

Unveiling the healing properties of *Euphorbia neriifolia* in treatment of piles

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ABSTRACT

Plants have been valuable because they can be utilised as medical herbs to cure a variety of diseases. *Euphorbia neriifolia* is one such plant that produces toxic milky white latex, a natural herb with wound healing property of piles. It may promote wound healing by enhancing collagen synthesis and tissue repair. Phenol is the main chemical compound use for the wound healing which include euphol, taraxerol, nerifoliol, etc. In combination it is effective remedy for managing and treating piles. The goal of the review is to refresh our understanding of *Euphorbia neriifolia*, including its uses, distribution, harmful effects, chemical composition, mechanism etc.

Keywords: *Euphorbia neriifolia*, piles, wound healing, pharmacological properties, mechanism

I. INTRODUCTION

The use of medicinal plants for healing dates back to the dawn of humans. India is home to over 45,000 different types of medicinal plants. While there are about 3000 officially recognised medicinal herbs, traditional healers employ around 6000. Secondary metabolites make up the majority of plant chemicals (bioactive substances) that are employed for pharmacological or toxicological effects. Based on their chemical classifications, these bioactive molecules, also known as secondary metabolites, can be grouped into numerous categories, including alkaloids, terpenoids, cardiac glycosides, saponins, steroids, limonoid, tannins, flavonoids, and phenolics.

Plants were an important source for the treatment of various infections and ailments in the eighteenth century and earlier.

The spine-filled annual or perennial herb *Euphorbia Neriifolia* Linn. (Euphorbiaceae) is known as Milk Hedge in English and "sehund" or "thohar" in Hindi. It can be found in Bangladesh, Burma, Baluchistan, India's hilly regions, and the Malaysian Islands. The *Euphorbia* plant is named after a Greek doctor named Euphorbus. He was the physician for Juba II, a Romanized king of a North African kingdom. Euphorbus is said to have used the plant's milky sap in his medicines. The *Euphorbia* plant produces a milky sap, or latex, that has been traditionally used to treat many health problems, including skin diseases, digestive issues, wounds, bleeding, bronchitis, tumors, white patches on the skin, and more. While the sap has medicinal uses, it can also be poisonous. The Euphorbiaceae family, part of the *Euphorbia* genus, includes plants widely used in local medicine where they grow. In Indian traditional medicine, these plants are especially popular for their healing properties. All *Euphorbia* plants produce latex and have a unique flower structure.

Euphorbia neriifolia is one of these plants and contains various beneficial compounds like sugar, tannins, flavonoids, alkaloids, and triterpenoidal saponins. It is used in traditional medicine to treat abdominal issues, bronchitis, tumors, white skin patches, piles, inflammation, spleen enlargement, anemia, ulcers, fever, and chronic respiratory problems. It also has properties like pain relief, liver protection, immune system support, anti-inflammation, mild calming effects, wound healing, and radiation protection.

The treatment of infectious diseases has become a major issue in modern times due to the development of resistance to frequently-used antibiotics and significant side effects associated with conventional medicines.^[1]



Fig 01 : Curcumin powder



Fig 02 : Euphorbia neriifolia

Table 1 – Plant profile of euphorbia neriifolia

Botanical name	Euphorbia neriifolia
Family	Euphorbiaceae
Kingdom	Plantae
Subkingdom	Tracheobionta (Vascular plants)
Superdivision	Spermatophyta (Seed plants)
Division	Magnoliophyta (Flowering plants)
Subfamily	Euphorbioideae
Tribe	Euphorbieae
Class	Magnoliopsida (Dicotyledons)
Subclass	Rosidae

Chemical constituents:

The main constituent is milk latex.

The milky sap is used to make "kshara sutra," a special medicated thread used to treat piles and fistulas.

The latex of euphorbia neriifolia containing steroids, triterpenoids, and other chemical:

1. Diterpenes and triterpenoids:

The major compound found in the latex with 24.50% diterpenes and 16.23% triterpenoid in the fresh latex.

2. Phorneroids:

Thirteen undescribed diterpenoids including phorneroids A – M were identified in the aerial parts of the plants.

3. Other chemical:

The plant also contain sugar, tannins, flavonoids, alkaloids, 24- methylene, cycloartenol, and triterpenoidal saponin.

Morphology of Euphorbia neriifolia

Synonyms: Ligularia Rumph, Five- tubercled spurge, Hedge euphorbia, Indian spurge tree, Milk spurge, Oleander leafed spurge, Euphorbia ligularia Roxb, Snuhi, Sehund tree.

Botanical name: Euphorbia neriifolia,

Family: Euphorbiaceae

Description : Euphorbia neriifolia is a smooth, upright plant with water-storing branches that help it survive in dry areas. It can grow up to 20 feet (1.8–4.5 meters) tall, with branches that are round or slightly five-sided. It looks similar to another plant, Euphorbia nivulia, but they can be distinguished by their thorns. In E. neriifolia, the thorns grow from bumpy spots on the branches, while in E. nivulia, they grow from flat, cork-like areas. [2].

1. Leaves

The leaves of E. neriifolia are simple, small, fleshy, and oblong to lanceolate (long and narrow). They are deciduous, meaning they fall off during dry seasons to reduce water loss. Leaves are typically found only at the tips of the young branches and are shed as the plant matures or during dry periods.

2. Involucres

Yellowish flower clusters grow in groups of three to seven, usually in threes, on a small fleshy stalk about 3.8 mm long. The side flowers in the cluster have their own tiny stems and are both male and female, while the center flowers are usually male and have no stem. The male flowers are surrounded by two bracts (leaf-like structures) that hold a male and female flower in their axils

(where the bracts meet the stem). Each bract may also carry its own stalk and has three lobes, with the middle lobe being serrated (like a saw). The flower lobes are wedge-shaped and fringed, and the anthers (pollen-producing part) are arrow-shaped and pointed, similar to those in *Euphorbia nivulia*.^[3]

3. Flowers

Male and female flowers grow together in the same cluster. On thin, forked stems, groups of three to seven flowers grow from the sides of the top leaves. These clusters are rounded, reddish, and flattened, and are about 1.5–2 mm tall and 4–5 mm wide. The middle flower has a short stem, while the side flowers have longer stems of about 6–7 mm. The flower glands are oblong and about 5 mm long and 1–3 mm wide. Although the flowers don't have petals, they are surrounded by two bright red bracts (leaf-like structures) that are oval-shaped and about 3–7 mm long. The cluster of flowers, called a cyathium, has one female flower and several male flowers in the same group. [4]

4. Fruits

The fruits look like small capsules. The style (part of the flower) is divided into three sections, and the stigmas (tips of the style) are slightly widened and smooth, with tiny serrated edges. These fruits, which are about 10 to 12 millimeters in size, grow in different climates but are only visible in February and March.^[4]

5. Seeds

The seeds of *Euphorbia neriifolia* are small, flat, and covered with fine hairs. These seeds are produced in the plant's capsule-like fruit, which splits open when mature to release them. The fine hairs on the seeds may help with their dispersal by wind or by attaching to animals, allowing the plant to spread in different environments.^[8]

6. Branch

The branches of *Euphorbia neriifolia* have a pair of strong spines on the bumps (tubercles) of the smaller branches, arranged in five vertical lines or ribs. As the branches grow, they become more rounded with five edges. The central growth area (meristem) is clearly visible during the plant's development stages. The central and outer growth areas are closely connected. The trunk is covered in a network-like bark.^[8]

7. Stem

The stem of *Euphorbia neriifolia* is cylindrical, smooth, and fleshy, with internodes 4–10 cm long and 2–6 cm wide. It has small spines (1–5 mm) and tubercles arranged in spirals. The dried stems are stiff and wrinkled, breaking easily to reveal a hollow center with papery scales. Inside, there are layers of tissues like the epidermis with stomata, chlorenchyma, and parenchyma bands. The stem also contains oil globules, latex tubes, starch grains, and vessels made of thin-walled fibers. A central stellar region with xylem rings, phloem, and medullary rays carries nutrients through the plant.^[5]

8. Stipular Thorns

The spines are small, 4–12 mm long, grayish-brown to black, sharp, and stay on the plant. They grow from short, cone-shaped bumps (tubercles) that are 2–5 mm tall and spaced 2–3 cm apart in a spiral pattern.^[4]

9. Glands

Euphorbia neriifolia has small circular glands located at the base of its tubercles (the bumps on its stem). These glands produce a milky latex, which contains toxic and medicinal compounds. The latex is acrid and is used in traditional medicine, but it can be irritating to the skin and eyes. These glands are essential for the plant's defense mechanism against herbivores and pests.^[6]

10. Powder

The powder of *Euphorbia neriifolia* is creamy golden and contains various plant parts. It has straight-walled epidermal pieces, stomata, and branching latex tubes. The powder also includes starch granules, stone cells, and fibers. Calcium oxalate crystals in different shapes are present, as well as lignified xylem fibers. After treating the powder with hydrochloric acid (HCl), the calcium oxalate crystals change from needle-shaped to sharper forms.^[7]

11. Latex

The latex of *Euphorbia neriifolia* is a thick, milky white liquid that is highly toxic and acrid. It contains various bioactive compounds like triterpenoids and alkaloids, which have medicinal properties but can also cause skin irritation, inflammation, and allergic reactions. The latex is traditionally used in Ayurveda for treating skin disorders, digestive issues, and respiratory

problems, though it must be handled with caution due to its toxicity. It also acts as a defense mechanism for the plant, protecting it from herbivores and pests.^[5]

12. Taxonomy

The plant belongs to the Eukaryota domain, Plantae kingdom, Magnoliophyta division, Spermatophyte super-division, Magnoliopsida class, Rosidae sub-class, Euphorbiales order, Euphorbiaceae family, Euphorbia genus, and the Euphorbia neriifolia Linn. Species.^[8]

Distribution

Euphorbia neriifolia grows in dry, rocky, and hilly areas of North, Central, and South India, especially in the Deccan Peninsula and Orissa. Originally from South Asia, it is now also grown in Sri Lanka, Myanmar, Bangladesh, Thailand, Malaysia, South China, Vietnam, and New Guinea. This plant is a herb that sheds its leaves seasonally (deciduous). The parts of the plant above the ground are used to make medicine.

Mechanism of action of euphorbia neriifolia :

1. Anti-inflammatory Action

- Mechanism: Piles are characterized by inflamed and swollen veins in the rectum or anus. Euphorbia neriifolia contains compounds that exhibit anti-inflammatory effects. These compounds may inhibit the production of pro-inflammatory cytokines, enzymes like cyclooxygenase (COX), and other mediators that cause inflammation. By reducing inflammation, the plant may help alleviate the swelling and discomfort of hemorrhoids.

2. Analgesic (Pain Relief) Effect

- Mechanism: Euphorbia neriifolia's bioactive compounds, especially its triterpenoids, may block pain signaling pathways. This action could reduce the sensation of pain associated with piles, providing symptomatic relief.

3. Laxative Effect

- Mechanism: Euphorbia neriifolia is believed to have a mild laxative effect, which helps ease bowel movements and prevents constipation. Since straining during defecation worsens piles, this laxative action reduces the mechanical pressure on hemorrhoidal veins. The laxative property may be linked to its stimulation of the intestinal muscles, promoting smoother bowel movements.

4. Astringent Effect

- Mechanism: The astringent action of Euphorbia neriifolia causes contraction of tissues and blood vessels, which helps shrink swollen hemorrhoids. This contraction can also reduce bleeding and promote healing. The plant's astringent properties may act on the veins, reducing their dilation and relieving symptoms.

5. Wound Healing and Tissue Regeneration

- Mechanism: Euphorbia neriifolia may promote wound healing by enhancing collagen synthesis and tissue repair. This property is beneficial for external hemorrhoids, where damaged skin or mucosal tissue requires healing. The phenolic compounds in the plant likely contribute to this action by protecting cells from oxidative stress and promoting regeneration.

By reducing inflammation, relieving pain, improving bowel movement, promoting tissue repair, and reducing vascular congestion, Euphorbia neriifolia may help manage the symptoms of piles. Its combined anti-inflammatory, astringent, and mild laxative properties create a multifaceted approach to treating hemorrhoids.

Curcumin as a Wound-Healing Agent

Wound healing is a very complex natural process involving several interconnecting steps to restore the normal structural integrity and function of the damaged area. The whole process of wound healing is divided into four phases: homeostasis, inflammation, proliferation, and tissue remodelling.^[9] An ideal wound-healing agent should prevent infection, reduce inflammation, and help cells grow and repair tissue quickly to speed up healing.^[10] Curcumin has been used to heal wounds for a long time, but only recently have studies shown scientific proof that it works well for both short-term and long-lasting wounds.^[11] In addition to being antibacterial, antioxidant, and anti-inflammatory, curcumin also promotes tissue proliferation and remodeling, making it a highly potent healing agent.^[12] Recent studies have shown that curcumin is important in all stages of wound healing. It helps control inflammation by stopping the production of two key proteins, interleukin-1 (IL-1) and tumor necrosis factor alpha (TNF-), which are responsible for causing inflammation.^[13] Curcumin also greatly reduces the activity of antioxidant enzymes, which are a major cause of inflammation and the oxidation process.^[14] It helps wounds heal faster by moving repair cells (fibroblasts) to the area, growing new tissue, and

producing more collagen to strengthen the skin. It also speeds up skin regrowth and boosts a protein

(TGF- β) that helps with tissue repair, making the wound close more efficiently.

Table 2- Curcumin profiles

Kingdom	Plantae
Subkingdom	Tracheobionta
Superdivision	Spermatophyta
Division	Magnoliophyta
Subclass	Zingiberidae
Order	Zingiberales
Family	Zingiberaceae
Genus	Curcuma
Species	Longa
Scientific name	Curcuma Longa

Piles disease ^[15]

Piles are swollen veins in the lower anus and rectum. This swelling can cause localized inflammation of other tissues. These growths can vary in size and location. Piles is another term for hemorrhoids. There are two types of piles namely – Internal piles and External piles.

Types of Piles (Hemorrhoids):

1. Internal Hemorrhoids:

- Located inside the rectum.
- Generally painless, but may cause bleeding during bowel movements.
- If they become very large, they may prolapse, meaning they can protrude through the anus, causing discomfort.

Medical professionals grade internal piles on a four-point scale

- **Grade I:** The growth does not cause symptoms and does not protrude out of the anus.
- **Grade II:** The piles may prolapse from the anus but return inside independently.
- **Grade III:** The piles prolapse and only recede within the anus with manual intervention.
- **Grade IV:** The piles prolapse outside of the anus and a person cannot push them back in.

2. External Hemorrhoids:

- Located under the skin around the anus.
- It can cause itching, pain, and swelling.
- Blood clots can form in external hemorrhoids, leading to a condition called thrombosed hemorrhoids, which is painful.

Symptoms:

- **Bleeding:** Bright red blood may be noticed on toilet paper or in the toilet after a bowel movement.
- **Pain or discomfort:** Common with external hemorrhoids, especially when sitting or during bowel movements.
- **Itching and irritation:** Around the anus.
- **Swelling:** Around the anus, particularly in external hemorrhoids.
- **Lumps:** A lump may be felt near the anus in the case of external hemorrhoids.

Causes:

Piles can develop due to increased pressure in the lower rectum, which may be caused by:

- **Straining during bowel movements** (due to constipation).
- **Sitting for long periods on the toilet.**
- **Chronic diarrhea or constipation.**
- **Obesity.**
- **Pregnancy:** The increased pressure in the pelvic region can lead to hemorrhoids.
- **A low-fiber diet:** Leads to straining during bowel movements.
- **Heavy lifting** or activities that increase abdominal pressure.

Diagnosis:

Piles are typically diagnosed through a physical examination, and in some cases, a digital rectal exam or procedures like a sigmoidoscopy or colonoscopy may be required to rule out other causes of rectal bleeding.

Treatment:

- **Dietary changes:** A high-fiber diet and increased water intake can help soften stools and reduce strain during bowel movements.
- **Over-the-counter treatments:** Creams, ointments, and suppositories may provide temporary relief from pain, itching, and swelling.
- **Warm baths:** Sitting in a warm bath for 10-15 minutes several times a day can help relieve symptoms.

Medical procedures:

- **Rubber band ligation:** A rubber band is placed around the base of the internal hemorrhoid to cut off its blood supply, causing it to wither and fall off.
- **Sclerotherapy:** A chemical solution is injected into the haemorrhoid, causing it to shrink.
- **Hemorrhoidectomy:** Surgical removal of large or severe hemorrhoids.
- **Laser or infrared coagulation:** Heat is used to shrink internal hemorrhoids.

Prevention:

- Eating a high-fiber diet (fruits, vegetables, whole grains).
- Drinking plenty of fluids.
- Avoiding straining during bowel movements.
- Regular exercise.
- Not sitting on the toilet for long periods.

If symptoms are severe or persistent, it's important to seek medical advice to avoid complications such as anemia from chronic blood loss or prolapsed hemorrhoids.

II. CONCLUSION:

The plant *E.neriifolia* shows better and fast wound healing activity and its chemical constituent play important role in healing wounds fastly. *E.neriifolia* shows potential for treating infections, and further research is needed to understand its bioactive compounds and how they work. It could also be used alongside other treatments, such in combination theories. *E. neriifolia* extracts and isolates can be explored for their therapeutic potential by use of modern assay methods. Molecular mechanisms should be established for therapeutic applications.

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