Pharmaceutical Sciences & Analytical Research Journal
ISSN: 2640-6659

Academic Strive
Researcher's perception is our reality

Research Article *Volume 6 Issue 2*

Wound Healing Activity of *Acacia* Bark and *Mangifera indica* Bark

Shailendra SN[1]*, Alagusundaram M[1], Harsha SS[2], Chinna B[3], Alok KS[4] and Ekta K[5]

[1]Department of Pharmaceutics, India

[2]Department of Pharma Practice, India

[3]Department of Pharmaceutical Analysis, India

[4]Department of Pharmaceutical Bio-technology, India

[5]Department of Pharmaceutical Chemistry, India

***Corresponding author:** Shailendra Singh Narwariya, Department of Pharmaceutics, School of Pharmacy, ITM University, Gwalior-474001 Madhya Pradesh, India, Tel: 9713793446; Email: shailugsp@gmail.com

Received Date: May 31, 2024; **Published Date:** June 26, 2024

Abstract

The complex and dynamic process of regenerating devitalized tissue was investigated using methanolic leaf extracts of Acacia bark, Mangifera indica, to support its long-standing use as a wound healer. To assess the wound healing activity at various doses of povidone iodine (5%) as the standard medication, five sets of six albinos Wister rats were employed in each model. Tensile strength, histological changes, and the rate of wound contraction were used to measure wound healing. The results show that, in compared to control and standard povidone iodine, experimental animals fed mg kg of ethanolic extract had a fast rate of wound contraction and larger wound breaking strength. By showing that the formulated extract has significant wound healing properties as measured on the 0, 4, 8, 12 and 16th days, i i.e. 232.21 ±5.8 (0%), 182.8 ± 4.2 (14.85%), 229.21 ± 5.2 (65.5%), 14.03 ± 2.9 (91.9%),2.7 ±1.04 (98.8%), the current study's findings support the use of the extract in traditional medicine. Its use in conventional medicine is justified since its active components can accelerate wound healing.

Keywords: Wound Healing Activity; Povidone Iodine; Extraction, *Acacia* and *Mangifera indica* Bark

Introduction

A physiological response to tissue injury is wound healing. However, a variety of cell types, cytokines, mediators, and the vascular system must cooperate in order to heal a wound. Bleeding is intended to cease during the initial cascade of platelet aggregation and blood vessel constriction. Leaves from acacia trees can be used to cure wounds. Both the leaves and the bark of babool have potent anti-inflammatory and antibacterial properties that lessen inflammatory bleeding and infections and expedite the healing of cuts and wounds [1]. Sprinkle some babool leaf powder on the wound promptly after taking a small amount of it. Aggressive radical action has negative effects on the body. Babool's antioxidant properties have advantages for treating liver illnesses and minimizing oxidative damage. Strong compounds found in bark help to reduce the risk of hepatotoxicity [2-4]. Babool has anticancer, anti-mutagenic, and anti-mutagenic qualities that can reduce the risk of some malignancies in addition to reducing tumor growth [5]. Babool contains anti-mutagenic compounds that combat cancerous cells and fatal diseases [6]. *Mangifera* sp. Bark is believed to have a tonic impact on mucous membranes and is an astringent that is used to treat rheumatism, diphtheria, and other conditions [7-9]. The gum is used in scabies and injured foot treatments. It is also thought to be anti-syphilitic [10-12]. Before being turned

into flour, the kernels are soaked in water to eliminate the astringent elements [13-15].

Materials and Methods

Plant Material

The Plant *Acacia* bark and *Mangifera indica* bark were obtained in the Turari vicinity of the ITM campus in Gwalior, India. The taxonomist at the Department of Botany, Faculty of Science, and ITM University verified their authenticity. For future use, a voucher specimen was added to the university's herbarium.

Animals

Albino Wister rats of either sex (110-145 g), CCMB, Taraka, was used in wound healing tests at the central animal house facility of the CCMB, Hyderabad. At a temperature of 25±2 °C, the rats were housed in a 12-hour light/dark cycle. The Vijaya College of Pharmacy in Hyderabad, Telangana, India provided them with limitless access to a regular pellet meal and water. The work was approved by the CPCSEA ethics committee, and all experimental methods were carried out strictly in compliance with ethical guidelines. CPCSEA's registration number is 1292/AC/09/CPCSEA.

Herbal Formulation

	Plants Extracts (gm)	
Extract	**A**	**B**
Extract -I	30	10
Extract -II	10	30

A-Acacia Arabica bark

B-Mangifera indica bark

Preparation of Herbal Ointment

The ingredients were fully mixed and melted over a water bath while being continuously stirred. After being taken out of the fire, the liquid was swirled until it had cooled. 10 g and 20 g of the plant extract were combined with a small quantity of a basic ointment foundation to create a methanol extract ointment, which produced 5% (w/w) and 10% (w/w) ointments, respectively. The residual base of the basic ointment was gradually added and well mixed up. After extraction, the ointment was put in a fresh container for topical application during the study.

Evaluation of Wound Healing Activity

Incision Wound Mode: The incision wound model was considered while receiving a little ether anaesthetic. The animal was positioned on the operation table and secured in place. On each side of the spinal column, a paravertebral straight incision measuring around 6 cm in diameter was made using a scalpel blade. The wounds were cleaned using cotton swabs that had been soaked in 70% alcohol. They were kept in various cages.

- Group- I were treated with control (ointment base),
- Group –II were treated standard (povidone ointment)
- Group –III were treated with Extract-I
- Group –IV were treated with Extract-II
- Group –V were treated Standard drug povidone iodine.

$$percentage\ wound\ healing = \frac{initial\ wound\ area - nth\ day\ of\ wound\ \ healing\ are \times 100}{initial\ area\ of\ wound\ healing}$$

Statistical Analysis

Results are the mean SEM for each set of six animals in order to compare the means of wound area measurement and wound breaking strength between groups at various periods. The outcomes are displayed as a percentage of wound contraction using data from six animals. With a control group and the student t-test, the effectiveness of the bark methanolic extract ointment in treating wounds was statistically tested. The average percentage of the excision wound's closure is used to represent the results. The incision wound healing model studies revealed that from the first day to the sixteenth, the size of the wound decreased in all of the test groups. The conventional, widely available ointment and the specially formulated (Test) ointment containing methanolic extract (mixture) had both entirely healed the wound by the sixteenth day. Compared to animals treated with the other extracts, those treated with the methanolic extract showed faster wound epithelization (2.7 + 1.04) in the animals. Ext-1 methanolic leaf extract showed 98.8% wound healing compared to the standard (ointment base), which showed 64.8% healing. The tensile strength of the animals was evaluated on the tenth damage day in the incision model. The Extract-1 demonstrated better wound healing properties in comparison to the standard.

Results and Discussion

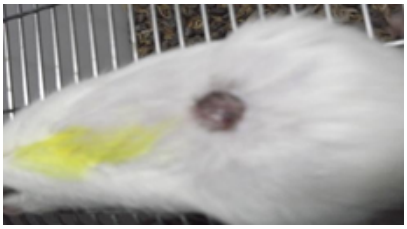
Acacia bark and *Mangifera indica* extracts were chosen for their capacity to facilitate wound healing. The percentage of the excision wound area that was closed as a result of the prepared bark of methanolic ointment's wound healing activity. As can be seen in table I, all of the 3,4groups tested underwent a reduction in wound size from day one to sixteen days in accordance with the research on the incision wound healing model. On day 16, the wound had fully healed with both the standard, over-the-counter ointment and the custom-made (Test) ointment containing methanolic extract. Compared to animals treated with the other extracts, those treated with the methanolic extract experienced faster wound epithelization (2.7+1.04). Extract I, a methanolic

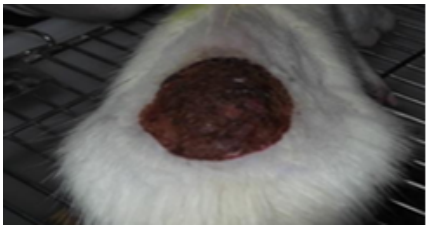
bark ointment, revealed 98.8% wound healing activity in comparison to the standard (ointment base), which only showed a healing rate of 64.8%. After the tenth wound in an incision model, the animals' tensile strength was evaluated. The Extract-I demonstrated enhanced wound healing capabilities when compared to the standard. The results show that the methanolic extracts can stimulate wound-healing activities. It must first go through extensive testing in clinical settings before being considered for the treatment of wounds. Additional purified ingredient study is necessary in order to completely understand the mechanism of action of the wound healing properties of the synthesized medicinal plants.

Groups	Wound Area (mm^2) ± SEM and (% of Wound Contraction) Post Wounding Days				
	0 day	4th day	8th day	12th day	16th day
Group-I Control	226.84 ± 4.11	215.90±9.81	139.06 ± 5.68	129.54± 1.02	73.81 ± 2.11
	0%	**-4.66%**	**-36.86%**	**-45.33%**	**-64.80%**
Group-II Standard (povidone)	226.02 ± 5.9	209.6 ± 3.89	82.36 ± 5.4	24.4 ± 0.88	4.50± 1.23
	0%	**-10.76%**	-63.98%	**-89.83%**	**-98.48%**
Group-III Methanolic Extract -I	229.21 ± 5.2	182.8 ± 4.2	76.7 ± 4.8	14.03 ± 2.9	2.7 ±1.04
	0%	**-14.85%**	**-65.50%**	**-91.90%**	**-98.80%**
Group-IV Methanolic Extract -II	228.22 ±2.1	178.2 ±3.2	72.7 ± 3.2	13.03 ± 3.4	2.6 ±1.01
	0%	-13.85%	-63.50%	-91.90%	-96.20%

Table 2: Post Wounding Days of Groups.

Group 1 & Group 2





Group 3 & Group 4

Figure 1: Control Groups.

References

1. Maslin BR, Miller JT, Seigle DS (2003) Overview of the generic status of *Acacia* (*Leguminosae*: *mimosoideae*). Australian Systematic Botany 16(1): 1-18.
2. Orchard AE, Maslin BR (2003) Proposal to conserve the name *Acacia* (*Leguminosae*: *Mimosoideae*) with a conserved type. Taxon 52(2): 362-363.
3. Chopra RN, Nayar SL, Chopra IC (1956) Glossary of Indian medicinal plants. CSIR, New Delhi, India, pp: 2-23.
4. Jain A, Katewa SS, Galav PK, Sharma P (2005) Medicinal plant diversity of Sitamata wildlife sanctuary, Rajasthan, India. J Ethnopharmacol 102(2): 143-157.
5. Jain AK, Shimoi K, Nakamura Y, Tomita I, Kada T (1987) Preliminary study on the desmutagenic and

antimutagenic effect of some natural products. Curr Sci 56(24): 1266-1269.

6. Doughari JH, Manzara S (2008) *In vitro* antibacterial activity of crude leaf extracts of *Mangifera indica* Linn. African Journal of Microbiology Research 2: 67-72.

7. *Mangifera indica*, From Wikipedia. The Free Encyclopedia.

8. Shah MBP, Parmer PK (2010) *Mangifera indica* (Mango). Pharmacognosy review 4(7): 42-48.

9. Raihan HM, Nan C, Yuling C (2013) Therapeutic Potential of the Natural Product Mangifern in Metabolic Syndrome; Journal of Nutritional Therapeutics 2(2): 74-79.

10. Sompong S, Pirote S (2009) Nutritive value and nutrient digestibility of ensiled mango by products. Maejo Int. J Sci Technol 3(3): 371-378.

11. Ashifat AA, Omotubga SK, Kehinde AS, Olayinka OO, Edugbola GO (2012) proximate evaluation of nutritional value of mango (*Mangifera indica*). Int J Res Chem Environ 2(4): 244-245.

12. Narwariya SS, Jain S (2022) Physicochemical In vivo anti-inflammatory effect of tablet containing fenoprofen. Res J Pharm Technol 15(10): 4413-4415.

13. Narwariya SS, Jain S, Muthumanickam A (2024) Formulation of mouth-dissolving tablets containing a spray-dried solid dispersion of poorly water-soluble fenoprofen calcium dihydrate and its characterization. ScienceRise: Pharmaceutical Science 2(48): 53-61.

14. Singh S, Khare E, Srivastava S, Rajput HS, Singh LK (2022) Design, formulation, and optimization of novel mouth dissolving tablet of drug ketorolac using special super disintegrate. Asian J Pharm 16(3): 371.

15. Narwariya Ss, Jain S (2021) Development and Evaluation of Mouth Dissolving Antiinflammatory Tablet Containing Fenoprofen. Journal of Advanced Scientific Research 12(3S2): 254-264.