

# Aromatic Medicinal Plants -Utilization and Effects

Sharwan Kumar Srivastava

Associate Professor, Department of Botany, Shri Lal Bahadur Shastri Degree College, Gonda, (U.P.), India

**ABSTRACT:** Plants with medicinal or aromatic properties that are used in pharmacy and/or perfumery are usually defined as medicinal and aromatic plants; however, medicinal, aromatic and cosmetic plants would be a better term as many medicinal and aromatic plants are also used in cosmetics. Aromatic plants are those that contain aromatic compounds – basically essential oils that are volatile at room temperature. These essential oils are odorous, volatile, hydrophobic and highly concentrated compounds. They can be obtained from flowers, buds, seeds, leaves, twigs, bark, wood, fruits and roots. Essential oils are complex mixtures of secondary metabolites comprised low-boiling-point phenylpropenes and terpenes. These oils usually consist of a about tens-to-hundreds of low molecular weight terpenoids. Even unidentified trace constituents may be held responsible for altering the odour, flavour and the bioactivity of the oil to a considerable degree. Essential oils have characteristic flavor and fragrance properties, possess biological activities and are widely applied in aromatherapy and healthcare in addition to several industries such as cosmetics, flavoring and fragrance, spices, pesticides and repellents, as well as herbal beverages. They have several medicinal properties.

**KEYWORDS:** aromatic, medicinal, plants, metabolites, oils, cosmetics, family, herbal, diseases

## I. INTRODUCTION

Various plant families, particularly *Lamiaceae*, *Apiaceae* and *Zinziberaceae* have been investigated in depth for their medicinal value due to their significant antioxidant properties. The antioxidant activities of aromatic plants is influenced by various factors such as growing conditions, methods of processing/extraction and importantly constituents of the antioxidants; the methods involved in determination of antioxidant capacity as well as extraction therefore play a crucial role. The plant *Ageratum* belongs to the family Asteraceae, which consists of about 30 species. The name is derived from the Greek word 'ageras' and konyz, referring to long life and similarity with *Inula helenium*. It is an aromatic herb, erect, annual and growing up to 1 m in height, commonly found in Africa, Asia, America and Australia. Few species of *Ageratum* have been pharmacologically evaluated. The weed is best known for its healing activity and has been used for treating burn, wound, skin diseases and various infections among others, since ancient times. It is rich in polyoxygenated flavonoids. The triterpenes are friedelin, and the major sterols are sterols- $\beta$ -sitosterol and stigmasterol. Lycopsamine and echinatine are two isomeric pyrrolizidine alkaloids isolated from *A. conyzoides*. The oil content varies from 0.11–0.58% for leaves and from 0.03–0.18% for the roots. The major components of the essential oil are 7-methoxy-2,2-dimethylchromene (prescocene I), 6,7-dimethoxy derivative, ageratochromene (prescocene II) and ageratochromene dimmer.[1,2]

*Allium cepa*, belonging to the family Liliaceae that occurs worldwide, is a bulbous plant. Among the many phyto-active constituents documented, the essential oil of *A. cepa* contains compounds such as 3-1,8-cineole, L-linalool and camphordare and has been thoroughly investigated. Besides this, the onion bulb contains Kaempferol,  $\beta$ -sitosterol, ferulic acid, myricic acid and prostaglandins. Flavonoids and tannins are also present in *A. cepa*. Quercetin, quercetin 4-glucoside, taxifolin, taxifolin 7-glucoside and phenylalanine have been isolated from the bulb. The major sulfur compounds are dimethyl trisulfide, propenyl propyl disulfide, dipropyl disulfide, propenylmethyl disulfide and methyl propyl trisulfide dipropyl trisulfide. Onion contains active compounds such as allyl propyl disulfide along with other active sulfur-containing compounds [3,4]

*Capsicum annuum* L. belongs to the genus *Capsicum* of family Solanaceae. Capsicum contains many chemicals, including water, fixed (fatty) oils, steam-volatile oil, carotenoids, capsaicinoids, resin, protein, fibre and mineral elements. Red peppers contain 280  $\mu$ g/gm total carotenoids. Capsanthin accounts for 60% of the total carotenoids. They also contain 11%  $\beta$ -carotene and 20% capsorubin. Capsanthin is acylated with C12–18 saturated fatty acids. *Centella asiatica* belongs to family Umbellifere (Apiaceae). It is a herb found all over India and also in tropical and subtropical countries. It contains triterpenoids such as asiaticoside, centelloside, madecassoside, thankunside, isothankunic acid, centellose, asiatic, centellic and madecassic acids. The other constituents includes brahmoside, brahminoside and brahmic acid. The structure of genin and brahmic acid has been elucidated as 2,6-hydroxy, 23-hydroxy-methyl ursolic

acid. The fatty oil consists of glycerides of palmitic, stearic, lignoceric, oleic, linoleic and linolenic acids. An alkaloid, hydrocotylin, has been isolated from the dried plants. Asiaticoside, madecossoside and centelloside have been isolated from the plant parts. Flavanoids, 3-glucosylquercetin, 3-glucosylkaemferol and 7-glucosylkaemferol have been isolated from the leaves.

*Citrus aurantium* belongs to the family Rutaceae. The essential oil of *C. aurantium* L. var. amara possess antianxiety and motor relaxant effects in rats and mice. *Coleus aromaticus*, belonging to family Lamiaceae, is native to India and the Mediterranean and possesses various medicinal values. The report on the chemical constituents of the leaves of *C. aromaticus* indicated the presence of carvacrol, thymol, eugenol, chavicol, ethyl salicylate, chlorophyllin, flavonoids (cirsimaritin) and  $\beta$ -sitosterol- $\beta$ -D-glucoside. *Coriandrum sativum* L. belongs to the family Umbelliferae (Apiaceae), commonly called as coriander. Phytochemical constituents of *C. sativum* seeds showed the presence of polyphenols (rutin, caffeic acid derivatives, ferulic acid, galic acid and chlorogenic acid), flavonoids (quercetin and isoquercetin) and  $\beta$ -carotenoids. Seeds of coriander mainly contain essential oils; however, leaves contain caffeic acid and flavonoids apart from volatile oils.[5,6]

## II. DISCUSSION

*Crocus sativus* L. belongs to family Iridaceae and is known for its dried red stigma, popularly called as saffron and cultivated in Iran, India and Greece. The major components of saffron are cis- and trans-crocins, which are glucosyl esters of 8,8'-diapocarotene-8,8'-dioic acid (croctin), one of the few families of carotenoids that are freely soluble in water. It also contains safranal, which is a monoterpene aldehyde, and picrocrocin, which is a glycosidic precursor of safranal. Saffron is known to contain around 150 volatile and aromatic compounds including terpenes, terpene alcohol and their esters. Safranal is considered to be responsible for its fragrance. *Curcuma longa* L. belonging to family Zingiberaceae is a cultivated plant of the Asian tropical region. It is popularly called turmeric, and is used as a coloring and flavoring agent for food. It also has medicinal value, with aromatic, stimulant and carminative properties. Combination of slaked lime with turmeric acts as traditional cure against sprains and swellings due to injury. *Cymbopogon citratus* (family Poaceae), commonly called lemon grass, is a widely used herb in tropical countries such as southeast Asia and Africa. The essential oil of the plant is used in aromatherapy and as a flavoring ingredient in herbal beverages. The chemical composition of the essential oil of *C. citratus* consists of compounds such as hydrocarbon terpenes, alcohols, ketones, esters and aldehydes. The essential oil is mainly composed of citral, which is a mixture of two stereoisomeric monerpene aldehydes; the trans-isomer geranial and cis-isomer neral. It has been reported to contain flavonoids and phenolic compounds such as luteolin, quercetin, kampferol and apigenin. Glycosyl derivatives of the flavones apigenin and luteolin have been identified in infusions of the lemon grass leaves. *Elettaria cordamomum* is commonly called cardamom and belongs to the family Zingiberaceae. It has light green pods and has aromatic dried fruits usually used in food preparation as well as for health benefits. *Illicium verum*, commonly known as Star anise, belongs to the family Illiciaceae and is native to China and Vietnam. The essential oil has confectionary application as a flavoring agent and industrial application in the preparation of Tamiflu to act against influenza virus. Anisyl acetone and benzenecarboxylic acid were identified as the main phenolic components present in aqueous fraction of *I. verum*. *Lavandula angustifolia* belongs to the family Lamiaceae.[7,8]

The genus *Lavandula* comprises approximately 35 species that have significant application in aromatherapy. A total of 47 compounds representing 98.4–99.7% of the oils were identified. 1,5-dimethyl-1-vinyl-4-hexenylbutyrate was the main constituent of essential oil (43.73%), followed by 1,3,7-octatriene, 3,7-dimethyl- (25.10%), eucalyptol (7.32%) and camphor (3.79%). *Mangifera indica* belongs to the family Anacardiaceae and is commonly called mango or aam in Hindi. It is medicinally important in Ayurveda. It has strong antioxidant, anti lipid peroxidation, immunomodulation, cardiotoxic, hypotensive, wound healing, antidegenerative and antidiabetic activities that are pharmacologically and medicinally important. *Mentha piperita*, commonly called peppermint, belongs to the family Labiatae and is a perennial herb that grows up to height of 30–90 cm. It is an aromatic, stimulant and carminative and employed for treating nausea, flatulence and vomiting. *Murraya koenigii* L. belongs to the family Rutaceae and is commonly known as Meethi neem or curry-leaf in Hindi, and is a native of south Asia. It is found almost everywhere in the Indian subcontinent and has an aromatic nature, growing up to 6 m in height. It is especially cultivated for its aromatic leaves .[9,10]

## III. IMPLICATIONS

*Myristica fragrance* belonging to family Myristicaceae is commonly called nutmeg and known for its antifungal, hepatoprotective and antioxidant properties. The chemical constituents include myristicin, lignan and eugenol. The essential oil of nutmeg contains mainly sabinene (15–50%),  $\alpha$ -pinene (10–22%) and  $\beta$ -pinene (7–18%), with myrcene

(0.7–3%), 1,8-cineole (1.5–3.5%), myristicin (0.5–13.5%), limonene (2.7–4.1%), safrole (0.1–3.2%) and terpinen-4-ol (0–11%). *Nigella sativa* belongs to the family Ranunculaceae and is commonly called black seed. It is a widely used medicinal plant throughout the world. The seeds of *N. sativa* and their oil have been widely used for centuries in the treatment of various ailments considered to be an important drug in the Indian traditional system of medicine such as Unani and Ayurveda. *Ocimum sanctum* L. belongs to family Labiateae, commonly known as holy basil, tulsi or tulasi. It is an aromatic, small annual herb, growing up to 18 inches and thought to have originated in north-central India. It now grows native throughout the eastern world tropics. *Origanum vulgare* belongs to the family Labiateae, and is generally found as a wild plant in Europe and Iran. It is used for treating rheumatism, muscle and joint pain, sore and swellings as an external applicant. Oregano oil is employed to counter toothache. *Piper longum* belongs to family Piperaceae, and is commonly known as Pipali in India. It is traditionally used as a medicine in Asia and the Pacific Islands for treating diseases such as gonorrhoea, menstrual pain, tuberculosis, arthritis and is also used for analgesic, diuretic and muscle relaxant purposes. *Zingiber officinale* is commonly called ginger and belongs to the family Zingiberaceae. It is found in Asia and America. It is medicinal and aromatic and generally employed for culinary practices and remedial uses. The essential oil possesses antibacterial, antifungal and antiviral activities.[11,12]

#### IV. RESULTS

The enhanced adverse effects of synthetic drugs and antibiotics has paved way toward utilization of natural products of plant origin in recent years in developed as well as developing countries. Use of aromatic plants and their products has gained momentum globally during recent times with wide applications in the herbal drug industry. Natural resources such as wastelands and forests could serve as reservoir for the same. However, with the increasing burden on natural resources, alternatively, introduction of crops through cropping systems could help out to great extent with a check on activity including chemical composition. Also, the scientific community must be encouraged to focus studies to screen more and more aromatic compounds of plant origin for their different bioactivities.

In traditional, herbal medicine, and aromatherapy, use of essential oils and their aroma compounds have been known since long, for the management of various human diseases. The essential oil is a mixture of highly complex, naturally occurring volatile aroma compounds synthesized by medicinal and aromatic plants as secondary metabolites. Essential oils widely used in pharmaceutical, cosmetic, sanitary, food industry and agriculture for their antibacterial, antiviral, antifungal, antiparasitic, insecticidal, anticancer, neuroprotective, psychophysiological, and anti-aging activities. Moreover, volatile aroma compounds comprise a chemically diverse class of low molecular weight organic compounds with significant vapor pressure. However, aroma compounds produced by plants, mainly attract pollinators, seed dispersers and provide defense against pests or pathogens. However, in humans, about 300 active olfactory receptor genes are involved to detect thousands of different aroma compounds and modulates expression of different metabolic genes regulating human psychophysiological activity, brain function, pharmacological signaling, and therapeutic potential.[13]

#### V. CONCLUSIONS

Many plant species are used as a source of treatment of various disorders, so these plants are also known as Medicinal and Aromatic plants. Plants have been used since ancient times of all civilizations and cultures, mostly as home remedies for treating seasonal flu viruses, cough, cold, stomachache, sore throat and headaches. Besides, the aromatic plants are still used in making perfumes, because of their pleasant smelling flowers, in cooking because of their strong flavors, and liquor industries. At the present there are used many herbal treatments that are becoming very popular in the society because of their efficiency and less side effects. Of course the medicinal and aromatic plants are less expensive, more available and have potential to control disorders. The use of these plants is also a potential material for maintaining good health and conditions, not only for a remedy for specific diseases.[14]

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