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FORMULATION AND EVALUATION OF SUPPOSITORY FOR THE 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

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.

Curcuma longa is a leafy, upright perennial herb that grows upto one metre tall on a short stem. It has yellow flowers that resemble funnels and oblong, pointed leaves. It is a member of the Zingiberaceae family. It is widely grown in tropical and subtropical regions of the world, mostly in China and India, and is typically grown in Asian nations. "Haldi" is a plant that is commonly known in India and has oblong, ovate, pyriform, and frequently short branches on its rhizomes.[2,3,4] According to recent study, curcumin possesses anti-inflammatory and anticancer properties, giving it a new level of promise.[5] Curcumin, a yellow powder made from rhizomes, has therapeutic applications. Curry powder is made from dried Curcuma longa, the plant from which turmericis derived. Ithasayellowtint. The turmeric cactasaanti cancer, antifertility, antimicrobial, anti-inflammatory.[5,6,7] The combination of euphorbia and turmeric give effective action on disease.

Fig 01: Curcumin powder.

Fig 02: Euphorbia neriifolia.

Table No. 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.

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.[8] An ideal wound-healing agent should prevent infection, reduce inflammation, and help cells grow and repair tissue quickly to speed up healing.[9] 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.[10] In addition to being antibacterial, antioxidant, and anti-inflammatory, curcumin also promotes tissue proliferation and remodeling, making it a highly potent healing agent.[11] 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.[12] Curcumin also greatly reduces the activity of antioxidant enzymes, which are a major cause of inflammation and the oxidation process.[13] 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 No. 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

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.

6. 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.

Piles[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 becaused by:

- **Straining during bowel movements** (due to constipation).
- **Sitting for long periods on the toilet**.

- **Chronic diarrheoa 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.
- **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.

Diagnosis

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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 falloff.
- **Sclerotherapy**: A chemical solution is injected into the haemorrhoid, causing it to shrink.
- **Hemorrhoid ectomy**: 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.

MATERIAL AND METHODOLOGY

MATERIAL

Euphorbia neriifolia: Fresh and mature latex of euphorbia neriifolia were collected from the parner region of ahemednagar district, Maharashtra India.

Turmeric: Collected from local area market of Shrirampur, in the march.

Excipients

Table No. 3: Ingredient and sample collection.

Sr.no	Ingredient	Sample Collection
1.	PEG6000	Store of PPCOP
2.	PEG600	Store of PPCOP
3.	Tween 80	Store of PPCOP
4.	Methyl paraben	Store of PPCOP
5.	Water	Vehicle

Chemicals

Methyl paraben, Polythylene Glycol 6000, Polyethylene 600, Tween 80, Lead acetate, Magnesium turnings, Concentrated hydrochloric acid, Ferric chloride.

Equipments

Beaker, Heating Mental, Test tube, conical flask, whatman filter paper, PH meter, Measuring cylinder, Test tube stand, stirrer, Water bath, Glass rod.

METHODOLOGY[15]

Preparation of extract of Euphorbia neriifolia

Extraction process

Latex Collection and Pre-treatment

Approximately 50 g of fresh latex was collected from mature stems of Euphorbia neriifolia using sterilized tools and stored in a clean glass container. Personal protective equipment (gloves, safety glasses) was worn throughout the process due to the irritant nature of the latex. The collected latex was allowed to stand undisturbed for 1–2 hours at room temperature to facilitate the sedimentation of particulate matter. The supernatant latex was then filtered through Whatman No.1 filter paper to remove solid impurities**.**

Extraction Procedure

The aqueous extraction was performed using the hot water extraction method. A total of 500 ml of distilled water was heated to 70–80°C in a 1 l borosilicate glass beaker placed on a thermostatically controlled hot plate. The pre-filtered latex (50 g) was added gradually to the hot water with continuous stirring using a glass rod. The mixture was maintained at 70–80°C and stirred continuously for 45 minutes to facilitate extraction of water-soluble phytoconstituents. After extraction, the solution was cooled to ambient temperature.

Filtration and Concentration

The cooled mixture was filtered using muslin cloth to remove residual solids. The filtrate was optionally subjected to centrifugation at 4000 rpm for 15 minutes to enhance clarity. The resulting supernatant was carefully decanted and concentrated by evaporation of water at 45°C using a vacuum oven until a semi-solid extract was obtained.

Storage

The final aqueous latex extract was weighed and the yield recorded (approximately 5–10 g). The concentrated extract was stored in an airtight amber-colored vial at 4°C until further analysis**.**

Figure 04: Euphorbia neriifolia (Latex) extract.

Extraction value= (Weight of extract obtained/weight of crude material used)× 100

Weight of euphorbia neriifolia latex : 50ml

Weight of dried extract after solvent evaporation = 18.4g

Extraction value= 18.4/50×100 = 37.6%

This value tells you how much of the crude material was extracted into the solvent.

Turmeric Extraction[16]

Turmeric rhizomes (*Curcuma longa* L.) were first washed, sliced, and oven-dried at 50°C until constant weight was achieved. The dried material was then ground into a fine powder using a mechanical grinder and sieved through a 60-mesh screen.

For extraction, a solvent system of propylene glycol and water (80:20 v/v) was prepared. A sample of 20g turmeric powder was accurately weighed and placed into a 200 mL amber glass flask. The prepared solvent was added in a solid-to-solvent ratio of 1:40 (w/v), yielding 200 mL of solvent for 20 g of turmeric.

The mixture was subjected to maceration at ambient temperature (25 ± 2°C) for 24hrs with continuous stirring on a magnetic stirrer. After extraction, the solution was filtered through Whatman No. 1 filter paper to remove solid residues. The filtrate was then collected, and if concentration was required, the solvent was partially removed using a rotary evaporator under reduced pressure at 45°C. The final extract was stored in amber vials at 4°C until further analysis.

Fig no 05: Turmeric extract.

Extraction value= (Weight of extract obtained/weight of crude material used)×100

Weight of turmeric(Curcuma longa): 20g

Weight of dried extract after solvent evaporation = 17.32g

Extraction value= 17.32/50×100 = 34.36%

This value tells you how much of the crude material was extracted into the solvent.

RESULT AND DISCUSSION

The result of the preliminary phytochemical examination of methanolic extract of euphorbia neriifolia are given below.

Sr.no	Plant constituent	Test performed	Observation	Result
1.	Flavonoid	Shinoda test	Yellowish-green colour	+
		Lead acetate test	Yellow precipitate	+
2.	Saponin	Froth test	Froth formation	+
		Foam test	Foam formation	+
3.	Phenol	Ferric chloride test	Reddish brown colour	+

The result of the preliminary phytochemical examination of methanolic extract of turmeric are given below.

Sr. no	Plant constituent	Test performed	observation	Result
	Curcumin	Alkaline test	Red colour	+
		Borax test	Reddish brown	+
		Sulfuric acid test	Yellow colour	+

Phytochemical assessment of formulated suppository.

1) Physical Appearance

Table: physical appearance of suppository.

Sr. no	Specification	Limit
1.	State	Solid (at room temperature)
2.	Colour	Yellowish to pale brown
3.	Odour	Characteristic (herbal)
4.	Texture	Smooth and uniform

2) pH

The pH of a suppository formulation should ideally be in a range that does not irritate mucosal tissues. A pH close to the physiological range (approximately 6.0 to 7.5) is usually considered acceptable.

Table: Determination of Ph.

Sr. no	Formulation	pH
1.	F1	6.1
2.	F2	6.4
3.	F3	6.7
4.	F4	7.0
5.	F5	6.5

3) Spreadability

Spreadability indicates how easily the suppository melts or spreads, affecting drug release and comfort upon administration.

Table: Determination of spreadability.

Sr. no	Formulation	Spreadability
1.	F1	30sec
2.	F2	27sec
3.	F3	32sec
4.	F4	28sec
5.	F5	29sec

Table: Observation table of evaluation test of suppository.

Sr. no	Parameters	Observation
1.	Visual examination	Yellow- orange, smooth, uniform cylindrical shape
2.	Texture uniformity	Uniform texture
3.	Spreadability	Moderate
4.	Stability	Stable at room temperature
5.	Melting point	34-36^{0}c
6.	Liquefaction time	3-6 minutes
7.	pH	Slightly acidic to neutral (6.5-7)
8.	Weight uniformity	1.8±0.05g

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.

DISCUSSION

This study focused on making and testing herbal suppositories using *Euphorbia neriifolia* and turmeric to treat piles. These herbs were chosen because they help reduce pain, swelling, and promote healing. Different bases like cocoa butter and polyethylene glycol were used to make the suppositories.

The prepared suppositories were tested for weight, melting point, disintegration time, drug content, and drug release. All formulations passed the basic quality tests. Among them, the suppository made with cocoa butter showed the best results with faster disintegration and better drug release.

Overall, the herbal suppositories were found to be effective and safe, showing good potential for treating piles naturally.

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