



Agrotechnology of Sweet Basil (*Ocimum basilicum* L.)



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Sweet basil (*Ocimum basilicum* L.) belongs to the Lamiaceae family commercially and extensively cultivated for its essential oil and is a native to India and other regions of Asia. It is a large, herbaceous, erect, strongly aromatic annual herb that grows upto a height of 30-90 cm, flowers are conspicuous with racemose inflorescence 0.72–1.25 cm long, corolla is long white, pink or pale-purplish in colour, seeds are ellipsoid and black in colour. Sweet basil is an important medicinal and aromatic crop which is used in perfumery, cosmetics, aromatherapy industry and common households. The crop grows well in the warmer climate and up to 1800 m altitude from sea level. This plant can occupy a wide range of habitats. In India, the cultivation of sweet basil is mainly concentrated in Uttar Pradesh, Punjab, and Haryana.



Common Name: Tulsa, Sweet basil

Varieties: CIM Saumya, CIM Sharda, CIM Surbhi, CIM Snigdha.

Marker compounds in Essential Oil: Methyl chavicol, methyl cinnamate and eugenol.

Soil and Agroclimatic Conditions:

It can be cultivated on a wide range of soils, from moderately fertile, well-drained loamy to sandy loam soils with a pH ranging from 4.5–9.0. Clayey, waterlogged soils are unsuitable for its cultivation. The crop is well suited in warm and humid climate having a temperature range of 25–35°C. High temperature and high humidity are good for plant growth and essential oil production. In heavy and continuous rainfall areas, crop growth is poor. In such areas the crop could be raised before the onset of monsoon and care should be taken that the rainwater does not stagnate in the field. Waterlogging causes root rot and results in stunted growth. In India, northern plains are suitable for its cultivation, while in hills, it can be cultivated as a summer crop.

Planting Time:

The crop can be grown from the middle of February to the end of September and also during *Kharif* cropping season in plains of north and south India, while in the hilly areas of north India, it can only be grown during *Kharif* cropping season.

Agrotechnology**Propagation:**

Basil crop can be propagated through nursery raising or direct seed sowing. However, direct sowing is not advisable for cultivation due to lower yield and a higher rate of seed therefore the plant is propagated through raising seedlings in the nursery and then transplanted into the main field. About 500 g seeds are required for raising seedlings for one hectare.

Direct Sowing:

For direct sowing the field should be cleaned of stubbles and weeds. About 10-15 tons of farmyard manure is required during the preparation of the land. In large-scale cultivation, farmers cultivate the Indian basil through broadcasting method. Its seed rate is 1.5-2.0 kg/ha. One part of the seed and ten parts of the sand should be mixed for proper broadcasting. By broadcasting, the spacing of the plants cannot be maintained. The thinning is advisable during the first weeding for maintaining the population density of the plants.

Nursery Raising:

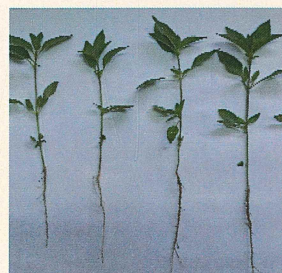
The cultivation of sweet basil through raising nursery is recommended. In the northern India, the seeds may be sown in the nursery in the months of April-May or August-September and in the hilly regions seeds are sown in April. Raised seedbeds of 10-15 cm height should be thoroughly prepared by the addition of well rotten farmyard manure and mixing well into the soil. Beds of 1 x 4 m, having irrigation channels are laid out and seeds (10-15 g per bed) are mixed with fine sand (1:10) and sown in lines of 5-10 cm apart in line sowing or broadcast over the beds. Care should be taken to avoid deep sowing, generally, seed should be sown within a depth range of 0.4-0.6 cm. The seeds are then covered with a thin layer of fine soil or farmyard manure. The nursery beds are watered immediately after sowing and regularly thereafter. The seeds start germinating 3 days after sowing and the germination will complete within 8-12 days. Frequent hand weeding should be done to maintain a weed-free nursery bed. The seedlings will be ready for transplanting in about 6 weeks after attaining a height of 10-15 cm. For healthy and vigorous seedlings a foliar spray of 2% urea solution should be given to the nursery plants at 15-20 days before transplanting.



Seeds of sweet basil



Seedlings of sweet basil



Seedlings ready for transplantation

Land preparation:

The land is well prepared with 2 to 3 ploughings until a fine tilth of soil is obtained. Farmyard manure/compost 10–15 t/ha is to be applied before the 2nd and 3rd ploughing.



Ploughing of plot through tractor for field preparation



Transplantation of crop

Transplanting:

Six week old seedlings having a height of 10–15 cm are transplanted in the main field with a spacing of 45x30 cm. Transplanting should be done preferably in the morning or evening hours to avoid transplantation shock. Cloudy weather and fine drizzle are considered ideal for transplanting, just after the planting, irrigation is required.

Crop Nutrition:

A well decomposed farmyard manure/compost 10-15 t/ha is to be applied before planting. A medium fertilizer dose of 120:60:40 kg/ha of N, P₂O₅, K₂O is recommended for economic yield. In the soil of average fertility, about 80 kg of nitrogen should be divided into three parts and given to the plant in equal quantity. Because it is a short duration crop, it is most responsive to nitrogen fertilizers. Half the dose of N and the entire dose of P₂O₅ and K₂O should be given as a basal dose, whereas, the remaining N is applied in two split doses after first and second cuttings.

Irrigation:

Irrigation depends upon the moisture in the field. When the crop is raised as a summer crop, irrigation is required once in a week. But, with the onset of monsoon, irrigation is not required till September. In total 12-15 irrigations are required during a year. In rainy season, no irrigation is required. Irrigation should be stopped, before harvesting.

Crop Rotation:

Due to high productivity and low returns from cereal crops, agriculture should be diversified from traditional crops to high-value crops like medicinal and aromatic plants. Cultivating Indian basil as a bonus crop may help minimize the expenses on cereal crops. The rotations are possible both with transplanted and direct planted basil crops. The following crop rotations are recommended: Basil—Potato—Mint; Basil—Potato; Basil—Mint; Basil—Brassica—Mint; Basil—Pea—Mint; Basil—Wheat—Mint, Basil—Chamomile—Mint.

Intercultural Operations:

Normally, the seedlings get well established in the field one month after transplanting, at this stage first weeding is done and the second is done one month after the first. In large plantations, the

expenditure on weeding can be minimized by the use of a cultivator drawn by a tractor. Hoeing is done two months after planting. In a broadcasting type of sowing, weeding is required after 25-30 days from sowing. In the first weeding, uprooting is required for unwanted plants to maintain the proper population. The second weeding is recommended after 1 month of first weeding.

Harvesting:

Harvesting is usually done in bright sunny days for good essential oil yield and quality. Normally 3-4 floral harvests are obtained in this crop. The first harvest of crop is obtained with the help of sickles at 90-95 days after planting in a stage when the plant is in full bloom and the lower leaves start turning yellowish, thereafter the subsequent harvests will be done at 65-75 days interval. For regeneration of the crop, the whole plant is harvested about 15-20 cm above from the ground level. Corresponding to the part harvested, two grades of essential oil can be obtained i.e. herb oil and flower oil. For getting the high-quality oil only the flowering tops are harvested. The harvested produce will be allowed to wilt in the field for 4-5 h to reduce the moisture

Storage of Essential Oil:

The essential oil should be stored in sealed amber coloured glass bottles, stainless steel containers, aluminum containers in a cool and dry place.

Yield:

An average yield of fresh herbage can be obtained 200 quintal/hectare. The average oil yield is about 90-100 kg/ha. Essential oil content is 0.5 to 0.8 %.

Uses of the essential Oil:

The essential oil is used in foodstuffs for flavor purpose, perfumery industry, and in toiletry products. In aromatherapy, it is used as insect repellent and cure for insect bites. The oil is antiseptic, digestive, expectorant, prophylactic. It is also used to cure fever, flu, anxiety, depression, fatigue and nervous disorders.

Cost of cultivation:

Essential oil price	Rs 900 - 1200/kg
Gross return	Rs 0.80-1.20 lakhs/ha/year
Cost of cultivation	Rs 0.40-0.60 lakhs/ha/year
Net returns	Rs 0.40-0.60 lakhs/ha/year

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