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Research Article

Phytochemical Analysis of *Phyllanthus emblica* (L) and its Medicinal Uses

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Abstract

Present investigation on Taxonomic morphology and phytochemical analysis of *Phyllanthus emblica* (L) has been used for the anti-inflammatory and anti-pyretic treatments by the rural population. *P. emblica* has been used for the treatment of several disorders such as the Scurvy, Cancer and Heart diseases. Results revealed that the among the four extracts show presence of carbohydrate in bark as evidenced by positive Molish test. All the four extracts of bark showed positive Molish test for carbohydrate. The phenols and tannins were detected only in chloroform and petroleum ether extracts but not in alcohol extracts. All the four solvent extracts of bark showed negative;' reagent test which indicated the absence of flavonoids. Saponin was detected in chlororform petroleum ether and n-hexane extracts of leaves as evidenced by positive froth foam test.

INTRODUCTION

Medicinal plants frequently used as raw materials for extraction of active ingredients which used in the synthesis of different drugs. Like in case of laxatives, blood thinners, antibiotics and anti-malaria medications, contain ingredients from plants. According to WHO (World Health Organization) 80 % of Asian and African population uses herbal medicine due to its low expense. About 25% of drugs using in USA derived from medicinal plants. 7,000 medical compounds and 120 active compounds currently isolated from herbs.

Herbal preparations

Single plant or multiple plant combinations are used. It Prepared in many form. Herbal juice extract, dry powder, tea, decoction, Tinctures, alcoholic preparation and oil or ghee preparations are available.

Ethno-medicine

Ethno-medicine is a study or comparison of the traditional medicine based on bioactive chemicals in the herbs and animals and practiced by various ethnic groups. Ethnobotany and medical anthropology are the tools using in Ethno-medicine. The purpose of the research is to identify and develop a marketable pharmaceutical product. From Chinese medicine 'Yu' identified 'Artemisin' named chemical compound useful in Malaria disease.

Phytochemicals

Antifungal activities (Ahmad et al., 2011; Ali Mohammadi et al., 2015).

Natural plant-derived oils have gained interest as alternatives to synthetic antifungals due to their eco-friendly, cost-effective, and multipurpose

therapeutic potential (De Sousa Barros et al., 2015). Previous studies have documented antifungal activity of several essential oils, including clove, peppermint, and oregano (Devi et al., 2010; Bassolé et al., 2010). However, studies on the antifungal properties of WGO remain limited, particularly concerning differences in extraction methods such as hot pressing versus cold pressing. The present research aimed to evaluate the antifungal activity of hot- and cold-pressed WGO obtained from different wheat varieties against human pathogenic fungi causing dermal infections.
These are chemical compounds synthesized by plants as its part of metabolism, may be part of defensive mechanism. Alkaloids, Glycosides, Glycosides, Terpenes are main Phytochemicals. Alkaloids are bitter-tasting chemicals examples are atropine, scopolamine, hyoscyamine, caffeine, cocaine, ephedrine (Ephedra), morphine. Anthraquinone glycosides are found in medicinal plants such as rhubarb, cascara, and Alexandrian senna. Polyphenols of several classes of chemicals, useful defences against plant diseases and predators. Examples are phytoestrogens and astringent tannins. Terpenes and terpenoids are found in resinous plants such as the conifers.

Present investigation on Taxonomic morphology and phytochemical analysis of Phyllanthus *emblica* (L) has been used for the anti-inflammatory and anti-pyretic treatments by the rural population. *P. emblica* has been used for the treatment of several disorders such as the Scurvy, Cancer and Heart diseases. Based on the traditional knowledge about the plant, present study was conducted. To evaluate the scientific basis for the use of plant, the antimicrobial activities of the extracts at different doses (10mg and 20mg/ml) of the leaves and fruits were evaluated against some common pathogenic bacteria using agar disc diffusion method. Gram positive bacteria like staphylococcus aureus and Bacillus subtilis gram negative bacteria like Pseudomonas aeruginosa, and Escherichia coli were used and antimicrobial activity of the concentrated extracts was evaluated by the diameter zone of inhibition against the above microorganisms. Plant extracts were active against both gram-positive, gram-negative Bacteria. The above observation indicates that, *P. emblica* has broad spectrum antibacterial activity and a potential source of new classes of antibiotics that could be useful for infectious disease chemotherapy and control. The study also conducted on the isolation of the chemical constituents present in the plant. The Phytochemical constituents of the dried powdered plant fruits and leaves were extracted using aqueous and organic solvents, results revealed the presence of alkaloids, oil, fat, glyceroids, carbohydrates, Phenolics, Tannins, lignin, saponins, flavonoids and Terpenoids.

MATERIAL AND METHODS

Collection of Plant

Collections of Phyllanthus emblica (L) plant part were collected from local area of Hingoli district, Maharashtra state, India. Plant part i.e. fruit and leaves cleaned soil dust with tap water. The plant material and specimens were identified by using standard floras like Cook 1907, Dhore 2005, Naik 1989, Yadav and Sardesai 2002.

Preparation of Plant Part Extract

Preparation of plant part leaves dried under shade and prepared fine powder, plant part extraction according to previously method used by Megala, and Elango, 2012, but were used some modified method in which the 5 gram of leaves dried powder extracted with 50 ml of three different solvent i.e. methanol, chloroform and petroleum ether , 24 hrs at room temperature and shaking constant and then filter with whatman filter paper no.1, excess solvent in extract evaporated and extract used for Qualitative and quantitative evaluation of phytochemicals.The preliminary screening test were performed for the presence of following secondary metabolites such as alkaloid, glycosides, terpenoids, tannin, flavonoids, saponins, steroid and phenols (Harborne, 1973) and Sofowara (2005).

According to Budhiraja, 2012, leaves powder extract in Chloroform and n-butonol solvent shows positive results of phytochemicals constituent and their activities against the anticancer and antibacterial so were used chloroform and n-butonol solvent.

Qualitative analysis of *Phyllanthus emblica* (L)

Alkaloids test

The plant extract was evaporated to dryness and the residue was heated on a boiling water bath with 2% hydrochloric acid. After cooling, the mixture was filtered and treated with a few drops of Mayer's reagent. Formation of turbidity or yellow precipitation showed the presence of alkaloid.

Glycosides

Glycosides are compounds which upon hydrolysis give rise to one or more sugars (glycones) and a compound which is not a sugar (Glycone or Genine). To the solution of the extract in glacial acetic acid, few drops of ferric chloride and concentrated sulphuric acid are added, and observed for a reddish-brown coloration at the junction of two layers and the bluish green colour in the upper layer.

Terpenoids and steroids

Four milligrams of extract were treated with 0.5 ml of acetic anhydride and 0.5 ml of chloroform. Then concentrated solution of sulphuric acid was added slowly and red violet colour was observed for terpenoid and green bluish colour for steroids.

Flavonoids

4 ml of extract solution was treated with 1.5 ml of 50% methanol solution. The solution was warmed and metal magnesium was added. To this solution, 5 – 6 drops of concentrated hydrochloric acid was added and red colour was observed for flavonoids and orange colour for flavones.

Saponins

0.5 g of extracts was added to 5 ml of distilled water in a test tube. The solution was shaken vigorously and observed for a stable persistent froth. The frothing was mixed with 3 drops of olive oil and shaken vigorously after which it was observed for the formation of an emulsion.

Phenols

The extract (50 mg) is dissolved in 5 ml of distilled water. To this few drops of neutral 5% ferric chloride solution are added. A dark green colour indicates the presence of phenolic compounds.

Tannins

To 0.5 ml of extract solution 1 ml of water and 1-2 drops of ferric chloride solution was added. Blue colour was observed for gallic tannins and green black for catecholic tannins.

Fig. *Phyllanthus emblica* (L) Plant with fruits

RESULTS AND CONCLUSION

Taxonomic Morphology of *Phyllanthus emblica* (L) Plant

Bark greyish brown with irregular flakes. Drooping branches and branchlets resembling compound leaves. Leaflets small and numerous, flowers produced below the leaves. Leaf Fall November—December, Flowering, March—May and Fruiting November—February.

Deciduous trees, to 15 m high, bark grey-brown, rough, irregularly flaking; blaze pink-red. Leaves simple, alternate, bifarious on short deciduous branchlets, closely overlapping, subsessile; stipules minute, lateral, linear; lamina 0.4-1.5 x 2-4 mm, oblong or linear-oblong, base round, apex obtuse and shortly apiculate, glabrous, membranous; nerves obscure. Flowers unisexual, 2-3 mm across, greenish-yellow, densely clustered in leaf axils; male flowers: tepals 6, oblanceolate, 1.5 mm, obtuse, stamens 3, anthers oblong, connate by their connectives; apiculate; disc glands 6; female flowers: tepals 6, oblanceolate, obtuse; ovary superior, 1.5 mm, 3-celled; ovules 2 in each cell; styles 3, broadly fimbriate, recurved, stigmatiferous. Fruit a capsule 1.5-2.5 cm across, subglobose, dehiscing into 6 cocci, disc enlarged to give an appearance of fleshy yellowish-green, indehiscent berry.

Results taken average of triplicates for different concentration of plant extract

The results of qualitative screening of phytochemical components in leaves and fruit of *P. emblica* revealed the presence of alkaloids, glyceroids, Terpenoids Steroids, Phenolics, Tannins, saponins, flavonoids. Phytochemical analysis conducted on the *phyllanthus Eblic*a and bark extracts revealed the presence of constituents which are known to exhibit medicinal as well as physiological activities. The phytochemical screening of the leaves of *phyllanthus Eblica* done with acetone, chloroform, Petrolium ether and n-hexane .Among the four extracts show presence of carbohydrate in bark as evidenced by positive Molish test. All the four extracts of bark showed positive Molish test for carbohydrate . The phenols and tannins were detected only in chloroform and petroleum ether extracts but not in alcohol extracts. All the four solvent extracts of bark showed negative ;' reagent test which indicated the absence of flavonoids. Saponin was detected in chlororform petroleum ether and n-hexane extracts of leaves as evidenced by positive froth foam test.

Table. 1. Qualitative analysis of *Phyllanthus emblica* (L). Fruit & leaves

Sr. No.	Phytochemical	Plant extract of leaves in					
		Alcohol		Chloroform		Petroleum ether	
		Fruit	leaves	Fruit	leaves	Fruit	leaves
1	Alkaloids	+++	++	++	+	++	+
2	Glycosides	++	+	+	+	+	-
3	Terpenoids	+	++	++	+	++	+
4	Steroids	+	-	+	-	-	-
5	Flavonoids	+++	+++	++	++	+	++
6	Saponins	+++	++	++	+	+	++
7	Phenols	+++	++	+	+	++	+
8	Tannins	++	+	++	++	+	+

CONCLUSION

Phyllanthus emblica L. (syn. *Emblica officinalis*) is commonly known as Indian gooseberry. In Ayurveda, *P. emblica* has been extensively used, both as edible (tonic) plants and for its therapeutic potentials. *P. emblica* is highly nutritious and is reported as an important dietary source of vitamin C, minerals and amino acids. All parts of the plant are used for medicinal purposes, especially the fruit, which has been used in Ayurveda as a potent Rasayana (rejuvenator*). P. emblica* contains phytochemicals including alkaloids, glyceroids, Terpenoids Steroids, Phenolics, Tannins, saponins, flavonoids, etc.

***Phyllanthus emblica* (L) Benefits & Medicinal Uses**

Indian Gooseberry has been given a prominent place in Ayurveda. In ancient India it was believed that Ambrosia (heavenly nectar) contained all rasas thereby, it could impart immortality. In that sense Amlaki and Hareetaki stand next by exhibiting five rasas. Therefore, Gooseberry is considered a "Rasayana" bestowed with anti-aging effects. Enthusiastic investigations on Amla substantiate almost all of its acclaimed properties. It has been identified to be a potent antioxidant, immunomodulatory, antistress etc. Apart from its medicinal use. It also finds an important place in traditional hair and skin care formulations. Its cytoprotective role has been investigated in detail. For Ayurveda Amlaki is considered to be a nature"s boon.

There are numerous Amla benefits and uses as follows:

Improves Immunity

Phyllanthus emblica (L) benefits include antibacterial & astringent properties which help improve the body's immunity system. Indian Gooseberry also increases white blood cells which help flush out the toxins from the body.

Hair Care

Phyllanthus emblica (L) is used in a lot of shampoos and conditioners owing to its rich antioxidant & iron content. Indian Gooseberry contains high levels of Vitamin C which helps reduce hair fall. It also strengthens the roots & maintains hair color. Antibacterial properties of Amla helps fight dandruff.

Reduces Stress

Phyllanthus emblica (L) is a great stress reliever which helps induce sleep and relieve headaches.

Eye Care

Phyllanthus emblica (L) is rich in carotene content which is well known for its powerful effect on vision-related conditions. Formulation made of Indian Gooseberry and Honey helps to improve eyesight, near-sightedness, and cataracts.

Respiratory Health

Phyllanthus emblica (L) proves beneficial against respiratory disorders. It helps to reduce cough, tuberculosis, throat infections and flu.

Treats Anemia

Phyllanthus emblica (L) is a rich source of iron, deficiency of which causes anemia.

Blood Purifier

Phyllanthus emblica (L) acts as an active blood purifier when consumed with honey.

Diuretic

Phyllanthus emblica (L) is also diuretic in nature. It means that Indian Gooseberry helps increase the volume and frequency of urination which improves the elimination of toxins from the body. Know more on detoxification.

Improve Digestion

Phyllanthus emblica (L) is rich in dietary fiber which helps improve the overall digestion process. Know more on how to improve digestion.

Absorbs Calcium

Phyllanthus emblica (L**)** benefits also include absorbing calcium which is an essential element for teeth, bones & hair.

Anti-aging

Phyllanthus emblica (L) reduces the number of free radicals in the body through its antioxidant properties. It helps reduce wrinkles, dark circles and other signs of aging. It also protects the body from radiation.

Improves Mental Functions

Daily consumption of Amla helps improves nerve health facilitating proper blood flow. It helps to prevent diseases like dementia and Alzheimer's. Indian Gooseberry also helps improve concentration power and memory skills.

Weight Management

Phyllanthus emblica (L) is known to boost metabolism which helps reduce body fat. It is recommended to add Amla in one's daily diet.

Skin Care

Phyllanthus emblica (L) helps flush out the harmful toxins from the body reducing skin blemishes. The astringent properties of Indian Gososeberry help tighten the pores, giving you clear and healthy skin.

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