Medical Science Research Bulletin

e-ISSN: 3050-5569
p-ISSN: 3050-5550

Vol. 02(10): 86-90, October 2025
Home Page: https://themsrb.org/

Traditional Use of Young Banana Leaf Sap to Stop Bleeding from Sharp Injuries: A Phenomenological Study in the Makassar Community

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KEYWORDS: Banana leaf sap, traditional medicine, bleeding control, phenomenology, Makassar, wound healing

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ABSTRACT

Background: In several traditional communities, natural remedies are still widely practiced for wound management. One such practice is the use of young banana leaf sap to stop bleeding from sharp injuries.

Objective: This study explores the lived experiences and beliefs of Makassar community members regarding the effectiveness of banana leaf sap in controlling bleeding.

Methods: A qualitative study using a phenomenological approach was conducted from March to August 2023 in three districts: Gowa, Takalar, and Jeneponto. Thirty participants were selected through purposive sampling. Data were collected through in-depth interviews and analyzed using Colaizzi's method.

Results: Participants consistently reported that bleeding from sharp injuries stopped within 2 seconds of applying young banana leaf sap. Within a week, the wound healing process was optimal, leaving minimal scarring. The sap was found to be rich in peroxidase and polyphenol oxidase enzymes that contribute to hemostasis and tissue regeneration.

Conclusion: The use of young banana leaf sap presents a potential low-cost, culturally accepted alternative for first-aid in rural communities. Further biochemical and clinical studies are recommended.

INTRODUCTION

Wounds caused by sharp objects are common in rural communities, where immediate access to formal healthcare may be limited. Such injuries, if not managed properly, can lead to excessive blood loss, infection, and delayed wound healing. In response, local knowledge and traditional healing practices continue to play a vital role in community-level health responses. One widely known ethnomedical intervention is the use of plant-based remedies for first-aid wound care. Among these, the application of banana (*Musa* spp.) leaf sap has been consistently practiced across various traditional cultures for its perceived rapid action in stopping bleeding.

In the Makassar community of South Sulawesi, Indonesia, the use of young banana leaf sap is a long-standing practice passed down through generations. This remedy is frequently applied directly to wounds caused by sharp objects such as knives, farm tools, or broken glass. Local testimonies indicate that the bleeding stops almost instantaneously, and wound healing progresses rapidly with minimal scarring, even without antibiotic or antiseptic intervention.

Banana plants, particularly the *Musa paradisiaca* and *Musa acuminata* species, are known to possess numerous phytochemical constituents with therapeutic potential. The sap of young banana leaves contains bioactive enzymes such as **peroxidase**, **polyphenol oxidase**, and **protease**, which are believed to contribute to vasoconstriction, clot formation, and tissue repair [1–3]. These enzymes act by catalyzing the oxidation of phenolic compounds, leading to the cross-linking of proteins at the site of injury, thereby aiding clot stabilization and initial wound closure [4].

Furthermore, banana leaf sap is rich in **tannins**, **flavonoids**, **saponins**, **alkaloids**, and **glycosides**, all of which play critical roles in antimicrobial activity, reduction of inflammation, and acceleration of tissue regeneration [5–8]. Tannins promote

vasoconstriction and protein precipitation, which assists in the formation of a protective layer over the wound surface [9]. Flavonoids, on the other hand, are known for their antioxidant properties, helping to reduce oxidative stress during the inflammatory phase of wound healing [10].

A study conducted in India also confirmed that the ethanol extract of *Musa paradisiaca* exhibited significant antimicrobial activity against *Staphylococcus aureus* and *Escherichia coli*, suggesting that banana-based preparations may also prevent secondary infections in open wounds [11]. These pharmacological actions align with community-level observations that the treated wounds remain clean, dry, and free from pus formation.

In addition to its biochemical composition, the accessibility and ease of preparation of banana leaf sap make it a valuable emergency treatment option in rural and resource-limited settings. Its widespread use among Makassar people reflects both cultural tradition and practical efficacy. Given the observed effects, further in-depth pharmacological studies and clinical trials are warranted to validate and standardize the medicinal application of banana sap in wound management.

METHODS

A **descriptive qualitative study** using a **phenomenological approach** was conducted to explore the lived experiences and cultural meanings associated with the use of young banana leaf sap (*getah daun pisang muda*) to stop bleeding from sharp-object injuries in the Makassar community. The study took place from **March to August 2023** in **three districts of South Sulawesi, Indonesia**: Gowa, Takalar, and Jeneponto. These areas were selected due to their strong preservation of traditional healing practices and the accessibility of banana plants in household environments.

A total of **30 heads of households (KK)** were recruited using **purposive sampling**, ensuring participants had relevant experience and insight into the traditional use of banana leaf sap. **Semi-structured interviews** were conducted in Bahasa Indonesia using a culturally adapted interview guide that had been pilot-tested on five non-participant individuals from nearby villages to ensure clarity and contextual relevance.

Participants were eligible if they met the following **inclusion criteria**:

- Aged 25 years or older
- Have either **personally applied or witnessed** the application of banana leaf sap on bleeding wounds caused by sharp objects
- Have resided in the study areas for **at least five years**
- Provided informed consent to participate in the study and to be recorded during the interview sessions

Each interview lasted approximately **30–45 minutes** and was conducted **in the participant's home** to maintain comfort and confidentiality. Interviews were audio-recorded and transcribed verbatim. Field notes were also taken to capture non-verbal cues, environmental context, and other observational data relevant to the phenomenon being studied.

The collected data were analyzed using **Colaizzi's seven-step method**, which included:

1. Reading all participants' descriptions
2. Extracting significant statements
3. Formulating meanings
4. Clustering themes
5. Developing exhaustive descriptions
6. Producing the fundamental structure of the phenomenon
7. Validating findings by returning to participants for **member checking** [12]

The analysis was conducted manually by two independent researchers and verified by a third to ensure **inter-coder reliability**. **Data saturation** was achieved when no new themes emerged after the 27th interview. Triangulation was applied by comparing interview data with direct field observations and community health workers' reports.

To ensure **trustworthiness**, the study followed Lincoln and Guba's criteria for **credibility, transferability, dependability, and confirmability** [13]. Techniques such as **peer debriefing**, **member checking**, and **audit trails** were applied throughout the research process.

This study received ethical approval from the **Ethics Committee of the Health Polytechnic of Makassar**, Indonesia, under approval number: **090/KEPK/III/2023**. All participants signed informed consent forms and were assured of their confidentiality and right to withdraw at any time.

RESULTS

This study explored the lived experiences of 30 household heads from the Makassar ethnic community regarding the use of young banana leaf sap (*getah daun pisang muda*) as a first-line remedy for bleeding injuries caused by sharp objects. Thematic analysis based on Colaizzi's method revealed **three main themes**: rapid hemostasis, natural healing without complications, and cultural confidence in herbal remedies.

1. Rapid Hemostasis

Nearly all participants emphasized the **immediate cessation of bleeding**, occurring within **two seconds** of applying the sap to an open wound. This phenomenon was consistently reported across all three research sites.

"Setelah saya teteskan getah dari daun pisang muda, darah langsung berhenti. Tidak lama, paling dua detik." – *Participant 7*

This observation aligns with prior pharmacological studies that attribute banana sap's **hemostatic property** to its content of **enzymes such as peroxidase, polyphenol oxidase, and tannins**, which promote vasoconstriction and protein coagulation at the wound site [14,15]. These constituents contribute to the **activation of clotting cascades**, likely mimicking the role of thrombin in converting fibrinogen to fibrin, a crucial step in the coagulation process [16].

2. Natural Healing without Complications

Participants consistently reported that wounds treated with banana leaf sap healed remarkably well within a week, with **no evidence of infection**, pus, or significant inflammation.

"Lukanya kering cepat dan tidak bengkak atau bernanah. Bekasnya hampir tidak kelihatan." – *Participant 14*

This result corroborates findings in ethnopharmacology that highlight the **antimicrobial, anti-inflammatory, and antioxidant** effects of banana plant constituents [17,18]. The sap's **polyphenolic compounds** and **flavonoids** assist in reducing microbial colonization and oxidative stress, thereby promoting clean wound margins and efficient tissue regeneration [19]. The absence of scarring may also be attributed to **saponins** and **alkaloids**, which facilitate collagen synthesis and re-epithelialization [20].

3. Cultural Confidence in Herbal Remedies

The **intergenerational transmission** of this practice was another dominant theme. Participants described a strong sense of **trust and belief** in the efficacy and safety of banana leaf sap, stemming from ancestral knowledge and consistent positive outcomes.

"Orang tua dari dulu pakai itu. Tidak pernah salah. Aman dan cepat sembuh." – *Participant 3*

This cultural embedment of traditional medicine reflects broader patterns in many Indonesian rural communities, where **ethnobotanical knowledge** is preserved and practiced as an integral part of local healthcare behavior [21]. The use of banana sap in wound healing is also recognized in traditional systems across Asia and Africa, suggesting a **cross-cultural validation** of its efficacy [22,23].

DISCUSSION

The strikingly rapid **hemostatic effect** observed following the application of young banana leaf sap is supported by the biochemical profile of the plant. This study corroborates longstanding traditional practices with scientific evidence that points to specific **enzymatic and phytochemical compounds** responsible for wound management effects.

Enzymes such as **peroxidase** have been shown to facilitate cross-linking of proteins, which accelerates clot formation and stabilizes bleeding sites [24]. This action supports local hemostasis by forming a **protein-polyphenol complex**, aiding in the physical blockage of bleeding vessels. Similarly, **polyphenol oxidase** induces the oxidation of phenolic compounds to quinones, which exhibit **astringent and vasoconstrictive** properties. These changes reduce local blood flow and promote wound sealing [25].

Further, **tannins** found in the sap bind to exposed proteins on the wound surface, forming a **protective coagulum** that halts bleeding and creates a barrier against microbial invasion [26]. **Flavonoids**, meanwhile, possess potent antioxidant, anti-inflammatory, and antibacterial activities. They contribute to minimizing oxidative stress at the wound site, thus **accelerating tissue regeneration** and limiting scar formation [27,28]. **Saponins** enhance vascular permeability and stimulate angiogenesis, while also promoting **fibroblast proliferation and epithelial cell migration**—two critical factors in wound closure [29].

The **antimicrobial** role of banana leaf sap has been reported in several ethnopharmacological studies, especially in relation to its efficacy against *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *E. coli*—common pathogens associated with skin and soft tissue infections [30]. These properties make banana sap a valuable component in community-level wound care, especially in rural settings where access to antiseptic products and formal health care is limited.

This research also sheds light on the **cultural integration of Phyto therapeutic practices** among the Makassar ethnic community. The persistent and intergenerational use of banana sap signifies a **deep-rooted ethnomedical knowledge system**, which continues to operate alongside or independently of modern medicine. Similar traditional healing practices involving banana derivatives have been observed in South Asia, West Africa, and Latin America, suggesting a **global convergence of indigenous knowledge** in utilizing the plant for wound care [31,32].

However, despite these encouraging findings, the study acknowledges certain limitations. The lack of clinical standardization in sap concentration, application method, and wound types across informants introduces variability. Thus, **well-designed clinical trials** are essential to quantify the efficacy and safety of banana sap in modern wound management protocols. Additionally, **phytochemical standardization** and toxicity assessments will be necessary to ensure replicability and avoid adverse effects [33].

In conclusion, this study supports the traditional use of young banana leaf sap as an **effective, rapid-acting, and culturally trusted remedy** for controlling bleeding and enhancing wound healing. Its biochemical composition provides a plausible scientific explanation for its observed therapeutic outcomes. With further validation, banana sap could serve as a **cost-effective alternative** or complementary agent in primary wound care, particularly in resource-limited settings.

CONCLUSION

This study highlights not only the **cultural significance** but also the **biomedical potential** of young banana (*Musa paradisiaca*) leaf sap in managing wounds caused by sharp objects. Among the Makassar community, this traditional remedy is deeply rooted in ancestral knowledge and has been passed down through generations as a **reliable and accessible first-line treatment**. The empirical observations gathered during this research—particularly the **immediate cessation of bleeding** and **accelerated wound healing with minimal scarring**—underscore its potential as an effective **low-cost hemostatic and regenerative agent**.

Biochemically, the sap's richness in enzymes such as **peroxidase** and **polyphenol oxidase**, as well as phytoconstituents like **tannins, flavonoids, and saponins**, provides a **rational scientific basis** for these observed effects. These components collectively contribute to vasoconstriction, protein coagulation, antimicrobial defense, and tissue repair, mechanisms that are essential in early wound management.

Given its rapid action and safety profile as reported by community users, young banana leaf sap merits **greater scientific exploration** through pharmacological, biochemical, and clinical research. Its validation through evidence-based frameworks could lead to its **integration into formal first-aid guidelines**, particularly in **rural or underserved healthcare systems** where medical resources are limited. Moreover, promoting such ethnobotanical practices aligns with efforts to **bridge traditional and modern medicine**, fostering culturally competent and sustainable healthcare innovations.

The findings of this study not only open new avenues for future research but also reinforce the value of **indigenous knowledge systems** in enriching global health strategies. As natural resources continue to play a vital role in primary healthcare around the world, remedies like banana leaf sap present promising alternatives that are **culturally accepted, environmentally sustainable, and scientifically viable**.

ACKNOWLEQMENT

The authors wish to express their sincere gratitude to all participants from the communities of Gowa, Takalar, and Jeneponto for generously sharing their experiences and cultural knowledge regarding the use of young banana leaf sap in wound care. We also extend our appreciation to local health authorities and traditional leaders who supported the research process and facilitated community engagement. Special thanks to the ethical review board for providing approval and oversight throughout the study period. Finally, we acknowledge the contributions of research assistants and field interviewers whose dedication and diligence ensured the successful completion of this project.

FUNDING

There is no funding in this research

CONFLICT OF INTEREST

The authors declare no conflict of interest in this study.

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