an average value of 37.5 ± 1.87 and differed from the blank group ($p <0.05$).Measurements in the third week of the average value in the blank group experienced a slight increase with an average value of 28.00 ± 0.89. In the cream group with a concentration of 2.5% watermelon rind ethanol extract, there was an increase with an average value of 35.17 ± 2.86 and had a difference with the blank group ($p <0.05$).

The cream group with a concentration of 5% watermelon rind ethanol extract had an average value of 38.50 ± 2.35 and differed from the blank group ($p<0.05$). The cream group with a concentration of 10% watermelon rind ethanol extract had an average value of 43.33 ± 1.97 and differed from the blank group ($p<0.05$).Measurements in the fourth week the average value in the blank group experienced a slight increase, namely 29.00 ± 0.89. In the cream group with a concentration of 2.5% watermelon rind ethanol extract, there was an increase with an average value of 37.33 ± 2.58, having a difference with the blank group ($p <0.05$). The cream group with a concentration of 5% watermelon rind ethanol extract had an average value of 41.83 ± 2.93 which differed from the blank group ($p <0.05$). The cream group with a concentration of 10% watermelon rind ethanol extract had an average value of 48.50 ± 1.87 and differed from the blank group ($p<0.05$).From the above review it can also be seen that the cream with a concentration of 10% watermelon rind ethanol extract had the highest percentage increase, namely 83.32%, followed by the cream group with a 5% concentration of watermelon rind ethanol extract, which was 58.08% then cream group with a concentration of 2.5% watermelon rind ethanol extract, namely 43.71%. Meanwhile, the lowest percentage increase was for the blank group, which was 15.41%.This shows that the higher the concentration of the ethanol extract of watermelon rind, the higher the ability of the cream preparation to increase skin hydration levels

IV. CONCLUSIONS AND RECOMMENDATIONS

The ethanol extract of watermelon rind has activity towards increasing elasticity in the skin of male white mice and the best concentration is a cream preparation with a concentration of 10% watermelon rind ethanol extract with an average value of elasticity of 68.33 ± 5.05 and a percent increase by 44.36%.The ethanol extract of watermelon rind has activity towards increasing sebum levels in the skin of male white mice and the best concentration is cream with a concentration of 10% watermelon rind ethanol extract with an average sebum level value of 6.83 ± 1.60 and percent. an increase of 70.56%.The ethanol extract of watermelon rind has activity towards increasing hydration levels in the skin of male white mice and the best concentration is a cream preparation with a concentration of 10% watermelon rind ethanol extract with an average sebum level value of 48.50 ± 1.87 and percent. an increase of 83.32%.

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