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Comparative Phytochemical Analysis and Predicted Phytopharmacotherapeutic Potential of Polyherbal Formulation (PHF-Manasabramhi)

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Article Info: Received: May 27th, 2013; Accepted: June 3rd, 2013**ABSTRACT**

Background: PHF-Manasabramhi, a polyherbal formulation contains combination of ingredients like *Moniera eunifolia* (200ml), *Emblia officinalis* (4.00gm), *Piper longum* (3.00gm), *Withania somnifera* (3.00gm), *Phseilus radiatus* (3.00gm), *Bilospermum montanum* (3.00gm), *Citoria tematea* (3.00gm) and *Gingiber officinalis* (3.00gm). Individually few of these herbal ingredients have shown different phytochemicals and pharmacological activities in different studies conducted earlier. Hence the rationale of this study was to evaluate its comparative phytochemical analysis and predict its phytopharmacotherapeutic potential as a compound preparation. **Objectives:** To evaluate comparative phytochemical analysis and predict its phytopharmacotherapeutic potential as a compound preparation. **Methods:** About 10 gm of PHF-Manasabramhi was used to evaluate its phytochemical constituents by using generally accepted laboratory technique for qualitative determinations. **Results:** Preliminary phytochemical screening of PHF-Manasabramhi shows the presence of Phytosterols, Alkaloids, Flavanoids, Glycosides, Tannins and Phenolic Compounds. **Discussion:** Our study reveals that PHF-Manasabramhi shows slight different phytochemicals as compared to phytochemicals done on individual ingredients by earlier studies. This could be possibly due to in-vitro drug interaction while processing the drug during manufacture of poly herbal product.

Keywords: Phytochemicals, Medicinal plants, PHF-Manasabramhi, Herbal Medicine**INTRODUCTION**

Plants, animals and minerals are naturally occurring sources of medicine. Many naturally occurring substances are organic in origin, obtained in both primary and secondary metabolic process and they provide a source of medicine since time immemorial. Very important bioactive constituents of these plants are steroids, tri-terpenoids, carotenoids, flavanoids, alkaloids, tannins and glycosides. Plants in all facets of life have served a valuable starting material for drug development [1]. Ayurveda (The 'science of life') is a system of traditional

medicine native to India and practiced in other parts of the world as a form of alternative medicine [2].

As per Indian heritage and science "Ayurveda" is a Upa Veda or annexure of four main Vedas (Knowledge Systems). The famous treaties of Ayurveda, "Charaka Samhita" by sage "Charaka", details the prevention and treatment of disease and "Sushruta Samhita" of Sage "Sushruta" deals Ayurvedic Surgical procedures [3].

Ayurveda is considered to be a form of complementary and alternative medicine (CAM) within the Western world, where several of its methods—such as herbs, massage, and Yoga as exercise or alternative medicine—are applied on their own as a form of CAM treatment. However, such alternative therapy approaches are not unique to Ayurveda because they are also available under the system of Unani Medicine, Greek Medicine or the Islamic Medicine [4].

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Bacopa monnieri/*Moniera cunifolia* (Waterhyssop, Brahmi, Thyme-leaved gratiola, Water hyssop) is a perennial, creeping herb whose habitat includes wetlands and muddy shores. The word *Brahmi* is also known as *Centella asiatica*, particularly in Northern part of India. Studies have shown that *Moniera cunifolia* has many chemical constituents including alkaloids (brahmine and herpestine), saponins (d-mannitol and hersaponin, acid A, and monnierin), flavonoids (luteolin and apigenin) [5-7].

Emblica officinalis Gaertn. (*Phyllanthus emblica* Linn.), also known

Indian system of medicine. According to the main classic texts on Ayurveda, *Charaka Samhita* and *Sushruta Samhita*, amla is regarded as the "best among rejuvenative herbs", and the "best among the sour fruits". The fruit pulp acts as antioxidant, immunomodulatory agent, cytoprotective against chromium, protects against oxidative stress in ischemic reperfusion injury. The root, bark and leaves are also used for the treatment of indigestion, diarrhea, dysentery, eczema and warts. Studies have shown that *Emblica officinalis* contains alkaloids, carbohydrate, glycoside and tannins [8].

Piper longum is a slender, aromatic, perennial climber, with woody roots and numerous wide ovate, cordate leaves. The inflorescence is a cylindrical, pedunculate spike, the female flower is up to 2.5 cm long and 4-5 mm in diameter but the male flower is larger and slender. The fruits are small, ovoid berries, shiny blackish green, embedded in fleshy spikes [9,10].

Withania somnifera, (Ashwagandha), is a shrubby plant cultivated in India, parts of East Asia and Africa which offers tremendous potential as an energizing medicinal herb. Ayurvedic practitioners have used the roots of this plant for centuries with success as a tonic to increase vitality and longevity, as well as to treat health conditions as diverse as tumors and arthritis. Its leaves are used in Ayurvedic and Unani systems for treatment of tumors and tubercular glands. A number of withanolide steroidal lactones have been isolated from the leaves of *Withania somnifera*. Earlier laboratory analyses have revealed presence of over 35 chemical constituents in the roots of *W. somnifera*. The biologically active chemical constituents are alkaloids (isopellertierine, anferine), steroidal lactones (withanolides, withaferins), saponins containing an additional acyl group (sitoindoside VII and VIII), and withanoloides with a glucose at carbon 27 (sitonidoside XI and X). *Withania somnifera* is also rich in iron [11,12].

Phaseolus radiatus (Green gram) seeds have been utilized as raw material for production of bean-seedings, bean-nodules and boiled bean. The occurrence of an alkaline glycerophosphatase has been observed for the first time in plants. Study reveals that *Phaseolus radiatus* contains flavonoids. It also contains Thiamine, Nicotinic acid, Riboflavin, Pyridoxin, Inositol, Vitamin B12, Ascorbic acid, Vitamin K, amino acids and proteins [13].

Baliospermum montanum (Willd.) Muell-Arg (Euphorbiaceae) is a leafy monoecious undershrub distributed throughout the greater

parts of India, Burma and Malaya. The roots of the plant are ascribed to possess medicinal virtues in Ayurvedic system of medicine and used in preparation of important Ayurvedic formulations. It is believed to be useful in asthma, bronchitis, leprosy, jaundice, wounds, constipation, anemia, leucoderma and fever. Following various folk claims for cure of numerous diseases, efforts have been made by researchers to verify the efficacy of the plant through scientific biological screenings. A scrutiny of literature revealed some notable pharmacological activities of the plant such as anticancer, antimicrobial, free radical scavenging, immunomodulatory, hepatoprotective, and

Clitoria ternatea is a perennial herbaceous plant, with elliptic, obtuse leaves. It grows as a vine or creeper, doing well in moist, neutral soil. The most striking feature about this plant are its vivid deep blue flowers; solitary, with light yellow markings. In traditional Ayurvedic medicine, it has been used for centuries as a memory enhancer, nootropic, antistress, anxiolytic, antidepressant, anticonvulsant, tranquilizing and sedative agent. Clitoides belong to the cyclotides family and studies have shown that clitoides display potent antimicrobial activity against *E. coli*, *K. pneumonia*, *P. aeruginosa* and cytotoxicity against HeLa cells. These peptides have potential to be lead compound for the development of novel antimicrobial and anti-cancer agents [15,16].

Ginger, the rhizome of *Zingiber officinale*, is one of the most widely used species of the ginger family (*Zingiberaceae*) and is a common condiment for various foods and beverages. Ginger has a long history of medicinal use dating back 2,500 years in China and India for conditions such as headaches, nausea, rheumatism, and colds. Characterized in traditional Chinese medicine as spicy and hot, ginger is claimed to warm the body and treat cold extremities, improve a weak and tardy pulse, address a pale complexion, and strengthen the body after blood loss [17].

Phytochemical screening revealed the presence of alkaloids, saponins, tannins, flavonoids, terpenoid and phlobotannins. The rationale of the present study was to carry out preliminary phytochemical screening of PHF-Manasabramhi.

MATERIAL AND METHODS

Permission from the Head of the Department was obtained before conducting the phytochemical analysis.

Chemicals and drugs

Chemicals required for phytochemical analysis were procured from Rajesh chemicals, Mumbai, India. PHF-Manasabramhi was obtained from Adithya Herbals, Pumpwell, Mangalore, Karnataka, India. It was dissolved in distilled water and used for analysis.

Phytochemicals analysis

Phytochemical analysis of the test solution was done according to conventional methods [18-20].

Test for phytosterols

a) *Salkowski reaction*: To 0.5 ml sample in a test tube add 1ml of conc. H_2SO_4 from the sides of the test tubes. Appearance of reddish brown colour in chloroform layer indicates presence of phytosterols.

Test for triterpenoids

a) *Tschugajew test*: To the sample, add excess of acetyl chloride and a pinch of zinc chloride. Keep aside for reaction to subside and then warmed on water bath. Appearance of eosin red colour indicates presence of triterpenoids.

Test for alkaloids

a) *Dragendroff's test*: Dissolve sample in chloroform. Evaporate chloroform and acidify the residue by adding few drops of dragendroff's reagent (potassium bismuth iodide). Appearance of orange red precipitate indicates presence of alkaloids.

Test for flavanoids

a) *Ferric chloride test*: To the sample, add few drops of neutral ferric chloride solution. Appearance of green colour indicates presence of flavanoids.

Test for phenolic compounds and tannins

q) *Ferric chloride test*: Take 2 ml of sample in a test tube and add ferric chloride solution drop by drop. Appearance of bluish black precipitate indicates presence of tannins and phenolic compounds.

Test for proteins

a) *Ninhydrin test*: Few drops of ninhydrin added to the extract. Appearance of blue colour indicates presence of amino acid where as proteins may rarely give positive result.

Test for glycosides

a) *Baljets test*: Treat the sample with sodium picrate solution. Appearance of yellow to orange colour indicates presence of glycosides.

Test for saponins

a) *Foam test*: A small amount of extract taken in a test tube with little quantity of water. Shake vigorously. Appearance of foam persisting for 10 minutes indicates presence of saponins.

Test for carbohydrates

a) *Fehling's test*: Few drops of extract heated with fehling's a and b solution. Appearance of orange red precipitate indicates presence of carbohydrates.

Test for lactones

a) *Baljets test*: Treat extract with sodium picrate solution. Appearance of yellow to orange colour indicates Presence of lactone ring.

Fixed oils and fatty acid

a) *Spot test*: Prepared spot on the filter paper with the test

solution and oil staining on the filter paper. Indicated the presence of fixed oil & fats.

RESULTS

In this study, we found that PHF-Manasabramhi contains Phytosterols, Alkaloids, Flavanoids, Glycosides, Tannins & Phenolic Compounds (Table 1).

Phytochemicals	PHF-Manasabramhi
Phytosterols	+
Triterpenoids	+
Alkaloids	+
Flavanoids	+
Phenolic Compounds And Tannins	+
Proteins	+
Glycosides	+
Saponins	-
Carbohydrates	-
Lactones	-
Fixed Oils And Fatty Acid	-

Table 1: Showing Phytochemical Analysis of PHF-Manasabramhi

DISCUSSION

Our study reveals that PHF-Manasabramhi shows different phytochemicals as compared to phytochemicals done on individual ingredients by earlier studies.

Data from cell culture and animal studies suggest that phytosterols containing plants may attenuate the inflammatory activity of immune cells, including macrophages and neutrophils. Plant Sitosterol has been found to induce apoptosis when added to cultured human prostate, breast and colon cancer cells [21-23]. The plants containing triterpenoids shows antimicrobial activity [24]. Flavonoids are known to inhibit or kill many bacterial strains, inhibit important viral enzymes, such as reverse transcriptase, protease and also destroy some pathogenic protozoans [13,25]. Various bioactivities of phenolic compounds are responsible for their chemopreventive properties (e.g., antioxidant, anticarcinogenic, or antimutagenic and anti-inflammatory effects) and also contribute to their inducing apoptosis by arresting cell cycle, regulating carcinogen metabolism and ontogenesis expression, inhibiting DNA binding and cell adhesion, migration, proliferation or differentiation, and blocking signaling pathways [26]. Tannins have shown potential antiviral, antibacterial and antiparasitic

effects [27,28]. Glycosides (Phenylethanoid) present in plants are naturally occurring compounds which are known to possess wide array of pharmacological activities including antibacterial, anti-tumor, antiviral, anti-inflammatory, neuro-protective, antioxidant, hepatoprotective, immunomodulatory and tyrosinase inhibitory actions [29].

Preliminary phytochemical screening of individual ingredients of PHF-Manasabramhi shows few of different phytochemicals conducted earlier by other authors than the phytochemical analysis of compound preparation done by us which shows the presence of Phytosterols, Alkaloids, Flavanoids, Glycosides, Tannins & Phenolic Compounds with a different composition. This difference could be possibly due to in-vitro drug interaction while processing the drug during manufacture of this poly herbal product.

The pharmacological actions of few of these phytochemicals can be co-related with the some of the actions mentioned in the classical texts. However further studies are required to know its in-vitro drug interaction during processing and also in-vivo drug interactions in animal as well as human studies. We also suggest that each ingredient in this preparation has to undergo comprehensive analysis including quantitative / semi quantitative analysis along with characterizing its chemical structure by finger printing studies with detailed phyto-pharmaco-therapeutic potential.

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