



ETHNOBOTANICAL SURVEY OF MEDICINAL PLANTS USED TO TREAT WOUND-HEALING IN THE LEMBANG REGION, WEST BANDUNG, WEST JAVA, INDONESIA

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ABSTRACT

The skin functions as the body's first line of defense, protecting internal organs from mechanical, chemical, and thermal damage. Wound healing is a dynamic process supported by multiple cellular activities, including homeostasis, inflammation, proliferation, and remodeling, which require appropriate harmonious integration to effectively repair damaged tissue. Natural phytomedicines that have many pharmacological properties have been used widely and effectively for wound care and infection prevention. This research aims to document and preserve the use of ethnomedicine to treat wounds by people in the Lembang Region, West Bandung, West Java, Indonesia. Fieldwork was carried out from March to April 2024 using direct interviews, questionnaires and discussions. Plant species are identified based on standard taxonomic methods, flower morphological characteristics, and where possible, using samples for comparison, as well as consultation with experts and the literature. The plant types obtained were grouped into families according to the Cronquist classification system. Plant names were checked against the Plant List (www.plantlist.org) and the International Plant Name Index (www.ipni.org). This research reports that 30 plant species are commonly used by people in the Lembang region for treating wounds. Among the various plant parts used, leaves (73.3%) are most often used in making wound medicine, followed by rhizomes (10%), stems, seeds, fruit, rind, and flowers (3.3% respectively). Meanwhile, the preparation method most often used is topical (100%). The results of this research confirm that people in the Lembang Region still rely heavily on medicinal plants for their health care system, especially for treating wounds using the most frequently used parts of the leaves and using them topically.

KEYWORDS: Traditional medicine, Ethnomedicinal plants, Lembang Region, Wound Healing.

INTRODUCTION

A wound is a disruption of cellular and anatomical continuity, characterized by damage to the protective or physiological function of tissue, caused by physical, chemical, microbial, thermal, or immunological injury to the tissue.^[1] After the injury, an inflammatory response occurs and cells under the dermis (The deepest layer of skin) begin to increase collagen production. Then, the epithelial tissue (Outer skin) regenerates.^[2] Wound healing is a natural reaction experienced by the body to restore the structural and functional integrity of injured tissue.^[3] This is a complex and dynamic process, which aims to replace damaged cellular structures and tissue layers.^[4] There are three stages of the wound healing process, including inflammation, proliferation, and regeneration remodeling.^[2] When injury occurs, inflammatory cells will release lysosomal enzymes and reactive oxygen species (ROS), and facilitate the

cleaning of various cell debris.^[5] After that, it is followed by a proliferative phase which is characterized by angiogenesis, collagen deposition, granulation tissue formation, epithelialization, and wound contraction. Angiogenesis involves the growth of new blood vessels from endothelial cells. Meanwhile, during the formation of granulation tissue, fibroblasts secrete collagen and fibronectin to form a new extracellular matrix (ECM). Then, epithelial cells will cross the wound bed to cover it, and form myofibroblasts which play an important role in wound contraction that occurs during the proliferation phase.^[6] Contraction is considered an important process in wound healing because it causes wound closure.^[7] The goal of wound care is to shorten healing time and reduce the risk of unwanted complications.^[8] Meanwhile, more than three-quarters of the world's population has relied on medicinal plants for wound care, and more than 400

species of medicinal plants have been reported to have wound-healing activity.^[9-11]

Medicinal plants are the most important and sometimes the only source of wound treatment. This is because medicinal plants are culturally acceptable, easy to access, and cheap compared to modern medicine.^[12-14] Indonesia is the second largest country in the world with forest biodiversity, where there are 28,000 plant species and 2,500 of these species are medicinal plants.^[15-17] Currently, research to obtain new anti-wound drugs derived from natural ingredients continues to be carried out, one of which is through exploring active compounds from natural ingredients, especially medicinal plants which have traditionally been used by people to treat wounds in various regions in Indonesia.^[18-20] One of the Region in Indonesia that still uses herbal plants as an alternative treatment, especially for treating wounds, is the Lembang Region. This research aims to obtain detailed information about the use of herbal plants for alternative wound therapy in Lembang Region, West Bandung, West Java, Indonesia using a field survey method.

MATERIALS AND METHODS

Study Area

Lembang is located in West Bandung Regency, West Java, Indonesia, with an area of 3.23 km². This area has an altitude of 2,084 meters above sea level with an average maximum air temperature of 24°C and a minimum of 17°C. Lembang is located between 06°45' 30" South Latitude and 107°35' 00" East Longitude. This area is a tropical climate area that is mostly inhabited by Sundanese tribes (98%) and other tribes (2%). Vegetation in the study area is in humid conditions with an average rainfall of 2,233 mm/year.

Data collection

An extensive field survey was carried out to obtain information about medicinal plants from the Sundanese tribe in the study area. To document existing information about medicinal plants from tribal practitioners, several field visits were conducted from March to April 2024 in

the Lembang Region, West Bandung, West Java, Indonesia. During the research, ethnomedicinal information was collected from middle-aged and older tribal practitioners in their local language (Sundanese), through direct interviews, questionnaires, and discussions. Information about local plant names, plant parts used, preparation methods and administration methods (e.g., infusion, topical, and decoction) of all ethnomedicinal plants collected were recorded during the survey period.

Botanical Identification

Plant species are identified based on standard taxonomic methods, flower morphological characteristics, and where possible, using samples for comparison, as well as consultation with experts and the literature.^[21] The plant types obtained were grouped into families according to the Cronquist classification system, except for Pteridophyta and Gymnospermae.^[22] Plant names were checked against the Plant List (www.plantlist.org) and the International Plant Name Index (www.ipni.org).

Ethics statement

All participants provided verbal consent before the interview and gave consent to publish the information they provided.

RESULTS AND DISCUSSION

This research revealed that 30 plant species are commonly used by local people to treat wounds (Table 1). This shows that the study location is affordable in terms of biodiversity. Among the various plant parts used, leaves (73.3%) are most often used in making wound medicine, followed by rhizomes (10%), stems, seeds, fruit, rind, and flowers (3.3% respectively). The use of leaves is reported to be easier to prepare and easier to extract active substances from them for treatment. At the same time, leaves have less effect on the mother plant.^[23] Meanwhile, the preparation method most often used is topical (100%). These results are in line with previous research which reported that the form of traditional medicine for wound treatment that is most widely used by the community is topical.^[24]

Table 1: Ethnomedicinal plants, local name, part used, mode of administration and dosage uses in Lembang, West Bandung, West Java, Indonesia.

No	Species	Family	Local name	Parts used	Mode of administration	Dosage of use
1	<i>Aglaia odorata</i> Lour	Meliaceae	Pacar Cina	Leaf	Topical	2.5 grams once a day
2	<i>Allium cepa</i> L.	Amaryllidaceae	Bawang bombai	Rhizome	Topical	2 grams once a day
3	<i>Allium sativum</i> L.	Alliaceae	Bawang Putih	Rhizome	Topical	2 grams once a day
4	<i>Aloe vera</i> L.	Xanthorrhoeaceae	Lidah buaya	Stem	Topical	10 milligrams once a day
5	<i>Anredera cordifolia</i> (Ten) Steenis	Basellaceae	Binahong	Leaf	Topical	4 grams once a day
6	<i>Areca catechu</i> L.	Arecaceae	Pinang	Seed	Topical	14 grams once a day
7	<i>Carica papaya</i> L.	Caricaceae	Pepaya	Fruit	Topical	9 grams once a day

8	<i>Catharanthus roseus</i> L.	Apocynaceae	Tapak Dara	Leaf	Topical	5 grams once a day
9	<i>Centella asiatica</i> (L.) Urban	Apiaceae	Pegagan	Leaf	Topical	20 grams once a day
10	<i>Chromolaena odorata</i> L.	Asteraceae	Kirinyuh	Leaf	Topical	2 grams once a day
11	<i>Citrus limon</i> (L.) Burm. f.	Rutaceae	Lemon	Leaf	Topical	3 grams once a day
12	<i>Cordyline fruticosa</i> (L.) A.Chev.	Asparagaceae	Andong Merah	Leaf	Topical	25 grams once a day
13	<i>Garcinia mangostana</i> L.	Clusiaceae	Manggis	Rind	Topical	100 grams once a day
14	<i>Gynura divaricata</i> (L.) DC	Asteraceae	Daun Dewa	Leaf	Topical	6 grams once a day
15	<i>Imperata cylindrica</i> L.	Poaceae	Alang-alang	Leaf	Topical	25 grams once a day
16	<i>Jatropha curcas</i> Linn.	Euphorbiaceae	Jarak	Leaf	Topical	2 grams once a day
17	<i>Jatropha multifida</i> L.	Euphorbiaceae	Jarak Tintir	Leaf	Topical	28 grams once a day
18	<i>Kalanchoe pinnata</i> Pers	Crassulaceae	Cocor Bebek	Leaf	Topical	10 grams once a day
19	<i>Moringa oleifera</i> L.	Moringaceae	Kelor	Leaf	Topical	75 grams once a day
20	<i>Orthosiphon stamineus</i> Benth	Lamiaceae	Kumis Kucing	Leaf	Topical	2.5 grams once a day
21	<i>Peperomia pellucida</i> L. Kunth	Piperaceae	Suruhan	Leaf	Topical	500 milligrams once a day
22	<i>Persea americana</i> Mill.	Lauraceae	Alpukat	Leaf	Topical	2 grams once a day
23	<i>Pilea melastomoides</i> (Poir.) Bl	Urticaceae	Pohpohan	Leaf	Topical	3 grams once a day
24	<i>Piper betle</i> L.	Piperaceae	Sirih	Leaf	Topical	6 grams once a day
25	<i>Portulaca oleracea</i> L.	Portulacaceae	Krokot	Leaf	Topical	180 grams once a day
26	<i>Pyrostegia venusta</i> (Ker Gawl.) Miers	Bignoniaceae	Jalaran Api	Flower	Topical	3 grams once a day
27	<i>Terminalia catappa</i> L.	Combretaceae	Ketapang	Leaf	Topical	3 grams once a day
28	<i>Tinospora crispa</i> L. Miers	Menispermaceae	Bratawali	Leaf	Topical	6 grams once a day
29	<i>Vernonia amygdalina</i> Del.	Asteraceae	Daun Afrika	Leaf	Topical	5 grams once a day
30	<i>Zingiber officinale</i> Rosc.	Zingiberaceae	Jahe	Rhizome	Topical	2 grams once a day

CONCLUSIONS

The results of this research confirm that people in the Lembang Region still rely heavily on medicinal plants for their health care system, especially for treating wounds using the most frequently used parts of the leaves and using them topically.

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