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Effectiveness of strawberry serum (*Fragaria Sp.*) on rabbit skin

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Abstract---Strawberries (*Fragaria Sp.*) are type plant from family *Roseaceae* that have various content chemical that is *Anthocyanins*, *Ellagic acid*, *catechin*, *quer -cetin*, *kaempferol*, vitamins A, B and C. Fruits strawberry have function as antioxidant as well as anti-inflammatory so that extract fruit strawberries can used as antidote radical free and will more maximum when used in form care face like serum preparations. Purpose of study this for knowing effectiveness from preparation of serum extract fruit working strawberries _ as antioxidant for care face. The method used in the research this that is method experimental with the results of the data obtained were analyzed using the *one-way ANOVA method* (one-way variant) using how SPSS uses confidence level 95% or = 0.05. Study this cover extract fruit strawberry use method maceration. Research results

obtained _ on the physical assessment in the serum preparation of strawberry ethanol extract that met the physical test parameters including viscosity, pH, dispersibility and homogeneity tests, did not meet the parameters, namely organoleptic & the formula for anti-acne serum preparations of strawberry fruit ethanol extract was the best Formula III according to output The best antibacterial activity against *Staphylococcus aureus* using an inhibition zone of 17.5 mm, this indicates that the antibacterial activity of anti-acne serum preparations is included in the strong category.

Keywords---fruit strawberry, serum preparation, antioxidant.

1. Preliminary

Care for skin face is something emphasis main to get healthy skin, charming and fresh if viewed. Care skin face is also possible way _ done in order to maintain health , moisture experience as well as beauty skin face on someone especially for people woman (Ni Wayan Sasri Septiari, 2014) . Skin alone is the outermost organ from body that covers whole body human. Skin shape not enough over 15% of human body weight. outside _ skin is pores or finished cavity _ the place for Secrete sweat . Skin have many function that is for protector for body , tool sense touch as well as regulator body temperature _ (Butarbutar & Chaerunisaa, 2020). Mostly _ woman have desire for get skin a white, clean, healthy and well -groomed face, but a lot too Some of those who don't notice type each other's skin so arise existence skin problems _ the face in between acne, skin dry and trouble another face , then from that needed sufficient knowledge _ as well as appropriate care _ with type skin with consider product for skin defined face _ have composition safe and natural ingredients so that no cause effect big side _ when used for type different faces _ (Kumarahadi et al., 2020).

For minimize effect side that happened so made preparation product beauty from ingredient nature, because in the present many development from various product beauty made _ from existing materials _ in nature so that created natural and natural products so that many interested by the crowd the community is also the price relative product _ cheap and affordable, one of the current product _ many and many interested that is facial serum preparation. Serum is incoming supplies _ in category preparation emulsion which has viscosity low. Advantages serum preparations can give comfortable effect _ when worn as well as fast seep into the layers skin so that the benefits contained in serum can feel with fast (Hidayah et al., 2021). Serum has concentrate tall with ability deep penetration _ as carrier ingredient active for penetrate layer skin face. Ingredients that contain compound phenolic and flavonoids are the metabolites present in antioxidant (Ernawati et al., 2021).

Serum preparations containing antioxidant could prevent happening radical free on the skin. Free radicals is compound chemical no stable, highly reactive because compound this there is content electrons that don't in pairs. Free radicals this can caused because metabolism body and also from factor environment that is air polluted by pollution, vehicle fumes as well as cigarette

smoke, it could also be because exposure radiation goods electronic (Kurniasih et al., 2019). Free radicals can neutralized with antioxidant experience from in body with normal state. But if rate radical high free _ need antioxidant from outside. Protection to radical free and exposure UV rays are considered important, because UV rays can result in damage collagen in the skin, hyperpigmentation, inflammation of the skin as well as damage components in the skin that can trigger aging early . Possible solutions protect skin from radical free and exposure UV rays are needed antioxidant from outside so required effort for nurse skin so you can maintain health and moisture experience skin (Dwimayasanti, 2018).

Antioxidant is compounds that can hinder reaction oxidation with tie radical free so that can hinder damage to cells. because of that needed Innovative facial serum formulation _ with the benefits contained inside it can neutralize effect negative from radical free caused by factors _ bad environment _ (Aziza et al., 2022). one _ ingredient plants that can utilized for make natural serum preparation that is fruit strawberry . Fruit strawberry is plant fruit potential. Fruit this many contained substance phytochemical especially compound phenolic that can useful for health there is also a body content chemical that is *Anthocyanins, Ellagic acid, catechin , quer-cetin, kaempferol* , vitamins A, B and C. Fruits strawberry have concentration high antioxidants. _ Antioxidant in fruit strawberry working for ward off radical free (Sumarlan et al., 2018).

2. Research Methods

Study this is study purposeful experimental _ for knowing effectiveness face serum preparation extract fruit strawberry with The results of the data obtained were analyzed using the *one-way ANOVA method* (one-way variant) using how SPSS uses level 95% confidence or = 0.05.

Tools and materials

Tools used in research this that is maserator, tool glasses, stands and clamps, tripods, clamps wood, magnetic stirrer, mortar and stemper, tube reaction and rack, water bath, crucible, pH indicator, UV -Vis spectrophotometer.

Materials used among them extract fruit got strawberries _ from plantation strawberry from area Kendal district, Central Java, 70% ethanol, aquadest, glycerin, carbomer, Na Benzoate, Triethanolamine, Disodium EDTA (Aziza et al., 2022).

Procedure Study

Samples used in the manufacture preparation product beauty in the form of face serum that is fruit Strawberry already _ extracted Becomes extract fruit strawberry with use method maceration. Fruit strawberry obtained from plantation Strawberry located in the Kendal area, Central Java. Fruit Strawberry already _ picked cleaned use running water, throw it away part leaf strawberry then cut and dried until dry then extracted. How to take the sample (sampling) used namely simple random sampling. Fruit selected strawberry (*Fragaria Sp.*) researcher that is fruit that is still fresh, ripe as well as no rotten (Ernawati et al., 2021) .

Extraction Maceration Method

Simplicity fruit strawberry as much as 30 grams included in maserator then added solvent in the form of 300 ml of 70% ethanol (1:10) then placed at temperature room spare room _ from exposure ray sun , wait for 5 days sambal occasionally conducted stirring in a day for 1 minute (Permanasari et al., 2019) .

Phytochemical Screening

1. Alkaloid Test

Add extract to in 1 ml of 2N HCl, heat for \pm 2 minutes , strain , enter to in tube , then add Dragendorff and Mayer reagents . Formed sediment orange show existence Dragendorph and existence sediment white show Mayer's presence

2. Flavonoid Test

Warming up extract with a mixture of 0.1 g Mg powder, 1 ml HCl, and 2 ml amyl alcohol produce color Red Yellow or orange showing _ presence of flavonoids.

3. Farming test n

Extract heated for \pm 5 minutes and cooled. FeCl₃ solution is dripped to in tube reaction until formed color blue black showing _ existence tannins.

4. Saponins

Extract dripping to in tube reaction and boiled with 20 ml of water in water bath. Filtrate shaken and silenced for 10 minutes. Formed foam show presence of saponins.

5. Triterpenoid and Steroid Test

Add 5 ml of ether to in extract, filter and enter to in Cup evaporation until dry, add 2-3 drops of Lieberman-Buchard reagent, color purple show presence of triterpenoids, and color blue or green show presence of steroids.

Preparation of Preparation Formula

Table 1. Formula for Strawberry Fruit Extract Serum Preparations

Ingredient	F0	F1	F2	F3
Strawberry Fruit Extract	-	1.25	2.5	5
Carbomer	1	1	1	1
Glycerin	5	5	5	5
Triethanolamine	3	3	3	3
Na Benzoate	0.15	0.15	0.15	0.15
EDTA Disodium	0.2	0.2	0.2	0.2
Aquadest	Ad 100	Ad 100	Ad 100	Ad 100

The serum was made by dissolving the ethanolic extract of the strawberry using sufficient aquadest water, dissolving the sodium EDTA, dissolving the sodium benzoate, then dissolving the serum. Boil water to dissolve the carbomer . After the water boils, put the carbomer into the mortar then spiked with 15 milliliters of hot water, mix and shake well until similar , enter EDTA which has been dissolved using water mix and shake well until similar , add sodium benzoate mix and mix well until similar , add triethanolamine , mix and mix well until kind ,

then add Strawberry fruit extract little by little mix and shake well until kind of & finally add glycerin mix and mix well until similar (Fikayuniar et al., 2021) .

Preparation Evaluation Test

1. Organoleptic Test

The organoleptic test of the preparation was observed exclusively covers color, aroma, & sensation on the skin by observing the visual appearance & sensation on the skin.

2. Homogeneity Test

The homogeneity test was carried out using the method of smearing the preparation using using object glass, the preparation is squeezed using 2 object glass using ensure that the preparation uses no visible grain.

3. pH test

The pH test was performed using a calibrated pH meter. After calibration is complete then insert the electrode into the preparation container . See the pH value that is there still is in the display pH range that meets the conditions is 4.5 – 6.5.

4. Viscosity Test

Viscosity test is carried out by placing the preparation on a viscometer until the spindle is submerged. The spindle is regulated using a speed of 60 rpm, the preparation is put into a glass beaker and then the spindle is adjusted and the speed is adjusted. The viscosity range is in the range of 800-3000 cPs.

5. Spreadability Test

The preparation is placed on a round glass with a diameter of 15 cm , in another glass it is placed on top of the preparation and is squeezed and left for 1 minute. Added additional load & allowed to stand for 1 minute. Spread within 5–7 centimeters shows that the semisolid consistency is very comfortable to use.

6. Antibacterial Activity Testing

Testing of antibacterial activity of serum preparations Strawberry fruit extract was carried out using the well method, using a method of measuring the diameter of the inhibition of bacterial growth against *S. aureus bacteria* . The test method is a well has formed In the test medium, the test solution was dripped using a micropipette, then incubated in an incubator at 37°C for 24 hours, after which the diameter of the inhibition zone (clear zone) was measured . more or less the well using a caliper (Afifah & Nurwaini , 2019) .

Discussion

Strawberry Fruit Extract

The result of maceration of 500 g of dry simplicia Strawberry grains using 96% ethanol solvent obtained a thick ethanol extract of 21.64 g using a yield value of 4.33% thick extract.

Phytochemical Screening

Phytochemical screening of basil leaf extract was carried out using a phytochemical screening method. This screening is to identify the compounds contained in the strawberry fruit extract.

Table 2. Phytochemical Screening Test Results

Group of compounds	Screening Results
Alkaloids	-
Flavonoids	+
Tannins	-
Saponins	+
Triterpenoids and Steroids	-

Phytochemical screening test results in When the test for tannins, alkaloids, triterpenoids and steroids were not identified, as a result the compounds identified in the ethanol extract of strawberry fruit were saponins and flavonoids.

Preparation Evaluation Test

1. Organoleptic Test

The organoleptic test aims to see the physical properties of the preparation visually by looking at the color, smell and texture of the serum preparation made . The results of the organoleptic test of the four formulas form a serum preparation that sync using the criteria that is green, special smell of plants & liquid texture.

2. Viscosity test

Viscosity test aims to determine how thick the level of viscosity is based on a liquid, the output of the viscosity test explains that there is a decrease in the viscosity value in each formulation, this is caused due to the disparity of active substances in the preparation. In addition, it is determined the several factors that resulting in different viscosity values such as changes in temperature, pH, changes in conditions, quality and concentration based on raw materials.

Table 3. Strawberry Fruit Extract Serum Viscosity Test

Test	Criteria	Results			
		F0	F1	F2	F3
Viscosity	800-3000 cP	1997 ± 56.4	1997 ± 57.8	1997 ± 115.43	1996 ± 336.3

Of the four formulas, it was stated that they met the required viscosity requirements influenced for essence preparations are 800-3000 cp.

3. pH test

Measurement of the pH value was carried out to determine the safety of the preparation when worn as a result there is no irritation in the skin.

Table 4. pH Test of Strawberry Fruit Extract Serum

Test	Criteria	Results			
		F0	F1	F2	F3
pH	4.5 - 6.5	5.25±0.04	5.14 ± 0.05	5.10±0.08	5.07±0.12

The results of the pH test explained that there was a decrease in the pH value in each formulation, a decrease was due to the disparity in the concentration of the active substance that was present used, the greater the concentration used, the smaller the resulting pH value. The Ph range in each formulation meets the requirements of 4.5 - 6, 5 use put calm in the skin when applied.

4. Spreadability Test

The dispersion test was carried out to determine the distribution of the preparation in when applied, as a result can observing the ease of application of the preparation in the skin

Table 5. Spreadability Test of Strawberry Fruit Extract Serum

Test	Criteria (cm)	Results			
		F0	F1	F2	F3
Spreadability	5 - 7	5.2±0.14	5.2±0.20	5.4±0.25	5.4±0.50

The results of the dispersion test indicate that the concentration of the active substance used is increasing increasing the dispersion value, the wider the active substance will be distributed properly, the dispersion range is 5-7 cm

5. Homogeneity Test

The homogeneity test was carried out to find out and see the mixing of the components involved already made.

Table 6. Homogeneity Test of Strawberry Fruit Extract Serum

Test	Criteria (cm)	Results			
		F0	F1	F2	F3
Homogeneity	Homogeneous	Homogeneous	Homogeneous	Homogeneous	Homogeneous

The homogeneity test indicate a different arrangement kind marked using no lumps or coarse granules in serum preparation & evenly distributed.

6. Antibacterial Activity Test

Antibacterial Activity Test was conducted to determine the effect of the effective concentration based on an antimicrobial substance on the test bacteria using the well method.

Table 7. Antibacterial Activity Test of Strawberry Fruit Extract Serum

Serum Type	Inhibition Zone Diameter mm			Average
	I . treatment	Treatment II	Treatment III	
K-	0	0	0	0
K+	36.4	30.6	30.5	32.5
F1	10.4	10	10.2	10.2
F2	14.6	14.1	14.5	14.4
F3	17.7	17.3	17.4	17.5

The table above shows that the output of antibacterial testing in the anti-acne serum of strawberries in F1 has a clear zone value of 10.2 mm, the inhibition zone indicates that it is in the moderate category, F2 has a clear zone value of 14.4 mm using the powerful category . & F3 has a clear zone value of 17.5 mm , indicating that it is in the powerful category , seen based on the clear zone of the wellbore area . From the three formulas , it can be concluded that the best clear zone is obtained In F3 it is considered in the powerful category , increasing the concentration of basil leaf extract will increase it any inhibition formed . As for the clear zone obtained positive control is considered very powerful has a clear zone value of 32.5 mm, a clear zone around the wellbore is generated The presence of active compounds in strawberry grain extract , namely flavonoids and saponins.

Flavonoid compounds have antibacterial properties using the working procedure of the occurrence of damage to the permeability of the bacterial cell wall, microsomes, & lysosomes becomes output relationship between flavonoids & bacterial DNA. While saponins can interfere with the permeability of microbial cell membranes cause cell membrane damage result in appearance become a crucial component according to in microbial cells, namely nucleic acids, proteins and others.

Conclusion

In this study, the physical assessment in the serum preparation of strawberry fruit ethanol extract that met the physical test parameters including the viscosity test, pH, dispersibility and homogeneity, did not meet the parameters, namely organoleptic and the formula for the anti-acne serum preparation of strawberry fruit ethanol extract was Formula III . according to output The best antibacterial activity against *Staphylococcus aureus* using an inhibition zone of 17.5 mm, this indicates that the antibacterial activity of anti-acne serum preparations is included in the strong category.

Suggestion

It is recommended that further research is needed can do further research using pharmaceutical formulations that out of tune & other bioactivity research was carried out in basil leaves and other parts according to basil flora .

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