IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 14, May 2026
Impact Factor: 8.2

Preparation and Evaluation of Polyherbal Syrup for Expectorant and Mild Analgesic Activity.

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Abstract: *Because polyherbal formulations are safer, have fewer adverse effects than synthetic medications, and have therapeutic promise, they have attracted a lot of interest recently. The manufacture and assessment of polyherbal syrup with expectorant and moderate analgesic properties is the main topic of this review study. Turmeric, ginger, tulsi, mint, cinnamon, lemon, and honey are among the medicinal herbs included in the formulation. These plants are well recognized for their analgesic, anti-inflammatory, and respiratory-calming qualities. Decoction, filtering, syrup base formulation, and preservation procedures are among the processes used in the manufacturing of herbal syrup that are highlighted in the review.*

To assess the formulation's quality, stability, and effectiveness, significant assessment factors are also covered, including organoleptic characteristics, pH, viscosity, specific gravity, total solid content, and pharmacological activities. For the treatment of cough, throat irritation, and moderate discomfort, polyherbal syrups offer a natural, tasty, and affordable substitute. To guarantee the safety and therapeutic efficacy of herbal remedies, the paper also stresses the significance of standardization and scientific validation.

Keywords: Polyherbal syrup; Expectorant activity; Herbal formulation; Turmeric; Ginger; Viscosity assessment; Ash value analysis.

I. INTRODUCTION

1.1 COUGH

Cough is a protective physiological reflex that assists in clearing the respiratory tract of irritants such as dust, food particles, or excess mucus. It can be categorized into two types: productive cough, where mucus is expelled from the lungs, and non-productive cough, which is dry and lacks mucus. Cough may be acute or chronic, often affecting daily comfort and productivity.

Although modern allopathic medications provide rapid relief, they are frequently associated with side effects like drowsiness, dryness of mouth, or the risk of dependency.[2]

The preparation and evaluation of polyherbal cough syrups focus on formulating natural, synergistic remedies to relieve respiratory distress. By combining plant-based extracts (such as Tulsi, Ginger, and Licorice) in a sweet syrup base, these formulations are designed to loosen mucus for easy expectoration while providing soothing, mild analgesic effects for sore throats.

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1.2 HERBAL MEDICINE

Herbal medicine, often referred to as phytotherapy, involves the use of plant-derived materials and extracts in the prevention and treatment of illnesses. This practice may also extend to products derived from fungi, bacteria, or animals.[3] Herbalism has been deeply rooted in traditional medicine systems for centuries, with many plant-based remedies forming the basis for modern pharmaceutical drugs. For instance, digitalis, a cardiac drug, originates from the foxglove plant. The widespread use of herbal medicine is due to its perceived safety, availability, and long-standing use in managing various health conditions.[4]

Herbal medicine is the study and use of medicinal plants and their parts (roots, leaves, bark, or flowers) to prevent disease, enhance general health, and treat ailments. It forms the foundation of traditional healing practices worldwide and is widely utilized in modern complementary and integrative healthcare.

Types of Herbal Preparations

Herbal medicines can be found in various forms, depending on the specific plant and its intended use:

- **Extracts & Tinctures**: Concentrated liquid forms, usually made by soaking plant material in alcohol or vinegar.
- **Teas & Infusions**: Hot water extractions of leaves, flowers, or roots.
- **Capsules & Tablets:** Powders, ground herbs, or dried extracts taken orally.
- **Topical Applications**: Gels, lotions, creams, or salves applied directly to the skin.

Popular Medicinal Herbs

Common plants frequently used in herbal traditions include:

- **Ginger:** Often used to aid digestion and reduce nausea.
- **Turmeric:** Known for its active compound, curcumin, which has anti-inflammatory properties.
- **Garlic:** Used for its potential immune-boosting and cardiovascular benefits.
- **Peppermint:** Frequently utilized to soothe digestive issues and headaches.
- **Ginseng:** Used in traditional practices to boost energy and reduce stress.

Safety and Considerations

Because a substance is "natural" does not mean it is safe or free of side effects.

- **Drug Interactions**: Herbs can interact negatively with prescription or over-the-counter medications.
- **Lack of Standardization:** Herbal supplements are often regulated differently than pharmaceuticals, meaning dosage and purity can vary significantly.
- **Consult a Professional:** Always speak with your healthcare provider or a registered medical herbalist before starting any herbal regimen and inform them of everything you are taking.

Trusted Resources

To learn more about the safety, efficacy, and scientific research surrounding specific herbs, consider consulting authoritative health guidelines:

- **National Center for Complementary and Integrative Health (NCCIH)**: Provides evidence-based information on various herbs and supplements.
- **World Health Organization (WHO) Traditional Medicine:** Offers global perspectives and regulatory insights on traditional therapies.
- **MedlinePlus: Herbal Medicine:** A comprehensive, consumer-friendly database provided by the U.S. National Library of Medicine.

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1.3 HERBAL SYRUP

Herbal syrups are sweetened liquid preparations that serve as an effective and palatable medium for delivering herbal decoctions. These syrups are particularly useful for populations such as children or elderly individuals who may struggle to ingest solid forms of medication. Herbal syrups may be classified as:[5]

Medicated syrups: Formulations that dissolve pharmaceutical agents in a sugar solution.

Herbal syrups: Prepared by combining concentrated plant extracts or decoctions with natural sweeteners like honey, sugar, or jaggery.[6]

Polyherbal syrups, those combining more than one medicinal plant are believed to provide synergistic effects, enhancing overall therapeutic efficacy. In traditional systems like Ayurveda, such combinations are emphasized to balance doshas, improve bioavailability, and reduce side effects. However, integrating traditional concepts into modern scientific frameworks continues to pose a challenge.[7]

Herbal syrups are concentrated liquid remedies that blend plant-based extracts (like tulsi, ginger, and licorice) with a sweet base like honey or sugar. They provide a palatable way to consume medicinal herbs and are widely used to soothe sore throats, calm coughs, and support overall wellness.

Common Types & Uses

- **Respiratory & Cough**: Formulated with ingredients like Vasaka, Yashtimadhu, and holy basil to help clear mucus, soothe irritation, and ease both dry and productive coughs.
- **General Wellness & Immunity**: Often contain tonics like Ashwagandha or Amla to boost energy levels, improve metabolism, and support the body's immune response.
- **Digestive & Child Care:** Gentle formulations designed to aid digestion, support a healthy appetite, and promote natural growth in babies and young children.

Popular Options & Where to Find

If you are looking to purchase, there are many easily accessible, plant-based remedies available:

- **Cough & Cold:** You can explore popular Ayurvedic formulations like Zandu, Kofol, or Himalaya Bresol on platforms like Amazon.in.
- **Wellness & Nutrition:** For specialized iron tonics or child-care syrups, check out ranges from Kerala Ayurveda.
- **Bulk or Generic:** For a wider variety of specialized Ayurvedic syrups (like liver or fever tonics), you can connect with verified distributors on IndiaMART.

How to Make a Simple Herbal Syrup at Home

You can also prepare basic, soothing herbal syrups in your kitchen.

1. **Brew a Decoction:** Simmer dry or fresh herbs (e.g., chamomile, ginger, or elderberry) in water for 15–30 minutes to extract the active properties. Strain the liquid.
2. **Add Honey:** Mix the warm liquid with raw honey, ideally at a ratio of 2 parts herbal infusion to 1 part honey.
3. **Store:** Pour into a sterilized glass jar and let it cool completely before sealing. Always store herbal syrups in the refrigerator, where they will stay fresh for about 3 to 4 weeks.

1.4 BENEFITS OF HERBAL SYRUPS

- Generally free from harmful side effects when properly prepared.
- Easily sourced from nature and widely accepted across age groups.
- Naturally pleasant-tasting and often self-preserving due to high sugar content.
- Suitable for flexible dosing and daily use without intensive medical supervision [8]

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1.5 DRAWBACKS OF HERBAL SYRUPS

- Possible sugar crystallization over time.
- Not appropriate in emergency cases or for unconscious patients.
- Absorption may be slower compared to intravenous or fast-acting synthetic drugs.[9]

Common Medicinal Herbs Used

Formulations typically utilize plants selected for their bioactive phytochemicals (e.g., flavonoids, alkaloids, tannins, and volatile oils):

- **Expectorant & Antitussive:** Adhatoda vasica (Vasaka) and Ocimum sanctum (Tulsi) loosen bronchial secretions.
- **Mild Analgesic & Anti-Inflammatory:** Zingiber officinale (Ginger) and Curcuma longa (Turmeric) reduce throat irritation and mild pain.
- **Soothing Agents:** Glycyrrhiza glabra (Liquorice) and Honey coat the throat to reduce cough reflexes.

II. METHOD OF PREPARATION

The preparation process involves blending traditional extraction with modern pharmaceutical syrup bases:

- **Decoction:** Accurately weighed crude powders of the selected herbs are boiled in distilled water. The mixture is simmered until the volume reduces to roughly of its initial volume to extract the active constituents.
- **Filtration:** The decoction is cooled and passed through a Buchner funnel or clean muslin cloth to remove plant debris.
- **Syrup Base Formulation:** Simple syrup (typically a \ (66.6\% \text{ w/v}\) concentration of sucrose in purified water) is prepared using heat, or natural honey is used directly as the syrupy base.
- **Mixing and Preservation:** The herbal decoction is mixed with the simple syrup or honey, usually in a 1:5 ratio. Preservatives like methyl paraben or sodium benzoate are added to ensure shelf life, alongside flavouring agents (e.g., peppermint or clove oil) to enhance palatability.

III. EVALUATION PARAMETERS

To ensure the syrup is stable, safe, and effective, it undergoes multiple pharmaceutical evaluations:

Physicochemical & Physical Evaluation

- **Organoleptic Tests:** Visual inspection of color (often brownish to dark yellow), odor (pleasant and aromatic), taste (sweet and mildly herbal), and clarity.
- **pH:** Measured using a digital pH meter; should typically fall between \(4.5\) and \(6.5\) to ensure oral tolerability and prevent gastric irritation.
- **Viscosity & Specific Gravity:** Measured using viscometers and pycnometers to ensure the syrup flows smoothly, adequately coats the throat, and has a consistent density.
- **Total Solid Content:** Evaluated to determine the concentration of active dissolved extracts and sugars.
- Pharmacological Evaluation
- **Expectorant Activity:** Often evaluated in vivo using a phenol red-induced mice or rodent model. Animals are given the herbal formulation, and the volume of respiratory tract secretions is measured spectrophotometrically to confirm expectorant efficacy.
- **Analgesic Activity:** Screened using standard models (e.g., tail-flick method or acetic acid-induced writhing in rodents) to verify the mild pain-relieving effects of the herbal blend.
- **Acute Toxicity Studies:** Conducted according to Organization for Economic Co-operation and Development (OECD) guidelines to determine the safety profile and ensure the absence of adverse effects at therapeutic doses.

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IV. CONCLUSION

Polyherbal syrups are a potential and successful herbal remedy for cough and related sore throats. Expectorant, calming, anti-inflammatory, and moderate analgesic effects are only a few of the synergistic therapeutic advantages that come from combining many medicinal plants. It may be inferred from the reviewed literature that well prepared herbal syrups minimize the negative effects frequently linked to synthetic cough treatments while having adequate physicochemical qualities, stability, and patient acceptance.

Because of their rich phytochemical composition, herbal substances including turmeric, ginger, tulsi, honey, and mint greatly contribute to respiratory relief and general wellness. Maintaining the formulation's quality and effectiveness requires evaluation studies such as pH measurement, viscosity analysis, organoleptic assessment, and pharmacological screening. Polyherbal syrups can therefore be safe, affordable, and patient-friendly substitutes in respiratory therapy; nevertheless, additional clinical and standardization research is required to determine their long-term safety and therapeutic efficacy.

Ethics:

This study was a secondary analysis based on the currently existing data and did not directly involve with human participants or experimental animals. Therefore, the ethics approval was not required in this paper.

Acknowledgment:

We sincerely acknowledge the support, guidance and encouragement provided by the academic staff from our respective institutions. Their dedication to fostering a productive research environment and facilitating access to essential resources has been invaluable in the completion of this manuscript.

Conflict of interest:

The author declares that there is no conflict of interest.

Funding:

This research received no specific grant from any funding agency in the public, commercial or not for profit sectors.

Data Access:

The data that supports the finding of this study are available from the corresponding author upon reasonable individual request.

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