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Journal of Pharmaceutical and Biological Sciences

Journal homepage: https://www.jpbs.in/

Review Article

Pharmacological activities of essential oils from some flowers, plants and aromatic seeds – A review

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ARTICLE INFO

Article history:
Received 12-10-2023
Accepted 24-11-2023
Available online 01-02-2024

Keywords:
Essential oils
Biological activity
Chrysanthemum
Marjoram
Coriander and Clove

ABSTRACT

Volatile oils or essential oils are the secondary plant metabolites producing from different plant parts like flowers, leaves, fruits, seeds, stem, roots and their barks. These are chemically classified as terpenoids, which are hydrocarbons with a hydroxyl or carbonyl group. These are having different organic exercises and utilized as cure in Gastrointestinal issues, cold, hack, skin illnesses and so forth. These oils revealed for their pharmacological impacts like enemy of oxidant, hostile to bacterial, mitigating exercises and as Carminative. Ayurveda's founding country is India. There are numerous plants in India that can produce essential oils, which are frequently used in our daily lives. In this review, we want to talk about the biological activities of essential oils that come from flowers (like rose, jasmine, chrysanthemum, marigold), plant leaves (like marjoram, coriander, and mentha), and aromatic seeds (like fennel, caraway, cumin, and coriander), all of which are consumed on a daily basis and contribute to the cleanliness of our environment and health.

1. Introduction

1.1. Application of traditional knowledge in modern medicine

Application of our ancient traditional knowledge always plays an important role in modern medicine discovery and in health care sector. So the majority of our plant-based products are therapeutic. Flowers play a significant role in a variety of worship practices in Indian culture. Flowers are a representation of power, purity, and kindness. Flowers are the rich sources of plant essential oils, along with other phytochemicals such as flavonoids, anthocyanins, alkaloids, and phenolic acid with multiple bioactivities. They additionally utilized for clinical practices. The most natural treatment with no side effects is flowers. They can be utilized fresh, dried, or crushed to produce essential oils. Along with flowers, other aromatic plant like Mint, Marjoram and Coriander (leaves), aromatic seeds like Cumin, Caraway, Fennel and Coriander are rich in volatile oils and which are used in our daily life.

1.2. Essential oils–Biological activities

As the name suggests, essential oils are necessary for a variety of physiological functions, including communication with other plants (of the same species or different species) via semiochemicals or Siderophores, as well as allelochemicals agents (affecting the growth and development of other organisms), defense against fungal and other infection via antimicrobial agents, defense against herbivores and insecticides via volatile organic compounds, and pollination via attracting pollinating vectors.

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https://doi.org/10.18231/j.jpbs.2023.013

Essential oils are having physiologically active molecules in their composition, used as remedies in the treatment of different diseases and disorders. The reported pharmacological activities like antibacterial activity used in the treatment of diphtheria, Epiglottitis, Pharyngitis (or) tonsilitis and Bronchitis (Anise, Eucalyptus, Peppermint, Tea tree, Thyme), tuberculosis (TB) (Garlic, Orange, Eucalyptus, Lavender, Niaouli, Peppermint, Clove), Dentistry (Clove). As anti fungal agents used in the treatment of Ear Infection (Tagetes) and Urinary Tract Infection (Cedar wood). The viral infections like Influenza, Pneumonia (Cypress and Niaouli), Sinusitis (Peppermint, rosemary, eucalyptus, and thyme oils), Flu (Lemon, lavender tea tree),[1] Mumps (Coriander, lavender, niaouli, and tea tree), Chicken pox (lavender and tea tree oils), Laryngitis (Cajuput and Lemon), are also treated with essential oil. Anti protozoal activity (clove and rosemary) also reported.[2]

Allergies like Red eyes, sneezing, a runny nose, itchiness, and even hives, eczema, and asthma attacks are treated with Lemon, lavender, marjoram and peppermint oils. Anticancer Agents (Eucalyptus, Peppermint, Jasmine, Lemon, Marjoram), Anti diabetic Agents (cyminum), Anti mutagenic Properties (lavender oil), Photo toxicity (oils collected by cold pressed method -Bitter orange, Grapefruit, Lemon, Lime and Cumin), The CNS disorders like Insomnia (neroli and spikenard), Migraine (Lemon), Depression (Jasmine), anxiety, Alzheimer's disease, sedative and auto immune disorder Arthritis (cypress, fennel, and juniper oils) are also cure with essential oil. Anti osteoporotic activity was exhibited by Pine oil, Thyme, Rosemary oils. Edema (Fennel), Acid refluxes (Fennel and peppermint oils), Attention deficit disorder (ADD) and attention deficit hyperactivity disorder (ADHD) (lavender and roman chamomile oils), Anti ageing agent (Sandal wood, Jasmine-Geranium oils) are the other disorders treated with essential oils and these are the main medicaments of Aroma therapy.[2]

The other pharmacological disorders exhibited by essential oils are antioxidant agents (cinnamon, thyme, clove, lavender and peppermint oils),[2] Anti-inflammatory activity (Eucalyptus, Thyme), Digestive activity, inhibiting resorption, Hepato protective activity.[3] antispasmodic, antiseptic, expectorant and stimulating Compounds, break down gallstones,[4] anti infective, relaxant, antiseptic, hypotensive, regulator, astringent, anti haemorrhagic, diuretic, anti phlogistic,[5] against ischemic heart disease and stroke, COPD, antiparasitic,[6] Obesity, Hypertension, Dyslipidemia, Enhance Breast Milk Production, Natural Antibiotics.[7]

Several plant species belonging to the Apiaceae, Alliaceae, Asteraceae, Lamiaceae, Myrtaceae, Poaceae, and Rutaceae family produce EOs with medicinal values. In this review we want give information about the biological activities of essential oils from leaves, aromatic seeds and flowers, which are used in kitchen and in traditional pooja or culture.

2. Review on Bilogical Activities of Essential Oils

2.1. Biological activities of essential oils from flowers

2.1.1. Chrysanthemum

Mum is a genus of flowering plant, having different species. Among them *Chrysanthemum morifolium* Ramat (C.M) is one of the species with a high ornamental value and the most popular traditional flower belonging to family Asteraceae (or) Compositae and available in different colors like White, Yellow, Red, Maroon, Purple, and Pink etc. People use the flowers of C.M as medicine, as it has broad bioactivities.

2.1.2. Chrysanthemum morifolium

flowers having pharmacological activities like anti oxidant, antibacterial, anti -viral (anti-HIV), antifungal, anti-inflammatory, Antipyretic, Antiseptic carminative, Aperient, depurative, diaphoretic**,** febrifuge, refrigerant, sedative, dizziness, anticancer, anti mutagenic, hepatoprotective activity, antiaging, nematicidal activity, neuroprotection and anti allergic activity.

The essential oil extracted from fresh flowers having antiviral, antibacterial, Antifungal, anti spirochetal, antimicrobial, anti-mycobacterial, anti-trypanosomal, antioxidant, anti hypertension, anti-inflammatory and immuno modulatory activities.[8–10] Also used in the treatment of pneumonia, colitis, stomatitis, cancer, fever and sore, vertigo and pertussis. And applicable in headache relief and prophylactic for photo aging, atopic dermatitis, cadmium induced toxicity and Cisplatin induced nephrotoxicity.[11]

2.1.3. Tagetus erecta

Plant is vulnerary, astringent, styptic, and Aromatic with diaphoretic, diuretic and having stimulant properties. Flowers are CNS-Stimulant and having antidepressant, antiseptic, Antimicrobial, Hepatoprotective, Anti-bacterial, Anti-oxidant, Anti-epileptic, Anti hyperlipedemic, Anti- diabetic, Cytotoxic, Anti nociceptive activity and Emmenagoggue effect. And also posses wound healing activity, Fungi toxic, Anti mutagenic and Analgesic activity. Despite these, *T. erecta* flowers are used in folk medicine to treat CVS and renal disorders.[12] Essential Oil from fresh flowers is having Antimicrobial Activity like anti bacteria and fungicidal, Hepatoprotective and antioxidant activity.[13–17]

Table 1: Chemical composition of essential oils offlowers, leaves and aromatic seeds.

S.No	Plant name	Plant part	Product	Chemical constituents
1.	*Chrysanthemum morifolium Linn (yellow, White, Maroon & Purple)*	Flowers	Essential oil	Trans-Chrysanthenyl acetate, cis-Chrysanthenyl acetate, Camphor, α-Pinene oxide, trans-Chrysanthenyl isovalerate and Myrcene, α-Curcumene, α-Farnesene, β-Bisabolene, Bisabolol, Capric acid, Linoleic acid, n-Heptadecane, Nonadecane and n-Pentacosane.[18]
		leaves	Essential oil	Limonene, γ-Terpinene, α-Pinene and α-Terpenyl acetate.[9,18,19]
		Stems	Essential oil	Limonene, 4-Terpenyl acetate and γ-Terpinene.
		roots	Essential oil	A-Calacorene, α-cedrene, β-bourbobene , Elemol and 2-Hexenal.[9,18,19]
2.	*Tagetes erecta (Yellow and Orange)*	Flowers (Capitula)	Essential oil	Limonene, Ocimenes, Linalyl acetate, Linalol, Tagetone, n-nonyl aldehyde, Aromadendrene, Phenylethyl alcohol, Salicylaldehyde, Phenyl acetaldehyde, 2-hexen-1-al, Eudesmol, Myrcene, p-Cymene, d-Carvone, Eugenol, Terpinolene, (Z)-Myroxide, Piperitone, Piperitenone, Piperitenone oxide, and β-Caryophyllene and terpinen-4-ol.[20]
		LEAVE	Essential oil	Limonene, α-pinene, β-pinene, dipentene, β-phellandrene, linalol, geraniol, menthol, tagetone, nonanal, linalyl acetate, camphene, sabinene, myrcene, (Z)-β-ocimene, (E)-β-ocimene, γ-terpinene, terpinolene, p-mentha-1,3,8-triene, terpinen-4-ol, p-cymen-9-ol, piperitone, thymol, indole, carvacrol, piperitenone, geranyl acetate, β-elemene, cyperene, β-caryophyllene, (E)-β-farnesene, γ-muurolene, γ-elemene, and nerolidol.[20]
3.	*Tagetes patula*	Flowers (Capitula)	Essential oil	Limonene, (Z)-β-ocimene, α-terpinolene , (E)-tagetone , (Z)-tagetone, piperitenone, piperitone, and β-caryophyllene.[20]
		Leaves		Limonene, (Z,Z)-alloocimene, (Z)-β-ocimene epoxide, (E)-tagetone, (Z)-tagetenone, piperitone, piperitenone, and α-terpinolene.[20]
4	*Jasminum officinalis*	Flowers	Essential oil	Benzyl alcohol, Linalool, Benzyl acetate, indole, Eugenol, Jasmone, α- Farnesene, cis-3-Hexenyl Benzoate, Methyl jasmonate, Benzyl Benzoate, Methyl palmitate, Isophytol, Farnesyl acetate, Ethyl linolenate, cis-phytol, trans-Phytol, Squalene.[21]

Continued on next page

Table 1 continued

5	*Jasminum multiflorum*	Flowers	Essential oil	Indole, cis-jasmone, benzyl alcohol, linalool and benzyl acetate, Eugenol, benzyl benzoate, farnesol, methyl palmitate and methyl salicylate.[22]
6.	*Nyctanthus arbor-tristis*	Flowers	Essential oil	α –Pinine, β-Cymene, 1-hexanol, methyl heptanone, phenyl acetaldehyde, 1-decenol and Anisaldehyde.[23–25]
		Leaves	Essential oil	Acorbic acid, oleanolic acid, nyctanthic acid, benzoic acid.[23–25]
		seed	Essential oil	Glucosides of linoleic, oleic, lignoceric, stearic, palmitic acid, 3,4-secotriterpene acid and β-sitosterozl.[23–25]
7	*Rosa indica (royal William -red and Rosa Korgane orange)*	Flowers Petals	Essential oil	(-)-cis-rose oxide (floral rose fragrance), geraniol, nerol, citronellol, phenyl ethanol and farnesol. Methyl santonilate, butanoic acid, 2-methyl-5-oxo-1-cyclopentene-1-yl ester, santolina epoxide, Artemiseole, 9-farnesene, octadecanoic acid ethyl ester, palmitic acid (2-phenyl-1,3-dioxolan-4-yl methyl ester), isosteviol, caryophylline oxide, pentyl phenyl acetate, and di hydro myrcene[26–28]
		Hip-Seed	Essential oil	Linoleic, oleic, palmitic and stearic acids.[26–28]
8	*Eugenia caryophyllus (Clove)*	Flower bud	Essential oil	Eugenol, β-Caryophyllene, α-Caryophyllene, Eugenyl acetate.[29–31]
9	*Mentha spicata (Mint oil)*	leaves	Essential oil	Linalool, limonene, and dihydrocarveol, 1,8-cineole, cisdihydrocarvone,dihydrocarveol, trans-carveol, cis-carveol, pulegone, carvone, iso-dihydrocarveol acetate, β-bourbonene, ε-caryophyllene.[32,33]
10	*Origanum majorana*	leaves	Essential oil	β-pinene, camphene, sabinene, α- and β- phellandrene, ρ-cymene, limonene, β-ocimene, γ-terpinene, terpinolene, α-terpinene, carvone, and citronellol. Terpinene 4-ol and cis-sabinene hydrate, Linalool, linalyl acetate, α-terpineol, trans- and cis-carveol, thymol, anethole, geraniol, and carvacrol.[34–36]
11.	*Coriandrum sativum*	leaf	Essential oil	Linalool, Geraniol, terpinen-4-ol,α-terpineol, Limonene, g-terpinene, p-cymene, α-pinene, camphene, myrcene, Camphor, Geranyl acetate, linalyl acetate, (E)-2-Decenal - 20–35, 2-decenoic acid.[37,38]
		Seeds	Essential oil	Linalool, geraniol, terpinen-4-ol, α-terpineo, Limonene, g-terpinene, p-cymene, α-pinene, camphene, myrcene, Camphor, Geranyl acetate, linalyl acetate.[37,38]
		stem	Essential oil	Phytol, 15-methyl tri cyclo [6.5.2(13,14),0(7,15)]-Pentadeca -1, 3,5,7,9,11,13-heptene), dodecanal and 1-dodecanol.[37,38]

Continued on next page

Table 1 continued

12	*Carum carvi (Caraway)*	Seeds	Essential oil	α-Pinene, Camphene, β-Pinene, β-Myrcene, Limonene, γ-Terpinene, β-Ocimene, p-Cymene, Terpinolene limonene oxide, Camphor, Linalool, Linalyl acetate, Terpinene-4-ol 0, β- Caryophyllene, Dihydrocarvone, α-Terpineol, Germacrene-D, Carvone, β- Selinene, α- Farnesene, Citronellol, δ-Cadinene, γ-Cadinene, Cuminaldhyde, Nero,l Trans-carveol, Nonadecane, Spathulenol, Eugenol, Thymol and Carvacrol.[39–43]
13	*Cuminum cymimum (cumin)*	Seeds	Essential oil	β-pinene, p-cymene, γ-terpinene, cuminaldehyde.[44]
14	*Foeniculum vulgare (Fennel)*	Seeds	Essential oil	Trans-Anethole, Fenchone, Estragole (methyl chavicol), and α-phellandrene.[45]

2.1.4. Tagetus patula

The plant part like dried leaves or florets in the form of infusions was used to treat fungal infection and having Antimicrobial, Antibacterial, Antifungal, Insecticidal, Antioxidant, Larvicidal, Anti-hyperglycemic and Anti nociceptive activities. It has been used in folk medicine to treat colic's, diarrhoea, vomit, fever, skin diseases and hepatic disorders.[46] Essential oil from flowers used as antibiotic and having antibacterial, antifungal, ant parasitic, antiseptic, anti-spasmodic, disinfectant and sedative activity.[47,48]

2.1.5. Jasminum officinalis Absolute

Also known as *Jasminum grandifolium Absolute: J. officinale* (*Oleaceae* family) is an attractive vine. It contains sweet smelling flowers that yield fragrant oil. Malati is good for healing chronic ulcers, skin diseases and poisonous affections. It is bitter, astringent, anrhelmintic, Diuretic and Emmenagoggue. Root is used in the treatment of Ringworm. Leaves: chewed as a treatment of ulceration or eruption in mouth, juice applied to corns. Oil prepared with juice of leaves used in otorrhoea (ear drainage). Alcoholic extract of aerial parts have anti hypertensive and anticancer activity and Shurb used in burns.

Jasmine oil has wide range applications in traditional medicine including gastric spasms and cardiovascular diseases, inflammation, hypertension, diarrhea, oxidative complaints, microbial infections, respiratory disorders, cardiovascular (hypertension) disorders and cancer. The pharmacological (therapeutic) properties of oil are anti oxidant,[49] CNS depressant, sedative, mild anesthetic and astringent,[50] used in treatment of gastric spasms and cardiovascular diseases, Tooth pain, fixing loose teeth, ulcerative stomatitis, leprosy, skin diseases, otorrhoea, ear pain, strangury, dysmenorrhea, ulcers, wounds, and corns. In Aromatherapy believe that jasmine oil can be useful as an antidepressant, as a calming agent to soothe stress, pain and anxiety, and as an aphrodisiac. In addition, jasmine oil if applied externally rejuvenates, softens and smoothens the skin and internally cures cancer, heart disease, and a variety of other ailments.[51]

2.1.6. Jasminum multiflorum

Flowers are used as beverage as these are rich source of poly phenolic compounds , applied as a lactifuge, emetic & Cardiac tonics, relieving stress, heat stroke or sunstroke, anxiety and to treat cuts and scrapes. Essential oil used as an aphrodisiac, a sedative, an antiseptic, antidepressant, antispasmodic, to increase immunity, to treat conjunctivitis and analgesic & head ache and having pharmacological activities like Anti hypertensive activity, Vasodilation effect, antidepressant, anti-inflammatory and analgesic and Antioxidant activity. The oil has the potency to treat fever, cough, indolent ulcer, abdominal distention, diarrhoea, lowering the blood glucose level, regulating menstrual flow, to clean kidney waste, inflamed and blood shot eyes, various skin diseases and leprosy.[52]

2.1.7. Nycanthus arbor-tristis Linn

Small tree having brilliant, highly fragrant flowers which bloom at night and fall off before sunrise, giving ground underneath a pleasing blend of white and red. The plant parts are containing potential phyto chemicals showing tremendous pharmacological activities. The flower oil has reported for its pharmacological activities like anticancer activity, CNS depressant activity, Anti diabetic activity, Antiparasitic activity,[53] Diuretic, Anti-bilious, Anti oxidant, Anti-inflammatory, Sedative and Anti filarial, antimicrobial, Anti plasmodial activity, Dyspepsia and Ophthalmic.[54] Anti-Anemic activity,[23] Immunostimulant effects,[24] Anti-helmintic Activity, Anti malarial, Anti-angiogenic activity.[55]

2.1.8. Rosa chenensis (Red and rosa tropicana (Orange)

Rose petals are mildly sedative, mild astringent, aparient, carminative, refregerent and antiparasitic. They are also mild laxative, a good supportive tonic for the heart, and useful for lowering cholesterol. The antiseptic nature of rose petals make them a wonderful treatment for wounds, bruises, rashes and incisions, their anti-inflammatory properties make them used in treatment for sore throat and ulcers. They can stimulate the liver and increase appetite and circulation. The extract of the rose petals is used as eye drops or eye wash in burning sensation of the eyes. The essential Oil having biological activities like anti oxidant, Antiviral activity, anti- inflammatory (ulcerative colitis), Antineoplastic and anti-cancer activities (used in the treatment of bladder cancer, prostate cancer and lung cancer).[56] The oil has also reported for its Anticonvulsant, anti microbial, Anti-cane, Relaxant(*respiratory system*), hypnotic effect,[57] Bronchodilatory effect,[58] anti-HIV, anti tussive, antidiabetic, analgesic,[59] Antifungal Activity,[60] Antispasmodic,[61] Improved sexual dysfunction,[62] anti-depressant effect.[63]

2.1.9. Eugenia caryophyllus (Clove)

Syzygium aromaticum is the synonym. The plant is famous for its aromatic flower buds which are commonly called as 'Clove'. The clove buds consisting of number of bio active molecules and producing therapeutic effects. The oil isolated from these flowers buds having pharmacological activities like Analgesic, Anesthetic, Anti cancer, anti coagulant, antidiarrheal, Anti inflammatory, anti microbial, antinociceptive, anti oxidant, antipyretic, Hemolytic, anti viral, Hepato protective, anti stress, antifungal, antibacterial, antiseptic.[29]

Clove oil when inhales helps in the removal of mucous discharge as well as relieves cold, cough, asthmatic issues,

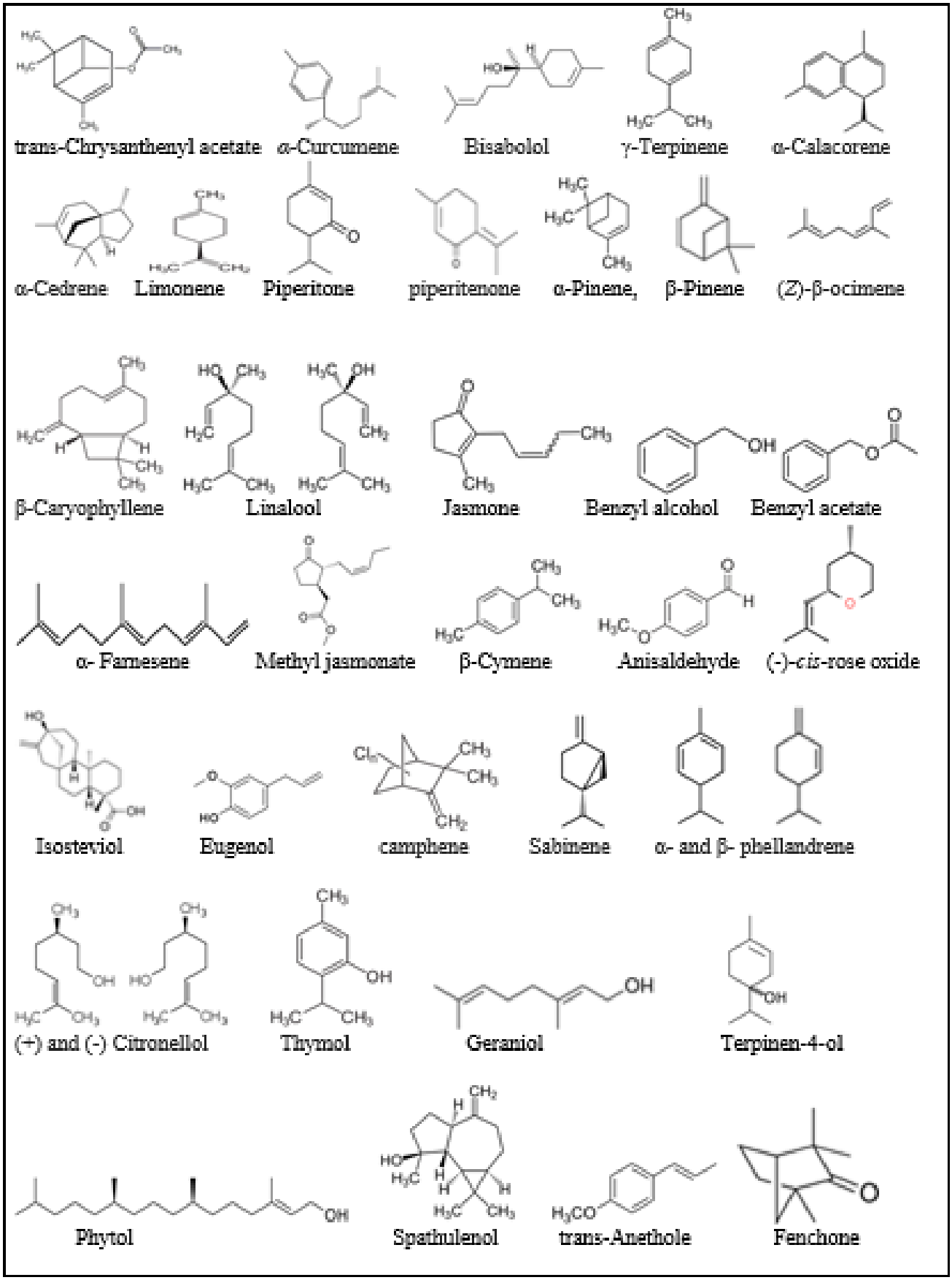

Figure 1: Structures of chief constituents of Essential oils.

stimulates blood flow, benefit diabetic patients in lowering blood glucose level, relieves muscular pains. Sniffing its aroma soothes headaches, dizziness and irritability, antiulcero genic, antithrombotic activity.[64]

2.2. Bi ological activities of Essential oils from leaves

2.2.1. Mentha spicata (Mint oil)

Mentha leaves commonly known as mint leaves, rich with essential oils. Because of this, it is frequently using as food ingredient. Not only that the oil also exhibits biological activities like antimicrobial, antiparasitic, antidiabetic, anti-inflammatory, anticancer effects, antibacterial, antifungal, Antioxidant, Larvicidal activity, anti-nociceptive activity, Hepatoprotective activity, Antipyretic activity, Psychopharmacological activities like Improvement of learning and memory effects, Anti-genotoxic potential, Anti androgenic activity.[32,33,65]

2.2.2. Origanum majorana oil

It is commonly known as Marjoram, is an aromatic herb producing essential oil from leaves having pleasant odour and using as good flavouring agent. The oil has reported for potent pharmacological activities like Antioxidant, Antimicrobial, Anti-inflammatory, Anti parasitic, Anti mutagenic, Anticancer, Antiproliferative, Antiplatelet, Anticholinesterase Inhibitory activity and also exhibits Antiulcerogenic, Hepatoprotective, analgesic and Nephrotoxicity protective effect.[34–36]

2.2.3. Coriandrum sativum (Leave oil)

Commonly known as Cilantro, Small culinary plant with hallow stems and aromatic leaves used to add good flavour to food and as medicine to treat gastro intestinal problems. Both the leave and seeds are having physiological effects. The oil from leaves having pharmacological activities like Anxiolytic effect, Anticonvulsant, Neuroprotective effect, Antibacterial, antifungal, Antihelmintic, Antioxidant effect, hypolipidemic, anti-inflammatory, Antidiabetic effect, antiproliferative and carminative activities.[37,66]

2.3. Biological activities of Essential oils from Seeds

2.3.1. Carum carvi

The dried fruits of plant called as Caraway and Black Zeera, a distinctive spice use in both cookery and herbal medicine. The essential oil from the fruits showing potent Antioxidant, Antimicrobial, Antidiabetic, Diuretic activity, Gastro intestinal activity, CNS activity, Immuno modulatory activity,[39] Hepatoprotective Activity , Antiulcerenogic Activity, Analgesic Activity, Reno protective Activity, Endocrine Activity, Anti-cholinesterase Activity, Antihyperlipidemic Activity,[40] Used in the treatment of Appetite- suppressing activity, Oral mucositis, Irritable Bowel Syndrome, Hypothyroidism, Blood pressure lowering, vasodilator and cardiac-modulatory, Antitubercular activity, Anti-cancer, Anti-colitis activity, Cardiovascular disease, Hypolipidemic effect,[41] Anti-amyloidogenic, Antibacterial, anticarcinogenic action, Anticonvulsant, Antifertility activity, Antifungal, Antimanic, Antiobesity, Anti-plasmodial, Anti-stress activity, Bio-enhancer, Bronchodilator activity, CNS Activity, Ant osteoporotic activity, Muscle relaxant,[42] Anti inflammatory,[43] sedative, spasmolytic, and anesthetic activities.[67]

2.3.2. Coriandrum sativum (Coriander Seed oil)

It is traditionally used in the treatment of diabetes and has biological activities like antioxidant activity, Hypolipidemic activity, Anthelmintic activity, Cytotoxicity activity,[68] Antidepressant, Sedative-hypnotic, Alzheimer's disease, orofacial dyskinesia, Antibacterial, antifungal, anthelmintic, , anti-inflammatory, Antidiabetic effect, hepatoprotective effect,[37] antihypertensive, Anxiolytic, diuretic, cognition improvement, myorelaxant8, anti cancerous, anti mutagenic,[38] antiproliferative, and carminative activities,[66] antiulcer, apoptotic, Anti leishmanial, antiviral, anti-ageing, anti coccidial, antinociceptive, Acesodyne, antibiosis,[69]. It protects against heart disease by decreasing lipid peroxide level and increasing anti oxidant enzymes level leads to decreasing the presence of cholesterol, LDL and TG and increase in HDL level.

2.3.3. Cuminum cymimum

It is a small aromatic herb; the dried seeds are called as Cumin - a unique spice used in ethnic cuisines because of its strong characteristic odour. It is also an anti diabetic remedy; it reduces blood sugar, glycosylated hemoglobin, plasma cholesterol, phospholipids, free fatty acids and triglycerides. The seed Oil used as medicine because of its Antioxidant Activity, Antimicrobial activity, Antidiabetic activity, Diuretic activity, gastrointestinal activity, CNS activity, Immuno modulatory activity,[39] Anti inflammatory, carminative, eupeptic, astringent, antibacterial, cough remedy and analgesic.[44,70,71]

2.3.4. Foeniculum vulgare

It is an aromatic and flavourful herb used in cooking and having medicinal importance. The plant is well known for its seeds and their oil. The oil extracted from the seeds having pharmacological effects like anticancer activity, Antifungal activity, Antioxidant activity, Antithrombotic activity, Anti hepatotoxic activity, Antidiabetic activity, Antimicrobial activity, Antibacterial activity, Oestrogenic activity, Bronchodilator effect, Anxiolytic activity.[72–74]

The chemical constituents of each essential oil which was mentioned in this review are mentioned in table 1 and the structures of chief constituents are presented in figure 1

respectively.

3. Conclusion

From literature survey, we got knowledge about biological importance of essential oils. These essential oils showing their activity on different biological systems like GIT in the form of Carminatives, anti ulcerating agents, On CNS by acting as Stimulants, Anti depressing agents, Anxiolytics, anti memory losing effects, On ANS in the form of Anticholinesterase, on CVS like Anti hypertensive, Antidiabetic activity, On respiratory system to treat conditions ranging from common cold to COPD, and also to treat Dermatitis, Inflammation etc. These also showing Broad spectrum effect on micro organism also and having Anti microbial, anti bacterial, Anti fungal, anti viral activity. Not only that shown potent anti caner activity. So, essential oils are the gift given by the nature to human community to maintain health and we want to continue research work on essential oils which were not reported till now and study on their interaction mechanism with environment in the form of semiochemicals.

4. Source of Funding

None.

5. Conflict of Interest

None.

6. Acknowledgement

I express my deep sense of gratitude to My Respected guide and research Supervisor Dr. Muthyala Murali Krishna Kumar sir for his support.

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Cite this article: Nandikatti VL, Nagasree KP, Krishna Kumar MM. Pharmacological activities of essential oils from some flowers, plants and aromatic seeds – A review. *J Pharm Biol Sci* 2023;11(2):72-81.