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Ocimum spp.: An Oyster in Plant Kingdom

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SUMMARY

The 'Sacred basil' or 'Holy basil' *Ocimum sanctum* (Linn) is a biennial or triennial shrub belonging to the family Lamiaceae and commonly cultivated in gardens as an aromatic plant. It is widely used as medicine to cure various ailments. It is frequently found as an escape. The species is worshipped by the Hindus of India and traditionally grown in courtyards and temples. The leaves of this basil, on steam-distillation, yield a bright yellow, volatile oil possessing a pleasant odour characteristic of the plant, with an appreciable note of cloves. The leaf extract of plant contains various kinds of phytochemicals which possess antiseptic, analgesic, anti-inflammatory, antimicrobial, anti-stress, immunomodulatory, hypoglycemic, hypotensive and antioxidant properties. Hence it is more beneficial to use tulsi asan herbal medicine as compared to chemically synthesized drug.

INTRODUCTION

The plant kingdom is an excellent source of potential drugs. There has been an increasing awareness about the importance of medicinal plants in the recent years. Medicinal plants are the rich source of different types of medicines and produce various bioactive molecules. Herbal plant extracts are very useful and are the major sources of medicine which play vital role in controlling various types of pathogens (Doss, 2009) and as growth promoters. These are not only the cheaper source for therapeutics but also the viable solution for various pathogens. The medicinal plants extract have now emerged as a good alternative as they are rich in a wide variety of secondary metabolites such as tannins, phenolics, alkaloids and flavonoids *etc.* which enhances growth, innate immune response and disease resistance against pathogenic bacteria in human as well as in different organisms (Edoga *et al*. 2005). About 80% of individuals from developed countries use various medicinal plants as traditional medicines and as anticancer drugs (Dewick, 1996), antimicrobial drugs, antifungal and in various proposes. The medicinal plants are rich sources of secondary metabolites which are chemically and taxonomically extremely diverse compounds with obscure function. A large number of phytochemicals are widely used in human therapy, agriculture, veterinary, various scientific researches and in different areas (Vasu *et al*. 2009) along with inhibitory effects on all types of microorganisms in vitro (Cowan, 1999).

Botanical classification

Kingdom: Plantae
Division: Magnoliophyta
Class: Magnoliopsida
Order: Lamiales
Family: Labiatae
Genus: *Ocimum*
Species: *sanctum*

Different Species of *Ocimum*

- *Ocimum basilicum* L. (Sweet basil)
- *Ocimum kilimandscharicum* Guerke (Camphor basil)
- *Ocimum gratissimum* L (Shrubby basil)
- *Ocimum canum* Sims (Hoary basil)
- *Ocimum tenuiflorum* L. (Holt basil)

Importance and uses of *Ocimum*

- The seeds of *Ocimum* plant give a greenish-yellow fixed oil and also contain antistaphlocoagulase which can be extracted with water and alcohol.

- The plant is used as a pot herb.
- Its leaves are used as a condiment in salads and other dishes.
- The leaves, seed and root are medicinally useful. The leaves also contain ascorbic acid (82 mg 100 g) and carotene (2.5 mg/100 g).
- The juice of the leaves possesses diaphoretic, antiperiodic, stimulating, expectorant and antipyretic properties.
- It is used in catarrh and bronchitis, applied to the skin in ringworm and other cutaneous diseases and as drops to relieve earache.
- An infusion of the leaves is used as a stomachic in gastric disorders of children. If taken internally, it strengthens the liver and heart and is a good appetizer.
- It cures amenorrhea and promotes the secretion of milk in lactating women.
- The leaves, if chewed, give relief from toothache.
- The leaf-juice is applied to reduce inflammations.
- A decoction of the root is given as a diaphoretic in malarial fevers.
- The dried and powdered root, if taken twice daily for seven days, cures spermatorrhoea.
- The seeds are mucilaginous and demulcent and are given in disorders of the genitourinary system. The seeds rubbed in water are given for irritation coughs, gonorrhoea, labour pains and dysentery.
- The seeds rubbed with cow's milk are given for vomiting and diarrhoea.
- The juice of the fresh leaves, flower-tops and the slender roots are considered to be good antidotes for snakebite and scorpion sting.
- Tribes (Sandals) use the plant in cholera, cough postnatal complaints, hemorrhagic septicemia and dog bite.
- The volatile oil is reported to possess antibacterial and insecticidal properties.
- It inhibits the in vitro growth of *Mycobacterium tuberculosis* and *Micrococcus pyrognes var. aureus*.

Role of *Ocimum* in Pest Management

- *Ocimum* helps in the attraction of fruit flies. So, it is used as trap crop for attraction of fruit flies and killing them by spraying suitable insecticides.
- It has marked insecticidal activity against mosquitoes.
- It is used as a repellent plant due to the presence of linalool in cruciferous vegetables against aphids, *Brevicorynae brassicae* and diamond back moth, *Plutella xylostella*.
- Higher dosages of ground leaves and essential oil extract of Ocimum suave (wild) are effective against *Sitophilus zeamays*, *Rhyzopertha dominica* and *Sitotroga cerealella* in maize and sorghum.

- The larvae of *Helicoverpa armigera* when feeds on the leaves of *Ocimum kilimandischaricum* shows growth retardation, increased mortality rates and pupal deformitis due to the presence of camphor, limonene and beta-caryophyllene..
- When *Ocimum* is planted as border crop in garlic, it helps in the management of thrips.
- It is used as trap crop, intercrop in many agroecosystems for managing different insect pests.

Phytochemicals present in Tulsi

Phytochemicals	Property/ use
Eugenol	Antiseptic and anaesthetic property, flavouring, antidiabetic, essential oil *etc*.
Thymol	Strong antimicrobial attributes
Beta caryophyllene	Relief of anxiety and depression
Rosmarinic acid	Antioxidant
Carvacrol	Protective effects for the liver, antioxidant, actively against harmful organisms
Terpeneurobosolic acid	Anticancerous properties

Sacred Basil

Pests

Leaf-roller

Leaf rollers sticking to the under surface of the leaves, fold them backwards length wise and web them together. It can be managed by removal and destruction of rolled leaves or by applying Carbofuran.

Tulsi lace wing, *Cochlochila bullita*

The adult and nymphs feed on leaves and younger stems, sometimes gregariously and leave their excreta making it unsuitable for use. Due to feeding, the leaves initially get curled and later the whole plant gets dried up. Spray Azadirachtin 10,000 ppm @ 5 ml/l to control this insect.

Diseases

1. Powdery mildew caused by *Oidium spp.* can be controlled by spraying wettable sulphur (4 g/litre of water).
2. Seedling blight caused by *Rhizoctonia solani*
3. Root-rot caused by *Rhizoctonia bataticola*

These two disease can be managed by improved phytosanitary measures and by drenching the nursery beds with Bavistin 1%.

Sweet Basil

Pests

Leaf rollers

The larvae cause serious damage to the plants by sticking to the under surface of the leaves, folding them from midrib length wise and webbing. Finally the infected leaves fall off. It can be managed by,

- Removal of infested rolled leaf
- Apply *Trichogramma chillonis*

Bug (*Monanthia globulifera*)

It causes leaf curling. It can be managed by the spraying of Azadirachtin 10,000 ppm @ 5 ml/l reduces this insect menace.

Aphids

It causes yellowing and distortion of leaves, necrotic spots on leaves, and/or stunted shoots, secrete honey dew which encourages the growth of sooty mould. It can be managed by,

- Pruning of infested shoots if the infestation is low
- Reflective mulches such as silver coloured plastics deter aphids
- Use of neem and canola oil is usually the best method to control aphids.

Cut worms, *Spodoptera exigua* and Loopers, *Trichoplusia ni*
The early stage larvae feeds on terminal clusters. Later stage larvae skeletonize the leaves and they will also cut the seedling stem near the base resulting in heavy loss. It can be managed by,

- Hand pick the larvae and kill them
- Removal and destruction of weed and crop residue

Flea beetle, *Phylotreta spp.*
It causes shot hole symptoms. It can be managed by,

- Use floating row covers prior to the emergence of beetles
- Early sowing
- Use of trap crop, cruciferous plants
- Application of thick layer of mulch
- Use of diatomaceous earth and neem oil
- Apply Spinosad, Bifenthrin and Permethrin *etc*.

Grasshoppers, various *spp*.
The early instar nymphs feed on leaves by forming circular holes. The later instar feeds on entire foliage. It can be managed by encouraging birds in field.

Japanese beetle, *Papilio japonica*
Skeletonization of leaves. Flowers and buds are also damaged. It can be managed by,

- Use of floating row covers.
- Spray Kaolin clay
- Hand picking of adult beetles and killing them by dipping in soap water.
- Use of insecticidal soaps or neem oil.

Leaf miner, *Liriomyza spp*.
It causes thin, white, winding trails on leaves. Heavy mining causes white blotches on leaves and leaves dropping from the plant prematurely. It can be managed by,

- Check transplants for signs of leafminer damage prior to planting
- Removal of plants from soil immediately after harvest

Slugs and snails

- Gray garden slug, *Decoratus reticulatum*
- Spotted garden slug, *Limax maximus*
- Brown garden snail, *Helix aspersa*
- European garden snail, *Cornu aspersum*
  They cause irregular holes on leaves and stem; flowers and fruits may be damaged, shredding of leaves in severe cases. Slime trails present on rocks, walkways, soil and plant foliage. It can be managed by,
- Practice good garden sanitation by removing garden trash, weeds and plant debris
- Reduce moist habitat
- Handpick slugs at night
- Spread wood ashes and egg shells around plants
- Attract molluscs by leaving out organic Use Ferrous phosphate, Metaldehyde
- matter such as, lettuce or grape fruits and kill them by using lure
- Sink shallow dishes filled with beer into the soil to attract and drown the molluscs

Diseases

Leaf spot (*Corynespora cassicola*)
Disease appears as small water soaked spots which later turn brown in colour.
Scab (*Elsinoe arxii*)
Disease causes puckering and dipping of the leaves and distortion of the tender twigs.
Blight (*Alternaria spp*.)
It is an important disease which starts with a chlorotic appearance on the leaves which turns purple and finally black. Later on leaves are shed. *Colletotrichum capsici* also causes leaf blight. The disease appears as small chlorotic spots on the leaves which enlarge rapidly. Older leaves appear to be more susceptible to infection. Disease can be effectively managed by foliar spraying of Bordeaux mixture 1% at 15 days interval.
Wilt (*Fusarium oxysporum*)
It can occur at all stages of growth. The disease is more pronounced in rainy season. Initially the leaves wilt but soon spreads to the whole plant. To control this disease the seedlings should be dipped in a solution of tafason or agallol at the time of planting

CONCLUSION

The presence of various bioactive compounds in the tulsi leaves makes it useful to cure various ailments by living population. *Ocimum sanctum* plant possess traditional medicinal properties and compounds with antimicrobial properties that can be used as antimicrobial agents in new drugs for the therapy of infectious diseases caused by various pathogens. It is more beneficial to use tulsi asan herbal medicine as compare to chemically synthesized drug.

REFERENCES

Cowan, M. M. (1999). Plant products as antimicrobial agents. *Clinical Microbiological Review*: 564-582.
Dewick, P. M. (1996). Tumor inhibition from plants: Tease and Evans. *Pharmacognosy*.
Doss, A. (2009). Preliminary phytochemical screening of some Indian medicinal plants. *Ancient Science of Life*, **29**(2): 12-16.
Edoga, H. O.; Okwu, D. E. and Mbaebie, B. O. (2005). Phytochemicals constituents of some Nigerian medicinal plants. *African Journal of Biotechnology*, **4**(7): 685-688.
Vasu, K.; Goud, J. V.; Suryam, A.; Singara and Chary, M. A. (2009). Biomolecular and phytochemical analyses of three aquatic angiosperms. *African Journal Microbiology Research*, **3**(8):418-421.