

# In vitro study of triphala ointment and randomized control trial of triphala ointment in leucorrhoea (shwetapradar): A conceptual study

Dr. Rahul Gajare<sup>1\*</sup>, Dr. Vaishnavi J. Potdar<sup>2</sup>

<sup>1</sup>Assistant Professor, Department of Prasuti Tantra Evum Striroga, BVDU College of Ayurved, Pune

<sup>2</sup>PG Scholar, Department of Prasuti Tantra Evum Striroga, BVDU College of Ayurved, Pune

## Corresponding name:

Dr. Rahul Gajare

Assistant Professor, Department of Prasuti Tantra Evum Striroga, BVDU College of Ayurved, Pune

[drrahulgajare35@gmail.com](mailto:drrahulgajare35@gmail.com)

## Abstract

Women's health has always been a significant concern in both modern and traditional medical systems. Among the most commonly reported gynecological symptoms is Leucorrhoea, or excessive vaginal discharge, which may be physiological or pathological in origin. In Ayurveda, a condition analogous to Leucorrhoea is referred to as Shwetapradar, characterized by the discharge of white, odorless, slimy fluid from the vaginal canal, mainly due to the prakop of Kapha and Apana Vata.

Shwetapradar is frequently seen in women of reproductive age and can be influenced by factors such as improper dietary habits, sedentary lifestyle, stress, hormonal changes, and unhygienic practices. While physiological discharge maintains vaginal moisture and pH, pathological discharge may be due to infections (fungal, bacterial, or protozoal), cervicitis, or hormonal disturbances.

In modern medicine, Clotrimazole, a broad-spectrum antifungal agent, is widely used for treating candidal vaginitis. However, its prolonged use may lead to recurrence, resistance, and side effects such as irritation or local burning. Triphala—a classical combination of Haritaki, Bibhitaki, and Amalaki—possesses antimicrobial, anti-inflammatory, astringent, Rasayana, and wound-healing properties, making it suitable for local vaginal application.

The comparative evaluation of Triphala and Clotrimazole in the management of leucorrhoea is significant for integrating evidence-based traditional medicine into modern clinical practice. By combining clinical observations with preclinical studies, including in vitro antifungal assays and mechanistic insights, a more comprehensive understanding of Triphala's therapeutic action can be established.

**Keywords:** Triphala, Shwetapradar, leucorrhoea, antifungal, Ayurveda, antimicrobial, vaginal infections.

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## 1. Introduction

Leucorrhoea is an abnormal vaginal discharge unrelated to menstruation or pregnancy. Pathological leucorrhoea may present as profuse white discharge accompanied by pruritus, irritation, foul smell, dyspareunia, or pelvic discomfort. Common aetiologies include *Candida*, *Gardnerella*, *Trichomonas*, cervical erosion, pelvic inflammatory disease, poor hygiene, and altered vaginal microbiota.

Conventional treatment involves topical and oral antifungal or antibacterial agents. Although effective, these pose challenges of drug resistance, recurrence, and local adverse effects. Hence, integrating safe, herbal alternatives becomes essential.

## Ayurvedic Perspective

In Ayurveda, Shwetapradar is described within the spectrum of Yonivyapad such as Kaphaja Yoni Vyapad, Kapharbuda, and Kleda-dominant conditions. Kapha and

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Kleda vitiation, along with Apana Vata dysfunction, collectively lead to excessive, white, slimy discharge.

Triphala—composed of Haritaki (*Terminalia chebula*), Bibhitaki (*Terminalia bellirica*), and Amalaki (*Emblica officinalis*)—is known for strong antimicrobial, astringent, antioxidant, and Rasayana properties. Triphala ointment allows localized, sustained drug delivery, enhancing therapeutic benefits for vaginal infections.

### 2. Review of Literature

Shwetapradar aligns with conditions dominated by Kapha and Kleda:

- **Charaka Samhita:** Kapha-vitiated disorders presenting with picchilata, bahu-srava.
- **Sushruta Samhita:** Kleda-Pradhan pathology causing abnormal discharge.
- **Ashtanga Hridaya:** Kapha-avrita Apana Vata leading to excessive discharge.

#### Disease Review

##### Hetu (Etiological factors):

- Ajeerna (Indigestion)
- Ashuchi (Use of unhygienic toilets)
- Abhighata (Sudden injury)
- Divanidra (day sleep)
- Vibhanda (Constipation)
- Madyapana (Consumption of excessive alcohol)
- Viruddhahara (Intake of incompatible food)

##### Purvaroop:

- **Yoni-kandu** – mild vaginal itching
- **Yoni-guru** – heaviness or looseness in the vaginal region
- **Yoni-Shoola** – mild lower abdominal/pelvic pain
- **Yoni-dourgandhya** – slight foul smell
- **Kati shoola / kati graha** – backache
- **Manda-aruja** – a feeling of discomfort or uneasiness
- **Klama**– early fatigue
- **Alasya** – laziness and tiredness

##### Roopa:

Shweta-Pandu varna strava – white or whitish-pale vaginal discharge

##### Samprapti-

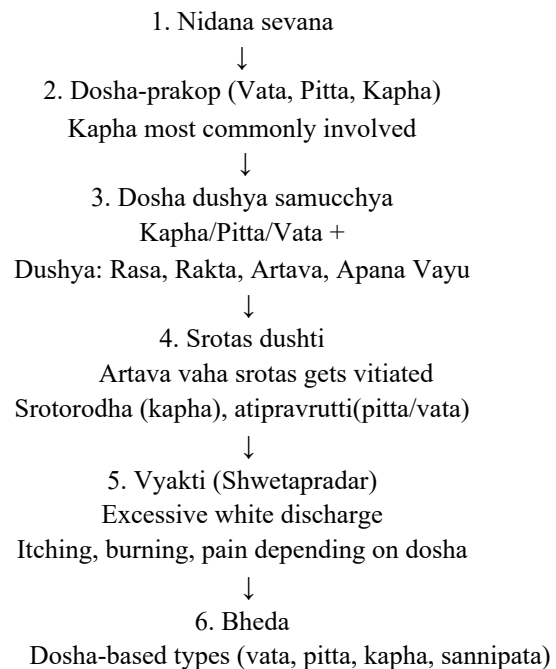
Samprapti of Shwetapradar Vitiation of Kapha Dosha by Nidana sevana of Shwetapradara like abhishyandi ahara, Vitiation of Vata dosha by Rukshadi dravyas along with

Manasika hetu, vitiated doshas causes Jatharagni mandyata leading to formation of Aama. This Aama gets accumulated in Aamashaya. The accumulated Aama vitiates Rasa dhatu. The vitiated rasa circulates through Rasavaha Srotasa in whole body leading to Rasavaha srotodushti. Artava is upadhatu of rasa. So Rasavaha srotodushti leads to artavavaha srotodushti.

##### Samprapti Ghatakas

Component	Description
<b>Dosha</b>	Kapha ↑, Pitta ↑, Vata (apana) vitiated
<b>Dushya</b>	Rasa, Rakta, Artava
<b>Srotas</b>	Artavavaha srotas
<b>Srotodushti Prakara</b>	Ati-pravrutti, slakshna-picchilata (kapha), sanga (vata)
<b>Roga marga</b>	Madhya (middle pathway)
<b>Adhishthan</b>	Yoni (vaginal tract)
<b>Vyaktasthan</b>	Yoni-mukha, artavavaha srotas
<b>Agni</b>	Mandagni → Ama formation
<b>Roga bala</b>	Madhyama

##### Flow Chart:



##### Drug Review

##### Triphala Ointment: A Conceptual Review

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Triphala, a potent Rasayana drug, holds promise in this context due to its:

- **Tridosahara action-** balancing all three doshas
- **Rasayana** – enhances immunity and tissue strength
- **Stambhana** – astringent, reduces discharge
- **Shothahara** – anti-inflammatory
- **Krimighna** – antimicrobial
- **Vrana-ropana** – wound healing

These properties directly counteract the pathophysiology of Shwetapradara.

### Pharmacological Review

#### Amalaki (*Embolica officinalis*)

- **Chemical constituents:** Ascorbic acid, gallic acid, ellagic acid, emblicanin A & B
- **Actions:** Antimicrobial, antioxidant, astringent, anti-inflammatory, Rasayana

#### Haritaki (*Terminalia chebula*)

- **Constituents:** Chebulinic acid, tannins, flavonoids, saponins
- **Actions:** Antibacterial (Staph., *E. coli*), antifungal (*Candida*), immunomodulatory

#### Bibhitaki (*Terminalia bellirica*)

- **Constituents:** Tannins, ellagic acid, gallic acid, beta-sitosterol
- **Actions:** Antibacterial, antifungal, astringent, anti-inflammatory

#### Major bioactive components of Triphala

- Tannins – potent antimicrobial, astringent
- Gallic acid – antifungal
- Chebulagic acid – antioxidant
- Flavonoids – antibacterial

Drug	Ayurvedic properties	Chemical composition	Pharmacological action
<b>1. Amalaki</b> <b>Latin Name:</b> <i>Embolica officinalis</i> <b>Family:</b> Phyllanthaceae	Rasa: All 5: Kashaya, Madhura, Amla, Katu, Tikta Vipak: Madhura Veerya: Sheetta Guna: Laghu, Ruksha Prabhava: Rasayana Doshaghna: Kaphapittaghna	Ascorbic acid (Vitamin C) Gallic acid, ellagic acid Emblicanin A & B (unique tannins) Chebulagic acid Flavonoids, polyphenols, pectin	Anti-inflammatory Antioxidant Haemostatic Astringent deepana Pachana Mild laxative Antipyretic Hepatoprotective Rasayana Antimicrobial
<b>2. Haritaki</b> <b>Latin name:</b> <i>Terminalia chebula</i> <b>Family:</b> Combretaceae	Rasa: All 5: Kashaya, Madhura, Amla, Katu, Tikta Vipak: Madhura Veerya: Ushna Guna: Laghu, Ruksha Prabhava: Rasayana, yogavahi, shodhana Doshaghna: Tridosahara – especially Vata	Tannins (e.g., Chebulinic acid, Chebulagic acid, Gallic acid, Ellagic acid, Corilagin), Saponins, Phytosterols, Flavonoids, Anthraquinones.	Antibacterial (especially against <i>Staphylococcus, E. coli</i> ) Antifungal (effective against <i>Candida albicans</i> ) Antioxidant Anti-inflammatory Immunomodulatory Astringent and wound healing properties
<b>3. Bibhitaki</b> <b>Latin name:</b> <i>Terminalia bellirica</i> <b>Family:</b> Combretaceae	Rasa: Kashaya, Vipak: Madhura Veerya: Ushna Guna: Laghu, Ruksha Prabhava: Kaphahara, Rasayana, Krumighna Doshaghna: kapha-pittahara	Tannins (e.g., Gallic acid, Ellagic acid, Chebulagic acid, Corilagin), Saponins, Flavonoids, Glucosides, Beta-sitosterol.	Antibacterial (inhibits <i>Staphylococcus, Salmonella</i> , etc.) Antioxidant Antifungal (against <i>Candida</i> and other fungi) Astringent – helps reduce discharge Anti-inflammatory and wound healing

### Modern pharmacology:

#### A. Antimicrobial action

- Inhibits *Candida, E. coli, Staphylococcus*, and mixed vaginal flora.
- Prevents secondary infection & reduces pathogenic colonization.

#### B. Anti-inflammatory & anti-irritant action

- Reduces vulvo-vaginal inflammation associated with pitta or kapha aggravation.
- Controls burning, erythema, and itching.

#### C. Astringent action (very important in Shwetapradar)

- Tannins (chebulagic, chebulinic acid) provide local protein coagulation → decreases excessive vaginal discharge.

#### D. Mucosal healing

- Promotes healing of vaginal mucosa affected by chronic discharge.
- Vitamin C & polyphenols aid epithelial repair.

#### E. Antioxidant action

- Neutralizes oxidative stress from chronic infection/inflammation.
- Helps restore normal mucosal immunity.

#### F. Restores vaginal flora

- Reduces harmful organisms, allowing growth of physiological lactobacillus

### Mode of action of Triphala Ointment:

Triphala ointment breaks the samprapti of Shwetapradara by its kashaya rasa and ruksha guna which reduce kapha picchilata and atipravrutti of strava.

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Its antimicrobial and anti-inflammatory phytochemicals (tannins, polyphenols, flavonoids) remove dosha-dushya sammuchya and pitta-vitiated inflammation.

Its antioxidant and wound-healing actions repair artavavaha srotas.

Its vatanulomana effect restores normal apana gati.

Thus, Triphala corrects kleda, reduces discharge, heals the mucosa, and stops recurrence.

## Pharmacodynamics (mechanism of action):

### A. On Cellular Level

- Phenolics suppress NF- $\kappa$ B, reducing IL-1 $\beta$ , TNF- $\alpha$   $\rightarrow$  decrease inflammation.
- Vitamin C promotes epithelial rejuvenation.
- Tannins cause vasoconstriction  $\rightarrow$  reduce exudate.

### B. Antimicrobial Mechanisms

- Tannins bind to microbial proteins  $\rightarrow$  membrane disruption.
- Polyphenols inhibit fungal enzymes  $\rightarrow$  prevents Candida growth.
- Interferes with bacterial DNA synthesis.
- Reduces biofilm formation  $\rightarrow$  essential in chronic leucorrhoea.

### C. Astringent Mechanism

- Precipitates mucosal proteins  $\rightarrow$  forms protective layer.
- Reduces local secretion & exudation.
- Improves tone of vaginal tissues  $\rightarrow$  reduces *atistrava*.

### D. Wound-Healing Mechanism

- Enhances fibroblast proliferation.
- Increases collagen (type I & III).
- Promotes angiogenesis  $\rightarrow$  improves mucosal health.

### E. Anti-itch Mechanism

- Reduces histamine release.
- Soothes inflamed mucosa.

## 3. In Vitro Antimicrobial Study

### 3.1 Test Drug

Triphala ointment prepared using Carbopol base (Ayurvedic Pharmacopeia standards).

### 3.2 Microorganisms

- *Candida albicans*
- *Candida glabrata*
- *E. coli*
- *Staphylococcus aureus*
- *Gardnerella vaginalis*

### 3.3 Methodology Proposed

- Agar well diffusion method
- MIC determination
- Colony count reduction assay
- pH stability of ointment

## 3.4 Expected Outcome

- Inhibition zones comparable to Clotrimazole
- Dose-dependent antifungal and antibacterial activity.

## 4. Expected Results

- Reduction of discharge due to astringent (Stambhana) action
- Decrease in itching, irritation, and foul smell
- Restoration of normal vaginal pH
- Improvement in mucosal health due to Rasayana and Vrana-ropana effects
- Lower recurrence compared to Clotrimazole
- No significant adverse reactions

## 5. Discussion

Shwetapradara arises from Kapha-Kleda aggravation, impaired Apana Vata, and Srotodushti. Modern pathological correlations include fungal invasion, bacterial imbalance, and mucosal inflammation. Current antifungals focus solely on pathogen elimination, not mucosal strengthening—hence relapse is common.

Triphala's antimicrobial constituents (tannins, gallic acid) destroy fungal cell walls and interfere with bacterial metabolic pathways. Its Stambhana guna reduces discharge, while Shothahara and Vrana-ropana properties restore mucosal integrity. Rasayana action enhances local immunity, reducing relapse.

Ointment formulation ensures:

- Enhanced mucosal contact
- Slow drug release
- Better absorption
- Minimal systemic absorption

Thus, Triphala ointment aligns well with both Ayurvedic pathology and modern microbiological needs.

## 6. Conclusion

This conceptual study highlights Triphala ointment as a promising, safe, and integrative therapeutic option for Shwetapradara. Its antimicrobial, astringent, immunomodulatory, and healing properties offer holistic benefits beyond symptomatic relief. The proposed in vitro and clinical studies will provide scientific validation and support wider clinical application.

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Triphala ointment may serve as an effective alternative to synthetic antifungals, especially in recurrent or resistant cases.

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