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Comparison Of The Effectiveness Of Grape Seed And Onion Extract In Healing Cut Wounds In Wistar Rats

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ABSTRACT

In healing cut wounds, generally many use drugs with chemicals, the use of chemicals in wound healing has a lot of negative impacts, therefore it is necessary to conduct further research on the benefits of natural ingredients such as plants to treat cut wounds, some of the advantages of using medicinal plants include relatively safer, easy to obtain, cheap, does not cause resistance, and relatively harmless to the surrounding environment or the mixture between the plants, which has been used for treatment for generations. One way to treat cut wounds is to use herbal plants because they are cheaper, easier to get, and have low side effects. Compounds that play a role in the healing process of cut wounds include flavonoids, saponins, tannins, polyphenols, and essential oils. One of the plants that has health benefits is grapes. The purpose of this study is to find out the comparison of the effectiveness of grape seeds and onion extract in healing cut wounds in wistar rats. The type of research used in this study is experimental research with a true experimental method with a post-test only control group design pattern. The sample to be used in this study is 24 rats divided into 4 groups so that each group contains 6 rats. Data analysis uses the One-Way ANOVA test. The results showed that shallot gel extract had a significant effect on the percentage of reduction in incision length.

KEYWORDS *Extract, Gel, Onion, Grape seed, Cut wound*

INTRODUCTION

A wound is a condition in which the discontinuity of tissue is characterized by damage to body tissues, types of wounds consist of abrasions, cuts, lacerations or scars, stab wounds, bite wounds, and burns (Oktaviani & Ekaningtias, 2019). Wounds are ruptures or tears in the skin or disturbances from normal conditions of the skin, imbalances in the integrity of the skin (loss/damage to part of the tissue structure or intact), and damage to the continuity of the skin, mucosa, membranes,

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and bones or other organs of the body; cuts can be caused by animal bites and trauma of sharp objects that can damage tissue structures (Wati, 2020). Cut wounds are caused by sharp object slices, the wounds are elongated and often occur in everyday life (Rahmanda, 2020).

One of the most common types of wounds is incision wounds. According to (Wilantari et al., 2019) Incision, wounds can also be referred to as incisions, which can occur because the skin layer is sliced by sharp objects or instruments, for example, wounds that occur as a result of surgery or surgery.

Based on data from Basic Health Research (Kemenkes, 2018) in 2018, cases of incision wounds are cases of injuries that occur in daily life, especially in the industrial and household sectors. Based on the prevalence of national injuries in Indonesia, incision injuries have a percentage of 20.1%, where the data is ranked third (after abrasions and sprains) as the cause of the most injuries from the national injury prevalence with the highest incidence of incision wounds in Papua Province (38.5%). Based on these data, the correct mechanism in the treatment of incision wounds is an important aspect to support the healing of incision wounds that occur (Rose, 2023).

Closure of wounds can occur naturally, but open wounds due to sharp objects have great potential for exposure to bacteria that may, at worst, cause long-term disability to death. For this reason, a substance or agent is needed that can increase or accelerate the closure process (Ramadhani, 2020).

In healing cut wounds, generally, many use drugs with chemicals, the use of chemicals in wound healing has a lot of negative impacts. Therefore, it is necessary to conduct further research on the benefits of natural ingredients such as plants to treat cut wounds. Some of the advantages of using medicinal plants include being relatively safe, easy to obtain, cheap, not causing resistance, and relatively harmless to the surrounding environment or the mixture between such plants, which has been used for treatment for generations (Barus & Lestari, 2018).

One way to treat cut wounds is to use herbal plants because they are cheaper, easier to get, and have low side effects. Compounds that play a role in the healing process of cut wounds include flavonoids, saponins, tannins, polyphenols, and essential oils (Zeyn, 2022).

One of the plants that has health benefits is grapes. Grapes are the most widely grown fruit, and the total grape production worldwide is around 60 million tons and is classified as a by-product of the wine industry (Zhang et al., 2020). Grape seeds contain 40% fiber, 16% oil, 11% protein, and 7% phenol complex. The polyphenols in grape seeds are mostly flavonoids, gallic acid, flavan-3-ol monomers such as catechins, epicatechins, gallocatechin, epigalocactectins, and epicatechins 3-O-galat, and procyanidins in the form of dimers, trimers and procyanidin polymers. The main content of grape seeds is phenols such as proanthocyanidins (oligomeric proanthocyanidins) (Wijaya, 2021). The research was conducted by (Kinanti, 2022) comparing the effects of grape seed extract and vitamin K in the wound healing process in white rats, where the results showed that the administration of grape seed extract cream affected the length of the wound in the healing process of iris wounds in white rats.

In addition to grape seeds, shallots also have health benefits, shallots (*Allium cepa* L.) one of the plants that can be cultivated and are easy to trade by intensive farmers and is a plant belonging to the genus Allium which is widespread almost

all over the world (KHUSNIA, 2021). Some of the secondary metabolite compounds in onion bulbs are flavonoids, tannins, and saponins. According to (Hasibuan et al., 2020) Shallot, bulbs contain chemical compounds, namely flavonoids, saponins, tannins, alkaloids, steroids, and terpenoids. In addition to having a fairly complete nutritional content, shallots are also rich in active chemical compounds (sulfur compounds). These compounds play a role in the formation of aromas and provide positive pharmacological effects for health. The content of active chemical compounds in shallots is S-Alil-L-Cysteine-Sulfoxide (SAC/Alliin), Prostaglandin A-1, Adenosine, Diphenyl-amine, Cycloaline, Methyl-alanine, Dihydro-alinine, Proxenyl-alinine, Profil-alinine, Kaemferol, Floroglusinol, Quercetin (Aryanta, 2019).

Shallots are plants that have tubers, the skin and flesh are reddish-purple. Shallots can live in high altitudes. The active compounds owned by shallots are Allisin and Alliin, Flavonoids, Alilpropyl disulfide, Phytosterols, Flavonols, Pectin, Saponins, Tripropanal sulfoxide, and acetogenin compounds. Flavonoid compounds that are anti-inflammatory and anti-microbial are very useful in helping the healing process of inflammation due to bruises, burns, or inflammation of internal organs (Nilan et al., 2019).

Embarrassing previous research (Hidayah et al., 2019) shows that the administration of shallot extract cream (*Allium Cepa* L.) can heal wounds in white rats (*Rattus Norvegicus*). The most effective burn healing with a concentration of 55%. From the benefits contained in the da; Am grape seeds and shallots eating, Researchers want to know more about the benefits of grape seed and onion extracts.

Based on the description above, the researcher wants to study more deeply the benefits of grape seeds and shallots in healing cut wounds in rats. Therefore, the title of this study is "Comparison of the Effectiveness of Grape Seeds and Shallot Extract in Healing Cut Wounds in Wistar Rats."

This study aims to:

1. Compare the effectiveness of grape seed extract and shallot extract in healing wounds in Wistar rats, especially in terms of reducing wound length during the healing process.
2. To determine the content of active compounds in grape seeds and shallots that contribute to the wound healing process, such as flavonoids, tannins, and saponins.
3. To identify differences in wound healing rates between treatments with grape seed extract, shallot extract, gentamicin gel, and the control group without treatment.
4. To measure the percentage reduction in wound length in each treatment group as an indicator of the effectiveness of grape seed and shallot extracts.

Benefits of Research The expected benefits of this study are:

1. Scientific contribution to the development of natural ingredients in wound healing. This study provides information on the potential of grape seeds and shallots as natural ingredients that are effective in accelerating the healing process of cuts, which can be an alternative to the use of chemical drugs that have side effects.
2. Development of herbal-based health products. The results of this study can be used as a basis for the development of pharmaceutical or cosmetic products

based on grape seed and shallot extracts, especially products used in wound care.
3. Utilization of local natural resources. This research supports efforts to utilize natural ingredients that are easily obtained and safer for health and the environment, such as grape seeds and shallots, which have the potential to be widely used in society.
4. Reduce the risk of side effects from using chemicals. By providing herbal-based alternatives that have been proven effective, this research can help reduce dependence on chemical drugs that often have negative side effects.

RESEARCH METHOD

The type of research used in this study is experimental research with a true experimental method with a post-test-only control group design pattern.

Experimental research methods can be interpreted as research methods used to find the effect of certain treatments on other treatments under controlled conditions" (Moleong, 2019). Experimental methods are divided into three large groups, namely Pre-Experimental, True Experimental, and Quasi-Experimental. In this study, the author uses a quantitative research type using True Experimental Design (real experiment) because, in this design, researchers can control all external variables that affect the course of the experiment.

The population of this study used 2-3 months of male *white rats Rattus norvegicus* of the Wistar strain. In this study, the determination of the number of samples using the Frederer formula is as follows:

$$(t-1)(n-1)\geq 15$$

Information:

t: Number of Experimental Groups

n: Number of repetitions or number of samples per group

In this study, four treatment groups were used so that the calculation of the number of samples was as follows:

$$(4-1)(N-1)\geq 15$$
$$3(n-1)\geq 15$$
$$3n-3>15$$
$$3n>18$$
$$n=18/3$$
$$n=6$$

So, the total sample that will be used in this study is 24 mice divided into four groups so that each group contains six mice.

The treatment groups in this study are as follows:

1. **Negative Control Group**: The negative control group was given an incision wound and then only closed with sterile gauze 1x a day for seven days.
2. **Positive Control Group**: The positive control group was given an incision wound followed by the administration of gentamicin antibiotics, then covered with sterile gauze 1x a day for seven days.
3. **Treatment Group 1**: Treatment group 1 was given an incision wound followed by the administration of grape seed extract 0.5 mg/head, then covered with sterile gauze 1x a day for seven days.

4. **Treatment Group 2**: Treatment group 2 was given an incision wound followed by the administration of shallot extract 0.5 mg/head, then covered with sterile gauze 1x a day for seven days.

Research Instruments

The instruments in this study include tools and materials. The tools used in this study were animal cages, digital scales, charter knives, razors, Handschoen, sterile gauze, non-woven bandages, calipers, analytical balances, pipettes, *pyrex* measuring cups, spatula, stirrer, stirrer, Buchner funnel, *rotary evaporator,* water bath, *sterile scalpel*. The ingredients used in this study were white rats, animal feed, fresh onions, grape seeds, 70% ethanol, propylene glycol, glycerin, 70% alcohol, and *Aquadest*.

Research Procedure

This study involved the adaptation of 24 rats for one week, with feeding according to 10% of body weight, ad libitum drinking water, and the cleanliness of the cage was maintained by replacing the husk every three days. Grape seed and onion extracts are made using the maceration method with 70% ethanol and then formulated into a gel. Phytochemical tests are carried out to identify compounds such as flavonoids, tannins, terpenoids, and saponins. The rats were anesthetized with ketamine, and a 2 cm long incision was made on the rat's back. The extract was applied topically daily for seven days, and wound healing progression was measured based on the reduction in wound area, length, and diameter.

Data Analysis

From the results of the research that has been carried out, all the results of the examination and calculation are recorded and then analyzed using SPSS 25 *for Windows*. The normality of the data was tested using *Shapiro-Wilk* because, in this study, the number of samples was ≤50, then continued with *Levene's test* homogeneity test to find out whether two or more variants of the data group had the same variant or not. If the conditions have been met and the data distribution curve is normal, a different test is carried out. Normal data were analyzed parametrically using *the One-Way* ANOVA test, while abnormal data were analyzed non-parametrically using the *Kruskal-Wallis* test. The hypothesis can be said to be accepted when *the p*-value is <0.05. Then, a *Posthoc test* was carried out with *the Tukey* HSD test for normal data distribution or *the Mann Whitney* test for abnormal data distribution to see the difference between treatment groups.

RESULT AND DISCUSSION

Phytochemical Screening

Shallot gel extract and grape seed gel were analyzed for phytochemical content through phytochemical screening, and the results of the phytochemical screening can be seen in the following table.

Table 1. Results of Phytochemical Screening of Shallot Gel Extract

Secondary Metabolites	Result
Flavonoids	+
Alkaloids	+
Saponins	+

Tannins	+
Glycosides	+
Steroids/Triterpenoids	+

Based on the table of phytochemical screening results on shallot gel extract above, it can be seen that shallot gel extract has phytochemical content in the form of flavonoids, alkaloids, saponins, tannins, glycosides, and steroids/triterpenoids.

Table 2. Results of Phytochemical Screening of Grape Seed Extract Gel

Secondary Metabolites	Result
Flavonoids	+
Alkaloids	-
Saponins	+
Tannins	+
Glycosides	+
Steroids/Triterpenoids	+

Based on the table of phytochemical screening results on grape seed gel extract above, it can be seen that grape seed gel extract has phytochemical content in the form of flavonoids, saponins, tannins, glycosides, and steroids/triterpenoids.

Wound Length

The length of the wound in the Wistar rat was given after being anesthetized with the administration of ketamine at a dose of 20 mg/KgBB through the intramuscular route with the initial step of shaving the hair around the rat's back and shaving with a diameter of approximately 3 cm which was then cleaned with 70% alcohol. This treatment is carried out equally for each test animal. The wound was made on the back of the rat by making a 2 cm incision using a sterile scalpel. The following are the results of the observation of wound length in 4 groups of Wistar rat samples.

Table 3. Results of Observation of Wound Length

Group	Wound Length (mm)				
	H0	H1	H3	H5	H7
Negative	20.4	19.0	15.9	15.0	11.8
Gentamycin Gel	20.5	18.6	15.5	13.3	6.5
Shallot Gel	20.5	16.9	13.4	9.4	4.5
Grape Seed Gel	20.5	18.4	14.7	13.2	8.2

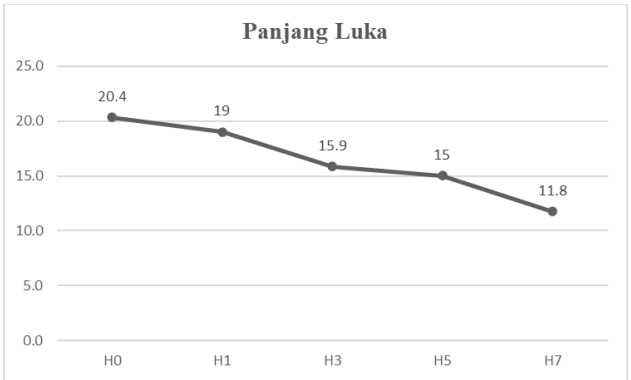

Figure 1. Wound Length Wistar Negative Control

Based on the wound length graph of the negative control group above illustrates a decrease in wound length from the day of surgery to the 7th day. On H0, the length of the wound was 20.4 mm, on the 1st day, the remaining wound was 19 mm, on the 3rd day, the remaining wound was 15.9 mm, on the 5th day, the remaining wound was 15 mm, and until the 7th day there was still a wound of 11.8 mm and the wound had not closed completely.

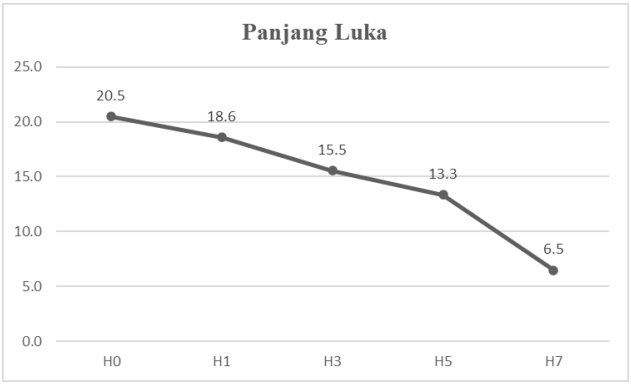

Figure 2. Wound Length Wistar Group Gentasimin Gel

Based on the wound length graph of the group given gentamicin gel above illustrates a decrease in wound length from the day of surgery to the 7th day. On H0, the length of the wound was 20.5 mm, on the 1st day, the remaining wound was 18.6 mm, on the 3rd day, the remaining wound was 15.5 mm, on the 5th day, the remaining wound was 13.3 mm, and until the 7th day there was still a wound of 6.5 mm and the wound had not closed completely.

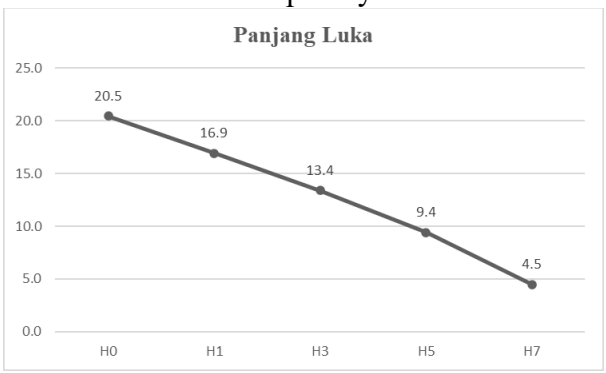

Figure 3. Long Wound Wistar Shallot Gel Extract Group

Based on the wound length graph of the group given, the shallot gel extract above illustrates a decrease in wound length from the day of surgery to the 7th day. On H0, the length of the wound was 20.5 mm, on the 1st day, the remaining wound was 16.9 mm, on the 3rd day, the remaining wound was 13.4 mm, on the 5th day, the remaining wound was 9.4 mm, and until the 7th day there was still a wound of 4.5 mm and the wound had not closed completely.

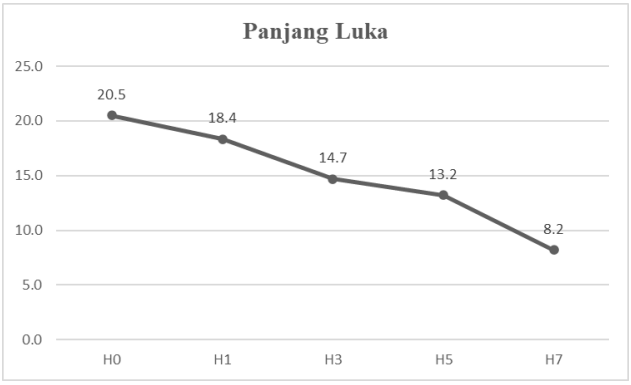

Figure 4. Long Wound Wistar Group Grape Seed Gel Extract

Based on the wound length graph of the group given grape seed gel extract above, there is a decrease in wound length from the day of surgery to the 7th day. On H0, the length of the wound was 20.5 mm, on the 1st day, the remaining wound was 18.4 mm, on the 3rd day, the remaining wound was 14.7 mm, on the 5th day, the remaining wound was 13.2 mm, and until the 7th day there was still a wound of 8.2 mm and the wound had not closed completely. Below is a summary of the length of the wounds in the 4 sample groups in the study.

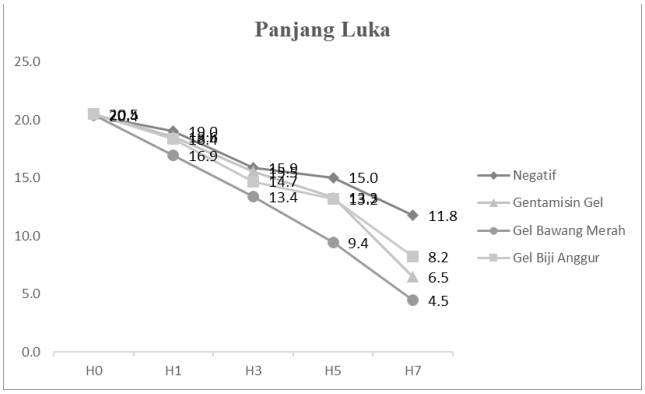

Figure 5. Wistar Wound Length 4 Sample Groups

Based on the table and graph observed above, on the 7th day, it was known that the wound on the Wistar-given onion gel extract had the shortest wound length of the other 3 sample groups, which was 4.48 mm. The next shortest wound length was found in the sample group given gentamicin gel extract, which was 6.47 mm, then the sample group given grape seed extract was 8.2 mm, and the negative control sample was 11.77 mm. The next analysis to be carried out is to test whether there is a difference in wound length in Wistar rats between the samples given gentamicin gel, onion extract, grape seed extract, and the negative control sample group. The test used is a one-way ANOVA test if the research data comes from data that is normally distributed and has a homogeneous variance, the results of the normality and homogeneity prerequisite tests are as follows.

Table 4. Normality and Homogeneity

Parameters	Treatment	*P Value*	Decision
Wound Length	Negative	0.626*	Usual
	Gentamycin Gel	0.569*	Usual

	Shallot Gel	0.776*	Usual
	Grape Seed Gel	0.631*	Usual
Levene Test Homogeneity		0.060**	Homogeneous Variance

** Shapiro-Wilk Test (p > 5%)*
*** Levene Test Test (p > 5%)*

From the data in the table above, it can be seen that *the P value* of the wound length data in all tested sample groups is greater than 0.05, this shows that the distribution of wound length data is normal, and the results of the variance test obtained a *Levene Test value* of 0.060 which is greater than 0.05 which means that the variance of the data is homogeneous. Therefore, the wound length data was analyzed with the Oneway Anova test, and the results of the analysis can be seen in the following table.

Table 5. Wound Length Comparison

Group	Wound Length (mm)	*P Value*
	Mean ± SD	
Negative	16.40 ± 0.37b	0.000*
Gentamycin Gel	14.88 ± 1.28b	
Shallot Gel	12.94 ± 1.45a	
Grape Seed Gel	14.99 ± 1.12b	

** Oneway Anova Significant at 5% (p < 0.05)*
[ab] Different letters show significant differences in Tukey HSD

Based on the results of the above test, a *p-value* of 0.000 was obtained, which is smaller than 0.05 (5%), which means that the hypothesis is accepted, or it is concluded that there is a significant difference in wound length between the negative control sample group, the sample group given gentamicin gel, onion gel extract, and grape seed gel extract. Wistar-given shallot gel extract is known to have a penetrating wound length when compared to the other 3 sample groups, which has an average wound length of 12.94 mm, followed by the gentamicin gel sample group of 14.88 mm, then followed by the sample group given grape seed gel extract of 14.99 mm and the largest average wound length is the negative sample group of 16.4 mm.

Percentage Decrease in Wound Length

Based on the observation data of wound length that has been described above, to find out the difference in the effectiveness of each treatment is to measure the percentage reduction in wound length among 4 sample groups in the study, the following is the data on the percentage reduction in wound length in 4 sample groups in the study.

Table 6. Results of Observation of Percentage Decrease in Wound Length

Wistar	Percentage Decrease in Wound Length			
	H1	**H3**	**H5**	**H7**
Negative	6.4	21.4	26.4	42.0
Gentamycin Gel	8.5	23.2	34.6	68.1
Shallot Gel	16.3	33.7	53.3	77.8
Grape Seed Gel	9.6	27.6	35.0	59.6

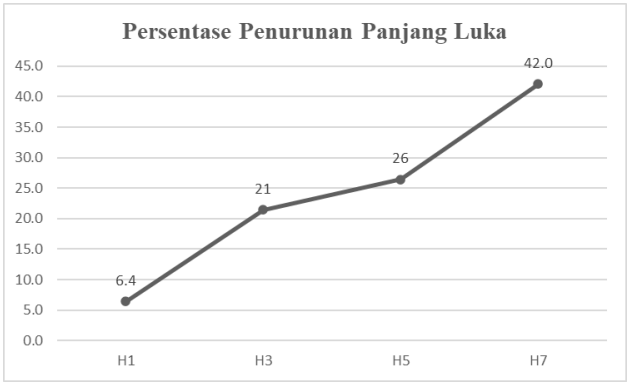

Figure 6. Percentage Decrease in Wistar Wound Length Negative Control

Based on the wound length graph of the negative control group above, there is an increase in the percentage of decrease in wound length from the day of surgery to the 7th day. On the 1st day, it decreased by 6.4%, on the 3rd day, it decreased by 21.4%, on the 5th day, it decreased by 26.4%, and on the 7th day, it decreased by 42% from the condition on the day of surgery.

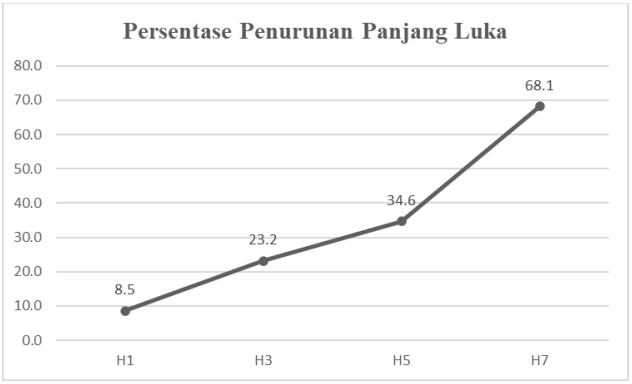

Figure 7. Percentage Decrease in Wound Length Wistar Gentamine Gel Group

Based on the wound length graph of the group given gentamicin gel above, there is an increase in the percentage of decrease in wound length from the day of surgery to the 7th day. On the 1st day, it decreased by 8.5%, on the 3rd day, it decreased by 23.2%, on the 5th day, it decreased by 34.6%, and on the 7th day, it decreased by 68.1% from the condition on the day of surgery.

Figure 8. Percentage Decrease in Length of Wistar Wounds Shallot Gel Extract Group

Based on the wound length graph of the group given, the shallot gel extract above illustrates an increase in the percentage of decrease in wound length from the day of surgery to the 7th day. On the 1st day, it decreased by 16.3%, on the 3rd day, it decreased by 33.7%, on the 5th day, it decreased by 53.3%, and on the 7th day, it decreased by 77.8% from the condition on the day of surgery.

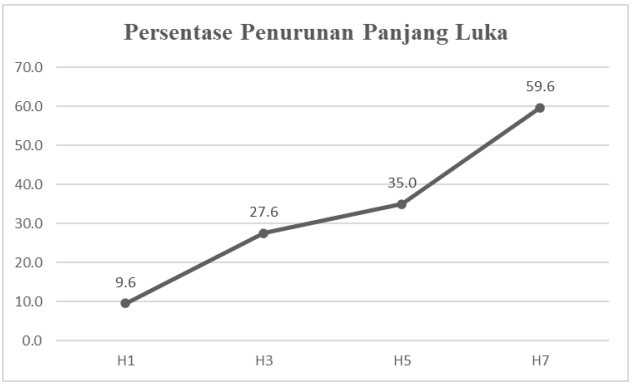

Figure 9. Percentage Decrease in Length of Wistar Wounds Group Grape Seed Gel Extract

Based on the wound length graph of the group given grape seed gel extract above, there is an increase in the percentage decrease in wound length from the day of surgery to the 7th day. On the 1st day, it decreased by 9.6%, on the 3rd day, it decreased by 27.6%, on the 5th day, it decreased by 35%, and on the 7th day, it decreased by 59.6% from the condition on the day of surgery. Below is a summary of the percentage reduction in wound length in 4 sample groups in the study.

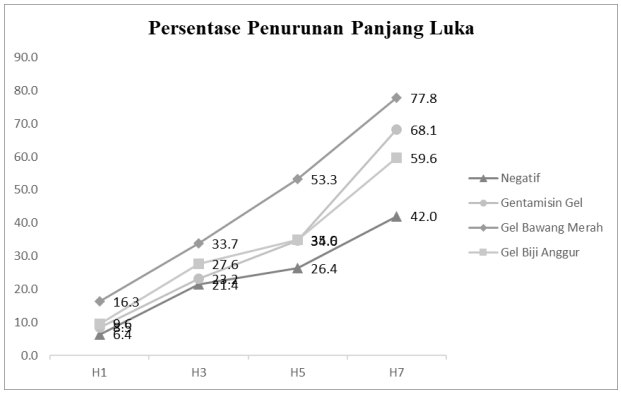

Figure 10. Summary of the percentage decrease in Wistar wound length in 4 sample groups

Based on the table and observation graph above, on the 7th day, it was known that the wound on the Wistar-given onion gel extract had the largest percentage decrease in wound length than the other 3 sample groups, which was 77.8%, which was measured from the condition on the day of surgery. The second largest percentage decrease was the group given gentamicin gel, which was 68.1%, then the group that was given grape by gel extract, which was 59.6%, and the smallest was the negative control group, which was 42%. The next analysis to be carried out is to test whether there is a difference in the percentage decrease in wound length in Wistar rats between the samples given gentamicin gel, onion extract, grape seed extract, and the negative control sample group. The test used is a one-way ANOVA test if the research data comes from data that is normally distributed and has a homogeneous variance, the results of the normality and homogeneity prerequisite tests are as follows.

Table 7. Normality and Homogeneity

Parameters	Treatment	*P Value*	Decision
Percentage Decline Wound Length	Negative	0.800*	Usual
	Gentamycin Gel	0.545*	Usual
	Shallot Gel	0.794*	Usual
	Grape Seed Gel	0.661*	Usual
Levene Test Homogeneity		0.063**	Homogeneous Variance

* *Shapiro-Wilk Test (p > 5%)*
** *Levene Test Test (p > 5%)*

From the data in the table above, it can be seen that *the P Value* of the percentage reduction in wound length in all tested sample groups is greater than 0.05, this shows that the distribution of the percentage of reduction in wound length data is normal, and the results of the variance test obtained a *Levene Test value* of 0.060 which is greater than 0.05 which means that the variance of the data is homogeneous. Therefore, the data on the percentage reduction in wound length was analyzed by the Oneway Anova test, and the results of the analysis can be seen in the following table.

Table 8. Comparison of Percentage Decrease in Wound Length

Wistar	Percentage Decrease in Wound Length Mean ± SD	*P Value*
Negative	24.1 ± 14.7b	0.000*
Gentamycin Gel	33.6 ± 25.4b	
Shallot Gel	45.3 ± 26.4a	
Grape Seed Gel	32.9 ± 20.7b	

[*] *Oneway Anova Significant at 5% (p < 0.05)*
[ab] *Different letters show significant differences in Tukey HSD*

Based on the results of the above test, a *p-value* of 0.000 was obtained, which is smaller than 0.05 (5%), which means that the hypothesis is accepted, or it is concluded that there is a significant difference in the percentage of reduction in wound length between the negative control sample group, the sample group given gentamicin gel, onion gel extract, and grape seed gel extract. Wistar-given shallot gel extract is known to have the highest average percentage of reduction in wound length when compared to the other 3 sample groups, which has an average percentage of 45.3%, followed by the gentamicin gel sample group of 33.6%, then followed by the sample group given grape seed gel extract of 32.9% and the average percentage of reduction in wound length is the negative sample group of 24.1%.

DISCUSSION

This study aims to determine the effect of giving onion gel extract and grape seed gel extract on the healing of cut wounds on the Wistar skin. This study was conducted to see the difference in macroscopic picture between treated wounds and wounds given onion gel extract and grape seed gel with wounds that were not treated or controlled wounds. Based on the results of the study, it can be seen that shallot gel extract can significantly increase the percentage of decrease in Wistar wound length after eight days of observation. This study showed that onion gel extract could affect the healing of cut wounds in Wistar rats.

Based on Rahayu's research in (Sulistiyono et al., 2018), it has previously been known that shallot gel extract with water solvent contains flavonoid compounds, saponins, steroids, terpenoids, polyphenols, and alkaloids that have the potential to be antioxidants. One of the natural wound healing alternatives is shallot gel extract. Shallot gel extract contains flavonoids, saponins, and tannins. Flavonoids can act as anti-inflammatory, antibacterial, and antioxidant Saponins interact with bacterial cells, causing the cell to break (lysis). According to Poeloengan in (Indarala et al., 2022), tannins can bind to lipoteichoic acid on the cell surface. According to Soemarie in (Badriyah et al., 2022), quercetin as a standard compound refers to previous research that confirms that quercetin is a flavonoid compound in shallot gel extract.

This is also due to Yunanda's opinion in (Marwan et al., 2023), which stated that with the results of the percentage of cut wound length in the treatment group, the length of the cut wound decreased. Skin consolidation can be seen from the measurement of wound length up to the 14th day after injury. The data was measured between the edges of the wound in centimeters (cm). Skin unification (Contraction) is the process of narrowing the size of the wound towards the middle

to reduce the size of the wound. In rats, the contraction of wound size in the treatment group using onion extract was found to be 90% faster than in other groups. This is due to the presence of flavonoids (quercetin), saponins, and allisin in shallot extract (Allium cepa L.). In addition, in Allium cepa L., there is also vitamin C for collagen synthesis, vitamin A for epithelialization, and zinc for cell mitosis and cell proliferation. The allicin content in shallots functions as an antibacterial by inhibiting bacterial RNA synthesis and inhibiting protein DNA synthesis in bacteria.

Flavonoids (*quercetin*) in shallots have antioxidant activity and effects to avoid free radicals, which are believed to be one of the important components in the healing of incisions. In addition, Flavonoids can also function in cell repair. The anti-inflammatory compounds of quercetin can reduce inflammatory symptoms such as pain, redness, and swelling. The anti-inflammatory activity of quercetin compounds works by inhibiting the enzyme cyclo-oxygenase (COX), which induces the formation of prostaglandins as inflammatory mediators. Its anti-inflammatory properties are useful for the body's defenses in preventing the spread of infection to other tissues and speeding up the healing process. Saponins in shallots can improve the wound-healing process by increasing collagen production and accelerating the epithelialization process. Shallots also contain vitamin C; vitamin C is an essential cofactor for the synthesis of collagen, proteoglycan, and other organic components of the intracellular matrix of tissues. In the proliferation phase, fibroblasts migrate towards the wound area and stimulate collagen synthesis. This condition is followed by three processes that take place in sequence in the form of epithelialization, wound contraction, and collagen formation. The epithelial closes the wound surface, and the contractions close the distance between the wounds. Myofibroblasts are cells that play a role in the contraction process. Myofibroblasts bind to the edges of the wound and pull the epidermal layer inwards so that the edges of the wound can be interlinked.

In the discussion section of the research, it's essential to highlight the effectiveness of grape seeds in wound healing, particularly in comparison to other treatments like red onion extract.

Grape seeds contain powerful antioxidants, especially polyphenols, and flavonoids, such as proanthocyanidins. These compounds play a crucial role in promoting wound healing by reducing oxidative stress, accelerating tissue regeneration, and enhancing the production of collagen, a protein essential for tissue repair. The presence of tannins and saponins in grape seeds further contributes to their anti-inflammatory and antimicrobial properties, which are beneficial in preventing infection and reducing inflammation during the wound-healing process.

In this study, while the red onion extract showed the highest effectiveness in reducing wound size, grape seed extract also demonstrated a significant impact. The reduction in wound size with grape seed extract was observed to be faster compared to the negative control group but slightly less effective than red onion extract and gentamicin gel. This difference in effectiveness could be attributed to the unique chemical composition of each treatment. Grape seeds, rich in flavonoids and polyphenols, offer strong antioxidant activity, which helps neutralize free radicals at the wound site and promotes the proliferation of fibroblasts, essential for skin regeneration.

Therefore, while grape seed extract is not as potent as red onion extract, it still represents a promising alternative due to its wound-healing properties. Further research might explore higher concentrations or combined treatments to maximize the healing effects of grape seed extract.

CONCLUSION

Based on the results of the above research, it can be concluded that:

1. Shallot gel extract had a significant effect on the percentage reduction in incision length.
2. Shallot gel extract is the formula with the highest percentage reduction in cut wound length compared to grape seed gel extract, gentamicin gel, and untreated wistar.
3. Further research is needed to increase the dose so that it can get even better results.
4. While grape seed extract is not as potent as red onion extract, it still represents a promising alternative due to its wound-healing properties. Further research might explore higher concentrations or combined treatments to maximize the healing effects of grape seed extract.

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