



# COMPERATIVE ESTIMATION OF CAMPHOR BASIL AND LEMON BASIL

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## **Abstract:**

In this article we are studied about comparison between two types of basil one of these camphor basil and another one lemon basil. These two are gives different in characters as like its morphology, microscopy and most of its chemical constituents with its therapeutic uses. The Holy basil is used as a expectorant traditionally to remove the cough and give a relaxation in lungs both pediatric as well as geriatrics patients. In that camphor basil the gives a strong menthol like odor. Basil plant does not come back every year. Basil is also important in oxygen supplies. Basil is a shrub and gives a height 1-2 meter. Camphor basil reduced pain and to provide a strong menthol from its flower part also leaves part. The chemical constituents in a camphor basil is limonene(7.6%) beta selinene, alpha pinene, camphenene, selinene ,myrtenol caryophyllene. In lemon basil linolool ,methyl chavicol, eugenol, bergamotene and methyl cinnamate.

## **Introduction :**

Plants are known for various medicinal properties from ancient times. The essential oils extracted from therapeutic plants are safe, economical, effective and easily available [1,2,3,4]. India is the home for more than 8000 species of vascular plant out of which 1748 are considered for their therapeutical uses [5]. Tulsi (*Ocimum sanctum* L) is one of the most common herb used in Indian traditional system and also named as "Holy Basil", "Queen of Herbs" [6,7]. The name Tulsi comes from Sanskrit word that means "the incomparable one" [8]. In Indian culture, it is worshiped very religiously and known as "Vishnupriya". The scientific name of Tulsi is *Ocimum sanctum* (Linn) which belongs to the Labiatae family and the *Ocimum* genus is derived from the Greek word ozo which means to

smell or having strong odor [9]. This plant has about 160 species in which *Ocimum sanctum*, *Ocimum gratissimum*, *Ocimum canum*, *Ocimum basilicum*, *Ocimum killimandscharicum*, *Ocimum ameicanum*, *Ocimum camphora* and *Ocimum miranthum* are therapeutically important [10,11]. There are commonly three types of Tulsi that are considered the most i.e. *Ocimum tenuiflorum* (Krishna tulsi), *Ocimum sanctum* (Rama Tulsi) and *Ocimum gratissimum* (Vana Tulsi) [12]. Numerous phytochemical constituents isolated from this plant which are responsible for their medicinal value both in modern medication system and traditional medication system i.e. Ayurveda, Unani, Siddha, Greek and Roman [13]. The presence of phytochemicals may vary in this plant because of its cultivation and harvesting procedure. In Ayurveda, it is explained as "the elixir of life" and believed to promote longevity. Our review is focused on a detailed description of Tulsi (*Ocimum L*) and its medicinal significance as per different medicinal Shifali Thakur et.al. Tulsi - a review based upon its ayurvedic and modern therapeutic uses. International Journal of Research and Review (ijrrjournal.com) 264 Vol.8; Issue: 5; May 2021 systems.

## Properties of camphor basil

**Name :** Camphor Basil Linn

**Biological source:** It is a dried as well as fresh leaves or whole plant of *Ocimum kilimandscharicum*.

**Family:** Lamiaceae

**Geographical source:** India, Kenya, Tanzania, Uganda, Sudan, Maharashtra.

**Cultivation , collection & Propogation:**

**Soil condition :** Sacred basil thrives well on a wide range of soils. Rich loam, poor laterite, saline and alkaline to moderately acidic soils are also well suited for its cultivation. Well drained soil helps in better vegetative growth. Water logged conditions can cause root-rot and results in stunted growth.

**Climate:** It flourishes well under fairly high rainfall and humid conditions. Long days and high temperatures have been found favourable for plant growth and oil production. It can grow up to an altitude of 900 m. The plant is moderately tolerant to drought and frost. The plant can be grown under partially shaded conditions but with low oil contents.

**Propagation:** Tulsi is propagated through seeds. Seeds will get deteriorated over generations, due to its high cross-pollination. Hence, for fresh plantings, the growers have to take fresh seeds from the pedigree stock.

**Planting time :** The nursery can be raised in the third week of February and transplanting is generally done in the middle of April.

**Nursery :** Raised seed beds of 15 × 4 × 9 ft size should be thoroughly prepared and well manured by the addition of farm yard manure 10 kg per bed. About 200-300 g seeds are enough to raise the seedlings for transplanting in one hectare of land. The seeds are very small and hence it should be mixed with sand and sown to a depth of 2 cm. After sowing, the seeds in the nursery, a mixture of farm yard manure and soil should be spread in a thin layer over the seeds and irrigate with a sprinkler hose. The seeds germinate in 8-12 days and the seedlings are ready for transplanting in about 6 weeks time at 4-5 leaf stage. A spray of 2% urea solution on the nursery plants at 15 to 20 days before transplanting helps in getting healthy seedlings for transplanting.

**Land preparation:** The land is brought to fine tilth and laid out into plots of convenient sizes. It is preferable to add 15 t/ha of farm yard manure and recommended fertilizers as basal dose during the preparation of land and should be mixed well in the soil.

**Transplanting:** Seedlings of six weeks old and having 4-5 leaves are transplanted at a spacing of 40 × 40 cm, 40 × 50 cm and 50 × 30 cm to get high herbage and oil yield at Lucknow, New Delhi and Indore respectively. The plots are irrigated immediately after transplanting. The seedlings will establish well by the time of second irrigation. At this stage gap filling and replacement of the poor plants are also done so that uniform plant stand is achieved.

**Crop nutrition:** As Tulsi is grown for its herbage, it is necessary to frequently replenish the soil. Farm yard manure / compost are to be applied at 10 t/ha before planting. Ensure that FYM / compost is well decomposed before use. Do not use compost made from city waste and human excreta. Do not apply fresh manure for plant nutrition. The optimum fertilizer dose recommended for this crop is 120 kg N, 60 kg of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O per hectare. Half the dose of N and the entire dose of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O should be given as a basal dose, whereas, the remaining N is applied in two split doses after first and second cuttings. Application of micronutrients, cobalt and manganese at 50 and 100 ppm concentrations respectively is reported to increase the oil yield significantly. Application of 120 kg N, 105 kg each of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O per hectare is recommended for saline and alkaline soils at Lucknow.

**Irrigation:** Tulsi's irrigation requirement depends upon the season and moisture content of soil. In summer three irrigations per month are necessary whereas, during other seasons it should be done as and when required except in rainy season when no irrigation is required. About 12-15 irrigations are required during the year. Apply mulch to conserve soil moisture. However, before harvesting, irrigation should be discontinued. If possible, test the irrigation water for any contaminants and adopt appropriate measures to prevent contamination.

**Intercultural operation:** Weeds have to be managed before they start competing with the main crop for nutrients and light. First weeding is done one month after planting and the second 4 weeks later. After this, no further weeding is required as the plants become bushy thereby suppress the weeds. One hoeing and earthing up operation is required at two months after planting. Use mulch to maintain soil moisture and to inhibit growth of weeds. Do not use chemical herbicides to eradicate weeds and do not keep weeds till flowering as this will increase weed pressure in coming years. Do not allow the soil to dry up due to excessive weeding.

**Pests:** Tulsi is found to be infested with few insect pests and diseases. Insect pests Leaf rollers: Leaf rollers sticking to the under surface of the leaves, fold them backwards length wise and web them together. Cultivation of Ocimum DMAPR, Boriavi 14 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.

**Management:** Spray Azadirachtin 10,000 ppm @ 5 ml/l to control this insect. Diseases The plant is susceptible to powdery mildew (*Oidium* spp.), seedling blight (*Rhizoctonia solani*) and root-rot (*Rhizoctonia bataticola*). Powdery mildew can be controlled by spraying wettable sulphur (4 g/litre of water) and the latter two diseases can be managed by improved phyto-sanitary measures and by drenching the nursery beds with Bavistin 1%.

**Harvesting:** Care should be taken while harvesting Tulsi to avoid any type of contamination. Clean all the surfaces that comes into contact with the plant during and after harvest. The crop is to be harvested at full bloom stage to obtain maximum essential oil yield and better quality oil. The first harvest is obtained at 90-95 days of planting. Thereafter, it may be harvested at every 65-75 days interval. Harvesting should be done usually on bright sunny days for high and good quality oil. It is not desirable to harvest the crop if there was a rain in the previous day. The crop should be cut at 15-20 cm above the ground level.

**Processing:** The harvested produce may be allowed to wilt in the field itself for 4-5 hours so as to reduce the moisture and also the bulkiness. However, oil quality and its yield do not diminish up to 6-8 hours after harvest, but further delay may cause considerable loss in yield and quality of oil. Steam distillation is found to be superior to hydro distillation and hydro cum steam distillation. Distillation unit should be clean, rust free and free of any other odour. The oil obtained is then decanted and filtered. The distilled oil is treated Cultivation of *Ocimum DMAPR*, Boriavi 15 with anhydrous sodium sulphate or common salt at the rate of 20 g per litre to remove the moisture. The oil should be stored in sealed amber coloured glass bottles or containers made of stainless steel, galvanised tanks, aluminium containers and stored in a cool and dry place. All processing activities should be recorded.

**Expected yield:** About 5 tonnes of fresh herbage per hectare can be obtained by two to three harvests in a year. The oil yield varies with type, season and place of origin. The whole herb contains 0.1-0.23% essential oil and an oil yield of 10-23 kg can be obtained per hectare.

## **Description:**

### **Morphological study**

Branched, aromatic under shrub 30-50 cm high, sometimes woody , hairy.

**Leaves:** simple, opposite, ovate-oblong, Entire or subserrate.

**Petioles:** slender hairy

**Flowers-**very small, pale white, borne in terminal and axillary racemes.

**Fruits :** subglobose or broadly oblong nutlets.

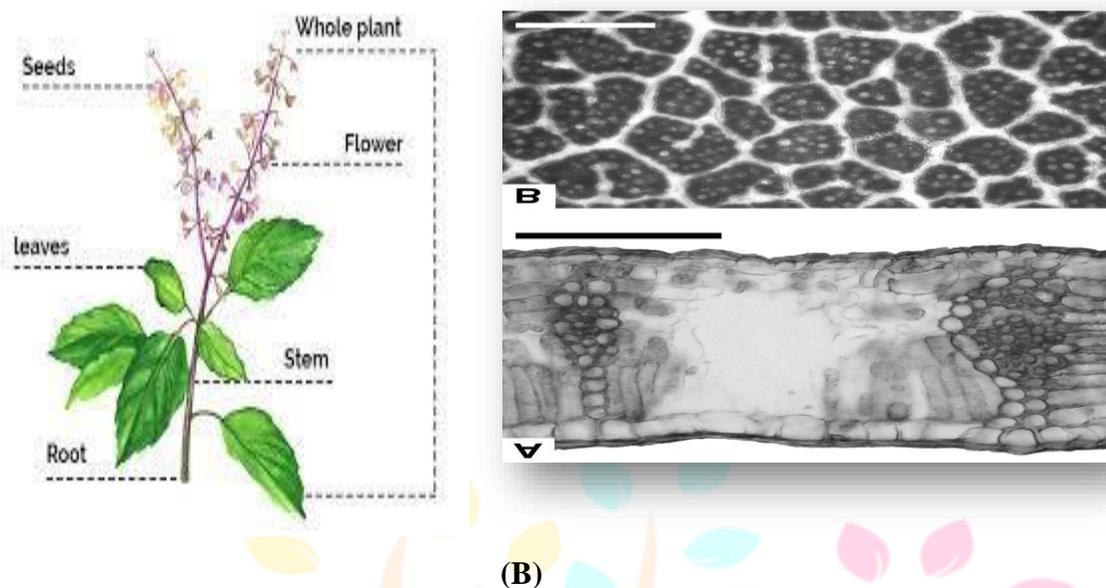
Flowers and fruits almost throughout the year. (Mainly during September-February).

### **Organoleptic properties:**

**Color:** Faint reddish green.

**Odor:** Aromatic

**Taste:** spicy basil flavor with a hint of camphor

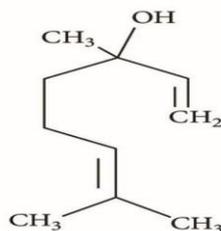


**Figure : A) Morphology and B) microscopical character of camphor basil**

**Chemical constituents:** Chemical composition of the essential oil of *O. kilimandscharicum* have been reported from Indiana where the major constituents were linalool (41.94-58.85%), camphor (17.0-15.82%) and 1,8-cineole (10.18-6.38%) (Charles, D.J. and J.E. Simon, 1992). Camphor (57.87%) (Vinutha, T. and L.N. Srikar, 2007) and 1,8-cineol (62.0%) (Ntezurubanza, L., et al., 1984), have been accounted from South India and Rwanda, respectively. In another report from North India camphor (53.89%), limonene (10.5%) and camphene (4.5%) (Garg, S.N., et al., 2004), were reported as the major constituents of the essential oil of *O. kilimandscharicum*.

**Uses:** The plant has carminative, stimulant, antipyretic, anti-fungal and anti-bacterial properties

**Chemical constituents structure:**



**Chemical structure of linalool**

**Properties of Lemon basil:**

Lemon basil, hoary basil, Thai lemon basil, or Lao basil, (*Ocimum × africanum*) is a hybrid between basil (*Ocimum basilicum*) and American basil (*Ocimum americanum*).

Family: Lamiaceae



## **Propagation**

### **SEED:**

Seed Depth: 1/4"

Space Between Plants: 10"

Space Between Rows: 12–18"

Germination Soil Temperature: 65–85°F, optimum 70°F.

Days for Germination: 5–10

Sow Indoors: 6–8 weeks before transplanting outside.

Sow Outdoors: 1–2 weeks after average last frost when temperatures are warm

## **Climate**

Basil is a semi-tropical herb and likes sunny days and comfortable temperatures. Because its leaves are slightly succulent, basil doesn't tolerate temperatures below freezing. Mild zones, like those above USDA Zone 5, exhibit ideal climate conditions for growing basil as an annual. This cultivar is grown as a perennial in Zones 9–11.

## **Growing Media**

**SOIL:** Prefers a well-drained loamy soil. A pH of between 6.0 and 7.0 will keep plants healthy and nourished.

## **STORAGE**

Fresh leaves will not keep over two or three days, even with refrigeration. Crumble dried leaves into an airtight container to keep for over a year.

## **Planting Time**

6 weeks before the last spring frost. The soil has warmed at least 50°F (10°C)- preferably around 70°F (21°C) for best growth. Nighttime temperatures shouldn't drop below 50°F (10°C)

## **Harvesting**

Picking the leaves of basil as soon as the plants are 6 to 8 inches tall. Once temperatures hit 80°F (27°C), basil will really start leafing out. Harvest in the early morning, when leaves are at their juiciest. Make sure to pick the leaves regularly to encourage growth throughout the summer.

## Nursery

It's easy to provide warmth, but natural light is not enough to develop sturdy seedlings. Use a fluorescent light fixture with ordinary cool white or warm white tubes, a 24-hour timer to turn electricity on and off, and a sheet of plastic to cover the area where the pots or flats will sit. The best place for germination is one with a daytime temperature of at least 65°F and a nighttime temperature of no less than 50°F- the warmer the better.

Attach the light fixtures to chains that will allow you to adjust the distance between the light and the plants as they grow - 2 to 3 inches is about right. Plug a timer into the light fixture and set it so the seedlings will receive 16 hours of light daily.

Flats or partitioned plastic pots 1½ to 2 inches deep with drainage holes are best for starting seedlings. About 400 seedlings can be started in a 10-inch by 20-inch flat and about 50 seedlings can be started in a 5-inch by 5-inch flat. Sow seeds a seed width apart in rows 1 to 2 inches apart. Water gently so the seeds don't wash out of place. Cover the container with plastic wrap, or put it in a transparent freezer bag.

### Comparative study on the basis of morphological characteristics.

Sr.No.	Characters	Camphor basil	Lemon Basil
1	Shape of leaves	Rounded, Slightly, Cupped	Tend to be narrow, slightly serrated edges
2	Flowers colors	Bears creamy, white flowers	White flowers
3	Plant grow	About 1-2 m	About 1 m
4	Climb for growing	Cooler climate(21 <sup>0</sup> C)	65-85 <sup>0</sup> F
5	Test	Spicy basil flavour	Sweet and tangy flavour

### Conclusion:

The diversity in basil based on appearance, flavors, fragrances, industrial, edible, and drying oils, and natural pigments offers a wealth of opportunities for developing new culinary, ornamental, and industrial crops. A number of basil species have commercial potential for the production of industrial products. Lemon basil has moderate levels of beta-carotene and high levels of vitamin K, which are renowned for their anti-inflammatory properties. Vitamin K in Lemon Basil is essential for the production of clotting factors in the blood and plays a vital role in the bone strengthening and mineralization.

**References :**

1. Anonymous, 1966. The Wealth of India – Raw Materials, Vol. III, CSIR, New Delhi. Bhasin, M., 012. Ocimum- Taxonomy, medicinal potentialities and economic value of essential oil. J. Biosphe., 1: 48-50.
2. Charles, D.J. and J.E. Simon, 1992. Essential oil constituents of *Ocimum kilim* and *scharicum* Guerke. J. Essent. Oil Res., 4: 125-128.
3. Vinutha, T. and L.N. Srikar, 2007. Essential oil composition of *Ocimum sanctum* and *Ocimum kilimandscharicum* inoculated with biofertilizers. Indian Perfum., 51: 60-62.
4. Ntezurubanza, L., J.J. Scheffer, A. Looman and A.B. Svendsen, 1984. Composition of essential oil of *Ocimum kilimandscharicum* Grown in Rwanda1. Planta Med., 50: 385-388.
5. Garg, S.N., A.A. Naqvi, J.R. Bahl and S.P.S. Khanuja, 2004. Composition of the essential oil of *Ocimum kilimandscharicum* leaf. Indian Perfum., 48: 47-49.
6. Myers, N., R.A. Mittermeier, C.G. Mittermeier, A.B. Gustavo, D.A. Fonseca and J. Kent, 2000. Biodiversity hotspots for conservation priorities. Nature, 403: 853-858.
7. Adams, R.P., 2007. Identification of essential oil components by gas chromatography/mass spectrometry, 4th ed. Allured Publ. Corp., Carol Stream, IL.
8. Vieira, R.F. and J.E. Simon. 1999. Chemical characterization of basil (*Ocimum* spp.) found in the markets and used in the traditional medicine in Brazil. Econ. Bot. (in press).
9. Morales, M.R. and J.E. Simon. 1997. 'Sweet Dani': A new culinary and ornamental lemon basil. HortScience 32:148–149.
10. Morales, M.R. and J.E. Simon. 1996. New basil selections with compact inflorescence for the ornamental market. p. 543–546. In: J. Janick (ed.), Progress in new crops. ASHS Press, Alexandria, VA.
11. Morales, M.R., D.J. Charles, and J.E. Simon. 1993. New aromatic lemon basil germplasm. p. 632–635. In: J. Janick and J.E. Simon (eds.), New crops. Wiley, New York.
12. Paton, A. 1992. A synopsis of *Ocimum* L. (Labiatae) in Africa. Kew Bul. 47:403–435.
13. Paton, A. and E. Putievsky. 1996. Taxonomic problems and cytotoxic relationships between varieties of *Ocimum basilicum* and related species (Labiatae). Kew Bul. 5:1–16.
14. Phippen, W.B. and J.E. Simon. 1998. Anthocyanins in basil. J. Agr. Food Chem. 46:1734–1738.
15. Simon, J.E., A.F. Chadwick, and L.E. Craker. 1984. Herbs: An indexed bibliography 1971–1980. Archon Books, Hamden. p. 7–9.
16. Simon, J.E., J. Quinn, and R.G. Murray. 1990. Basil: a source of essential oils. p. 484–489. In: J. Janick and J.E. Simon (eds.), Advances in new crops. Timber Press, Portland, OR.
17. Sobti, S.N. and P. Pushpangadan. 1982. Studies in the genus *Ocimum*: Cytogenetics, breeding and production of new strains of economic importance. p. 457–472. In: C.K. Atal and B. M. Kapur (eds.), Cultivation and utilization of aromatic plants. Regional Laboratory Council of Scientific and Industrial Research, Jammu-Tawi, India.

18. Albuguerque, U. 1996. Taxonomy and ethnobotany of the genus *Ocimum*. Federal Univ. Pernambuco.
19. Angers, P., M.R. Morales, and J.E. Simon. 1996. Fatty acid variation in seed oil among *Ocimum* species. *J. Am. Oil Chem. Soc.* 73:393–395.
20. Charles, D.J. and J.E. Simon. 1992. A new geraniol chemotype of *Ocimum gratissimum* L. *J. Essential Oil Res.* 4:231–234.
21. Charles, D.J. and J.E. Simon. 1990. Comparison of extraction methods for the rapid determination of essential oil content and composition of basil (*Ocimum* spp). *J. Am. Soc. Hort. Sci.* 115:458–462.
22. Charles, D.J., J.E. Simon, and K.V. Wood. 1990. Essential oil constituents of *Ocimum micranthum* Willd. *J. Agr. Food Chem.* 8:120–122.
23. Darrah, H. 1974. Investigations of the cultivars of basil (*Ocimum*). *Econ. Bot.* 28:63–67.
24. Darrah, H.H. 1980. *The cultivated basil*. Buckeye Printing Co., MO.
25. De Baggio, T. and S. Belsinger. 1996. *Basil: An herb lover's guide*. Interweave Press, CO. Heath, H.B. 1981. *Source book of flavors*. AVI, Westport, CT.
26. Grayer, R.J., G.C. Kite, F.J. Goldstone, S.E. Bryan, A. Paton, and E. Putievsky. 1996. Intraspecific taxonomy and essential oil chemotypes in sweet basil, *Ocimum basilicum*. *Phytochemistry* 43:1033–1039.
27. Harley, M.M., A. Paton, R.M. Harley, and P.G. Cade. 1992. Pollen morphological studies in the tribe Ocimeae (Nepetoideae: Labiatae): *Ocimum* L. *Grana* 31:161–176. Marotti, M., R. Piccaglia, and E. Giovanelli. 1996. Differences in essential oil composition of basil (*Ocimum basilicum* L.) Italian cultivars related to morphological characteristics. *J. Agr. Food Chem.* 44:3926–3929.

