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Review of the Healing Potential of Burn Wounds with Aloe Vera Extract Cream: The Influence of Formula and Virgin Coconut Oil Application

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Abstract

This paper discusses the potential of using Aloe vera extract cream with various formulas, including the incorporation of Virgin Coconut Oil (VCO) as a cream base, for burn wound healing. The study aims to investigate the healing effects of second-degree burn wounds in mice using Aloe vera extract cream with different formulas. Phytochemical analysis identified the presence of phenols, tannins, and saponins in the Aloe vera extract. The results of the wound healing tests indicate that Aloe vera extract creams with different formulas have the potential to accelerate healing, with a healing time range of 8 to 14 days. Formulas containing VCO as a cream base showed faster healing, likely due to the medium-chain saturated fatty acid content in VCO that supports tissue regeneration. Aloe vera extract also possesses cleansing and antiseptic properties that can prevent infections in wounds. Although healing times varied among the different formulas, the main conclusion is that Aloe vera extract creams have the potential to support the healing of second-degree burn wounds.

Keywords: Burn wound healing, Aloe vera extract cream, Virgin Coconut Oil (VCO).

1. Introduction

In an era of rapid scientific and technological advancements, modern medicines have significantly contributed to disease treatment and human well-being. However, amidst these developments, natural remedies continue to hold a crucial place within society. Natural remedies, especially those derived from plants, have occupied a unique position in the history of human medicine and health. In this context, the Aloe vera plant has garnered particular attention as a natural ingredient with potential health benefits(Shakib et al., 2019; Rajeswari et al., 2012).

The Aloe vera plant has been recognized and utilized by various cultures since ancient times as a natural medicinal plant. Its primary advantage lies in its ability to produce positive effects without the harmful side effects often associated with modern pharmaceuticals. Aloe vera has long been used in traditional medicine to address various health concerns, including wound healing, inflammation reduction, and even in cosmetic products (Gupta and Rawat, 2017; Javed 2014).

Nevertheless, knowledge and information regarding various types of plants that can be employed as natural remedies are still limited. Research and a more profound understanding of the properties and health benefits of plants like Aloe vera remain essential. Aloe vera, particularly the Aloe vera variety, holds promising pharmaceutical potential. Compounds such as saponins, flavonoids, tannins, and polyphenols found in the gel of the Aloe vera plant offer diverse healing abilities, including antiseptic and infection-fighting properties.

Beyond its health benefits, the Aloe vera plant also possesses economic potential as a trading commodity. Its high adaptability and capacity to thrive in various soil types make it a promising candidate for cultivation. With growing public interest in natural ingredients and alternative treatments, opportunities for developing a market for Aloe vera-based products are expanding (Balaji et al., 2015); Ni et al., 2004).

In this context, this article will further elucidate the Aloe vera plant, particularly the Aloe vera variety, as a natural medicinal plant with pharmaceutical potential and health benefits. Furthermore, the botanical characteristics and properties of this plant will be expounded upon. Through a deeper comprehension of Aloe vera, it is anticipated that its utilization and potential as a natural remedy can be further optimized to bolster human health and well-being.

Virgin Coconut Oil (VCO) is an oil derived from fresh coconuts, distinct from regular coconut oil that often undergoes chemical processing or high-heat treatment. VCO possesses unique characteristics, including unsaturated and non-hydrogenated fatty acids, which contribute to its distinctive health benefits. VCO is produced at low

temperatures (< 60°C) by processing coconut milk that is left to stand for several days, resulting in pure oil with various health and cosmetic advantages (Solikhah, 2021; Satheeshan et al., 2020; Wijaya et al., 2012).

The health benefits of VCO encompass enhancing the immune system, preventing infections caused by bacteria, viruses, and fungi, managing diabetes, and maintaining soft and smooth skin. VCO contains fatty acids that combat free radicals and strengthen the immune system. Additionally, VCO's natural texture makes it suitable for skincare and cosmetic applications. In this context, a cream is a solid preparation containing dissolved medicinal substances in a suitable base. Creams are often used as semi-solid preparations with relatively fluid consistency, such as oil-in-water emulsions or water-in-oil emulsions. Aloe vera extract cream with VCO has potential as a solution for burn wound healing.

The aim of this research is to develop a formula for Aloe vera extract cream with VCO for burn wound healing. Furthermore, this research aims to understand the influence of varying volumes of Aloe vera extract in the cream on cream stability and determine the most effective burn wound healing formula for mice. By comprehending the effects of these variables, it is anticipated that an optimal cream formula can be developed for burn wound healing purposes.

In this context, this research will investigate how to create Aloe vera extract cream with VCO for burn wound healing and test the effects of varying Aloe vera extract volumes in the cream on stability and effectiveness in burn wound healing in mice. The ultimate goal of this research is to contribute to the understanding of utilizing VCO and Aloe vera extract in the realms of health and cosmetics, particularly in burn wound healing.

2. Methodology

This research was conducted using structured steps and methods to understand the healing effects of a cream containing Aloe vera extract. The following are the steps and methods used in this study:

1. Aloe Vera Sample Preparation:
   - Aloe vera samples were prepared by cutting a 5 cm section from the base.
   - The Aloe vera section was then cut into small pieces, and its skin was peeled.
   - The sample was washed with running water to remove the sap.
   - The cleaned sample was weighed, amounting to 500 g.
   - The weighed Aloe vera sample was then blended.
2. Extraction and Aloe Vera Extract Preparation:
   - The blended Aloe vera sample was filtered.
   - The filtered Aloe vera extract was heated at 70°C for 10 minutes.
3. Cream Preparation:
   - The independent variable in this study is the Aloe vera extract.
   - The controlled variable is the application of the cream.
   - The ingredients used in cream preparation include Aloe vera (Aloe barbadensis), virgin coconut oil, stearic acid, triethanolamine, adeps lanae, liquid paraffin, nipagin, nipasol, and distilled water.
4. Phytochemical Identification Test:
   Phytochemical identification test was conducted on the Aloe vera extract to identify the chemical compounds present in the extract.
5. Burn Wound Healing Effect Testing:
   - The burn wound healing effect testing method involved applying the cream containing Aloe vera extract to burn wounds on mice.
   - The dependent variable was the healing time, measured by monitoring the progress of burn wound healing.
6. Cream Stability Measurement:
   Cream stability was measured by observing the physical and textural changes of the cream with varying volumes of added Aloe vera.

Table 1. Cream Formulation with Aloe Vera Extract:

No	Formula	Ekstrak Lidah Buaya (%)	Basis Krim (%)
1	F0A	10	90
2	F0B	10	90
3	F1A	15	85
4	F1B1	5	95

This study aims to evaluate the effectiveness of a cream containing Aloe vera extract and VCO in burn wound healing, as well as to analyze the influence of varying Aloe vera extract volumes on cream stability. Therefore, it is expected that this study will provide important information regarding the potential use of Aloe vera extract cream in burn wound healing, along with the most effective formula to enhance the healing process in mice.

3. Results and Discussion:

This research involves a series of sample preparation, extraction, and phytochemical identification steps to uncover the active compound content in the Aloe vera extract produced through the infusion method. The results and discussions of this study are outlined as follows:

In the sample preparation stage, Aloe vera is prepared by cutting a 5 cm section from its base, then slicing it into small pieces and peeling its skin. This sample is then thoroughly washed with running water to remove existing sap. Afterward, the cleaned sample is weighed at 500 g and blended to achieve a specific consistency. The outcome of this process is the Aloe vera extract that will be used in the phytochemical identification test.

The phytochemical identification test is conducted using the infusion method to identify the presence of active compounds in the Aloe vera extract. The identified compounds include phenols, tannins, saponins, and sterols. The results of the phytochemical identification test show that the Aloe vera extract contains three active compounds, namely phenols, tannins, and saponins. However, the test for sterol content yields a negative result. Phenols, tannins, and saponins are water-soluble compounds, while sterols tend to be insoluble in water but can dissolve in alcohol.

The selection of the infusion method as the extraction method is based on the ease of equipment use and required materials. Although this method only provides qualitative information about the presence of active compounds, it is considered accurate and efficient enough for phytochemical identification purposes.

The results of this study indicate that the active compounds present in the Aloe vera extract have significant benefits in skin care and wound healing. Tannins have astringent properties that can help tighten skin pores, prevent minor bleeding, and protect wounds from infection. Phenols possess antiseptic properties that aid in protecting the skin from infections and preventing oxidative damage. Meanwhile, saponins also contribute to skin care and tissue regeneration.

Overall, this research successfully uncovers the presence of active compounds in Aloe vera extract and provides insights into its potential use in health and cosmetic treatments. Although the quantitative measurement of compounds was not performed in this study, the qualitative information obtained serves as an important initial step in the development of Aloe vera extract-based products.

Table 3. Results of the Phytochemical Identification Test of Aloe Vera Extract using the Infudation Method

No	Senyawa	Hasil
1	Fenol	+
2	Tanin	+
3	Sterol	-
4	Saponin	+

The results of the phytochemical identification test revealed the presence of saponins in the Aloe vera extract. Saponins have the ability to act as cleansers and antiseptics, which can function to clean wounds and prevent the growth of microorganisms, such as bacteria, that typically occur in wounds. Therefore, Aloe vera extract containing saponins can help prevent wounds from experiencing serious infections (Wani et al., 2010).

Furthermore, the results of the cream washability examination across various formulas (FOA, FIA, FOB, and F1B) indicated that 1 gram of cream in the FOA and FIA formulas can be washed well using 14 mL of distilled water. However, in the FOB and F1B formulas, 1 gram of cream requires 17 mL of distilled water to clean. The washability of the cream is related to the cream type, with microemulsion-in-water (m/o) type creams being easier to wash compared to water-in-microemulsion (o/m) type creams.

From this explanation, it can be concluded that Aloe vera extract containing saponins has the potential to assist in cleaning and preventing infections in wounds. Additionally, the results of the cream washability examination show differences in washability abilities among various cream types, which need to be considered in product development.

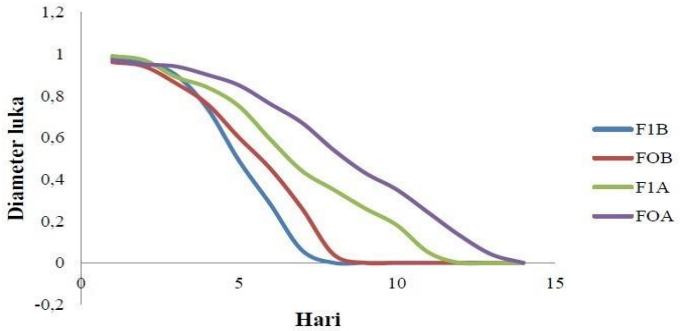

Figure 1. Wound Diameter over Time in Mouse Wound Healing

Observation results indicate that when using F1B cream, the burn wound diameter changed to 0 on the 8th day, while FOB extract cream healed the burn wound on the 9th day. F1A extract cream required up to the 12th day for burn wound healing, while FOA extract cream needed up to the 14th day for healing. Theoretically, these results suggest that all four extract creams have the potential to accelerate the healing of second-degree burn wounds within the time frame of 10-14 days.

Aloe vera extract creams using a cream base containing Virgin Coconut Oil (VCO) demonstrated faster effectiveness compared to other formulas. VCO contains medium-chain saturated fatty acids that can support the healing and tissue regeneration processes (Gani, et al., 2005). The wound healing process generally involves three phases: the inflammatory phase, the proliferation phase, and the maturation phase. The inflammatory phase is characterized by swelling, the proliferation phase involves the formation of exudate and fibrolas that create a crust-like layer over the wound, and the maturation phase includes the formation of new tissue indicating healing or wound contraction.

In the burn wound test on mice, each extract cream showed different healing times, indicating that each phase of the healing process occurs within varying time frames. However, overall, Aloe vera extract creams with VCO showed the potential to expedite the burn wound healing process, which can be attributed to the healing properties possessed by the Aloe vera extract and VCO.

4. Conclusion

In this study, the effects of healing second-degree burn wounds using Aloe vera extract creams with various formulas have been investigated. Phytochemical analysis revealed the presence of phenols, tannins, and saponins in the Aloe vera extract, indicating potential cleansing and antiseptic properties that support healing. Burn wound healing tests on mice resulted in various healing times ranging from 8 to 14 days, depending on the formula used. Formulas that incorporated Virgin Coconut Oil (VCO) as a cream base demonstrated faster healing effectiveness, which may be due to the medium-chain saturated fatty acid content in VCO that supports tissue regeneration.

Therefore, Aloe vera extract creams have the potential to expedite the healing process of second-degree burn wounds. The utilization of various formulas and the integration of VCO as a cream base have proven to be more effective in burn wound healing. The cleansing and antiseptic properties of Aloe vera extract also offer additional benefits in infection prevention. However, it's important to note that healing times vary according to the formula used, as well as the healing process involving multiple stages in tissue regeneration. Hence, further development in optimizing this Aloe vera extract cream formula could potentially provide a more effective solution in supporting the healing of second-degree burn wounds.

References

Gani, R., Hughes, H., Fleming, D., Griffin, T., Medlock, J., & Leach, S. (2005). Potential impact of antiviral drug use during influenza pandemic. Emerging infectious diseases, 11(9), 1355.

Wani, M. Y., Hasan, N., & Malik, M. A. (2010). Chitosan and Aloe vera: Two gifts of nature. Journal of Dispersion Science and Technology, 31(6), 799-811.

Shakib, Z., Shahraki, N., Razavi, B. M., & Hosseinzadeh, H. (2019). Aloe vera as an herbal medicine in the treatment of metabolic syndrome: A review. Phytotherapy Research, 33(10), 2649-2660.

Rajeswari, R., Umadevi, M., Rahale, C. S., Pushpa, R., Selvavenkadesh, S., Kumar, K. S., & Bhowmik, D. (2012). Aloe vera: the miracle plant its medicinal and traditional uses in India. Journal of Pharmacognosy and Phytochemistry, 1(4), 118-124.

Gupta, A., & Rawat, S. (2017). Clinical importance of Aloe vera. Research Journal of Topical and Cosmetic Sciences, 8(1), 30-39.

Javed, S. (2014). Aloe vera gel in food, health products, and cosmetics industry. Studies in Natural Products Chemistry, 41, 261-285.

Solikhah, T. (2021). Aloe vera and Virgin Coconut Oil (VCO) accelerate healing process in domestic cat (Felis domesticus) suffering from scabies. Iraqi Journal of Veterinary Sciences, 35(4), 699-704.

Satheeshan, K. N., Seema, B. R., & Manjusha, A. M. (2020). Development of virgin coconut oil based body lotion. The Pharma Innovation Journal, 9(5), 96-101.

Wijaya, R. A., Latifah, L., & Patjojo, W. (2013). Formulasi krim ekstrak lidah buaya (Aloe vera) sebagai alternatif penyembuh luka bakar. Indonesian Journal of Chemical Science, 2(3).

Balaji, A., Vellayappan, M. V., John, A. A., Subramanian, A. P., Jaganathan, S. K., SelvaKumar, M., ... & Yusof, M. (2015). Biomaterials based nano-applications of Aloe vera and its perspective: a review. RSC advances, 5(105), 86199-86213.

Ni, Y., Turner, D., Yates, K. Á., & Tizard, I. (2004). Isolation and characterization of structural components of Aloe vera L. leaf pulp. International immunopharmacology, 4(14), 1745-1755.