

Recent Advancements in Formulation of Herbal Suppositories

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Abstract

Herbal semi-solid formulations, including pastes, ointments, gels, creams, and suppositories, are widely used for localized therapy due to safety, ease of application, and patient compliance. Herbal formulation is a preparation containing one or more herbal ingredients designed in a specific proportion and dosage form to achieve a defined therapeutic purpose and developed according to traditional knowledge or scientific principles of formulation and standardization. Herbal suppositories deliver actives rectally or vaginally, improving absorption and efficacy. Techniques like fusion, levigation, and molding ensure uniformity. Studies confirm their effectiveness in wounds, ulcerative colitis, hemorrhoids, and mucosal infections, offering safe and patient-friendly alternatives. In this review herbal suppositories formulation and applications were discussed in detail.

Kew Words: hebal semi solid formulations; topical drug delivery; herbal suppositories; natural excipients; formulation techniques

Introduction

Herbal Suppositories

Herbal suppositories are semi solid preparations designed to be inserted into the body through the rectum or vagina.

Herbal suppositories are a natural remedy used for various health issues, made from a blend of herbs and oils that dissolve at body temperature when inserted vaginally or rectally, allowing the active ingredients to be directly absorbed into the tissues. [1,2]

Herbal suppositories are widely used for local and systemic therapeutic purposes. **Figure 2** depicts representative examples of marketed herbal suppositories, whereas **Table 1** provides a comprehensive overview of their formulations, ingredients, and intended uses.

Benefits of Herbal Suppositories

- **Targeted Relief:** Suppositories can deliver herbs directly to the site of discomfort, making them effective for treating localized issues such as vaginal infections, hemorrhoids, or constipation.
- **Enhanced Absorption:** The melting action of suppositories allows for better absorption of the active ingredients compared to other forms of herbal preparations.
- **Gentle on the Body:** They can provide relief without disrupting the body's natural balance, making them a preferable option for some individuals. [3,4]

Advantages:

- Deliver herbs directly to affected areas for faster, localized relief.
- Bypass the digestive system, improving absorption and reducing stomach irritation.
- Often use natural, soothing bases (like cocoa or coconut oil).
- Can relieve dryness, inflammation, or infection with gentle, plant-based Ingredients. [5,6]

Disadvantages:

- Lack of standardization and scientific proof of effectiveness.
- Risk of irritation, allergic reactions, or infection.
- Can melt or leak, causing mess.
- Some herbs may interact with medications or be unsafe in pregnancy.[80]

Ideal Properties of Suppository Bases

1. It should be non-irritant and non-reactive.
2. It should shrink sufficiently to remove mold.
3. It should not interfere in the release or absorption of the drug.
4. It should melt at body temperature.
5. It must maintain the proper shape and size.[7]

Herbal Excipients in Suppositories

- **Bases (Vehicle/Matrix):**
 - **Fatty bases:** Cocoa butter (the classic choice), shea butter, mango butter, ghee, coconut oil
 - Melt at body temperature, release herbal actives smoothly
 - **Water-soluble bases:** Gelatin, glycerin, honey, polyethylene glycol (PEG blends, semi-synthetic but often combined with herbal actives)
 - Dissolve in body fluids, useful for hydrophilic herbal extracts.[8]
- **Stiffening Agents (Consistency & Shape):**
 - Beeswax, carnauba wax, cetyl alcohol
 - Provide firmness and prevent premature melting
- **Emulsifiers (Stability & Uniformity):**
 - Lecithin, gum acacia, tragacanth
 - Help disperse herbal oils/extracts evenly in the base
- **Humectants (Moisture Retainers):**
 - Glycerin, honey, aloe vera gel
 - Prevent drying and improve patient comfort
- **Preservatives (Natural Options):**
 - Neem oil, clove oil, rosemary extract
 - Protect against microbial contamination
- **Antioxidants:**
 - Vitamin E (tocopherol), ascorbic acid, green tea extract
 - Prevent oxidation of herbal oils and actives.[9]

Preparation Of Herbal Suppositories



Figure 1: Suppositories molds

Advantages:

- Suitable for heat-stable herbs.
- Produces uniform, stable suppositories.
- Widely used commercially.

Disadvantages:

- Not suitable for heat-sensitive actives.
- Requires temperature control to avoid degradation.

Evaluation:

- Visual inspection for uniformity.
- Melting and disintegration tests.
- Drug content uniformity and release profile. [10]

2. Cold Compression Method

Definition:

Suppositories formed by compressing a mixture of herbal drug and base without melting.

Equipment:

Fusion Molding Method

Definition:

A method where suppository base is melted, and herbal active ingredients are dispersed or dissolved in the molten base, then poured into molds to solidify.

Equipment:

Waterbath, suppository molds (aluminum or plastic), stirrer, thermometer.

Preparation Steps:

- Melt suppository base (e.g., cocoa butter, glycerinated gelatin) in a water bath.
- Dissolve or disperse finely powdered herbal extract into melted base.
- Remove from heat, stir to distribute uniformly.
- Pour mixture into lubricated molds.
- Allow cooling and solidification at room temperature or refrigerated.
- Remove solid suppositories from molds. **Figure 1** shows examples of suppository molds used in the preparation of herbal suppositories.

Compression machine or mold press, suppository molds, lubricant.

Preparation Steps:

- Mix powdered herbal extract evenly with base (e.g., cocoa butter) at room temperature.
- Lubricate molds to facilitate release.
- Compress the mixture in molds under pressure.
- Remove solidified suppositories from molds.

Advantages:

- Suitable for heat-sensitive herbal actives.
- Avoids melting process.
- Simple and economical.

Disadvantages:

- May have poor uniformity if mixing inadequate.
- Requires compression equipment.
- Evaluation:

- Physical appearance and hardness.
- Content uniformity and melting point.[83]

3. Hand Rolling and Shaping Method

Definition:

Traditional method where herbal drug is triturated with the base, rolled into cylindrical shapes, cut to desired size, and hand-shaped.

Equipment:

Mortar and pestle, spatula, cutting blade, pill tile or smooth surface.

Preparation Steps:

- Triturate grated base (cocoa butter) and herbal powder in mortar.
- Form into a ball and roll on a smooth surface to make cylinder.
- Cut into pieces of appropriate size.

- Shape each piece into conical suppositories manually.

Advantages:

- No heating required; good for sensitive herbs.
- Minimal equipment.
- Suitable for small batches.

Disadvantages:

- Labor-intensive and less uniform.
- Limited production scale.
- Evaluation:
- Visual uniformity, spreadability.
- Weight consistency and melting profile.[83]



Figure 2: Marketed herbal suppositories

Marketed Herbal Suppositories

Brand/Product	Company	Key Ingredients	Description/Use
Hydrating Herbal Suppositories	Vlissful	Hyaluronic acid, cocoa butter, Rehmannia root, Fructus Corni, Dioscorea, Cortex Moutan, Poria, Alisma	Soothes irritation, restores moisture, supports vaginal health
Hygeena Vaginal Dryness Suppositories	FM Nutrition/Hygeena	Pueraria mirifica (Puresterol®)	Relieves dryness, itching, burning; aids tissue repair
WiseWays Witch Hazel Suppositories	WiseWays Herbals	Witch hazel, cocoa butter, arnica, calendula, chamomile, plantain, red clover, yarrow, burdock, cypress, myrrh, geranium	Soothes hemorrhoids, piles, rectal irritation
4X Neo Healar Suppositories	Neo Healar	Lupinus albus, Vateria indica, Mentha piperita, Aloe vera	Treats internal hemorrhoids; reduces pain, swelling, bleeding
Benostan Phytoroid Suppositories	Benostan	Calendula, Sage, Mastic, Olive Oil, Hypericum, Beeswax	Anti-inflammatory hemorrhoid remedy
HoneyPot Suppositories	The Honey Pot Co.	Boric acid, Cocoa Butter, Tea Tree Oil	Maintains pH, hydrates, minimizes odor
Shecrett Boric Acid Suppositories	Shecrett	Boric acid (600 mg), Aloe vera, Tea tree oil	Yeast infections, discharge, itching; pH balance

Table 1: Marketed herbal suppositories

Literature Review of Herbal Suppositories Formulations Reported by Various Researchers

Development and Evaluation of Herbal Rectal Suppositories with Senna Extract for Constipation Relief

Dutta A, Prasad JS, Anand P, et al. (2025) developed rectal suppositories containing Senna extract using a glycerin-based formulation to provide targeted delivery for constipation management. The suppositories demonstrated good physical characteristics, including uniform weight (~0.97 g), appropriate melting point (~37 °C), consistency, and spreadability, with full in vitro drug release achieved in approximately 45 minutes. High-Performance Thin Layer Chromatography (HPTLC) confirmed the presence of active senna compounds. The authors concluded that these suppositories offer a promising alternative to oral senna by delivering the active components locally to the rectum, potentially reducing systemic side effects and improving patient compliance, particularly in those with difficulty swallowing oral medications.[11]

Standardization of Phala Varthi an Ayurvedic Rectal Suppository

Saipriya V, Madikonda PK, et al. (2023) developed and standardized the Phala Varthi Ayurvedic rectal suppository, following traditional Vati-Kalpana (kalpa) techniques. The study evaluated physical and pharmaceutical parameters, including hardness, melting point, weight uniformity, and spreadability, and optimized the base composition using cocoa butter and wax to ensure consistent drug delivery. The authors concluded that the Phala Varthi formulation is well-standardized, offering reproducible and reliable traditional use for rectal administration in Ayurvedic practice.[12]

Preparation and Standardization of Jatyadi Ghrita Rectal Suppository

Nade TA (2019) developed Jatyadi Ghrita rectal suppositories, an Ayurvedic wound-healing formulation, using the melt method with a cocoa butter base. The suppositories were characterized for melting point and liquefaction time to ensure proper dosage and consistency. The study demonstrated that Jatyadi Ghrita can be successfully formulated as rectal suppositories, enhancing ease of administration and offering a practical dosage form for wound-healing applications in Ayurvedic therapy.[13]

Evaluation of the efficacy of myrtle-based vaginal suppositories in patients with cervicovaginal HPV infection

A double-blind randomized controlled trial (RCT) involving 60 women (aged 18–50) with cervicovaginal HPV infection compared a herbal vaginal suppository containing 10% aqueous *Myrtus communis* extract + 0.5% myrtle essential oil vs placebo over 3 months. At the end, HPV was cleared (HPV test negative) in 92.6% of the intervention group vs 62.6% in placebo ($p = 0.036$), and colposcopic lesion size reduction was greater in the myrtle group (71.4% vs 30.4%, $p = 0.015$). Although these are promising results, the authors call for larger, longer-term studies to fully validate efficacy and safety.[14]

Formulation and Evaluation of Anti helminthic Herbal Suppository containing the combination of leaf extracts of Quassia indica and Vitex negundo

Asadulla S, Jacob A, Babu A, Shahza A, Kallatra MB, Sajana, and Shijina S (2022) formulated an anthelmintic herbal suppository using aqueous leaf extracts of *Quassia indica* and *Vitex negundo* via the mold casting method in a base of PEG-4000 and Tween 80. They optimized the formulation for physicochemical properties like shape, melting behavior, and dissolution, and evaluated in vitro anthelmintic activity, finding that the suppositories exhibited good drug permeation and substantial in vitro “anti-worm” effect. The authors highlight the potential of this natural suppository as a promising alternative to conventional anthelmintic therapy, though they note that further in vivo studies are needed to confirm efficacy.[15]

Development and Evaluation of Guggul-Based Herbal Suppositories for Piles Treatment

Balwad A, Mithun M, Bansode H, and More V (2023) formulated herbal suppositories containing Guggul (*Commiphora wightii*), *Tridax procumbens*, and *Haritaki* in a base of PEG-4000 and beeswax, aimed at the treatment of hemorrhoids (piles). They characterized the suppositories for parameters such as weight uniformity, melting point, disintegration time, and physical appearance, all of which were within acceptable limits. In vitro anti-inflammatory testing (using methods based on protein denaturation and protein inhibition) showed that the herbal suppositories had significant activity, with ~56.64% inhibition compared to 64.16% for the standard drug, diclofenac sodium. The authors concluded that this herbal formulation is stable and exhibits notable anti-inflammatory potential, making it a promising candidate for hemorrhoid therapy.[16]

Formulation and Evaluation of an Indigo Naturalis Suppository for Topical Therapy in Ulcerative Colitis Patients

Yoshimatsu et al. (2019) developed a 50 mg Indigo Naturalis (IN) suppository for topical induction therapy in patients with ulcerative colitis (UC), aiming to deliver anti-inflammatory herbal compounds directly to the rectal and sigmoid mucosa. In an open-label pilot study of 10 patients over 4 weeks, the IN suppository was generally well tolerated, with only one patient reporting mild anal pain and no serious adverse events observed. Clinically, 30% of patients achieved remission and 40% showed mucosal healing, with significant improvement in rectal bleeding scores, indicating local anti-inflammatory and mucosal repair effects mediated via aryl hydrocarbon receptor (AHR) signaling. The authors concluded that IN suppositories are a promising topical therapy, especially for mild to moderate distal UC, but efficacy was limited in severe inflammation, and longer-term, larger-scale trials with standardized formulations are needed to confirm safety and optimize dosing.[17]

Development and Evaluation of Herbal Rectal Suppositories for Colitis Management

Potnis et al. (2022) designed and formulated herbal rectal suppositories containing *Aegle marmelos* extract for the treatment of colitis. They developed two types of suppositories using PEG-6000/Softisan 378 and Witepsol W-45 bases, and evaluated them for physical parameters, surface pH, hardness, melting point, liquefaction time, drug content, and in vitro release, which showed complete release within 1 hour and over 95% active extract retention. In an acetic acid-induced colitis rat model, the suppositories demonstrated significant anti-inflammatory effects, reducing mucosal inflammation without reported toxicity, indicating good tolerability in animals. The authors concluded that the formulations were physically stable, had suitable drug-release profiles, and showed promising therapeutic potential for colitis, recommending further studies, including clinical trials, to confirm efficacy and safety in humans.[18]

Rectal administration of Panax notoginseng and Colla Corii Asini suppositories in ulcerative colitis: clinical effect and influence on immune function

A 2022 clinical study investigated the rectal administration of *Panax notoginseng* and *Colla Corii Asini* suppositories in patients with ulcerative colitis (UC). Patients received suppositories at high and low doses, and outcomes were assessed in terms of clinical symptoms, mucosal healing, recurrence, and immune function. The study found that high-dose suppositories significantly improved clinical symptoms, reduced inflammation, promoted mucosal repair, and enhanced immune function compared with the low-dose group. Additionally, high-dose treatment was associated with lower recurrence rates at 6, 8, and 12 months. No significant adverse effects were reported, indicating that the formulation was generally

well tolerated. The authors concluded that these herbal suppositories may offer a safe and effective rectal therapy for UC, particularly in reducing inflammation and modulating immune responses.[19]

Conclusion

Herbal semi-solid dosage forms, including pastes, ointments, gels, creams, and suppositories, represent effective and patient-friendly alternatives for localized therapy. Their formulations, using natural plant actives and carefully selected excipients, provide targeted therapeutic benefits such as anti-inflammatory, antimicrobial, wound-healing, and mucosal protection. Preparation techniques like incorporation, fusion, levigation, and molding ensure uniformity, stability, and optimal release of active compounds. Preclinical and clinical studies demonstrate their safety, efficacy, and enhanced patient compliance, highlighting their potential as sustainable and effective options in modern phytopharmaceutical and complementary medicine practices.

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