

Formulation And Development Of Herbal Ointment Containing Wood Apple Shell For Wound Healing Activity

Gitanjali Shinde, Rutuja Nagare, Sakashi Nichit, Roshni Kharat, Vaishnavi Sabale, Anuja Modhave

Matoshri Miratai Aher College Of Pharmacy, Karjule Haryana

ABSTRACT

The present study aims to formulate and evaluate a herbal ointment containing wood apple shell extract for wound healing activity. The shells of *Limonia acidissima* were processed and extracted using Soxhlet extraction. The extract was incorporated into an ointment base prepared with beeswax, liquid paraffin, and soft paraffin. The formulation was evaluated for physicochemical parameters such as pH, spreadability, consistency, and stability. The wound healing activity was assessed using excision wound model. The formulation showed promising wound contraction, reduced inflammation, and improved epithelialization. The results indicate that wood apple shell ointment can be used as an effective herbal wound healing formulation.

Keywords: Wood apple shell, Herbal ointment, Wound healing, *Limonia acidissima*, Topical formulation.

INTRODUCTION

Wound healing is a complex physiological process involving inflammation, proliferation, and tissue remodeling. Herbal medicines play an important role in wound healing due to their antimicrobial and anti-inflammatory properties. Wood apple shell contains

bioactive constituents such as flavonoids, tannins, alkaloids, and phenolic compounds which promote wound contraction and collagen synthesis. These phytochemicals help in reducing infection and accelerating tissue regeneration. Hence, the present study focuses on the formulation and evaluation of wood apple shell ointment for wound healing.



The Wood Apple is a medicinal fruit tree. In Marathi, it is called Kavath. The hard outer covering of this fruit is known as the wood apple shell. This shell is considered important in traditional medicine and research due to its beneficial properties.



Key Characteristics

- ✓ Hard, thick, and brown-colored shell

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

- ✓ Contains natural tannins, flavonoids, and antioxidants
- ✓ Used in formulations such as ointments, powders, and extracts

Traditionally used in Ayurvedic preparations

Medicinal Uses

- Helps in wound healing
- Shows antimicrobial activity
- Reduces inflammation (anti-inflammatory)
- Used in skin-protective ointment formulations

MATERIALS AND METHODS

1. Materials

- Wood apple shell powder
- Beeswax
- Liquid paraffin
- White soft paraffin
- Petroleum jelly
- Ethanol (solvent)
- Distilled water
- Methyl paraben (optional preservative)

2. Preparation of Wood Apple Shell Powder

Wood apple shells were collected, washed with distilled water, and dried under shade. The dried shells were powdered using mechanical grinder and sieved through mesh to obtain uniform particle size.

3. Extraction Procedure

10 g of wood apple shell powder was subjected to Soxhlet extraction using ethanol as solvent for 6–8 hours. The extract was concentrated using water bath and stored in airtight container for further formulation.

Materials

- 10 g wood apple shell powder
- 100–150 ml ethanol (or methanol)
- Soxhlet apparatus
- Filter paper thimble
- Round bottom flask
- Water bath / heating mantle

Steps for wood apple shell powder extraction

1. Weighing

- Accurately weigh 10 g of wood apple shell powder.

2. Loading

- Place the powder in filter paper thimble.
- Insert into Soxhlet extractor.

3. Solvent Addition

- Add 100–150 ml ethanol into round bottom flask



4. Extraction

- Heat at 60–70°C.
- Run Soxhlet for 6–8 hours (8–10 cycles).



5. Completion

- Continue until solvent in siphon tube becomes light or colorless.

6. Filtration

- Remove extract and filter to remove particles.

7. Evaporation

- Evaporate solvent on water bath at 40–50°C.
- Thick extract will remain.



8. Storage

- Store concentrated extract in airtight container at 4°C.

Objective of Wood Apple Shell Extraction

- ✓ To obtain bioactive compounds from wood apple shell powder.
- ✓ To isolate phytochemicals such as tannins, flavonoids, and phenolic compounds.

- ✓ To prepare extract for wound healing ointment formulation.
- ✓ To evaluate antimicrobial activity of the extract.
- ✓ To study anti-inflammatory and antioxidant properties.
- ✓ To develop herbal topical formulation using the extract.

4. Formulation of Ointment

Table 1: Composition of Ointment (10 g)

Ingredient	Quantity
Wood apple shell extract	0.5 g
Bees wax	1 g
Liquid paraffin	1.5 g
White soft paraffin	7 g
Preservatives	q. s.

5. Method of Preparation

- 1) Beeswax was melted using water bath.
- 2) Soft paraffin and liquid paraffin were added.
- 3) The mixture was stirred continuously.
- 4) Wood apple shell extract was incorporated slowly.
- 5) The mixture was stirred until uniform.
- 6) The ointment was allowed to cool.
- 7) Packed in suitable container.

Evaluation of Ointment:-

1. Physical Appearance

Color, odor, and consistency were evaluated visually.

2. pH Determination

pH was measured using digital pH meter after dispersing ointment in distilled water.

3. Spreadability

Spreadability was determined using two glass slide method.

4. Homogeneity

The formulation was tested by visual inspection.

5. Extrudability

Extrudability was determined by tube pressing method.

6. Stability Study

The ointment was stored at room temperature and observed for 30 days.

Wound Healing Activity

Excision Wound Model

Animals were divided into three groups:

- ✓ Control group
- ✓ Standard group
- ✓ Test group (wood apple ointment)

The ointment was applied daily and wound contraction was measured at regular intervals. The epithelialization period was recorded.

Table : Physical Evaluation of Ointment

Parameter	Observation
Color	Brownish
Odor	Characteristic
Consistency	Smooth
Homogeneity	Good
Phase separation	None
Skin irritation	Absent

Table : pH and Spreadability

Parameter	Result
PH	6.4
Spreadability (g. cm/sec)	7.8
Extrudability	Good

RESULTS AND DISCUSSION

The formulation showed smooth texture and good homogeneity. The pH was found to be suitable for skin application. The ointment exhibited good spreadability and stability. The wound healing study showed faster wound contraction in test group compared to control. The presence of flavonoids and tannins in wood apple shell contributed to antimicrobial and anti-inflammatory activity, enhancing collagen synthesis and tissue regeneration.

CONCLUSION

The formulated wood apple shell ointment demonstrated significant wound healing activity. The herbal formulation was stable, safe, and effective. The results support the use of wood apple shell extract as potential natural wound healing agent.

ACKNOWLEDGEMENT

The authors are thankful to the laboratory staff for providing necessary facilities.

REFERENCES

1. Mohanty S., Pattnaik A. (2025). Ethnobotanical Significance, Phytopharmacology, and Toxicological Profile of *Limonia acidissima*.
2. Khatun S., Sen S. (2024). Ethnomedicinal Aspects, Phytochemical and Pharmacological Properties of *Limonia acidissima*.
3. Thomas A., Ponnammal N.R. (2005). Preliminary Studies on Phytochemical and Antibacterial Activity of *Limonia acidissima* Plant Parts.
4. Meghwal A. et al. (2024). Phytochemical and Pharmacological Activities of Wood Apple: A Systemic Review.
5. Wood Apple—*Limonia acidissima* (Exotic Fruits Reference Guide, 2018).
6. *Limonia acidissima* Shell: Micro and Nanoparticles Preparation and Chemical Treatment. Materials Today Proceedings (2022).
7. Beneath the Rind: Health Benefits and Applications of Wood Apple Fruit.
8. USDA Phytochemical Database – Plant *Limonia acidissima* (Rutaceae).



9. Influence of Phytochemicals and Antioxidant Activity of Wood Apple. (Review articles summarized in pharmacological literature).
10. Processing of Wood Apple Shell Powder for Bio-based Materials and Applications.

HOW TO CITE: Gitanjali Shinde, Rutuja Nagare, Sakashi Nichit, Roshni Kharat, Vaishnavi Sabale, Anuja Modhave, Formulation And Development Of Herbal Ointment Containing Wood Apple Shell For Wound Healing Activity, J. Pharm. Sci., 2026, 2 (6), 308-312. <https://doi.org/10.5281/zenodo.20721393>

