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Topical Herbal Therapy with *Solanum tuberosum* L. to Combat Acne

Neneng Siti Silfi Ambarwati[1] and Hanita Omar[2]

[1]Faculty of Engineering, Universitas Negeri Jakarta, Jl. Rawamangun Muka, East Jakarta, Indonesia, 13220
[2]Chemistry Division, Centre for Foundation Studies in Science, University of Malaya, Malaysia

Abstract

Acne is an infectious disease that usually occurs during puberty. Acne can be treated with topical, systemic, hormonal and herbal therapy. Potatoes can be used externally and are useful as anti- acne agents. Data analysis technique used in this study is the null hypothesis testing which was previously carried out normality tests and homogeneity tests as requirements for data analysis. Test the similarity of the two variants using the *t*-test with a significance level of 0.05 and the degree of freedom (df) = 8. The results showed that the acne reduction score (*Acne vulgaris*) on facial skin using a potato mask with five sample subjects ranged between the first treatment of 18.50 after treatment to 22.25. The results showed that the acne reduction score (*Acne vulgaris*) on facial skin using a control mask with five sample subjects ranged between the first treatment of 16.00 after treatment to 15.25. The study showed that the sample data from using potato mask and using control mask is usually distributed. The study also showed that the data was homogeneous. The results of the *t*-test shows that there is an effect of using a potato mask compared to a control mask.

Keywords: topical therapy, *Solanum tuberosum* L., combat acne

1. Introduction

Acne is an infectious disease that usually occurs during puberty [1]. At puberty, the oil glands that are at the base of the hair follicle and stimulated by the adrenal hormones begin to work actively [2]. Acne occurs because the follicle that connects the sebaceous oil gland to the surface of the skin is blocked by the presence of oil, dirt or bacteria so that the sebum produced by the gland accumulates under the skin [3]. Skin bacteria then overgrow so the skin becomes swollen and red, and hardens [4]. Acne usually appears on the face, neck, chest, back and upper arms [5].

To treat acne can be done with topical, systemic, hormonal and herbal therapy [6]. The ingredients are used topically between using benzoyl peroxide, antibiotics and retinoids [7]. While the ingredients for systemic therapy include the use of antibiotics

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and retinoids [7]. It's just that the use of these drugs can cause unwanted side effects and antibiotic resistance [8]. Therefore, alternative therapeutic acne whose detrimental effect can be ignored is by natural therapy (using herbal ingredients) [9]. The use of herbs to treat acne can be internal or external [10]. External ways are preferred because they are easier to use and do not feel a taste that is not like bitter taste [11].

Potatoes are plants that are usually eaten as vegetables [12]. Also, potatoes are also used for medicine, including overcoming hunger, control appetite, improve bowel function, treat urarthritis, infections, ulcers, burns, eye pain, wound healing, blood pressure reduction. Potatoes contain provitamin A, vitamin K, sulfur, vitamin C, nitrogen, 80% water, 100-110 kilocalories / 150 grams, 10 milligrams of sodium / 150 grams [13].

Potatoes can be used externally and are useful as anti-aging agents, sunburn medications, headache medications (rubbed on the temples), treat tired eyes, remove glue from the hands, sticky hand washing, and as shoe polish. The azelaic acid content of potatoes can inhibit the action of the tyrosinase enzyme so that it can reduce the resulting pigmentation spots acne unusually mild to moderate acne both causes inflammation and the onset of blackheads. External use of potatoes can also reduce the growth of bacteria in the skin follicles and prevent cell damage from free radicals [13].

The study aimed was to determine the potato content used in the study of the effect of using potato masks on reducing acne. This study used a quasi-experimental method with a control group, were used to measure changes in effects measured over time (every week within two months).

2. Methods and Equipment

2.1. Methods

This study used a quasi-experimental method, which in this study evaluated the relationship between the use of potato masks and the results of the reduction of acne on the facial skin by intervention not randomly. Quasi-experimental studies are categorized into three main types: time series design disconnected, design with control groups, and design without control groups. This study used a quasi- experimental method with a control group. Quasi-experimental studies in this study were used to measure changes in effects measured over time (every week within two months) [14].

The quasi-experimental research method meets the requirements for causality including temporality and the strength of relationships. With the control group at the

same time, measurement with time series (per week), sensitivity analysis and design elements can better support the hypothesis that interventions are causally related to results. This quasi-experimental study design uses observations collected prospectively using baseline measurements conducted before the study was conducted. This is done also for the control group. The control group uses a mask that does not affect the reduction of acne [14]. Each group uses five samples, so the number of samples used is 10 people in the age of adolescents (18-22 years). This sample is divided into two groups. Group A as many as 5 people used potato masks and group B as many as 5 people used control masks.

The method of making potato masks is to clean the potatoes in running water, cut the potatoes and skin, after which the potatoes are mashed and aerated so that the potatoes are not too runny [15].

The treatment in the sample is by preparing sterile ingredients and tools, then the face is cleaned of dirt and makeup, three experts diagnosed the skin with neutral facial cleansers, then the face mask is applied until the mask dries and is cleaned using warm water. After that, the skin is diagnosed by three expert assessors with a magnifying lamp [16].

Data analysis techniques in this study using the null hypothesis testing which previously carried out normality tests and homogeneity tests as requirements for data analysis. The normality test is done to find out whether the data is normally distributed or not by using the Lilliefors test [17].

Homogeneity test is done to find out whether the population of both groups is homogeneous or not. Tests are carried out using a formula [18]:

$$F = \frac{\text{Biggest Variance}}{\text{Smallest Variance}} \tag{1}$$

F = Variable Data Variance

If the calculation results get $F_{count} < F_{table}$ then H_0 is accepted meaning the research data is homogeneous and vice versa if the $F_{count} > F_{table}$ is H_0 is rejected and H_i is accepted which means the data is not homogeneous [18].

Test the similarity of the two variants using the *t*-test with a significance level of 0.05 and the degree of freedom (df) = 8 [19].

$$t = \frac{x_1 - x_2}{S_{gab}\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \tag{2}$$

$$S_{gab}^2 = \frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2} \tag{3}$$

x_1: average value of acne reduction results by using a potato mask

x_2: the average value of acne reduction results by using an acne mask

t: *t*-test value S^2_{gab}: standard deviation

S_1: variance mask potato group

S_2: variance mask group acne

n_1: number of group A members

n_2: number of group B members

If the calculation results get the value $t_{count} > t_{table}$ then H_o is rejected meaning there is an effect of using potato masks on the results of the reduction of acne on the facial skin $t_{count} < t_{table}$ then H_o is accepted which means there is no effect of using potato masks on results of the reduction of acne on facial skin.

2.2. Equipment

In diagnosing the facial skin samples are assisted with the use of a magnifying lamp that is a magnifying glass that is equipped with a light beam so that it can be more specifically seen facial skin abnormalities and reduce or minimize the relative error of diagnosis [20].

The research conducted is by using the assessment criteria sheet tool, by three experts [21].

3. Results

Based on the experimental results obtained an increase of 3.75. Variance in group A = 0.294. A standard deviation of group A = 0.542.

TABLE 1: Description of Group A Research Data Using Potato Masks Before and After Treatment.

Sample	I	II	III	IV	V	VI	VII	VIII	Amount
1	0.25	0.75	0.50	0.75	0.25	0.25	0.75	0.25	3.75
2	0.25	0.50	0.00	0.75	0.25	0.25	0.25	0.50	2.75
3	0.00	0.75	0.50	0.50	0.25	0.25	0.00	0.25	2.50
4	0.50	0.50	0.75	0.00	0.75	0.50	0.00	0.25	3.25
5	0.00	0.50	0.25	0.75	0.25	0.25	0.25	0.25	2.50
$\sum X_A$ = 14.750									
S^2 = 0.294									
S^A = 0.542									

Assessment data for acne facial skin care groups using a control mask.

Based on the experimental results obtained an increase of 0.75. Variance group B = 0.081. The standard deviation of group B = 0.285. Value distribution can be seen in the following table.

TABLE 2: Description of Research Data Group B Using Control Masks Before and After Treatment.

Sample	I	II	III	IV	V	VI	VII	VIII	Amount
1	0.00	0.00	0.00	0.50	0.25	0.00	0.00	0.00	0.75
2	0.25	0.25	0.25	0.25	0.00	0.00	0.00	0.00	1.00
3	0.00	0.00	0.25	0.25	1.00	0.00	0.00	0.00	1.50
4	0.00	0.00	0.00	0.00	0.50	0.50	0.00	0.25	1.25
5	0.00	0.00	0.25	0.50	0.00	0.25	0.25	0.00	1.25
$\sum X_B = 5.750$									
$S^2 = 0.081$									
$S^B = 0.285$									

The results showed that the acne reduction score (*Acne vulgaris*) on facial skin using a potato mask with 5 sample subjects ranged between the first treatment of 18.50 after treatment to 22.25.

The results showed that the acne reduction score (*Acne vulgaris*) on facial skin using a control mask with 5 sample subjects ranged between the first treatment of 16.00 after treatment to 15.25.

3.1. Analysis of requirements testing

3.1.1. Lilliefors normality test

The results of the calculation of the normality reduction of acne (Acne vulgaris) on the pustular facial skin using a potato mask are as follows:

1. Reduction of acne (*Acne vulgaris*) on facial skin using a potato mask is obtained = 0.241. At the significance level α = 0.05 and n = 5 obtained L_{table} = 0.337, thus Calculate < L_{table}, i.e. 0.241 < 0.337 means that the sample data is normally distributed.

2. Acne reduction (*Acne vulgaris*) on facial skin that uses a control mask is obtained = 0.163. At the significance level α = 0.05 and n = 5 obtained L_{table} = 0.337, thus Calculate < L_{table}, which is 0.163 < 0.337 means that the sample data is normally distributed.

TABLE 3: Acne Reduction Normality Test on Facial Skin Using Potato Masks and Control Masks.

No.	Groups	L_{count}	L_{table}	Test Criteria	Conclusion
1.	Reduction of acne (*Acne vulgaris*) lightly using a potato mask	0.241	0.337		Normal Distribution
				Thank H_o If $L_{Calculate} < L_{Normal}$	
2.	Reduction of acne (*Acne vulgaris*) mild using a control mas	0.163	0.337		Normal Distribution

3.1.2. Test for homogeneity

Homogeneity test is carried out by using the similarity variance test. The test results show F_{count} = 3.615 at the significance level α = 0.05 and the numerator 4 and df 4 denominator is F_{table} = 6.39. Thus, $F_{count} < F_{table}$, meaning that the data from both samples is homogeneous.

TABLE 4: Data Homogeneity Test Result of Acne Reduction (Acne vulgaris).

No.	Group	F_{count}	F_{table}	Test Criteria	Conclusion
1.	Reduction of acne (*Acne vulgaris*) lightly using a potato mask			Thank H_o If $F_{count} < F_{table}$	Homogeneous Data
		3.615	6.39		
2.	Acne reduction (*Acne vulgaris*) lightly using a control mas				

3.2. Hypothesis testing

Research hypothesis testing is done using the *t*-test at a significance level α = 0.05 The null hypothesis states that there is no effect on the results of facial skin treatments that use potato masks to reduce acne (*Acne vulgaris*).

While the alternative hypothesis states that there is an effect of facial skin treatments that use masks on the results of reducing acne on the skin.

The results of testing the hypothesis by using the *t*-test obtained *t*-count = 6.573 and *t*-table = 1.86 at the significance level α = 0.05 and df = 8. This states that $t_{count} > t_{table}$, then H_o is rejected and H_1 is accepted meaning that there is an effect of reducing acne (*Acne vulgaris*) on pimply facial skin using a potato mask.

4. Discussion

Potato masks (*Solanum tuberosum* L.) are preparations of masks made from potatoes which are mashed with a blender so that they are shaped like porridge. Excellent

potatoes can be used as a mask for acne type skin with better results. Potatoes are an ingredient that is used by many people to overcome various diseases including the world of beauty, namely to reduce acne on the skin.

Before using the potato first mashed with a blender and then added with rose water, so that it penetrates into the pores of the face and can reduce acne on the facial skin. From the data in the field shows treatment I to VIII can be concluded that the results of the reduction of acne (Acne vulgaris) that uses a potato mask are more influential than the control mask that can be seen from the sample graph A. On the graph the sample using potato masks increased by 3.75. Sample A has a value of 18.50 before treatment and after treatment changes to 22.25.

Sample B using a potato mask increased by 2.75. Sample B has a value of 17.50 before doing nurses and after treatment changes to 20.25.

Sample C using a potato mask increased by 2.50. Sample C has a value of 19.75 before doing nurses and after treatment changes to 22.25.

Sample D using a potato mask increased by 3.25. Sample D has a value of 17.25 before doing nurses and after treatment changes to 20.50.

Sample E using a potato mask increased by 2.50. Sample E has a value of 17.25 before treatment and after treatment changes to 19.75.

5. Conclusion

From the results of this study, it can be concluded that the use of potato masks can affect the reduction of mild acne on the facial skin.

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Conflict of Interest

The authors have no conflict of interest to declare.

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