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FORMULATION AND EVALUTION OF HERBAL OINTMENT USING HIPTAGE BENGHALENSIS FOR WOUND HEALING.

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ABSTRACT

Wounds are inevitable events in life, resulting from a variety of causes including physical trauma, chemical exposure, biological factors, and microbial infections. Healing is a vital survival mechanism that aims to restore normal anatomical structures and functions through the process of tissue regeneration. In recent years, plants and their extracts have shown significant potential in the management and treatment of wounds. Herbal medicines are not only cost-effective and readily available, but are also generally considered safe, with allergic reactions being relatively rare. These natural agents promote wound healing and tissue regeneration through multiple mechanisms, offering a holistic and efficient approach to recovery.

KEYWORDS: Herbal, Ointment, Wound healing,

INTRODUCTION

India boasts a rich and diverse flora that is widely distributed across the country. Herbal medicines have long served as the foundation for treating a variety of diseases and physiological conditions in traditional healing systems such as Ayurveda, Unani, Siddha, and others. Medicinal compounds derived from plants play a significant role not only in traditional therapies but also in modern and Western medicine. In fact, plant-based remedies have been integral to human healthcare for thousands of years. Ancient civilizations in India, China, and other parts of the world extensively used plant-derived drugs for therapeutic purposes.

Today, a considerable number of modern pharmaceuticals are derived from plants and are effective against a wide range of diseases. Typically, this involves isolating the active chemical compounds from specific plants and modifying them for enhanced therapeutic use. According to a survey conducted by the World Health Organization (WHO), over 80% of the global population still relies on traditional medicine for primary healthcare needs. Even in developed countries, approximately 25% of medical drugs are plant-based. The use of medicinal plants is particularly prevalent among indigenous populations in rural and developing regions.

A wound can be defined as a disruption or break in the epithelial integrity of the skin or, more broadly, as the loss of anatomical or functional continuity of living tissue.

Hiptage benghalensis (L.) Kurz, a member of the Malpighiaceae family, is a medicinal plant known for its various healing properties. The leaves of *H. benghalensis* are traditionally used in Burma for the treatment of several skin diseases, while in Indonesia, the bark is commonly applied for wound healing. In India, this plant is widely utilized to treat conditions such as cough, asthma, leprosy, and excessive thirst, among others.

Scientific studies suggest that the therapeutic properties of *H. benghalensis* may be attributed to the presence of mangiferin, a bioactive compound known for its anti-inflammatory, hepatoprotective, antioxidant, and antimicrobial properties. These pharmacological activities support the plant's traditional use and highlight its potential in modern wound healing and disease management strategies.

CLASSIFICATION OF WOUNDS:

Wounds can be classified based on various criteria, such as the nature of the injury, visibility of tissue damage, and the physiological progression of the healing process. Broadly, wounds are categorized as open or closed based on their physical characteristics, and as acute or chronic depending on the healing response.

1. Open Wounds:

In open wounds, there is a visible break in the skin, and bleeding is typically evident. These wounds involve external exposure of underlying tissues and may vary in severity. Open wounds are further classified into the following types:

Incised wounds – Clean cuts usually caused by sharp objects such as knives or blades.

Lacerations or tear wounds – Irregular tears in the skin or tissues caused by blunt trauma.

Abrasions or superficial wounds – Surface wounds caused by friction or scraping.
Puncture wounds – Deep, narrow wounds typically caused by sharp, pointed objects like needles or nails.
Penetrating wounds – Wounds that enter the body and affect internal tissues or organs.
Gunshot wounds – Caused by bullets or projectiles, often involving both entry and exit wounds with varying degrees of tissue damage.

2. Closed Wounds:

In closed wounds, the skin remains intact, and the bleeding occurs beneath the surface, making it less visible. Despite the absence of an external opening, these wounds can cause significant internal damage. Common types include:
Contusions or bruises – Caused by blunt force, leading to discoloration from internal bleeding.
Hematomas or blood tumors – Localized collections of blood outside blood vessels, often forming a swelling.
Crush injuries – Result from prolonged pressure or impact that compresses tissues without breaking the skin, often causing extensive internal damage.

3. Acute Wounds:

Acute wounds are injuries that follow a predictable and timely healing process. These wounds typically result from surgical procedures, accidents, or cuts, and they usually progress through the normal stages of healing (inflammation, proliferation, and remodeling) without complications. Healing is completed within the expected timeframe, restoring both anatomical and functional integrity.

4. Chronic Wounds:

Chronic wounds are those that fail to heal in a timely and orderly manner. Instead of progressing through the normal healing phases, they remain in a prolonged inflammatory state. Chronic wounds often require extended care and may recur. Common contributing factors include:
Local infections
Poor oxygen supply (hypoxia)
Repeated trauma
Presence of foreign bodies
Systemic health issues such as diabetes mellitus, malnutrition, immunodeficiency, and the use of certain medications
Effective treatment of chronic wounds typically requires addressing the underlying cause in addition to wound care.

MECHANISM OF WOUND HEALING

The body's response to injury—whether surgically or traumatically induced—is immediate. Damaged tissue undergoes a complex but well-coordinated healing process that progresses through three main phases:
1. Inflammatory Phase
2. Proliferative Phase
3. Remodeling Phase
Each phase plays a crucial role in restoring tissue integrity and function.
1. Inflammatory Phase
The inflammatory phase is the initial response following injury and serves to prepare the wound for repair. This phase is characterized by swelling, redness, pain, and loss of function—all classical signs of inflammation. The purpose of these reactions is to immobilize the affected area, minimize further damage, and initiate the healing cascade.
Onset and Duration: This phase begins immediately after injury and typically lasts for 48 hours, though it may extend up to 2 or 3 weeks in some cases.
Hemostatic Response: The process starts with vasoconstriction and platelet aggregation to halt bleeding by forming a clot.
Inflammatory Response: This is followed by vasodilation, which increases blood flow to the wound site, and the infiltration of immune cells. Neutrophils and macrophages perform phagocytosis, clearing dead tissue and pathogens, thereby setting the stage for tissue repair.
2. Proliferative Phase
The proliferative phase follows the resolution of inflammation and typically spans from 2 days up to 3 weeks. During this phase, the structural rebuilding of the wound occurs through the following processes:
Granulation: Fibroblasts migrate to the wound site and synthesize extracellular matrix components such as collagen and glycosaminoglycans. Concurrently, angiogenesis leads to the formation of new capillaries, ensuring an adequate supply of nutrients and oxygen.
Wound Contraction: Myofibroblasts help to contract the wound margins, reducing the wound size.
Epithelialization: Epithelial cells proliferate and migrate across the wound bed, forming a new surface layer that restores the skin's barrier function.
3. Remodeling Phase
The final phase of wound healing, known as the remodeling or maturation phase, may last from 3 weeks up to 2 years. It is during this phase that the wound achieves its final structure and strength.
Collagen Remodeling: Type III collagen laid down during earlier phases is gradually replaced by the stronger type I collagen. This process is aided by vitamin C-dependent hydroxylation, which promotes collagen cross-linking and increases tissue tensile strength.
Scar Formation: Over time, the scar tissue becomes flatter, more organized, and eventually reaches about 80% of the tensile strength of the original tissue.

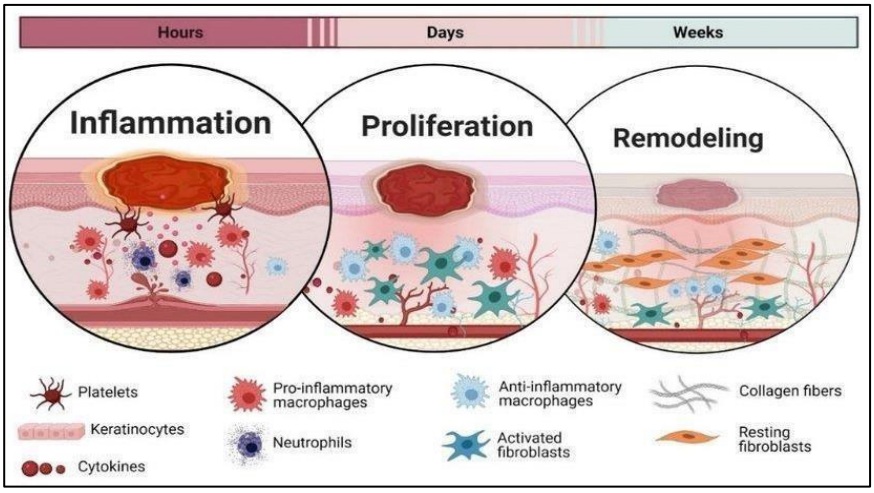

Fig. 1: Mechanism of Wound Healing

MATERIAL AND METHODS:

Ingredients Table:

Sr.No.	Ingredients	Equipments
1)	*Hiptage Benghalensis* Extract	Beaker
2)	Beeswax	Water Bath
3)	Cocoa Butter	Stirrer
4)	Coconut Oil	Spatula
5)	Peppermint Oil	Grinder
6)		Weighing Balance
7)		Filter Paper
8)		Measuring Cylinder
9)		Conical Flask

Table 1: Ingredients of Ointment.

Sr.No.	Ingredients	F1	F2	F3
1)	*Hiptage Benghalensis* Extract	4ml	4ml	4ml
2)	Beeswax	3gm	2gm	4gm
3)	Cocoa Butter	5gm	4gm	2gm
4)	Coconut Oil	6.5ml	5ml	6ml
5)	Peppermint Oil	0.2ml	0.4ml	0.1ml

Formulation Table:

Table 2: Formulation Table of Ointment.

FORMULATION OF OINTMENT

Hiptage benghalensis leaves after extraction process was formulated as ointment. The beeswax is an oleaginous material and was selected for preparation of ointment also, a few drops of peppermint oil was added.

EXTRACTION METHOD:

Decoction (Water-Based Extraction)

Process:

Weigh the fresh or dried plant material (e.g., 25–30 g dried).

Add 5–10 times the volume of water (e.g., 100 mL).

Boil gently for 20–30 minutes until the volume is reduced to 1/4th.

Cool and filter through muslin cloth.

Ointment Method:

1. Prepare the Fat Phase: Weigh 3 g beeswax, 5 g shea butter, and 6.5 g coconut oil. Place them into a clean beaker. Melt this mixture in a water bath at ~70–75°C, stirring until completely liquefied and uniform.

2. Add Herbal Extract:

Cool the melted mixture slightly to around 55–60°C. Add 4 g of *Hiptage benghalensis* extract (semi-solid or thick paste). Stir continuously until fully dispersed and homogenized.

3. Incorporate Sensitive Ingredients:

Allow the mixture to cool to around 40–45°C. Add 0.2 mL peppermint oil and 0.3 mL vitamin E oil using a dropper. Mix gently but thoroughly for even distribution.

RESULT

Physical Evaluation:

Sr. no.	Test	Observation
1.	Colour	Opaque green
2.	Odour	Characteristic
3.	Consistency	Semisolid

Table 3: Physical Evaluation of Formulated Ointment.

pH:

The Determination of pH of Formulated Ointment is 6.4.

Spread ability:

Sr. No.	Formulation	Spreadability
1.	2% w/w	Good

Table 4: Determination of Spread ability

CONCLUSION

The findings of the present investigation clearly indicate that the ointment formulated from H. benghalensis leaf extract is a promising, safe, and cost-effective treatment for wounds and various skin disorders. The study highlights the plant's significant potential as a wound-healing agent, particularly when used in topical formulations. This supports its traditional use in folk medicine for treating common skin conditions. The final ointment formulation demonstrated excellent spreadability on the skin, showed no signs of irritation, diffused effectively, and remained stable across a range of temperatures. Although further research is ongoing, these results suggest that developing new formulations based on H. benghalensis could be both feasible and beneficial.

REFERENCE

1. Perumal SR, Ignacimuthu S, Patric RD , 12, 2008, Preliminary screening of ethnomedicinal plants from India, Eur Rev Med Pharmacol Sci, 1-7
2. Fabricant DS, Farnsworth NR 2001, The value of plants used in traditional medicine for drug discovery, Environ Health Pers, 109 (Suppl 1), 69-75.
3. Priya KS, Gnanamani A, Radhakrishnan N, Babu M 2002, Healing potential of Datura alba on burn wounds in albino rats, J. Ethnopharmacol., 83,193-199.
4. Steenkamp V, Mathivha E, Gouws MC, Rensburg CEJ 2004, Studies on antibacterial, antioxidant and fibroblast growth stimulation of wound healing remedies from South Afr.
   J. Ethnopharmacol., 95,353–357.
5. Principe P, Monetising 2005 the pharmacological benefits of plants. US Environmental protection Agency,Washington, D.C., 1991.
6. Ramzi SC, Vinay K, Stanley R, Pathologic Basis of Diseases , 5th edition, WB Saunders Company, Philadelphia, 86.
7. Strodtbeck F 2001, Physiology of wound healing, Newborn Infant Nurs. Rev, 1 , 43-45.
8. Kumar B, Vinaykumar M, Govindarajan R, Pushpangadan P 2007, Ethanopharmacological approaches to wound healing-exploring medicinal plants of India, J.Ethanopharmacol., 114, 103-113.
9. Roberts PR, Black KW, Santamauro JT, Zaloga GP, 1998, Dietry peptides improve wound healing following surgery, Nutrition, 14, 266-269.
10. Meenakshi S, Raghavan G, Nath V, Ajay Kumar SR, Shanta M,2006, Antimicrobial,wound healing and antioxidant activity of Plagiochasma appendiculatum Lehm. et Lind. J Ethnopharmacol., 107, 67–72.