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A DETAILED PHYTOCHEMICAL ANALYSIS AND WOUND HEALING POTENTIAL OF ASIAN PALMYRA PALM (BORASSUS FLABELLIFER) LEAF SECRETION

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ABSTRACT

The Asian Palmyra palm (Borassus flabellifer) has long been prized in rural Asia for its traditional medical properties, especially in the treatment of wounds, in addition to its culinary and commercial applications. Although the fruit and sap are widely recognized, nothing is known about the leaf secretions' potential for medical use in scholarly literature. These leaf secretions have long been used by the local people to treat cuts, scrapes, and skin irritations; this study examines their wound-healing qualities. The leaf secretions were carefully collected, extracted using ethanol, and then analyzed phytochemically. It was determined that flavonoids, tannins, saponins, phenolic acids, and alkaloids were present. These substances are all known to have positive effects on wound healing, including tissue regeneration, antibacterial activity, inflammation reduction, and antioxidant defense. The results not only validate long-standing customs but also suggest that palmyra leaf secretions may be used to create natural, reasonably priced wound-healing treatments. By bridging the gap between traditional knowledge and contemporary research, this study opens the door for sustainable, plant-based wound care solutions, particularly for areas with limited access to commercial medication.

KEYWORDS: *Asian Palmyra palm, traditional medical, wound healing, phytochemical, extract.*

INTRODUCTION

The increasing global demand for natural, safe, and cost-effective therapies has renewed interest in medicinal plants and their bioactive constituents. Among such traditional resources, the **Asian Palmyra Palm** (*Borassus flabellifer*), also known as **Tala Tree**, **Toddy Palm**, or **Ice Apple Tree**, holds significant ethnomedicinal importance. Native to tropical Asia, this large and hardy palm tree has been utilized for centuries across **India, Sri Lanka, Myanmar, and Southeast Asia** for its diverse benefits, particularly in **folk medicine, nutrition, and rural livelihoods**.

Figure 1 & Figure 2. Asian Palmyra palm.

While the **fruits, sap, and fibers** of the Palmyra palm are commonly used in food and industry, the **medicinal properties of its leaf secretions** remain relatively underexplored. In traditional medicine, **leaf extracts or exudates** from the Asian Palmyra tree have been used for treating **minor cuts, wounds, skin inflammation, and infections**. These secretions are believed to contain **bioactive compounds** with **antimicrobial, anti-inflammatory, antioxidant**, and **tissue regenerative** effects properties that are crucial for the **wound healing process**.

WOUND HEALING: A BIOLOGICAL CHALLENGE

Wound healing is a complex physiological process involving **hemostasis, inflammation, proliferation, and remodeling** phases. Effective healing depends on the balance between **cell proliferation**, **oxidative stress management**, and **infection control**. The development of herbal-based formulations offers promising alternatives to synthetic drugs by minimizing side effects and promoting faster recovery through **natural bioactives**.[1]

WHY PALMYRA LEAF SECRETIONS?

Recent interest has grown in evaluating the **phytochemical content** and **pharmacological properties** of Palmyra palm leaf secretions, which are rich in:

- Phenolic compounds
- Flavonoids
- Tannins
- Terpenoids
- Natural enzymes and mucilage

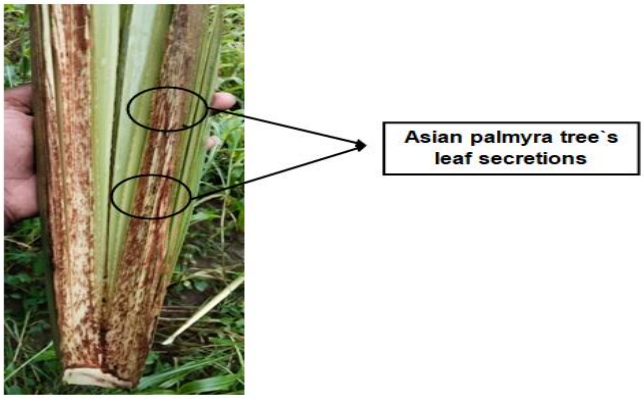

Figure 3. Insight view.

These compounds are known to support **collagen synthesis, tissue regeneration, antimicrobial activity**, and **reduction of oxidative damage**—key elements in effective wound care. Preliminary studies and anecdotal reports from traditional healers suggest that the **gel-like secretion from crushed or aged Palmyra leaves** may offer a **protective barrier** on wounds, accelerate tissue formation, and reduce local inflammation.[2]

TRADITIONAL KNOWLEDGE (Ethnomedicine)

The Asian Palmyra palm's leaf secretions possess wound-healing properties, attributed to bioactive compounds like tannins, carbohydrates, proteins, and terpenoids. Traditional

practices involve using these secretions to treat cuts and wounds, particularly those sustained by toddy tappers.[4]

SCOPE OF THE PROJECT

This project focuses on

- **Collection and preparation** of leaf secretions from Borassus flabellifer.
- **Phytochemical screening** of the extract.
- Bridging between **traditional and scientific knowledge**

Significance of the Study

The study aims to validate the traditional knowledge associated with the Palmyra leaf and scientifically establish its role in modern wound care solutions. If successful, it could provide a **natural, biodegradable, and affordable** wound healing agent with potential for development into a **phytopharmaceutical or cosmetic product**, especially for rural and resource-limited settings.

METHODOLOGY

Collection of Asian Palmyra leaf secretions

Materials required

- Sterile collection container (glass or food-grade plastic).
- Sterile cotton or muslin cloth.
- Clean knife or blade.
- Gloves and mask.
- Labeling tags.

Identification & Selection of plants

- **Identify** a healthy **mature Asian Palmyra palm** (*Borassus flabellifer).*
- Select **young unopened fan-like leaves** or the **leaf base (petiole)** – the area where secretion is often found.
- Early morning (before sunrise) is ideal for secretion collection due to higher fluid exudation.

Cleaning the Area

- Wear **gloves** and a **mask** to maintain hygiene.
- Use a **clean damp cloth** to wipe off any dirt, dust, or microbial deposits around the **leaf base or cut area**.

Collection and storage of secretion

- With a sterile sharp knife, gently scrap the secretion and collect the secretion in a sterile container.
- Transfer the collected secretions into a clean, airtight glass container.
- Label with :
- Date and time of collection.
- Plant part used.
- Collector`s initials.
- Store in a refrigerator.

EXTRACTION OF ASIAN PALMYRA LEAF SECRETIONS

(Ethanol extraction preferred)

Soaking in ethanol

- Take 20 - 50 grams of previously dried and powdered collected material in a conical flask.
- Add 150 - 300 ml of 70% ethanol & ensure full immersion.
- Seal the container tightly with a stopper or foil.
- Let it **stand for 7 days** at room temperature & Shake occasionally (2–3 times a day) to enhance extraction.

Filtration

- After7 days, filter the mixture using **filter paper or muslin cloth**.
- Collect the filtrate in a clean container.

Figure 4. Maceration.

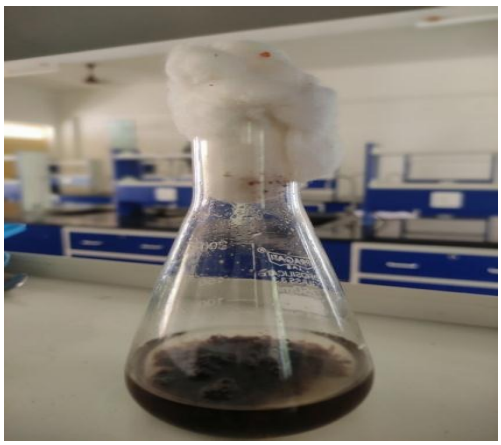

Figure 5. Extract.

Solvent evaporation

Transfer the filtrate

- Pour your ethanolic extract (after filtration) into a clean beaker or round-bottom flask.

Set up the water bath

- Fill a larger container (or lab-grade water bath) with enough water to submerge the lower part of your extract container.
- Heat the water bath to **40–50°C**. Do **not** exceed 60°C to avoid degrading heat-sensitive compounds.

Place the extract in the bath

- Put the beaker containing your extract into the water bath.
- The ethanol will slowly begin to evaporate due to its low boiling point (78.37°C), even at ~50°C, especially over time.

Wait and observe

- Stir gently if possible. You'll observe bubbling and the smell of ethanol.
- Keep the bath temperature consistent.
- Continue heating until the volume reduces significantly and a **thick, viscous residue** forms. This is your **crude extract.**

Cooling and Storage

- Once done, remove the beaker from the water bath and let it cool to room temperature.
- Transfer to a small container (preferably amber-colored).

PHYTOCHEMICAL SCREENING

❖ **Alkaline Reagent Test**

Procedure: Take **1 ml of extract** in a test tube. Add **2 ml of 2% NaOH** solution. Observe the color change. A **yellow color** indicates Flavonoids. Add **a few drops of dilute HCl.**

❖ **Lead Acetate Test (for Tannins)**

Procedure: Take **1 ml of extract** in a test tube. Add **1–2 ml of 10% lead acetate solution**. **Observe the reaction**: Formation of a **white or yellowish precipitate** indicates the **presence of tannins**.

❖ **Foam Test (for Saponins)**

Procedure: Take **1 ml of extract** in a test tube. Add **10 ml of distilled water**.**Shake the test tube vigorously** for about **15–30 seconds**. Let it **stand undisturbed** for **10–15 minutes**.

❖ **Ferric Chloride Test**

Procedure: Take **1 ml of the extract** in a clean test tube. Add **a few drops of 5% $FeCl_3$ solution** to it. Mix gently and **observe any color change**.

❖ **Wagner's Test (for Alkaloids)**

Procedure: Take **1 ml of extract** in a test tube. Add **a few drops (2–3) of Wagner's reagent**. Mix gently and **observe the formation of precipitate**.

Figure 6. Leaf secretion.

Figure 7. Phytochemical screening.

RESULTS

Compounds	Chemical test	Observation	Result
Flavanoids	Alkaline reagent test	Appearance of an intense yellow color	Present
Tannins	Lead acetate test	Formation of a yellow precipitate	Present
Saponins	Foam test	A Stable foam	Present
Phenoic acids	Ferric Chloride Test	Formation of a blue colour	Present
Alkaloids	Wagner's Test	Reddish brown colour precipitate	Present

Phytochemical analysis of ***Borassus flabellifer*** leaf secretions has identified a variety of bioactive compounds that contribute to their medicinal properties.

These include:

- ***Flavonoids:*** Known for their antioxidant and anti-inflammatory effects, flavonoids help in neutralizing free radicals and reducing oxidative stress at wound sites.
- ***Tannins*****:** Exhibit astringent properties, which promote wound contraction and tissue repair.
- ***Saponins*****:** Enhance cellular proliferation and play a role in collagen synthesis, which is crucial for wound healing.
- ***Phenolic acids*****:** Possess strong antimicrobial properties, preventing infections in wounds.
- ***Alkaloids*****:** Exhibit analgesic and anti-inflammatory effects, reducing pain and swelling at the wound site.

DISCUSSION

The process of healing a wound is one of the most complex physiological events in the human body. It involves a delicate balance of cellular and molecular mechanisms. Modern medicine has given us many synthetic drugs and dressings, but people are becoming more interested in natural and traditional remedies. This brings us back to plants like the Asian Palmyra palm, or Borassus flabellifer, which has been used in rural and folk medicine for a long time.People in the area, especially toddy tappers, have used the leaf secretions of this palm to treat small cuts, wounds, and skin irritations for a long time. These secretions are often overlooked compared to the fruit and sap. These practices have been passed down through generations and are not just stories; they show that people have an instinctive understanding of how rich the plant is in bioactive compounds.

CONCLUSION

This study's scientific examination identified the presence of alkaloids, phenolic acids, flavonoids, tannins, and saponins—all of which are known to promote various stages of the wound healing process. Flavonoids and phenolic acids have antibacterial and antioxidant properties that shield the wound from pathogens and oxidative damage. Tannins encourage tissue regeneration and wound contraction, while saponins boost the production of collagen, which is essential for skin repair. By lowering pain and inflammation, alkaloids enhance comfort and promote recovery. The viscous, bioactive residue left over after the ethanol extraction process may serve as a natural dressing for wounds, creating a semi-occlusive layer that shields and supports the wound environment. This is in line with more conventional uses, in which the leaf gel was administered directly to wounds in its unprocessed state.

REFERENCES

1. Mariselvam, R., Ignacimuthu, S., Ranjitsingh, A.J.A., and Selvakumar, P.M. (2021). An insight into leaf secretions of Asian palmyra palm: A wound healing material from nature. Materials Today: Proceedings, 47: 733-738.
2. Rajendran, M., Sivakumar, V., and Kumaravel, S. (2022). Phytochemical profiling and wound healing potential of Borassus flabellifer leaf extracts. Journal of Medicinal Plants Research, 16(4): 89-98.
3. Shanmugalingam, V., Sathasivampillai, S. V., and Srithayalan, S. (2021). Pharmacological Activities of Borassus flabellifer L. Extracts and Isolated Compounds. International Journal of Innovative Research and Reviews, 5(2): 23-31.
4. Venkatesan, R., Rajasekaran, P., and Thangaraj, P. (2020). Traditional knowledge and therapeutic potential of Borassus flabellifer: A review. Journal of Ethnopharmacology, 249, 112389.
5. "An insight into leaf secretions of Asian palmyra palm: A wound healing material from nature" (ScienceDirect, 2021).
6. An Insight into the Polymeric Structures in Asian Palmyra Palm (Borassus flabellifer Linn) Organic Polymer Material Research.