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REVIEW ON POLYHERBAL WITH PHARMACOLOGICAL PROPERTIES

Vaishnavi Deosarkar[1], Aditi Kanade[2], Mr. Mohd Ameen Mahmood[3], Dr.Jsmeel Ahmed[4]

Department of Pharmacology, Kandhar college of pharmacy Balantwadi Post Ghodaj Tq Kandhar Dist Nanded, Maharashtra, India

Abstract

Polyherbal syrups, known for their therapeutic and health benefits, are also referred to as polyherbal therapies, as they combine multiple herbs in one formulation. These mixtures offer several advantages over single-herb treatments and allopathic medications, contributing to the global rise in the popularity of herbal remedies. For centuries, people have turned to plant-based medicines due to their perceived safety, effectiveness, cultural acceptance, and minimal side effects. As awareness about the benefits and applications of medicinal plants grows, the belief that natural remedies are safer alternatives to allopathic drugs—often considered less effective for some conditions—has become more widespread. In clinical settings, over 700 herbal and polyherbal formulations, including decoctions, tinctures, tablets, and capsules, are derived from more than 100 plant species. Among these, polyherbal syrups have emerged as an especially convenient and effective option. This review offers an overview of recent advancements in the formulation and evaluation of polyherbal syrups, with a focus on their various pharmacological properties.

Keywords: Polyherbal syrup, pharmacological activity

INTRODUCTION

Herbal cough syrup is a natural remedy often used to relieve coughs and other respiratory symptoms. It is made from various ingredients, including honey, ginger, liquorice, vasaka, tulsi, and turmeric, all of which are believed to support respiratory health. The effectiveness of these ingredients is linked to the "Rasa" (taste) of the plant materials, which help balance the body's tridosha according to traditional beliefs. Herbal cough syrup is commonly used as an alternative to conventional cough medicines that contain synthetic compounds, which can sometimes cause unwanted side effects. While herbal syrups are generally considered safe and effective for most individuals, it is advisable to consult a healthcare professional before trying any new remedy. Medicinal plants and herbs play a crucial role in the discovery of new bioactive compounds, many of which have become the basis for modern drug development. Polyherbal formulations, which combine multiple active ingredients, have been used for centuries to treat

various health conditions and continue to grow in popularity due to their natural origin and reduced risk of side effects, especially in both developing and developed countries.

Polyherbal formulations are Collection of therapeutic entities that are formulated and prepared based on the healing properties of individual Ingredients according to the condition of sickness. Such plant constituents with diverse pharmacological Activities principally work together in a dynamic way to produce maximum therapeutic benefits with minimum Side effects. Polyherbal cough syrup is a herbal or botanical remedy designed to relieve cough and associated symptoms. Unlike single-herb cough syrups, polyherbal formulations combine multiple herbs or plant extracts to create a Comprehensive solution for various types of coughs. These syrups are often preferred for their potential to address different aspects of respiratory discomfort and for their potential to minimize side effects.[1]

Key features and benefits of polyherbal cough syrup include:

1. *Multiple Herbal Ingredients:* Polyherbal cough syrups contain a blend of herbs known for their Therapeutic properties to cough relief. This diverse combination can target different causes and types of Cough, such as dry cough, productive cough, or throat irritation.[2]
2. *Holistic Approach:* The use of multiple herbs allows for a holistic approach to addressing cough symptoms. Herbs with expectorant, anti-inflammatory, antimicrobial, and soothing properties may be included to provide Comprehensive relief.[2]
3. *Reduced Side Effects:* Compared to some pharmaceutical cough syrups that may contain synthetic Chemicals, polyherbal cough syrups aim to minimize adverse effects by using natural.[3]
4. *Customized Formulations:* Herbalists and manufacturers can tailor the formulation to meet specific needs, Considering factors like age, underlying health conditions, and the type of cough.[3]

SYRUP

Syrup is viscous, concentrated or nearly saturated aqueous solution of sucrose containing 66.7% w/w of sugar.

1. Medicated syrup: Medicated syrups are nearly saturated solution of sugar in water in which medicaments And drugs are dissolved. It is intended for oral use.
2. Herbal syrup: An herbal syrup is prepared by mixing a concentrated decoction with either honey or sugar or Alcohol. It is intended for oral use. Herbal syrups show more potent Action than other types of syrup.

BENEFITS OF HERB-HERB COMBINATIIONS

➢ Herbal cough syrups may contain natural ingredients such as Honey, ginger, and tulsi, which can help to Soothe the throat and reduce coughing.

➢ Soothes throat irritation: Many herbal cough syrups contain herbs such as licorice root, marshmallow root, And slippery elm, which can help to soothe the throat and reduce irritation.

➢ Boosts the immune system: Some herbs, such as Echinacea and elderberry, have been shown to boost the Immune system, which can help the body fight off infections that may be causing the cough.

➢ Provides relief from cold and flu symptoms: Herbal cough syrups may contain natural ingredients such as Ginger, turmeric, and black pepper, which can provide relief from cold and flu symptoms such as congestion and Fever.

➢ Has fewer side effects: Unlike conventional cough syrups, which may contain synthetic ingredients that can Cause side effects, herbal cough syrups are made from natural ingredients and are generally considered safe When consumed in moderation.[3]

➢ Polyherbal formulations designed by the combination of multiple herbs exhibit ample advantages over a Single herb and allopathic medicine. This resulted in the emerging trend in herbal drug therapy worldwide [3]

➢ High therapeutic effectiveness against a vast number of afflictions is exerted owing to the presence of Numerous phyto constituents. Factual assessments show an inclination for herbal preparations due to their Adequacy and promising outcomes of the treatment [4]

➢ By abolishing the need to administer more than one single herbal formulation at a time. Polyherbal Preparations bring enhanced convenience for patients. As the administration of multiple herbs as one Formulation shows better convenience, it indirectly marks improved patient compliance[3],[4]

➢ Polyherbal formulations have a widespread therapeutic window. Being viable indeed at a lower dose and Harmless at a higher dose, most of them have a predominant risk-to-benefit ratio [3].

➢ Herbal combinations with several constituents simultaneously act on diverse targets to elicit intensive Alleviation. The presence of distinctive types of constituents remedies the affliction by distinctive mechanisms To provide a complete treatment against an illness[3] [4],[5]

Active ingredients in herbal medicine

Gum:

- It was Investigated the antitussive properties of peach gum.
- The herbal gums exhibit a considerable antitussive action.
- Cough-suppressing activity is likely to be similar to that of mucilage.
- Gums are translucent, amorphous natural plant hydrocolloids that are typically formed in higher plants as a Protective after-injury substance

Flavonoids:

- Flavonoids can reduce the activity of cholinesterase and xanthinoxidase by inhibiting oxidative and Reductive reactions.
- Flavonoids' therapeutic effects are utilised to treat cardiovascular disorders, thromboembolic consequences, And renal ailments combined with antitussive-expectorant activity, are likely to contribute to the positive and Beneficial effects.
- Flavonoids are made up of flavonol glycosides and their aglycones.

Liquorice:

- Liquorice root can be used as a natural remedy for coughs.
- The roots of liquorice are obtained from the plant Glycerrhiza glabra, belonging to the Family Leguminosae.
- Liquorice root contains several active compounds, including glycyrrhizin, which is a calcium and potassium Salt of Glycyrrhizinic acid, flavonoids, species of bees, such as Apis mellifera, Apis dorsata, Apis florea, Apis Indica, and other species of Apis, responsible for anti-inflammatory and soothing properties that can help to Relieve coughs and other respiratory symptoms.

Honey:

- Honey has been used for centuries as a cough suppressant and is believed to have both antimicrobial and Anti-inflammatory properties that can help to soothe the throat and reduce coughing.
- Honey can be used as a natural remedy for coughs.
- The Honey is a viscid and sweet secretion stored in the honeycomb by various species belonging to the family Apidae.

Tulsi:

- The leaves of tulsi, also known as holy basil, are obtained from the plant of Ocimum sanctum belonging to The family Labiatae.
- It is ethno botanically used for various diseases and is a well-recognized herb of Ayurveda.
- Tulsi contains several active compounds, including Eugenol and Rosmarinus acid, which have anti-Inflammatory and antimicrobial properties.
- These properties can help to reduce inflammation and fight off infections that may be causing the cough.
- This herb is meant for the treatment of various respiratory problems, including coughs, skin diseases, and Immune boosting.

Vasaka:

The leaves of Vasaka obtained from plant Adhatoda vasica., belonging to the family Acanthaceae, also Known as Malabar nut or Adhatoda vasica, is a plant commonly used in Ayurvedic medicine to treat respiratory Problems. Including coughs. Vasaka leaves contain several active compounds, including vasicine and Vasicinone, which have been shown to have bronchodilator. Expectorant, and anti-inflammatory properties.

Turmeric:

The rhizomes of turmeric are obtained from the plant Curcuma longa belonging to the family Zingiberaceae, a spice commonly used in Indian and Middle Eastern cuisine, has been traditionally used in Ayurvedic and Chinese medicine to treat various respiratory problems, including coughs. Turmeric contains a Compound called curcumin, which has anti-inflammatory and antioxidant properties that can help to reduce Inflammation and boost immunity.Tulsi: The leaves of tulsi are obtained from the plant of Ocimum sanctum belonging to family Labiatae, wich is Also known as

holy basil, is ethnobotanically used for various diseases and also wellrecognised herb of Ayurveda. This is meant for treatment of various respiratory problems, including coughs and skin diseases and Immune booster. Tulsi contains several active compounds, including eugenol and Rosmarinus acid, which have Anti-inflammatory and antimicrobial properties that can help to reduce inflammation and fight off infections That may be causing the cough.

Peppermint

Peppermint oil is obtained from the Ariel Part of the Mentha Piperita., belonging to the family Lamiaceae, known as medicinal herb commonly used to treat various respiratory problems, including coughs.Mentha contains several active compounds, including menthol, which has anti-inflammatory and soothing Properties that can help to reduce coughing and soothe the throat.

PHARMACOLOGICAL ACTIVITY

1) Antitussive activity

A polyherbal syrup was formulated using Adhatoda vasica, Zingiber officinale, Ocimum sanctum, Glycyrrhiza glabra, Withania somnifera, Piper longum, Terminalia chebula, and Mentha piperita. Meher et al. evaluated the syrup's antitussive properties using a citric acid-induced cough model in guinea pigs. The findings revealed that the syrup demonstrated significant antitussive activity in a dose-dependent manner. Researchers concluded that the herbal formulation's effect at the minimum dose was superior to the standard drug. Therefore, it was determined that 1 ml of the polyherbal cough syrup produced a notable antitussive effect in experimentally induced cough reflex in mice, comparable to the standard antitussive agent, diphenhydramine hydrochloride. The syrup's activity was benchmarked against diphenhydramine HCl. [6]

2) Anticancer activity

A polyherbal compound (PHC, formulated as syrup) consisting of Allium sativum, Curcuma longa, Panax Ginseng, and Camellia sinensis with honey and 70% sucrose solution the study was double-

blind randomized Placebo controlled. The patients were randomly assigned to PHC or placebo group. The PHC group was treated With the PHC (20 ml, three times daily) for 12 weeks, while the placebo group received 70% sucrose syrup (containing edible red colour). The Quality of Life was assessed at baseline and after 12 weeks. The patients Were followed up to determine overall survival. PHC has shown to significantly improved cancer-related Symptoms, psychological and social functions of the patients, and physical performance. Death occurred in 22% And 33% of cases in the PHC and placebo group, respectively. The mean survival time was 16.8 months in the Placebo group and 21.4 months in the PHC group, but the difference was not statistically significant. The author Has concluded that the PHC improved cancer-related symptoms, physical performance, and psychological and Social functions in patients with gastrointestinal Thapring is a Traditional Tibetan Medicine (polyherbal formulation) composed of Terminalia chebula, Saussurea lappa, Acorus calamus, Aconitum ferox, Oxytropis microphylla, Commiphora mukul, Acacia catechu, Delphinium brunonianum and a mineral ingredient. Evaluation of the pro-apoptotic and anti-tumorigenic Properties of Thapring in hepatoma cells and in a transgenic mouse model of hepatocellular carcinoma was Done by Tenzin et al. The growth inhibition property and pro-apoptotic action of Thapring were assessed in A549, Huh7, and HepG2 cell lines using MTT assay and flow cytometry, respectively. Serological studies for Superoxide dismutase, vascular endothelial growth factor and liver function were assessed in the serum of X15-Myc transgenic mice. Their study suggested that Thapring possesses a strong anti-cancer activity (growth Inhibition, cell cycle arrest, proapoptotic activity) in hepatoma cells and shows minimal cytotoxic effect on non-Hepatoma cells and nontransformed AML12 hepatocytes.[7]

3) Antiulcer activity

Anjan et al. conducted an experiment to investigate the antiulcer effects of a polyherbal syrup formulated with Diastase, Papain, Nux-vomica Tincture, Compound Cardamom Tincture, and Hydrolyzed Casein. The study utilized healthy female Wistar rats, aged 8-12 weeks, which were randomly assigned to five groups, each consisting of six rats. Group 1 (control) received distilled water and 1 ml of 100% ethanol per kg of body weight orally, while Groups 2 and 3 (test groups) were given the prepared formulation at doses of 1.8 ml/kg and 2 ml/kg, respectively. Group 4 (standard) was administered Famotidine at a dose of 20 mg/kg, and Group 5 (normal) received only distilled water. All animals, except those in the normal group, were given 1 ml/kg of 100% ethanol orally after 45 minutes of receiving the formulation or Famotidine. In the antiulcer assessment, ethanol-induced ulcers were observed in the stomachs of the rats, and various parameters such as gastric juice volume, free and total acidity, pH, lipase and amylase activities, gastric wall mucus content, total protein, pepsin activity, peristaltic movement, and gastric emptying were measured. The study concluded that the polyherbal syrup exhibited significant antiulcer properties and could potentially be effective in treating gastric disorders.[8]

4) Antiasthmatic activity

Bharangyadi, a polyherbal formulation composed of Clerodendrum serratum, Hedychium spicatum, and Inula racemosa, was studied by Divya Kajaria et al. to assess its anti-asthmatic properties using various in vitro and in vivo experimental models. The findings indicated that Bharangyadi possesses

strong histamine antagonistic effects, along with significant mast cell stabilizing and spasmolytic activities in tested animals. The ethanolic extract of Bharangyadi, administered at doses of 500 and 1000 µg/ml, provided dose-dependent protection against compound 48/80-induced degranulation. Pre-treatment with the extract conferred 80% and 86% protection from histamine-induced bronchoconstriction in guinea pigs, leading to a 27.8% and 36.1% increase in pre-convulsion time, comparable to the effects of a standard drug. Furthermore, in histamine antagonism screening on guinea pig ileum, Bharangyadi was shown to significantly reduce smooth muscle contractions in a dose-dependent manner, with higher concentrations of the extract resulting in maximal inhibition when combined with maximum doses of histamine.[9]

5) Antidiabetic activity

M. Senthil Kumar and colleagues developed a polyherbal anti-diabetic syrup using extracts from the leaves of Gymnema sylvestre (meshashringi) and the seeds of Syzygium cumini (Indian black jamun). Three different formulations were created: F1, containing 10 grams of meshashringi leaf powder; F2, with 10 grams of Indian black jamun seed powder; and F3, which included 5 grams of both meshashringi leaf powder and Indian black jamun seed powder. These formulations were prepared and subsequently evaluated. The anti-diabetic potential of the syrup was assessed in vitro using a glucose-binding test. Results indicated that the evaluation parameters of the formulations were within acceptable standards, and the in vitro tests demonstrated significant anti-diabetic activity. [10].

6) Antidepressant Activity

Zakerin et al. prepared an herbal syrup by decocting a combination of various plants, including Lavandula angustifolia, Melissa officinalis, Echium amoenum, Cordia myxa, Glycyrrhiza glabra, Ziziphus jujuba, Foeniculum vulgare, Fumaria parviflora, Adiantum capillus-veneris, and Alhagi species, along with glycerin and potassium sorbate. The syrup's physicochemical properties were analyzed, and an accelerated stability test was conducted. Male Wistar rats, weighing between 220 and 250 g, were used in the study, divided into six groups. The control group received distilled water, while the syrup group was administered 3.3 mL/kg of the herbal syrup. A positive control group received 20 mg/kg of fluoxetine, and another group (SH) was treated with only the syrup's excipients. All treatments were given daily via intra-gastric gavage for three weeks. To assess the syrup's antidepressant effects, a Forced Swimming Test (FST) was performed, and serum levels of serotonin (5-HT), noradrenaline (NA), and brain-derived neurotrophic factor (BDNF) were measured. Histopathological examinations were also conducted on the spleen, liver, and kidneys. The herbal syrup was found to be brown with a distinctive taste and aroma. The syrup significantly reduced immobility time in the FST, which was associated with increased levels of NA and 5-HT, although BDNF levels were unaffected. No toxic effects were observed in the liver, kidneys, or spleen. These findings suggest that the herbal syrup has notable antidepressant properties in the rat FST model, likely through its ability to increase 5-HT and NA levels, and could potentially be a viable treatment for depression pending clinical trials. [11].

7) Antimicrobial and Antibacterial activity

A polyherbal formulation was created using a decoction of the aerial parts of Rhynchosia recinosa and the stem barks of Ozoroa insignis, Maytenus senegalensis, Entada abyssinica, and Lannea schimperi, and its safety and effectiveness were assessed. Both the individual extracts and the polyherbal mixture were evaluated for antibacterial properties against four Gram-negative bacteria: Escherichia coli (ATCC 25922), Salmonella typhi (NCTC 8385), Vibrio cholerae (clinical isolate), and Klebsiella pneumoniae (clinical isolate) using the microdilution technique, as reported by Emmanuel et al. Additionally, the extracts were tested for toxicity using brine shrimp and assessed for acute toxicity in mice. The combined extract demonstrated dose-dependent protective effects in a rat model of gastric ulcers induced by ethanol and hydrochloric acid. The findings indicated that the extracts exhibited weak antibacterial activity against the four Gram-negative bacteria and displayed low acute toxicity in both mice and brine shrimp. [12].

In this study four different crude extracts were prepared from the leaves ofOcimum sanctum, Boswellia serrata, rhizomes of Zingiber officinale androots of Glycyrrhiza glabra by Barik et Al. An attempt has also been made to formulate polyherbal syrup and suspension by using These extracts. The antimicrobial activity of the prepared polyherbal formulations and the Crude extracts were tested against some bacterial strains which are responsible for generation Of various types of respiratory diseases. The poly herbal formulations and all the extracts Exhibited antibacterial activity in concentration dependent manner but the polyherbal Formulations displayed better activity than that of their crude extracts.[13]

8) Hepatoprotective activity

Livergen syrup is a blend of various herbal extracts, including Ipomoea turpethum, Oldenlandia corymbosa, Andrographis paniculata, Apium graveolens, Cyperus rotundus, Eclipta alba, Berberis lycium, Carum copticum, Picrorhiza kurroa, Cichorium intybus, Trigonella foenum-graecum, Plumbago zeylanica, Solanum nigrum, Tephrosia purpurea, Terminalia arjuna, and Terminalia chebula. This formulation was obtained from a local market by Arsul et al. to assess its hepatoprotective effects against carbon tetrachloride (CCl4)-induced hepatotoxicity in rats. Silymarin (100 mg/kg) served as the standard treatment. Blood samples were collected to evaluate serum levels of Glutamate Pyruvate Transaminase (SGPT), Glutamate Oxaloacetate Transaminase (SGOT), Alkaline Phosphatase (ALP), total protein, bilirubin, and cholesterol. The rats were divided into four groups, with CCl4 administered intraperitoneally for five days to induce hepatotoxicity, followed by treatment with either Livergen or Silymarin for an additional five days. Enzyme levels were measured on the sixth day, and serum levels were recorded on the eleventh day. Each parameter was analyzed separately to determine significant intergroup differences. The hepatotoxicity caused by CCl4 is believed to result from free radical reactions with lipids and proteins. The study demonstrated a significant reduction in the enzyme levels of ALP, SGOT, SGPT, bilirubin, and cholesterol due to the polyherbal formulation Livergen, indicating its considerable hepatoprotective activity. [14].

9) Antioxidant and immunomodulating activity

Rizer Syrup (RS) is a polyherbal formulation containing a blend of medicinal herbs such as Ashwagandha (Withania somnifera), Shatavari (Asparagus racemosus), Amla (Emblica officinalis), Haritaki (Terminalia chebula), Bibhitaki (Terminalia bellirica), Gokshura (Tribulus terrestris), Bala (Sida cordifolia), Varahikand (Dioscorea bulbifera), Vidarikand (Pueraria tuberosa), Bhringraj (Eclipta alba), and Kaucha (Mucuna pruriens) as its active ingredients. The formulation is primarily indicated for conditions such as oxidative stress, weakened immunity, and general debility. In a study conducted by Ankur et al., the antioxidant potential of Rizer Syrup was evaluated using two assays: the DPPH (1,1-Diphenyl-2-Picryl Hydrazyl) assay and the hydrogen peroxide (H_2O_2) scavenging assay. Methanolic extracts of Rizer Syrup were tested alongside ascorbic acid, which served as the reference standard. The IC50 value for ascorbic acid in the DPPH assay was 19.82 µg/ml, while for the methanolic extract of Rizer Syrup, it was 56.52 µg/ml. Similarly, in the H_2O_2 scavenging assay, the IC50 values were 24.70 µg/ml for ascorbic acid and 57.50 µg/ml for the Rizer Syrup extract. [15]

CONCLUSION

Numerous research studies have assessed the impact of polyherbal syrups on various pharmacological activities. Based on the overall findings, it can be concluded that polyherbal syrups are therapeutically effective at lower doses and have fewer side effects compared to allopathic medications. Combining multiple herbs in polyherbal formulations offers significant advantages over single-herb treatments and conventional allopathic drugs. The synergistic effects of these preparations make them preferable, as they can be administered at lower doses while still achieving the desired pharmacological effects. This reduces the likelihood of adverse side effects, making them a safer alternative to allopathic medicine.

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