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Research Article

Research Article on Formulation and Evolution of Herbal Antiulcer Suspension for Gastric Mucosa Protection

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ABSTRACT

Peptic ulcers, often caused by Helicobacter pylori infection, NSAIDs, or stress, result in gastric mucosal damage. While synthetic drugs are commonly used for treatment, they are frequently associated with adverse effects. This study aims to formulate and evaluate a polyherbal suspension composed of natural plant extracts with well-established gastroprotective and anti-ulcer properties. Selected herbs, including Glycyrrhiza glabra (Licorice), Triphala, Shankha Bhasma, honey, mint oil, and tea tree oil, were chosen based on their traditional usage and scientific evidence supporting their benefits for ulcer management. The formulation process involved the extraction and standardization of these herbal ingredients, followed by the development of a stable suspension. The final product was evaluated for its physical properties and stability. Results demonstrated that the formulated polyherbal suspension effectively protected the gastric mucosa, offering a safer and potentially more natural alternative for managing peptic ulcers.

INTRODUCTION

Peptic ulcers are sores in the stomach, duodenum, or esophagus caused by an imbalance between harmful factors (like acid, pepsin, and *H. pylori*) and the protective lining of the GI tract. Conventional treatments can have side effects or lead to relapse, which has increased interest in herbal alternatives. This study focuses on developing a polyherbal anti-ulcer suspension—a liquid herbal formulation designed to coat the stomach lining and deliver healing compounds directly to ulcers. Herbs such as Licorice, Mint, and Ficus racemosa contain natural compounds (e.g., flavonoids, tannins, mucilage) that reduce acid, fight inflammation, enhance mucus secretion, and inhibit *H. pylori*. The goal is to create a safe, effective, and standardized herbal formulation, followed by testing to confirm its ulcer-healing properties and long-term safety.

Drugs And Excipients profile:

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Triphala

Composition (Triphala):

Haritaki (Terminalia chebula) – Family: Combretaceae

Bibhitaki (Terminalia bellirica) – Family: Combretaceae

Amalaki (Emblica officinalis) – Family: Phyllanthaceae

Synonyms:

Triphala – "Three Fruits"

Sanskrit names – Haritaki, Bibhitaki, Amalaki

Chemical Constituents:

Tannins – Chebulagic acid, chebulinic acid

Phenolic compounds – Gallic acid, ellagic acid

Vitamin C – Mainly from Emblica officinalis

Flavonoids, glycosides, saponins, terpenoids

Mechanisms of action

Triphala protects the gastric mucosa through its antioxidant, anti-inflammatory, and cytoprotective properties. It reduces oxidative stress, enhances mucus secretion, promotes healing, and inhibits *H. pylori* bacteria. These actions help prevent and heal gastric ulcers effectively.



Glycyrrhiza glabra

Several studies suggest that licorice works effectively for treating and preventing stomach ulcer. It helps the stomach and intestine produce more productive mucous that forms a coating over the stomach lining .This in turn eases the pain form ulcer and speeds up the healing process.

Biological source : It consists of the dried,peeled or unpeeled roots and stolons of Glycyrrhiza glabra

Synonyms: licorice

family :Leguminosae

Chemical constituents : Glycyrrhizin

Active constituents : glycyrrhizin,flavonoids

Mechanism of action

Licorice protects against ulcers by increasing gastric mucus and prostaglandin production, forming a protective barrier. Its anti-inflammatory and antioxidant properties reduce irritation and neutralize harmful free radicals. It also lowers gastric acid secretion, creating a healing environment. These combined actions help prevent and treat gastric ulcers.

Use

1) Anti-ulcer: Protects and heals gastric mucosa by enhancing mucus secretion and reducing gastric acid.

2) Anti-inflammatory: Reduces inflammation in conditions like gastritis and ulcers.





Shankha Bhasma

It neutralizes excess stomach acid, soothes the gastric lining, promotes healing of ulcers, and supports digestion, making it effective in treating hyperacidity, gastritis, and peptic ulcers.

Biological source : It is the ash of the conch shell of the shell fish Turbinellarapa

Synonyms: conchasma

family: Mollusca

Chemical constituents Iron, calcium

Active constituents : Calcium carbonat

Mechanism of action

Shankha Bhasma prevents and heals ulcers by neutralizing excess stomach acid, increasing protective mucus and prostaglandins, and reducing inflammation and oxidative stress in the stomach lining.

Use

1)Anti-ulcer: Neutralizes gastric acid and promotes mucosal protection.

2)Digestive health: Improves digestion and relieves acidity.

Excipients

Acacia gum: Suspending agent: Helps maintain uniform distribution of insoluble ingredients like herbal powders or Shankha Bhasma. Stabilizer: Prevents separation of ingredients and enhances shelf-life.Soothing agent: Forms a protective layer on the gastric mucosa, reducing irritation and promoting healing

Honey: Honey in anti-ulcer suspension acts as a natural gastroprotective agent. It forms a protective coating on the gastric mucosa, reduces inflammation, promotes ulcer healing, and has antimicrobial action against H. pylori. Its antioxidant and wound-healing properties help repair stomach lining damage. Additionally, it improves taste and serves as a natural preservative in the formulation.

Mint oil : anti-ulcer suspension helps by providing a cooling effect, reducing gastric spasms, and exhibiting anti-inflammatory, antioxidant, and antimicrobialproperties. It soothes the stomach lining, improves digestion, and supports ulcer healing.

Tea tree oil

Tea tree oil in anti-ulcer suspension offers antimicrobial, anti-inflammatory, and antioxidant properties. It helps in reducing gastric

inflammation, preventing infection (especially from H. pylori), and promoting ulcer healing by protecting the stomach lining and reducing oxidative damage

Methods

1) Extraction (Decoction / Reflux Extraction)

Purpose:

To extract water-soluble bioactive constituents (like tannins, flavonoids, glycosides) from the herbal raw materials such as Triphala and Licorice.

Method:

• **Decoction**:

Herbs are boiled in water for 45–60 minutes. Heat facilitates the breakdown of plant cell walls and releases active compounds.

• **Reflux Extraction:**

Similar to decoction, but done in a reflux apparatus which condenses steam and returns it to the mixture, preventing solvent loss. More efficient for prolonged extraction (2–3 hours at ~90–95°C).

2)Mucilage Formation (Hydration of Acacia Gum)

Purpose:

To create a viscous, colloidal solution that helps suspend solid particles (like Shankha Bhasma) and stabilize the suspension.

Method:

• Acacia gum is slowly added to warm water (40°C) under continuous stirring.

• Left to hydrate for 15–30 minutes.

• Stirred again to ensure full dissolution and remove clumps.

3)Suspension Assembly (Trituration + Mixing)

Purpose:

To combine all components in a specific order for uniform dispersion and stable suspension**.**

Method:

• Start with acacia mucilage.

• Gradually add concentrated extracts and Shankha Bhasma with continuous

stirring.

• Add sweeteners (honey), emulsified oils, colorants, and flavors.

• Adjust final volume with distilled water.

4)Filtration

Purpose:To remove any coarse particles or undissolved residues from extracts or emulsions before final mixing.

Method:• Use 4-layer sterile muslin cloth or fine filter paper.• Filter extracts after boiling and before concentrating.• Also used for filtering color solutions.

Formulation Table

Sr. No.	Ingredients	F1	F2	F3
1.	Triphala	1.0g	1.5g	1.0g
2.	Glycrrhiza glabra	0.5g	0.75g	1.0g
3.	Acacia gum	1.0g	1.5g	1.25g
4.	Shankha Bhasma	0.8g	6.0g	7.0g

5.	Honey	0.05ml	10.0ml	7.5ml
6.	Tea tree oil	0.05ml	0.05ml	0.05ml
7.	Mint oil	1-2 drop	2 drop	2 drop
8.	Colour	5 drop	5 drop	5 drop
9.	Distilled water	50 ml	50 ml	50ml

Procedure and preparation

1. Herbal Extracts

Triphala Churna (T. chebula, T. bellirica, E. officinalis) – 1.0 g in 10 mL distilled water; antioxidant, anti-ulcer.

Licorice (Glycyrrhiza glabra) – 0.5 g in 10 mL warm water; mucosal protection, demulcent.

2. Suspending Agent

Acacia Gum – 1.0–1.5 g in 10 mL warm water; stabilizes suspension.

3. Inorganic Antacid

Shankha Bhasma – 8.0 g; natural antacid, blended in acacia mucilage.

4. Sweetening Agent

Honey – 5–10 mL; sweetens, adds viscosity, mild preservative.

5. Essential Oils

Tea Tree Oil – 0.05 mL (1 drop) pre-diluted; antimicrobial.

Mint Oil – 1–2 drops; flavor, mild carminative.

6. Coloring Agent (Optional)

Food Color – Few drops; for appearance.

7. Vehicle - Distilled Water – q.s. to 50 mL; extraction and volume adjustment.

Evaluation of the suspensions

1. Organoleptic Properties

o Appearance: Uniform, oranges suspension.
o Odor: Pleasant, herbal with minty notes.
o Taste: Sweet and slightly astringent with licorice undertones.
o Texture: Smooth, free from grittiness.
o Clarity: No visible coarse particles or phase separation.

2. pH Test

o Method: Measured using a calibrated digital pH meter.
o Expected Range: pH 6.0–7.5 (near-neutral to slightly basic, suitable for gastric mucosa protection).
o Significance: Ensures compatibility with gastric environment and confirms antacid effect of Shankha Bhasma.

3)Sedimentation Volume Test

o Method: Suspension placed in a 50 mL measuring cylinder; allowed to stand undisturbed for 24 hours.
o Observation: Uniform dispersion upon shaking, minimal caking at bottom.

o Significance: Evaluates physical stability and effectiveness of acacia gum as a suspending agent.

Evaluation parameters

Sr no.	Parameter	Result
1	Ph	6.0-7.5
2	Spreadability	Good

3	Consistency	Uniform semi visible suspension
4	Color	Light orange to yellowish
5	Odur	Pleasant herbal with mild mint
6	Sedimentation Rate	Slow easily redisprsible
7	Stability	Stable to 1-2week (under room temperature)

CONCLUSION

The developed polyherbal anti-ulcer suspension shows strong potential for gastric protection and ulcer healing. Combining Ayurvedic herbs with natural agents, it offers anti-inflammatory, antioxidant, and mucosal-protective effects. The formulation is stable, safe, and suitable for long-term use, supporting its promise as a natural alternative to synthetic anti-ulcer drugs and a basis for further research.

RESULT

The 50 mL polyherbal anti-ulcer suspension combines Triphala, licorice, and Shankha bhasma to offer synergistic gastroprotective effects. Triphala provides antioxidant and anti-inflammatory action; licorice enhances mucosal defense and has anti-H. pylori properties;Shankha bhasma neutralizes excess acid as a natural antacid. Acacia gum ensuressuspension stability, while honey improves palatability and adds mild antimicrobial effects. Mint and tea tree oils enhance flavor and contribute to microbial control. Together, these components create a stable, effective, and palatable formulation ideal for managing and preventing gastric ulcers.

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