BIOLOGY, MEDICINE, & NATURAL PRODUCT CHEMISTRY ISSN 2089-6514 (paper)
Volume 14, Number 1, April 2025 | Pages: 225-231 | DOI: 10.14421/biomedich.2025.141.225-231 ISSN 2540-9328 (online)

Effectiveness Test of Melon Fruit Peel Ethanol Extract Cream (*Cucumis melo*) on Incision Wound Healing of White Rats (*Rattus norvegicus*)

Husna Rizki, Harlita
Department of Biology Education, Faculty of Teacher Training and Education, Sebelas Maret University,
Jl. Ir. Sutami 36 Kentingan, Jebres, Surakarta, Central Java 57126, Tel. 0271-646994, Fax. 0271-646655, Indonesia.

Corresponding author*
harlita@staff.uns.ac.id

Manuscript received: 03 February, 2025. Revision accepted: 20 May, 2025. Published: 19 June, 2025.

Abstract

Incision wounds are a type of open wound that requires treatment to prevent infection and accelerate healing. Using natural ingredient-based creams has become a more practical alternative to conventional ointments. Melon rind (*Cucumis melo*) contains active compounds such as tannins, flavonoids, and phenols that have anti-inflammatory and antimicrobial properties, potentially accelerating wound healing and reducing the risk of infection. This study aims to test the effectiveness of melon rind ethanol extract cream on incision wound healing in white rats (*Rattus norvegicus*). The study used an experimental method with three treatment groups: control (bacitracin), 15% melon peel extract cream (P1), and 25% melon peel extract cream (P2). Mice were adapted for 7 days before the treatment test. The cream was applied three times a day for 14 days, and wound diameter and body weight were observed every two days. Observation data were analysed using one way ANOVA test version 26.0. The results showed that melon rind extract cream had physical characteristics that met the standards. ANOVA and LSD tests on wound diameter showed significant differences between control and treatment, although there was no significant difference between P1 and P2. Meanwhile, the ANOVA and LSD test results on body weight showed significant differences between groups. Group P2 showed a steady increase in body weight, indicating the safety of the cream.

Keywords: Experiment; Melon Fruit Peel (*Cucumis melo*); Cream; Incision Wound; White Rat (*Rattus Norvegicus*).

INTRODUCTION

An incision wound is a wound that occurs when a sharp object is cut. Wounds occur when the continuity of anatomical structures in body tissues is disrupted. This damage can vary from as mild as damage to the epithelial layer of the skin to involving deeper tissues, including fat, muscle, bone, and other components such as tendons, blood vessels, and nerves. This condition is usually caused by traumatized (Prajayanti et al., 2024). The characteristics of incision wounds include open wounds, pain, and the length of the wound is greater than the depth of the wound.

Incision wounds are a type of open wound that requires optimal treatment to prevent infection and accelerate the healing process. In medicine, ointments are often used as topical preparations to treat wounds. However, ointments have several drawbacks, such as their oily texture that leaves a sticky feeling and is difficult to clean from the skin (Rosyiedi, 2011). The development of pharmaceutical technology has encouraged the use of natural extract-based creams as a more effective alternative. Cams generally have a lighter consistency and are less viscous than ointments. Creams are easy to spread on the skin so that it is easy to use, easy to clean because it is not greasy, and the cream penetrates faster into the skin. Therefore, creams are currently more favoured over ointment preparations (Suena et al., 2022). Natural extract-based creams often contain antimicrobial and anti-inflammatory compounds, which can protect wounds from infection and improve recovery outcomes (Purba et al., 2024). This makes creams a superior modern solution in the management of incision wounds

One natural ingredients that has the potential to be developed in making cream is melon rind. Melon rind is often considered as waste or animal food (Fajrin et al., 2024). The utilisation of melon rind not only helps reduce environmental pollution, but also provides added value through its active compound content. Melon rind is known to have antioxidant activity, namely tannins, flavonoids and phenols. These compounds maintain skin damage, heal wounds, and neutralise free radicals (Rahmi & Minerva, 2022).

Flavonoids are phenolic compounds that act as antioxidants, helping to inhibit excessive oxidative reactions caused by inflammation or metabolic processes.

In addition, flavonoids also accelerate the wound revitalisation process, with more effective results than betadine, due to their ability to increase vascularity (Bihani & Mhaske, 2020). In a study by Ismail et al. (2010), melon rind showed a flavonoid content of 5.13 ± 1.32 mg GAE/g. Tannins have been considered as health-promoting plant components, as they have anti-carcinogenic and anti-mutagenic potential, as well as antimicrobial, antioxidant, and antiradical properties (Buzzini et al., 2008). In a study (Vella et al., 2019), the tannin content was higher in melon rind than in seeds, showing 11.83 ± 1.44 and 0.92 ± 0.03 mg GAE/g, respectively. Polyphenolic compounds function as antioxidants with the mechanism of inhibiting the process of lipid peroxidation. This helps prevent and slow down cell damage due to necrosis and increase blood vessel formation in the wound area (Akhmadi et al., 2022). In a study by Ismail et al. (2010), the total content of phenolic compounds detected in melon rind extract was 4.70 ± 0.23 mg GAE/g extract.

Based on the background, a study was conducted on the effectiveness of melon rind ethanol extract cream (*Cucumis melo*) on incision wound healing in white rats (*Rattus norvegicus*). This research will produce a safe, environmentally friendly, sustainable wound healing agent.

MATERIALS AND METHODS

Ethical Clearance Submission

This research has been approved by the Research Ethics Commission of the Faculty of Medicine, Sebelas Maret University with Ethical Clearance number 13/UN27.06.11/KEP/EC/2025

Place and Time of Research

This research was conducted at the Microbiology Laboratory in Building D FKIP UNS, Integrated Laboratory Technical Implementation Unit (UPT) UNS, and UD. Wistar Yogyakarta. This research was conducted in July-August 2024.

Tools and Materials

The tools used in this research are beaker glasses, analytical scales, stirring rods, blenders, porcelain cups, erlenmeyers, pH meters, stopwatches, adhesive test kits, glass, scales, filter paper, measuring cups, rotary evaporators, animal scales, gloves, masks, ovens, knives, alumunium foil, filter paper, cameras, tweezers, water baths, bunsen and ointment pots.

The materials used in this study were melon rind (*Cucumis melo* L.), 70% ethanol, paraffin liquid, distilled water, stearic acid, adeps lanae, TEA, nipagin, nipasol, 9 male white rats (*Rattus norvegicus).*

The white rat test animals used were healthy male white rats aged 2-3 months with a body weight of 150-200 gr obtained from UD. Wistar Yogyakarta. Before being tested, the rats were acclimatised to the environment for 1 week.

Research Design

This *research* uses the experimental method or *experiment* (*experiment research*) and Completely Randomised Design (RAL) with three replicate treatments. The laboratory approach will be carried out with a series of experiments. This study tested the characteristics of melon rind extract cream and the effectiveness of melon rind ethanol extract cream (*Cucumis melo*) on white rat (*Rattus norvegicus*) incision wound healing.

Procedures

Preparation of Fruit Peel Extract

The melon rind was separated from the fruit and then cleaned and chopped. After that, it was dried in a drying cabinet then pollinated and sieved with a mesh sieve (Khairani et al., 2020). Then, it was soaked in 70% ethanol in a ratio of 1:5 and allowed to stand for 24 hours (Hariningsih & Hartono, 2022). After 24 hours, the extract was filtered with a filter cloth. The next 24 hours, a second filtration was done. Then, the extract was concentrated using a *rotary evaporator*. The extract was put into a tool with a temperature of 40°C for 1.5 hours and a speed of 100 rpm until a concentrated extract was obtained (Suhartanto et al., 2022). The manufacture of melon rind extract was carried out in the Technical Implementation Unit (UPT) Integrated Laboratory UNS.

Preparation of Extract Cream

The method of making melon skin ethanol extract cream is as follows, all tools and ingredients used are prepared.Then the ingredients to be used are weighed according to the formulation. The oil phase and water phase are separated. The oil phase is stearate acid, cetyl alcohol and nipasol. The water phase is TEA, glycerin, nipagin and distilled water. The oil phase and water phase were each heated at 70ºC. After everything is melted, put the oil phase little by little into the hot lumping that has been filled with the water phase, then crushed until a cream base is formed. After that, melon peel extract was added and stirred until homogeneous, then put into a container (Hariningsih & Hartono, 2022). The manufacture of extract cream was carried out at the Technical Implementation Unit (UPT) Integrated Laboratory UNS.

The cream was made in 2 doses, namely 15%, and 25% with the same cream base composition (Khairani et al., 2020). The base composition can be seen in Table 1.

Table 1. Dosage of Cream Preparation.

Material Name	Treatment (%)		Function
	P1	P2	
Melon rind extract	15%	25%	Active substance
Stearic acid	12	12	Emulsifiers
Cetyl alcohol	0,5	0,5	Thickener
TEA	1	1	Emulsifiers
Glycerin	2	2	Humectants
Nipagin	0,1	0,1	Preservatives
Nipasol	0,05	0,05	Preservatives
Aquadest	Ad 100	Ad 100	Solvent

Description:
P1 = 15% melon rind extract
P2 = 25% melon rind extract

Test Animal Preparation and Wound Making

There were 9 male white rats (*Rattus norvegicus*) in a healthy condition aged 2-3 months with a body weight of 150-200 gr obtained from UD. Wistar Yogyakarta. Before being tested, the rats were adapted to the environment for 7 days and fed and drank ad libitum. White rats were divided into 3 treatment groups randomly. incision wounds were made with a sharp object (scalpel) with a diameter of 2 cm. The 3 groups of rats were given each treatment which can be seen in Table 2.

Table 2. Dosage of the cream preparation.

Variables	Material	Dosage
Control	Bacitracin	100%
Treatment	Melon rind extract (P1)	15%
	Melon rind extract (P2)	25%

Observation and Data Collection

Wounded white mice were observed to measure open wound area and body weight during observation. The cream preparation was applied evenly on the sliced wounds three times a day, and this treatment was carried out every other day for 14 days. Measurement of wound area and body weight of the rats was done periodically, i.e. every other day for 14 days.

Data analysis

Data analysis included qualitative and quantitative analyses. Qualitative analysis included testing the characteristics of melon skin extract cream including colour, smell, texture, homogeneity, and Ph. Meanwhile, quantitative analysis included measuring the body weight of rats and measuring the average diameter of open wounds. The body weight and burn wound diameter measurements were analysed using a *one-way* ANOVA test version 26.0. If there was a significant difference, the LSD (*Least Significant Different*) test was performed.

RESULTS AND DISCUSSION

Cream Characteristics

In this study, the treatment with cream preparations from melon rind extract (*Cucumis melo*) contained 2 doses with different comparisons, namely cream treatment with 15% melon rind extract dose (P1) and cream with 25% melon rind extract dose (P2). Both cream preparations were then formulated into cream preparations. Furthermore, the resulting cream was tested to evaluate its characteristics, such as colour, smell, texture, and consistency (Lumentut et al., 2020), with the observation results summarised in Table 3.

Table 3. Cream Characteristic Test Results.

Aspects	15% cream	25% cream
Colour	White	Bone White
Smell	Non-stinging rubber	Stinging Rubber
Texture	Smooth viscous	Smooth viscous
Ph	6	6
Homogeneity	Homogeneous	Homogeneous

Open Wound Diameter

The effectiveness test evaluated the effect of cream formulations containing melon rind extract as an active ingredient in healing sliced wounds. This test aims to determine the best cream formulation that provides optimal results in accelerating the wound healing process. The results of wound diameter observation for 14 days can be seen in Table 4.

Table 4. Results of Mean Diameter of Open Incision Wound.

Group	Average wound healing diameter (cm)							
	Day-							
	0	**2**	**4**	**6**	**8**	**10**	**12**	**14**
K	2	1,73	1,57	1,4	1,27	0,9	0	0
P1	2	1,55	1,3	1,17	0,9	0,53	0	0
P2	2	1,3	1,17	0,93	0,8	0,47	0	0

Description:
K = Bacitracin ointment (Control)
P1 = 15% Extract Cream Treatment
P2 = 25% Extract Cream Treatment

From Table 5, shows that on days 12 and 14 the average wound diameter was 0 because the observation showed that the wound had completely closed and only the scar remained. Comparison of the results of the average diameter of incision wound healing can be seen in Figure 1.

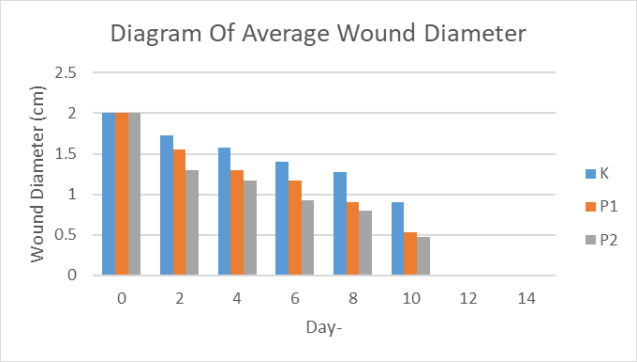

Figure 1: *Graph of Mean Incision Wound Diameter.*

Based on the diagram above, it shows that the diameter of open sliced wounds treated with cream with 25% concentration of melon rind extract (P2) is reduced faster than cream with 15% concentration of melon rind extract (P1) and with control (K). Meanwhile, the 15% melon peel extract cream treatment group (P1) showed a faster reduction in the diameter of open sliced wounds compared to the control (K). To determine the difference between the control group and the treatment group, *a one-way* ANOVA test was conducted. Before the ANOVA test, a normality test is carried out to assess the distribution of data in the data group or variable, whether the data distribution is normally distributed or not (Fahmeyzan et al., 2018).

The normality test results showed that the data on incision wound diameter during observation were normally distributed. After conducting the normality test, the homogeneity test was conducted to determine whether the data variance was homogeneous. The results of the homogeneity test showed that the Sig. (P Value) of 0.182 ($p>0.05$), indicating homogeneous data. After the data used has met the requirements of the ANOVA test, the ANOVA test is then carried out. The results of *one way* ANOVA show a sig value. (P Value) of 0.046. ($p<0.05$), indicating a significant difference (Khairani et al., 2020). After the ANOVA test results showed that significant differences, further LSD (*Least Significant Different*) tests were carried out to determine significant differences between groups.

The results of the LSD test on the diameter of incision wounds on the significance value between the control treatment (K) with 25% melon peel extract cream treatment (P2) of 0.034 ($p<0.05$), it can be interpreted that there is a real difference. Furthermore, for the control treatment (K) with 15% melon peel extract cream treatment (P1) is 0.027 ($p<0.05$), which means that there is a significant difference. However, between the 15% melon peel extract cream treatment (P1) and the 25% melon peel extract cream treatment (P2) there is a significance result of 0.981. It can be said that between the two treatments there is no significant difference.

Body Weight

Body weight measurements were taken to determine the most stable body weight during observation. The results of observations of body weight measurements for 14 days can be seen in Table 5 and Figure 2.

Table 5. Results of Average Rat Body Weight.

Group	Average Body Weight (gr)							
	Day							
	0	2	4	6	8	10	12	14
K	176	170	171,33	173	180	179	182,33	183,33
P1	188	185,33	188,67	194	198,67	197,67	202,33	211,33
P2	250,33	254	257	259,67	261	264,33	266,33	270,33

Description:
K = Bacitracin ointment (Control)
P1 = 15% Extract Cream Treatment
P2 = 25% Extract Cream Treatment

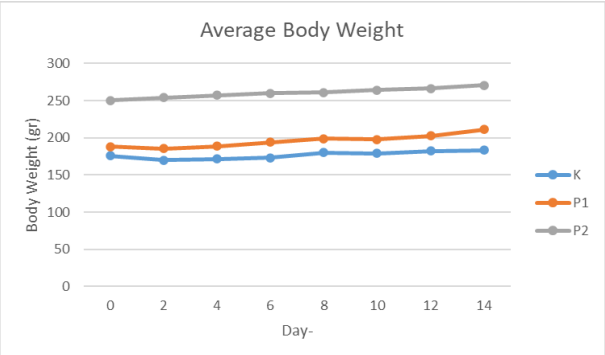

Figure 2. *Average Weight Chart.*

The average body weight results from the graph show that all treatments experienced a decrease and an increase in body weight. To find out whether the three treatment groups had significant differences, the one way ANOVA test was conducted (Sihotang et al., 2022). Before conducting the ANOVA test, the data used must meet the requirements of the normality test and homogeneity test with a sig value ($p>0.05$).

The results of the normality test and body weight homogeneity test have a sig value >0.05, which means that the data is classified as normal and homogeneous so that the *one way* ANOVA test can be carried out. From

the results of the ANOVA test, the sig value obtained is 0.00 ($p<0.05$), which means that there is a significant difference in the average body weight of rats in each treatment. After the ANOVA test results showed a significant difference, a further LSD (*Least Significant Different*) test was conducted to determine the significant differences between groups.

The LSD test results show that each treatment group of control (K), 15% melon rind extract cream (P1), and 25% melon rind extract cream (P2) has a significance value of 0.000 ($p<0.05$), which means there is a significant difference in the average body weight between each treatment group.

Discussion

The results of the characteristic test which includes smell, colour, texture, homogeneity, and pH (Lumentut et al., 2020), show that the preparation of melon skin ethanol extract cream with a concentration of 15% (P1) and 25% (P2) has physical properties that meet the standards, such as aroma and colour in melon skin extract cream depending on the concentration of extract used. The higher the addition of the extract, the aroma of the extract cream will be more pungent and the colour more intense (Jami'ah et al., 2018). Both preparations have different colours, white in P1 and bone white in P2, with a smooth, non-sticky texture and good homogeneity. The colour of melon rind extract tends to be yellow due to the content of carotenoids and flavonoids (Jami'ah et al., 2018). The content of active compounds in the extract influences the distinctive aroma that appears in both preparations (Alatas & Anindhita, 2023). This study also showed good physical stability of the cream preparation, with a smooth texture, The results of the pH examination showed that both melon rind extract cream preparations had a pH of 6, the pH was by skin physiology, which is in the interval 4.5-7 (Hariningsih & Hartono, 2022), and optimal homogeneity, because the application results showed no lumps, had an even structure, and a uniform colour from the beginning to the end of the application (Fauziah, 2022). This ensures comfort and safety in application. This ensures comfort and safety when applying the cream to the wound.

Observation of wound diameter showed that the treatment group with 25% melon rind extract cream (P2) gave faster healing results than the control group (K) and the 15% treatment group (P1). On day 10, the diameter of the wound in P2 showed that the wound had dried up and only scabs with a diameter of 0.47 cm remained, then on day 12 the wound had completely healed. The greater the concentration of melon rind extract, the higher the content of natural compounds, especially tannin compounds. In research Mahmudah et al. (2021), stated that the content of tannin compounds reduced the length of significant wounds for 13 days. The tannin content acts as an antioxidant and antimicrobial that has healing ability through its effect in promoting epithelialisation (Buzzini et al., 2008). In addition, melon rind extract contains flavonoids and phenols. The presence of flavonoid compounds is an antioxidant, helping to inhibit excessive oxidative reactions caused by inflammatory processes or body metabolism (Bihani & Mhaske, 2020). While phenols act as antioxidants with the mechanism of inhibiting the lipid peroxidation process (Akhmadi et al., 2022). The more compounds present, the greater the effect of closing the incision wound area, and the stronger the antimicrobial power and accelerate wound healing (Oeleu, 2022). Statistical analysis using ANOVA test and LSD further test showed significant differences between the control and both treatment groups. However, no significant difference was found between P1 and P2, although descriptively P2 showed better results. This suggests that a higher extract concentration can provide a faster healing effect, but the difference is not too striking (Bawotong et al., 2020).

Results showed fluctuations in body weight in all groups, with a more stable increase in the P2 treatment group compared to P1 and control. This suggests that treatment with melon peel extract cream, especially at a concentration of 25%, not only supports the wound healing process but also does not have a negative effect on the health of the rats. The increase in body weight occurs because melon rind extract containing flavonoids enters the body, functions like estrogen increasing the amount of endogenous estrogen which can increase the synthesis and secretion of growth hormone so that it can stimulate the growth of cells in the body, causing weight gain (Sandana et al., 2020). Statistical analysis using ANOVA test and LSD further test showed significant differences between control and treatment groups, as well as between P1 and P2. The more stable increase in body weight in P2 indicates that the cream preparation with melon skin extract does not have toxic or negative effects, but instead supports overall health (Adhikari et al., 2021).

CONCLUSIONS

This study shows that melon peel extract-based cream effectively accelerates slice wound healing in white rats. The cream with 25% extract concentration (P2) gave better results compared to the 15% cream (P1) and the control (Bacitracin ointment), indicated by faster wound diameter shrinkage in the P2 treatment group. Both cream formulations have good physical characteristics, such as smooth texture, non-sticky, optimal homogeneity, and pH by human skin physiology (pH 6). The effectiveness of this cream is supported by the content of active compounds in melon rind extract, such as tannins, flavonoids, and phenols, which act as antioxidants and antimicrobials, promoting the epithelialisation process and accelerating wound healing. In addition, the P2 treatment group also showed a more stable increase in body weight than the other groups, indicating that the use of creams with higher extract

concentrations did not hurt the health of the rats, and even supported overall health conditions. Statistical analysis showed a significant difference between the control and treatment groups, although no significant difference was found between P1 and P2. Overall, this study provides evidence that melon peel extract cream can be an environmentally friendly and effective alternative for incision wound healing.

Acknowledgements: The authors would like to thank the Technical Implementation Unit (UPT) of the UNS Integrated Laboratory for conducting experiments there.

Authors' Contributions: Harlita designed the study. Husna Rizki carried out the laboratory work. Husna Rizki analysed the data. Husna Rizki wrote the manuscript. All authors read and approved the final version of the manuscript.

Competing Interests: The authors state that there are no competing interests

Funding: The authors declare that this research did not receive any funding.

REFERENCES

Adhikari, A., Barakoti, H., & Kumar Dey, B. (2021). Evaluation of Acute Dermal Irritation, Sensitization and Acute Dermal Toxicity of Leather Cream in Laboratory Animals. *Indo Global Journal of Pharmaceutical Sciences*, *11*(03), 01–06. https://doi.org/10.35652/igjps.2021.113001

Akhmadi, C., Utami, W., & Annisaa', E. (2022). Senyawa Fitokimia dan Aktivitas Farmakologi Family *Basellaceae* sebagai Obat Luka : A Narrative Review. *Generics: Journal of Research in Pharmacy*, *2*(2), 77–85. https://doi.org/10.14710/genres.v2i2.13798

Alatas, A., & Anindhita, M. A. (2023). Pengaruh Carbopol 940 Sebagai Gelling Agent Terhadap Karakteristik Fisikokimia Sediaan Masker Gel Peel-Off Ekstrak Kulit Buah Melon Oranye (*Cucumis melo* L.). *BENZENA Pharmaceutical Scientific Journal*, *1*(02), 56–71. https://doi.org/10.31941/benzena.v1i2.2326

Bawotong, R. A., De Queljoe, E., & Mpila, D. A. (2020). Uji Efektivitas Salep Ekstrak Daun Jarak Pagar (*Jatropha curcas* L.) Terhadap Penyembuhan Luka Sayat Pada Tikus Putih Jantan Galur Wistar (*Rattus norvegicus*). *Pharmacon*, *9*(2), 284. https://doi.org/10.35799/pha.9.2020.29283

Bihani, T., & Mhaske, N. (2020). Evaluation of in vivo wound healing activity of Plumeria obtusa L. (Champa) spray in rats. *Wound Medicine*, *28*(March 2018), 100176. https://doi.org/10.1016/j.wndm.2019.100176

Buzzini, P., Arapitsas, P., Goretti, M., Branda, E., Turchetti, B., Pinelli, P., Ieri, F., & Romani, A. (2008). Antimicrobial and Antiviral Activity of Hydrolysable Tannins. *Mini-Reviews in Medicinal Chemistry*, *8*(12), 1179–1187. https://doi.org/10.2174/138955708786140990

Fahmeyzan, D., Soraya, S., & Etmy, D. (2018). Uji Normalitas Data Omzet Bulanan Pelaku Ekonomi Mikro Desa Senggigi dengan Menggunakan Skewness dan Kurtosi. *Jurnal VARIAN*, *2*(1), 31–36. https://doi.org/10.30812/varian.v2i1.331

Fajrin, F. N., Kurnadi, R. L. S., Kholifah, E., Shobah, A. N., & Halimatusyadiah, L. (2024). Comparison of the Toxicity of Watermelon Rind Extract (*Citrullus lanatus*) and Melon Rind Extract Using BSLT Method. *Jurnal Ilmiah Sains*, *24*(April), 99–109. https://doi.org/10.35799/jis.v24i1.49263

Fauziah, F. (2022). Studi Formulasi Dan Uji Stabilitas Fisik Sediaan Salep Dan Krim Ekstrak Etanol Daging Buah Kopi Robusta (*Coffea canephora*). *Jurnal Sains Dan Kesehatan Darussalam*, *2*(1), 1–9. https://doi.org/10.56690/jskd.v2i1.35

Hariningsih, Y., & Hartono, A. (2022). Formulasi Krim Ekstrak Etanol Kulit Pisang Kepok (*Musa Paradisiaca Formatypica*) Sebagai Penyembuh Luka Bakar. *Pengembangan Ilmu Dan Praktik Kesehatan*, *1*(2), 48–56. https://doi.org/10.56586/pipk.v1i2.213

Ismail, H. I., Chan, K. W., Mariod, A. A., & Ismail, M. (2010). Phenolic Content And Antioxidant Activity Of Cantaloupe (*Cucumis melo*) Methanolic Extracts. *Food Chemistry*, *119*(2), 643–647. https://doi.org/10.1016/j.foodchem.2009.07.023

Jami'ah, S. R., Ifaya, M., Pusmarani, J., & Nurhikma, E. (2018). Uji Aktivitas Antioksidan Ekstrak Metanol Kulit Pisang Raja (*Musa paradisiaca sapientum*) Dengan Metode DPPH (2, 2-difenil-1-pikrilhidrazil). *Jurnal Mandala Pharmacon Indonesia*, *4*(1), 33–38.

Khairani, T. N., Rumanti, R. M., Manao, A., Farmasi, D., Farmasi, F., Helvetia, I. K., Farmasi, M., Farmasi, F., Helvetia, I. K., Noverita, T., Institut, K., Helvetia, K., Kapten, J., & No, S. (2020). Formulasi Sediaan Krim Ekstrak Etanol Kulit Buah Manggis (*mangostana* L.) Sebagai Obat Luka Bakar Pada Tikus Putih Jantan. *Jurnal Dunia Farmasi*, *4*(2), 53–58.

Lumentut, N., Edi, H. J., & Rumondor, E. M. (2020). Formulasi dan Uji Stabilitas Fisik Sediaan Krim Ekstrak Etanol Kulit Buah Pisang Goroho (*Musa acuminafe* L.) Konsentrasi 12.5% Sebagai Tabir Surya. *Jurnal MIPA*, *9*(2), 42. https://doi.org/10.35799/jmuo.9.2.2020.28248

Mahmudah, B. H., Umboro, R. O., & Apriliany, F. (2021). Uji Efektivitas Ekstrak Daun Ciplukan (*Physalis angulata* L.) Terhadap Penyembuhan Luka Sayat Pada Kelinci Jantan (*Oryctolagus cuniculus*) Galur Wistar. *Cendekia Journal of Pharmacy*, *5*(2), 196–205.

Oeleu, K. Y. (2022). Uji Aktivitas Gel Ekstrak Daun Pandan Wangi (*Pandanus amaryllifolius roxb*) Terhadap Penyembuhan Luka Bakar Buatan Pada Kelinci New Zealand. *Jurnal Ilmiah Kesehatan Ar-Rum Salatiga*, *6*(2), 51–57. https://doi.org/10.36409/jika.v6i2.151

Prajayanti, E. D., Primaratri, S., Putri, A. H., Fitri, D., Utami, E., & Putri, D. A. (2024). Gudang Jurnal Multidisiplin Ilmu Peran Nutrisi Dalam Proses Penyembuhan Luka Di Bangsal Kultura RS Universitas Sebelas Maret. *2*(November), 174–179.

Purba, G. S., Oktoba, Z., Soleha, T. U., & Adjeng, A. N. T. (2024). Sains Medisina. *REVIEW: Efektivitas Daun Nangka Sebagai Antibakteri*, *3*(3), 22–28. https://wpcpublisher.com/jurnal/index.php/sainsmedisina/article/view/356

Rahmi, F., & Minerva, P. (2022). Kelayakan Daun Pandan Wangi Sebagai Masker Tradisional Perawatan Kulit Kering. *Jurnal Tata Rias Dan Kecantikan*, *3*(2), 58. https://doi.org/10.24036/.v3i2.62

Rosyiedi, A. F. (2011). Uji Sifat Fisik dan Iritasi Sediaan Salep Ekstrak Etanolik Daun Pepaya (*Carica papaya* L.) Dengan Basis Hidrokarbon dan Absorbsi. *Universitas Sebelas Maret Surakarta*, 68.

Sandana, A., Jems Akiles Unitly, A., Eddy, L., Biologi Fakultas Matematika dan Ilmu Pengetahuan Alam, J., & Pattimura, U. (2020). The Effect of Administration Ethanol Extract Clove Leaf (*Syzygium aromaticum* L.) on The Improvement of Appetite and Body Weight of Rattus norvegicus. *Biofaal Journal*, *1*(2), 2723–4959.

Sihotang, N. L., Idiawati, N., & Prayitno, D. I. (2022). Efektivitas Plester Luka Ekstrak Etanol *Sargassum polycystum* dan *Padina australis* terhadap Penyembuhan Luka Sayat. *Jurnal Sosial Dan Sains*, *2*(2), 278–285. htp://sosains.greenvest.co.id.

Suena, N. M. D. S., Ariani, N. L. W. M., & Antari, N. P. U. (2022). Physical Evaluation and Hedonic Test of Sandalwood Oil (*Santalum album* L.) Cream as an Anti-Inflammatory. *Jurnal Ilmiah Medicamento*, *8*(1), 22–30. https://doi.org/10.36733/medicamento.v8i1.3425

Suhartanto, K., Anggleri Julia, Y., & Evelyn Andreana, P. (2022). Uji Efektivitas Krim Ekstrak Etanol Bunga Kamboja (*Plumeria sp*.) dalam Penyembuhan Ulkus Kaki pada Tikus yang Diinduksi Aloksan. *Essence of Scientific Medical Journal*, *20*(1), 12–18.

Vella, F. M., Cautela, D., & Laratta, B. (2019). Characterization of polyphenolic compounds in cantaloupe melon by-products. *Foods*, *8*(6), 2–11. https://doi.org/10.3390/foods8060196