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BOTANICAL DESCRIPTION, PHYTO-CONSTITUENTS, CULTIVATION PRACTICES AND FUTURE PROSPECTIVE OF OCIMUM BASILICUM L.

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ABSTRACT

Ocimum basilicum L. commonly known as Sweet Basil belongs to the genus *Ocimum* of the family Lamiaceae. *Ocimum* (from Greek ozo for smell) is appropriate for the genus since its various species are known for their peculiar strong odour. It is an annual plant found in the wild tropical, subtropical and temperate regions of the world. It is common herb, grown in many households with a broad range of therapeutic properties. Various plant parts such as leaves, seeds and roots are recommended for the common people as folk medicines. Chemical constituents such as linalool, eugenol, 1, 8-cineone, methyl eugenol and anthocyanin are mostly responsible. Present review was an attempt to provide a perspective on the botanical description, cultivation practices, chemical constituents, biogeography and pathological issues of sweet basil grown in different parts of world. In the future, scientists may create transgenic basil plants to eliminate the plant's environmental stress and to target a particular chemical component that acts against a variety of human ailments.

***Index Terms*: *Ocimum basilicum* L., Lamiaceae, Cultivation practices, Chemical constituents, Biogeography, Therapeutic uses**

1. INTRODUCTION:

Lamiaceae (Labiatae) is an important angiosperm family inhabit diverse ecosystem and have a great diversity with a cosmopolitan distribution (Milan Stankovic, 2020). Most of the members are strongly aromatic due to presence of monoterpenes, sesquiterpenes and phenylpropanoids secondary metabolites (Nahak *et al*., 2011).The family Lamiaceae distributed across the temperate and tropical regions but

mainly centered in the Mediterranean region of the world covering about 200 genera and 3,200 species (Shukla and Misra, 1979; Cronquist, 1981; Jones and Luchsinger, 1987; Pandey, 2004 and Kumar, 2009).Important genera are Salvia, Ocimum, Oreganum, Thyme, Perilla, Nepeta etc. The characteristic feature of this family are square stem, opposite, decussate leaves with two distinct lips of strongly zygomorphic flower and many gland dots. Plants belong to this family are valuable in food, cosmetics, flavoring, fragrance, perfumery, pesticide, and pharmaceutical industries. Because of a wide range of applications, the plants of Lamiaceae family are widely cultivated and are, therefore, regarded as an indispensable source of functional food (Kruger, 1992; Singh and Panda, 2005, Milan Stankovic, 2020).

One of the most important genera of family Lamiaceae is Ocimum which is native to India, Southern Asia and Middle East. About 150-160 species of this genera widely dispersed over the warm regions of the globe (Evans, 2001 and Kumar, 2009). It is extensively cultivated in Southern, Central and Eastern Europe, North Africa, and in the USA, particularly California due to its immense economic importance as a source of volatile aromatic oils, medicines and as ornamental (Kruger, 1992; Singh and Panda, 2005). All these species grows in wide variety of soil and climatic conditions which leads to difference in their growth habit, physiological appearance, chemical and aromatic constituents. The different species of Ocimum occurs in different forms ranging from herbs to sub shrubs with numerous morphological variations such as leaf shape, size, hairs, glands and many more morphological peculiarities. These species are excellent source of essential oils which are extensively used for pharmacological purposes such as antimicrobial, antioxidant, antifungal and anti-inflammatory activities (Nahak *et al.*, 2011).

Ocimum basilicum L. is one such species belonging to this genus has numerous potent activities due to the metabolites present in it. It is commonly known as the sweet/French basil (Xianmin et al., 2009). It has been used as a folk remedy for an enormous number of ailments, including cancer, convulsion, deafness, epilepsy, gout, impotency, insanity, hiccup, nausea, sore throat, diarrhea, toothaches, and whooping cough (Makri and Kintzios 2009). It has the largest market demand among the species and chemotypes and is cultivated for commercial purposes in several countries, such as India, France, Morocco and Italy (Andrea *et al.*, 2014; Malekpoor *et al.*, 2016). In Mediterranean area, infusions of *Ocimum basilicum* L. are extensively used as old style medicine to shrink plasma lipid (Bravo *et al.*, 2008). In this review paper we shed light on the cultivation practices, chemical constituents, biogeography, pathological aspects of sweet basil.

2. ECOLOGY/ BIOGEOGRAPHY:

Sweet basil can be grown in copious environmental conditions on an extensive range of terrain. Basil is one of the crops among several aromatic and medicinal crops which used sodic wasteland owing towards its tolerance to higher salt, pH and exchangeable sodium percentages (Aishwath and Nibauria, 2009).

Sweet basil is native to Asia (India, Pakistan, Iran, Thailand and other countries) and can be observed growing wild in tropical and sub-tropical regions (Olga and Spiridon, 2008). It is indigenous to Persia and Sindh and lower hills of Punjab in India but now become globalized due to human cultivation (Nandkarni, 2005). It reached England in the 16th Century and North America in the early 17th Century. Great tolerance power of *Ocimum basilicum* L. habitats varies from tropical areas of Asia, Africa, central and South America but highly cultivated in Iran, Japan, China, and Turkey (Ali, 2021).

3. DESCRIPTION OF PLANT:

Ocimum basilicum L. has erect branching herb with height of 0.6 to 0.9 m, glabrous, more or less pubescent. Stems and branches are green or sometimes purplish in colour. Leaves are simple, opposite**,** 2.5-5 cm or more long, ovate, acute, entire or more or less toothed margin with entire base. The petiole is 1.3-2.5 cm long. The leaves have numerous dots like oil glands which secrete strongly scented volatile oil. Inflorescence is racemose, where the terminal raceme is usually much longer than the lateral ones. The bracts are stalked, shorter than the calyx, ovate and acute. Calyx is five mm long, enlarging in fruit and very shortly pedicelled. Its lower lip with the two central teeth is longer than the rounded upper lip. Corolla being 8-13 mm long are white, pink or purplish in colour, glabrous or variously pubescent. The upper filaments of slightly exerted stamen are toothed at the base. Ovary is superior and 2-carpellary, 4-locular and a 4-partite fruit of four achenes (Jayaweera, 1981; Kiritikar, 2003).

4. REPRODUCTIVE BIOLOGY, CYTOLOGY AND GENETICS:

Darrah (1974) and Khosla (1986) reported that species of Lamiaceae are primarily crossbreeding and have floral structures suitable for pollination by bees. Raju (1989) reported that *O. americanum* and *O. basilicum* L. are predominantly autogamous. A study performed by Almeida *et al*., (2004) revealed that *O. officinalis* L. is predominantly autogamous but also able to reproduce by cross-fertilization. The floral structure of *O. basilicum* L. adapted to pollinator-mediated out-crossing (Matthew *et al*., 2016; Nation *et al*., 1992).

Sobti and Pushpangadan (1982) presented the cytogenetical and evolutionary relationship in *Ocimum americanum, O. canum,* and *O. basilicum. Ocimum americanum* was found to be morphologically intermediate between the other two species in most characters. Karyo - morphological investigations were done by Sobti and Pushpangadan (1982) in five *Ocimum* species with their different races. Meiotic studies in five species of *Ocimum* from pollen mother cells by Khosla (1989) suggested that the basic number x= 8 represented *Sanctum* group while basic number x= 12 represented *Basilicum* group.

5. BREEDING ASPECTS AND BIOTECHNOLOGY:

Genetic variability, adaptability and evolution of the species are important for the success of any improvement program. Genetic enhancement of the *Ocimum* species by using different breeding is necessary for developing varieties having high herb and essential yield characters. A number of varieties have been developed at the CSIR-Central Institute of Medicinal and Aromatic Plants, India by the application of breeding techniques such as Khushmohak, CIM Saumya (Lal *et al*., 2003). Lal *et al*. (2004) developed an early, short duration, high essential oil, methyl chavicol and linalool yielding variety of Indian basil (*O. basilicum* L.) CIM Saumya in Central Institute for Medicinal and Aromatic Plants, Lucknow. The production of hybrids by crossing cultivars contributes to the creation of new essential oils for the world market (Da Costa, 2014; Fehr, 1987). An improvement program was conducted by Blank (2004) in which 55 accessions of *Ocimum* sp. were investigated. Their studies revealed genotypic variation in the content and yield of essential oil and were able to identify promising genotypes for improvement programs.

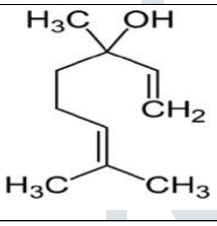
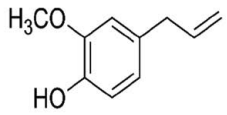
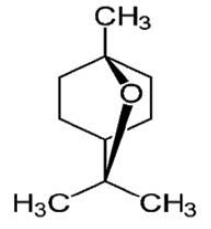
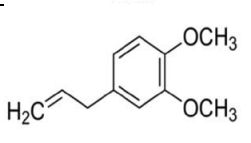
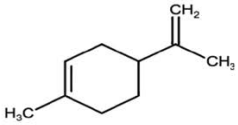
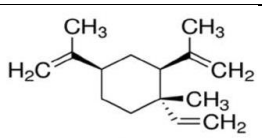
Labra (2004) studied the capacity of the amplified fragment length polymorphism (PCR-BASED MARKER) approach in the research of genetic variability within *Ocimum* genus was verified in an analysis of genetic distances among nine *Ocimum basilicum* L. varieties. Murray

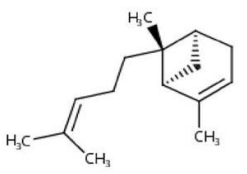
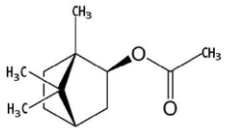
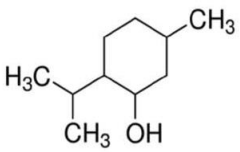
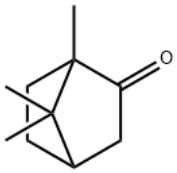
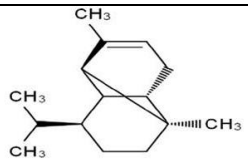
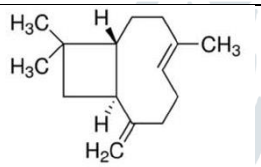
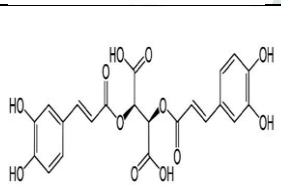
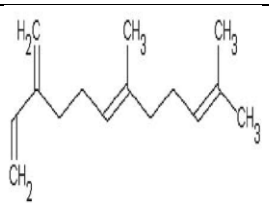
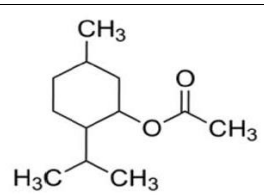
et al. (2005) reported the diversification and speciation of flowering plants accompanied by variation in the amount of nuclear DNA of the entire chromosome complement or holoploid nuclear DNA content together with changes in chromosome number and structure.

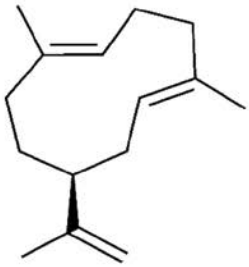
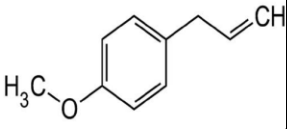
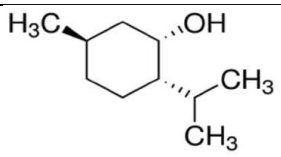
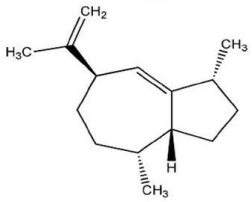
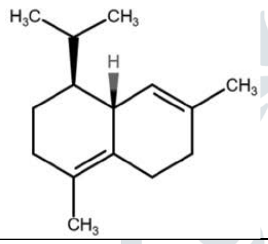
6. CHEMICAL CONSTITUENTS

In Sweet basil five types of oil profiles have been identified on the components in its essential oil: (i) linalool; (ii) methyl chavicol; (iii) both linalool and methyl chavicol; (iv) both linalool and eugenol; and (v) a rich profile with both methyl chavicol and methyl eugenol (Grayer *et al*., 1996; Pandey & Singh, 2014) (Table1).Basil has the ability to synthesize and convert phenyl propenes (important chemicals in determining the flavor of herbs which can also act as cultivator attractants or herbivore deterrents. Essential oil of *Ocimum basilicum* L. has also been reported as repellant to *Nephotettix virescens* (Chittihunsa and Samngamnim, 1999) and *Anopheles stephensi, Aedes aegypti* and *Culex quinquefasciatus* (Prajapati *et al*., 2005), while acting as an anti feedant in *Helicoverpa armigera* (Balakrishnan *et al.*, 2018; Rao *et al*., 2000).

Table1: Chemical composition, structure, class, extraction method, biological activities and uses of *Ocimum basilicum* L.

S.N	Chemical Constituents	Structure	Chemical Class	Extraction Method	Biological activity and Uses	References
1	Linalool		Monoterpene alcohol	Solvent free microwave extraction and conventional hydro-distillation	Anticancer, Anti proliferative, Anti inflammatory, Anti microbial and used as fragrances in food additives, cosmetics.	Galhiane *et al*.,2006
2	Eugenol		Phenylpropanoid	Steam Distillation	Antioxidant activity, antidiabetic, anti stressactivity, antiseptic and used in perfumes, mosquito repellent	Khalil *et al*., 2017
3	1,8-cineole		Monoterpenoid	Hydro distillation	Antiulcer, Wound healing Activity, Anti-cancerous and used as personal care products, flavouring	Rocha *et al*., 2015, Hendrawinata *et al*.,2011
4	Methyl eugenol		Phenylpropene	Hydrodistillation	Anticonvulsant and Anesthetic and used in non-alcoholic beverages, processed food	Benitz *et al*., 2009; Ding *et al*., 2014.
5	Limonene		Monoterpene	Solvent at high pressure high temperature extraction	Motor relaxant, Anti inflammatory and used as flavouring agent, ointments	Lopresto *et al*., 2014; Vale *et al*., 2002
6	β-elemene		Sesquiterpenoid	Hydro and glycol distillation	Antineoplastic, Anticancer and used as enhance effect of	Hui- Ping *et al*., 2014; Quentin *et al*.,2010

					chemotheraphy, cell apotopsis.	
7	α-bergamotene		Sesquiterpene	Cold maceration	Abiotic Stresses release. Used as flavouring and flavour agent	Jadhav *et al*., 2016; Palmer *et al*., 2015
8	Bornyl acetate		Acetate ester	Microwave assisted Extraction	Anti-inflammatory, Analgesic, used as air fresheners, cleaners and care products.	Fan *et al*., 2018; Xiao *et al*.,2005
9	Menthol		Alcohol	Soxhlet solvent extraction	Local anesthetic, used in minor irritation, pain, sore mouth.	Alvi *et al*., 2001; Galeotti *et al*.,2001
10	Camphor		Terpenoid Liquid	liquid extraction	Antipruritic, Counterirritant. Used treat toenail fungus, insect bites.	Nozala *et al*., 2002; Zuccarini, 2009
11	α-copaene		Sesquiterpene	Supercritical fluid extraction	Cytotoxic, antioxidant. Used as Flavor additives.	Tam *et al*., 2007; Turkez *et al*.,2013
12	β-caryophyllene		Sesquiterpene	Supercritical fluid extraction	Antibiotic, antioxidant, carcinogenic. Used an insect attractant, a fragrance.	Quispe *et al*., 2008
13	Chicoric acid		Phenylpropanoid	Solvent microwave Extraction	Antioxidant, immune-stimulatory, treatment of diabetes, epilepsy, hermorrhoids.	Lekar *et al*., 2013; Kuban *et al*.,2016
14	Farnesene		Sesquiterpene	Steam Distillation	Antioxidant, anti-insecticidal, used as sedative and attractive scent.	Green and Osborn, 1993; Sun *et al*., 2011
15	Menthyl acetate		Monoterpene	Solid-phase micro extraction	Antioxidant, antibacterial, used as flavouring agent an odour.	Rohloff, 1999, Muftah *et al*.,2015

16	Germacrene		Sesquiterpene	Solvent extraction	Anti-inflammatory, analgesic, used to treat fevers, perfume industry.	Noge and Becerra, 2009, Del *et al*.,2009
17	Estragole		Phenylpropene	Hydro distillation	Neuronal excitability, used in cosmetic products, cleaning, fragrance.	Andrade *et al*., 2015; Silva *et al*, 2013.
18	Neo isomenthol Menthane		Monoterpenoid	Steam distillation	Nasal sensation. Used as flavouring agent and pharmaceutical products.	Manuale *et al*., 2010; Eccles *et al*., 1988
19	Guaiene		Sesquiterpene	Steam distillation	Antithrombotic, antidepressant, used in flavouring industries.	Gakuubi, 2016; Swamy and Sinniah, 2015
20	δ-cadinene		Bicyclic sesquiterpene	Headspace solid-phase Micro extraction	Antioxidant, antimicrobial, used as flavouring industries, cosmetics.	Nekoei and Mohammad, 2017 Scura *et al*., 2016

7. CULTIVATION METHODS

7.1. Soil condition

Basil can grow on a variety of soils, from sandy loam soils with a pH range of 4.3–9.1 to highly fertile, well-drained loam soils. While clayey, wet soils are inappropriate. It can tolerate higher copper and zinc concentrations, but is sensitive to cobalt and nickel (Simon *et al.*, 1999).

7.2. Climate

Crops grow best in warm, humid climates up to 1800 meters above sea level. Long days, high temperatures, and high humidity have been found to be beneficial for plant growth and high oil production. Frost can also damage the plant. Root rot and stunted development are caused by water logging.

7.3. Propagation

The plant is propagated by seeds. 125 g of seeds are needed to raise seedlings in one hectare. (Simon *et al.*, 1999).

7.4. Planting time

The crop can be produced in the plains of North or South India from the middle of February to the end of September, as well as during Kharif. The crop can be cultivated in Kharif in the hilly regions of north India.

7.5. Nursing rising of seeds

Raised seed beds should be well prepared by adding well-rotten manure and leaf mold each at a rate of 1 kg/sq m and thoroughly incorporating them into the soil. Raised seed beds should be between 10 and 15 cm high. Seeds (10–15 g per bed) are mixed with fine sand or wood ash and sowed in rows 6 cm apart or dispersed over the beds after being set out in 1 m by 4 m beds with irrigation channels. After that, a thin layer of fine dirt or farmyard manure is spread over the seeds. Following seeding, the nursery beds are irrigated on a regular basis.

7.6. Planting

7.6.1. Land preparation

The soil is finely tilthed after two to three ploughings, which effectively prepares the field. Prior to the second and third harvests, apply 10-15 t/ha of farmyard manure or compost. (Roberts *et al*., 2009).

7.6.2. Transplanting

The seedlings are transplanted into the field when they are six weeks old and about 10-15 cm tall. To prevent transplantation shock, transplantation should ideally take place in the evening. For basil cultivation, a spacing of 40 to 60 cm is recommended. It's thought that transplanting is best done under cloudy, light drizzle.

7.7. Crop nutrition

Before sowing, 10 t/ha of compost or farmyard manure should be applied. Make sure FYM and compost have fully decomposed before using. Although a good response can be obtained up to 120:100:100 kg/ha, a medium fertiliser dose of N, P2O5, and K2O is advised for economic output. According to reports, using cryfish excrement as fertiliser led to increased growth and productivity in aquaponic systems (soilless) (Saha *et al*., 2016).

7.8. Irrigation

A weekly irrigation routine is necessary while growing this crop in the summer. However, irrigation is not necessary until September due to the arrival of the monsoon. The crop needs to be irrigated once or twice more every month. In total, 12 to 15 irrigations are needed each year.

7.9. Intercultural operation

The seedlings are weeded for the first time a month after they are planted, followed by a second time four weeks later. Due to the plants' ability to grow bushy and smother weeds, no additional weeding is needed. Two months after planting, harrowing is completed.

7.10. Pests and Diseases

Pests are common and cause serious damage to the crop like leaf rollers and Bug (*Monanthia globulifera*). Diseases like Leaf spot (*Corynespora cassicola*), Scab (*Elsinoe arxii*), Blight *(Alternaria* sp.), Wilt (*Fusarium oxysporum*), Downy mildew (*Pernospora belbahrii*) are common (Roberts *et al*., 2009) (Table 4).

7.11. Harvesting

The crop is harvested 90 to 95 days after planting, when the plant is in full bloom and the lower leaves have begun to turn yellow. Sickles are used to harvest. This crop often produces 3–4 flowering harvests. The first harvest is made when the plants are fully bloomed, and the following harvests are made 65 to 75 days afterwards. After removing around 15 cm of the ground for crop regeneration, the entire plant is harvested. To lessen the moisture and bulkiness, the collected product will be allowed to wilt in the field for 4-5 hours.

7.12. Processing

By steam or hydro-distilling the young inflorescence or the entire plant, sweet basil oil can be produced. To get rid of the moisture, the distilled oil is treated with anhydrous sodium sulphate or regular salt at a rate of 20 g per litre. The oil needs to be kept in airtight amber-colored glass bottles, stainless steel containers, galvanised tanks, and aluminium containers in a cool, dry location.

7.13. Expected yield

Each acre can produce 3–4 tonnes of flowers and 13–14 tonnes of herbage on average. The oil yield will be about 30-35 kg/ha from the flower (flower oil) and 18-22 kg/ha from the total herb since the inflorescence contains 0.4% while the whole herb has 0.10 to 0.25%.

In European climatic condition, high quality yield of basil has been reported in foil tunnel method in organic farming which also enhances the content of essential oil, flavonoids and phenolic acids (Bączek *et al*., 2019).

7.14. Varieties

Ocimum basilicum L. is the only species which is economically grown in India. From several institutions various varieties are released as such RRL-011, Vikarsudha, Kusumohak, and Cim-Saumya. There are several International popular varieties of *Ocimum basilicum* L. which have been developed through several breeding techniques like crossing, selection with varied chemotypes listed in table 2 and 3.

Table 2: Varieties, origin of plant germplasm, chemotypes of *Ocimum basilicum L.* and its breeding techniques

S.No.	Varieties	Origin of the Plant germplasm	Chemotypes	Breeding techniques
1.	Purple Ruffles	Germany	Linalool	Crossing
2.	Cinnamon	Poland, Wroclaw	Linalool and methyl cinnamate	Selection
3.	Osmin	California	Linalool	Selection
4.	Lattuga	USA	Linalool	Selection
5.	Purple opal	Czech Republic	Linalool	Selection
6.	Blue spice	Czech Republic	Bisabolene	Asexual reproduction
7.	Fino Verde	Maine, USA	Linalool	Asexual reproduction
8.	Holandjanin	Istria	Linalool	Asexual reproduction
9.	Compact	Maine, USA	Linalool	Asexual reproduction
10.	Genovese	Slovenia	Linalool	Selection
11.	Purple Opal	Czech Republic	Linalool	Selection
12.	Siam queen	USA	Methyl chavicol	Cross selection
13.	Dark lady	Wolsier, Germany	Linalool	Asexual reproduction
14.	Dbasbloom	Israel	Linalool	Asexual reproduction

Table3: Released varieties from CSIR-CIMAP of *Ocimum basilicum* L. with their quality and breeding techniques

Varieties	Common name	Herb yield (q/ha)	Oil content (%)	Oil yield (kg/ha)	Main essential oil constituents					Breeding techniques	Reference
					Eugenol	Methyl eugenol	Methyl chavicol	Linalool	Methyl cinnamate		
CIM Snigdha	French basil	221	0.9	190	-	-	9.1	1.95	78.7	Developed through half – sib selection	Lal *et al.*, 2003
CIM Saumya	Indian basil	290	0.68	197.2	-	-	62.54	24.61	-	Developed through half – sib selection	Lal *et al.*, 2004
CIM Shurabhi	Sweet basil	200	0.75	166	-	-	0.44	75.71	-	Developed through intensive breeding	Lal *et al.*, 2003
CIM Sharada	French basil	280	0.7	190	-	-	89.75	0.067	-	Developed through intensive breeding	Lal *et al.*, 2003)
Khushmohak	Sweet basil	391	0.4	134	-	-	37	45	-	Developed through selection in seed raised progeny of the introduced strain from Argentina	Lal *et al.*, 2004
Vikarsudha	French basil	335	0.5	167.5	0.62	-	78	0.16	-	Developed through intraspecific hybridization between exotic basil from Australia (EC-331886)-CSIRO No. L6323) and local adaptive landrace, Badaun local	Lal *et al.*, 2004

7.15. Diseases affecting the *Ocimum basilicum* species

Numerous medicinal properties has been exhibited by basil, it also been affected by some diseases like wilt, mold, spot and rot. Mostly fungi occurs the infection in leaves and stem. Most diseases occur in leaves and stem of basil plants due to the infection of fungi. Nevertheless, it can be eliminated by employing a suitable natural fungicide in order to preserve its original medicinal essence. Some of the diseases affecting basil are mentioned in table-4 with its control measures.

Table 4: Diseases, symptoms, causing agents of *Ocimum basilicum* L. and its control measures

S.No.	Diseases Name	Parts of the Plant	Symptoms	Causing Agent	Control measures	Reference
1.	Cercospora leaf spot	Leaves	Circular to irregular dark spots on leaves	*Cercospora Ocimicola*	Use fungicides	Taie *et al.*, 2010
2.	Downy mildew	Leaves	Yellowing leaves	*Peronospora Belbahrii*	Spraying with Ca, Mg, K and fungicides	Tran, 2011
3.	Leaf spot	Leaves	streaks on stems	*Pseudomonas* Spp	Hot water treatment, crop rotation	Tran, 2011
4.	Root rot	Stem	Failure of seeds to germinate	*Rhizoctonia Solani*	Improve drainage system	Tran, 2011
5.	Basal rot	Leaves	Wilting of leaves	*Rhizoctonia Solani*	Proper planting, Diseases free bulbs, avoid over crowding	Gamliel and Yarden, 1988
6.	Black spot	Leaves and stem	Black spots on leaves	*Colletotrichum gloeosporioides*	Use highly effective fungicides, crop rotation	Tran, 2011
7.	Gray mold	Leaves and stem	leaves dying and dropping from plant	*Botrytis cinerea*	Tillage, crop rotation, planting resistant hybrids	Tran, 2011
8.	Fusarium wilt	Leaves and stem	Yellow and wilting leaves, death of the plant	*Fusarium oxysporum* f.	Use tolerant cultivar, use nitrate nitrogen fertilizer	Taie *et al.*, 2010

8. THERAPEUTIC AND OTHER USES

Basil is useful in diseases of heart and blood, biliousness kapha and vata, leucoderma etc. The juice relieves joints pain, gives luster to eyes, is good for toothache, earache and cures epistaxis when used with camphor (Khare, 2007). The juice of plant is dropped into ears to cure dullness of hearing (Khare, 2007; Nadkarni, 2005). The infusion of the plant is given to treat cephalgia and gouty joints and used as gargle for foul breath. Basil cures headache, aids digestion and acts as a mild laxative. The plant is also reported to keep away the flies and snakes

(Anonymous, 2003). The oil of the plant has been found to be beneficial for the alleviation of mental fatigue, colds, spasm, rhinitis, and as a first aid treatment for wasp stings and snakebites (Ismail, 2006). The oil content has anti-cancerous property (Rabani *et al.,* 2004).

Basil is a popular culinary herb used in many cuisines including Italian and Thai. It is used both fresh and dried; however the predominant flavors diminish with drying. Fresh basil is preserved in oil or vinegar, or frozen. Basil is best dried out of direct sunlight, which can brown the leaves in drying process (American, 1966; Duke, 1985; Ortiz, 1996).

9. CONCLUSION AND FUTURE PROSPECTIVE

The present review majorly focused on the botanical description, geographical distribution, chemical constituents, cultivation practices and various biological potential with important plant varieties released from research organizations, essential for the continued development of medications for human consumption. In the future, scientists may create transgenic basil plants to eliminate the plant's environmental stress and to target a particular chemical component that acts against a variety of human ailments.

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