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A Comparitive Study on Various Properties of Five Medicinally Important Plants

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Abstract: Indian traditional medicines based on various systems including Ayurveda, Siddha, Unani and Homeopathy. The evaluation of these drugs is primarily based on phytochemical, pharmacological properties. plants have been an exemplary source of medicine. Ayurveda and other Indian literature mention the use of plants in treatment of various human ailments. In traditional system of medicine various plant parts such as stem bark, root bark aerial roots, vegetative buds, leaves, fruits and latex are used in dysentery, diarrhoea, diabetes leucorrhoea, menorrhagia, dropsy, jaundice, diarrhoea, dysentery, intermittent fevers, diseases of urino-genital system, scabies, ulcers, wounds, cold, nervous disorders and as tonic. Medicinal plants are popular in indigenous system of medicine like ayurveda, siddha, unani and homoeopathy and is used for its hepatoprotective, antitumour, antidiabetic, antihypertensive, analgesic, anti-inflammatory and antimicrobial properties. The present review is therefore, an effort to give a comparative study on its properties of five medicinally important plants.

Key words: Antioxidant, antiviral, lupeol, quadrangularins, nimbidin, tannins, *Aloe vera*

INTRODUCTION

Nature has bestowed upon us a very rich botanical wealth and a large number of diverse types of plants grow wild in different parts of our country. India is rich in all three levels of biodiversity, as species diversity, genetic diversity and habitat diversity (Mehmood *et al*., 1999). Today, there is a renewed interest in traditional medicine and an increasing demand for more drugs from plant sources. This revival of interest in plant-derived drugs is mainly due to the current widespread belief that green medicine is safe and more dependable than the costly synthetic drugs. Natural products are known to play an important role in Pharmaceutical biology. Plants have been an important source of medicine for thousands of years. Even today, the World Health Organization estimates that up to 80% of people still rely mainly on traditional medicines. In fact, many of the current drugs either mimic naturally occurring molecules or have structures that are fully or in part derived from natural motifs (Yates, 2002; Joseph and Raj, 2010a). It is believed that the whole plant has more effective healing properties than its isolated constituents. Any part of the plant may contain active components (Nair and Chanda, 2004). Cissus quadrangularis is the most common species, belonging to the family Vitaceae, commonly known as Hadjod. It has been reported to include antioxidant, anti-flatulence, antibacterial, antifungal, anti-inflammatory, analgesic, antibacterial and cancer suppressive (Joseph and Raj, 2011). The use of medicinal plants by man for the treatment of diseases has been in practice for a very long time. Screening of compounds obtained from plants for their pharmacological activity has resulted in the isolation of innumerable therapeutic agents. All plants containing active compounds are important. The beneficial medicinal effects of plant materials typically result from the combinations of secondary products present in the plant. In plants, these compounds are mostly secondary metabolites such as alkaloids, steroids, tannins and phenol compounds, which are synthesized and deposited in specific parts or in all parts of the plant. Many *Ficus* species are commonly used in traditional medicine to cure various diseases. They have long been used in folk medicine as astrigents carminatives, stomachics, vermonicides, hypotensives, antihelmintics and anti-dysentery drugs (Trivedi *et al*., 1969; Joseph and Raj, 2010b). *Phyllanthus amarus* is an erect annual herb of not more than one and half feet tall and has small leaves and yellow flowers. In folk medicine *P. amarus* has reportedly been used to treat jaundice, diabetes, otitis, diarrhoea, swelling, skin ulcer, gastrointestinal disturbances and blocks DNA polymerase in the case of hepatitis B virus during reproduction (Oluwafemi and Debiri, 2008; Joseph and Raj, 2010c). *Phyllanthus amarus* has been reported to include antioxidant, antiviral, antibacterial, hypoglycemic, cancer suppressive and

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anthelmintic effects. Neem is considered to be part of India's genetic bio-diversity. The most active, currently identified ingredient of Neem is azadirachtin. It finds applications in neem-based pesticide formulations that are safe, which leave behind residues polluting air, water and soil. Aloe vera is a perennial, drought-resisting, succulent plant belonging to the Asphodelaceae family. It has a vast traditional role in indigenious system of medicine like ayurveda, siddha, unani and homoeopathy. Bioactive compounds from aloe vera are very effective in various treatments, such as burns, allergic reactions, rheumatoid arthritis, rheumatic fever, acid indigestion, ulcers, diabetes etc. The active ingredients have been shown to have analgesic, anti-inflammatory, antioxidant and anticancer agent (Joseph and Raj, 2010a). The study was aimed to present an overview of traditional and pharmaceutical applications of bioactive compounds present in these medicinally important plants.

***Aloe vera*:**

Taxonomy:

Kingdom : Plantae
Order : Asparagales
Family : Asphodelaceae
Genus : *Aloe*
Species : *Aloevera*

Habitat : *Aloe vera* grows in arid climates and is widely distributed in Africa, India and other arid areas.

Chemical properties: It contains many vitamins, biochemical catalysts such as amylase and lipase, can aid digestion by breaking down fats and sugars. Carboxy-peptidase, inactivates bradykinins and produces an anti-inflammatory effect. Sodium, potassium, calcium, magnesium, manganese, copper, zinc, chromium and iron are the minerals in this plant. It also contains sugars, the most important are the long chain polysaccharides, comprising glucose and mannose, known as the gluco-mannans. The polysaccharides are absorbed complete and appear in the blood stream unchanged hence they act as immuno-modulators (Green, 1996; Kahlon *et al*., 1991; Sheets *et al*., 1991). The bitter aloes consist of free anthraquinones and their derivatives, barbaloin, aloe-emodin-9-anthrone, lsobarbaloin, Anthrone-C-glycosides and chromones and act as potent antimicrobial agents (Lorenzetti *et al*., 1964; Sims *et al*., 1971), The sterols include Campesterol, Sitosterol and Lupeol (Coats and Ahola, 1979). It also contains salicylic acid and amino acids.

Traditional properties: *Aloe vera* was well known not only to the Egyptians, but also the Roman, Greek, Arab and Indian cultures. In fact, many famous physicians of those times, including Dioscorides, Pliny the EIder and Galen considered to be the father of modern medicine, included aloe vera in their therapeutic armouries. The Egyptians referred to aloe as the plant of immortality and included it among the funerary gifts buried with the pharaohs. The healing benefits of aloe were recognized in the ancient Indian, Chinese, Greek and Roman civilizations. It is traditionally used to heal wounds, relieve itching and swelling and is known for its anti-inflammatory and antibacterial properties. Ghritkumari is described as multi functional herb in Ayurveda as blood purifier, anti-inflammatory, diuretic, uterine tonic, spermatogenic, laxative and fever reliever. It is used in ayurvedic formulations for appetite-stimulant, purgative, emmenagogue and antheimintic, cough, colds, piles, debility, dyspnoea, asthma and jaundice. It is widely used in ayurvedic formulations for liver protection and general debility (Joseph and Raj, 2010a).

Pharmacological properties: It is used as antitumor, antioxidant (El-Shemy *et al*., 2010), Aloe vera gel had a dose-dependent anti-inflammatory effect (Langmead *et al*., 2004), hypoglycemic and hypolipidemic (Kim *et al*., 2009), Wound healing (Davis *et al*., 1989), antimutagenic (Stamic, 2007), hepatoprotective (Alqasoumi *et al*., 2008), immunomodulatory activity (Madan *et al*., 2008), gastroprotective (Yusuf *et al*., 2004) and antifungal activity (De Rodriguez *et al*., 2005).

***Cissus quadrangularis*:**

Taxonomy:

Kingdom : Plantae
Division : Magnoliophyta
Class : Magnoliopsida
Order : Vitales
Family : Vitaceae
Genus : *Cissus*
Species : *quadrangularis*

Habitat: *Cissus quadrangularis* is a herb, reaching a height of 1.5 m and has quadrangular-sectioned branches with internodes. *Cissus quadrangularis* grows natively in hot, dry regions of India, such as the *Deccan peninsula*.

Traditional properties: *Cissus quadrangularis* is used for obesity, diabetes, a cluster of heart disease risk factors called metabolic syndrome and high cholesterol. It has also been used for bone fractures, weak bones (osteoporosis), scurvy, cancer, upset stomach, hemorrhoids, peptic ulcer disease. *Cissus quadrangularis* is also used in bodybuilding supplements as an alternative to anabolic steroids. It has been prescribed in Ayurveda as an alterative, anthelmintic, dyspeptic, digestive, tonic, analgesic in eye and ear diseases and in

the treatment of irregular menstruation and asthma. All parts of the plant are used for medicine (Joseph and Raj, 2011).

Phytochemical properties: Cissus quadrangularis contains alkaloids, resveratrol, piceatannol, pallidol, parthenocissin, quadrangularins, ascorbic acid, carotene, phytosterol substances, calcium, flavinoids, vitamins, enzymes, nicotinic acid, tyrosin and triterpenoids (Joseph and Raj, 2011).

Pharmacological properties: The whole water extract, methanol extract and ethanol extract of Cissus quadrangularis posses antioxidant (Jainu and Devi, 2005a), antibacterial (Murthy *et al*., 2003), anti-osteoporosis (Shirwaikar *et al*., 2003), anti-tumor (Opoku *et al*., 2000), antiulcer (Jainu *et al*., 2010), analgesic (Swamy *et al*., 2006; Jainu and Devi, 2005b), anti-obesity (Oben *et al*., 2006), bone fracture healing (Prasad and Udupa, 1963; Udupa and Prasad, 1964) and antipyretic activities (Vijay and Vijayvergia, 2010).

***Ficus religiosa*:**

Taxonomy:

Kingdom : Plantae
Division : Magnoliophyta
Class : Magnolipsida
Order : Urticales
Family : Moraceae
Genus : *Ficus*
Species : *religiosa*

Habitat: *Ficus religiosa* are ever green trees up to 30 m. Bark of trunks and older branches brown, smooth, Branchlets glabrous. Leaves: ovate, to 5 cm; petiole slender. Leaf blade broadly ovate to ovate-orbiculate. Ficus plants are found throughout the world as moderate woody plants or trees.

Traditional properties: According to Unani system of medicine, root, bark is aphrodisiac and also good for lumbago. Roots are said to be good for gout. The roots are chewed to prevent gum disease. The fruit is laxative, promotes digestion, aphrodisiac and checks vomiting. Ripe fruits are alexipharmic (an antidote or defensive remedy against poison, venom or infection) are good for foul taste, thirst and heart disease. The powdered fruit is taken for asthma. Sushruta administered a decoction in urinary disorders and vaginal discharges. Milk cocked with the fruit, leaf bud, bark and the root added with sugar and honey was prescribed as an aphrodisiac. Powder of the dried bark was dusted over burns (Joseph and Raj, 2010b).

Phytochemical properties: *Ficus religiosa* contains tannin, saponin gluanol acetate, β-sitosterol, leucopelargonidin - 3 - O - α -L- rhamnopyranoside, lupeol, ceryl behenate, lupeol acetate, α-amyrin acetate, leucoanthocyanidin and leucoanthocyanin (Husain and Virmani, 1992).

Pharmacological properties: Fruit extracts exhibited antitumor activity (Mousa *et al*., 1994), aqueous extract of *F. religiosa* performs antioxidant and antidiabetic activity (Kirana *et al*., 2009), methanol extract has antihelmintic activity (Iqbal *et al*., 2001) and aqueous extract of *F. religiosa* showed high antimicrobial activity (Preethi *et al*., 2010) against selected pathogenic organisms.

***Phyllanthus amarus*:**

Taxonomy:

Kingdom : Plantae
Division : Angiospermae
Class : Dicotyledoneae
Order : Tubiflorae
Family : Euphorbiaceae
Genus : *Phyllanthus*
Species : *amarus*

Habitat: It is widely spread throughout the tropics and subtropics in sandy regions as a weed in cultivated and wastelands (Ross, 1999; Joseph and Raj, 2010c).

Traditional properties: The plant is bitter, astringent, cooling, diuretic, stomachic, febrifuge and antiseptic. It is useful in dropsy, jaundice, diarrhoea, dysentery, intermittent fevers, diseases of urino-genital system, scabies ulcers and wounds. The young shoots of the plant are administered in the form of an infusion for the treatment of chronic dysentery. In females it is used as a galactogogue, in leucorrhoea and mammary abscess. In skin conditions, especially scabby or crusty lesions, bruises, wounds, scabies, offensive ulcers and sores, oedematous swellings, tubercular ulcers and ringworm. The powdered leaves of *P. amarus* were given in form of capsules to the patients with chronic viral hepatitis B. Due to its antiseptic, coolant, febrifugal, stomachic, astringent and diuretic properties of this plant it is very much utilized in traditional medicine (Joseph and Raj, 2011).

Phytochemical properties: *Phyllanthus amarus* primarily contains lignans (Sharma *et al*., 1993; Somanabandhu *et al*., 1993), flavonaoids like quercertin, astralgin, quercertrin, isoquercitrin and rutin, Tannins (Houghton *et al*., 1996) and alkaloids like sobubbialine, epibubbialine; diarylbutane, nyrphyllin and a neolignan, phyllnirurin (Joseph and Raj, 2010c).

Pharmacological properties: *Phyllanthus amarus* have some anti activities like antioxidant (Lim and Murtijaya 2007), anti-Inflammatory (Kassuya *et al*., 2005), antinociceptive (Santos *et al*., 2000), anti hepatotoxic (Sane *et al*., 1995), antitumour (Rajeshkumar *et al*., 2002), anti viral (Lee *et al*., 1996; Ott *et al*., 1997), anti hyper glycemic (Sivaprakasam *et al*., 1995), hepatoprotective (Obianime and Uche, 2008) and immunostimulant activity (Taiwo *et al*., 2009).

***Azadirachta indica*:**

Taxonomy:

Kingdom: Plantae
Division: Magnoliophyta
Order: Sapindales
Family: Meliaceae
Genus: *Azadirachta*
Species: *indica*

Habitat: It is evergreen and grows throughout India.

Traditional properties: Neem is widely used in traditional system of medicine for centuries now. Each part of neem is used in medicines and thus commercially exploitable. It is also considered to be a natural source for a medicines and industrial products. Neem bark is cool, astringent, bitter, acrid and refrigerant. It is useful in cough, fever, loss of appetite, worm infestation. It heals wounds and vitiated conditions of kapha, excessive thirst, vomiting, and diabetes. Neem leaves are beneficial for insect poisons and eye disorders. Neem treats Vatik disorder. It is anti-leprotic. Neem fruits are purgative, bitter, anti-hemorrhoids and anthelmintic.

Phytochemical properties: There are many active compounds found in neem tree. The most common ones are azadirachtin, nimbin, nimbidin, nimbidol, sodium nimbinate, quercetin. Neem seed oil contains the major concentrations of these active compounds along with many fatty acids like oleic acid, stearic acid, palmitic acid, linoleic acid and so on. Lesser amounts of these active compounds are also found in Neem leaves and bark (Veitch *et al*., 2007; Nathan *et al*., 2005a, b).

Pharmacological properties: The bark, seeds, leaves, fruit, extracts and oils of the Neem tree contain pharmacological constituents which offer some impressive therapeutic qualities, like antimicrobial (Helmy *et al*., 2007), anti-pyretic and anti-inflammatory (Biswas *et al*., 2002), anti-tumour (Bose *et al*., 2007), anti-helmintic activities (Sharma *et al*., 2009).

CONCLUSION

Medicinal plants are used in India for the treatment of various diseases. The plants are having bitter, astringent, cooling, diuretic, stomachic, febrifuge and antiseptic properties. They are useful in dropsy, jaundice, diarrhoea, dysentery, intermittent fevers, diseases of urino-genital system, scabies, ulcers, tumours, worm infections and wounds. According to Unani system of medicine, some plant leaves are astringent to bowels and good in case of bronchitis whereas fruits are useful in treatment of dry cough, loss of voice, diseases of kidney and spleen. Bark are useful in Asthma and piles. Methanol extract contained relatively higher levels of total phenolics than the other extract. Antioxidants from figs can protect lipoproteins in plasma from oxidation and produce a significant increase in plasma antioxidant capacity. The antioxidant potential of the extracts can be assessed by employing different in vitro assays. The present study shows the various properties of bioactive compounds present in some medicinal plants. Further studies should be conducted to isolate and characterize the active components present in these medicinal plants.

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