सत्यमेव जयते

MINISTRY OF FOOD PROCESSING INDUSTRIES
GOVERNMENT OF INDIA

NIFTEM
KNOWLEDGE • INNOVATION • OUTREACH

BASIL PROCESSING

AATMANIRBHAR BHARAT

PM Formalisation of Micro Food Processing Enterprises Scheme (PM FME Scheme)

CONTENTS

INTRODUCTION

Basil is an herb in the mint family. It adds flavor to meals, and its nutrients may provide health benefits.

Scientific namen : *Ocimum basilicum* (sweet basil)

Indian variety : holy basil *Ocimum santum* also known as Tulsi.

Provide vitamins, minerals, and a range of antioxidants

Essential oil may also have medicinal benefits.

INTRODUCTION

Rich in secondary metabolites and essential oils.

Safe to use, economical, effective and easy availability.

Rich in phenolic compounds and useful for therapeutic potentials.

Used in both Unani and Ayurvedic system of medicine.

Rich and spicy, mildly peppery flavour with a trace of mint and clove.

used widely as a flavouring confectionary, baked foods and meat products, culinary and an ornamental herb.

INTRODUCTION

O. sanctum is an erect, herbaceous, bi & triennial plant.

Height - 30-75 cm.

Leaf structure - serrate, pubescent on both sides.

Flowers - purplish or crimson.

Fruits - ellipsoid, slightly compressed, pale brown or reddish.

IMPORTANT CHEMICAL COMPOUNDS IN BASIL

The plant contains mainly phenols, aldehydes, tannins, saponin and fats.

The essential oil components are Eugenol - 71%,

Eugenol methyl ether - 20%

Carvacrol - 3% and

minor portions - Nerol, Caryophyllene, Selinene, α-pinene, ß- pinene,

Other chemicals found- Camphor, Cineole, Linalool

CHEMICAL COMPOSITION / 100G FRESH BASIL

Nutritive elements	**Content**
Fat	0.64 g
Protein	3.15 g
Water	92.06 g
Vitamins & Minerals	**Content**
Vitamin A	264 µg
β-Carotene	3142 µg

Ca	177 mg
Fe	3.17 mg
Mg	64 mg
Mn	1.148 mg
P	56 mg
K	295 mg
Na	4 mg
Zn	0.81 mg

Cultivation methods - SOIL

Rich loam, poor laterite, saline and alkaline to moderately acidic soils

Well drained soil - better vegetative growth.

Water logged conditions can cause root-rot and results in stunted growth.

LOAMY SOIL

WELL DRAINED

ROOT ROT

CULTIVATION METHOD - CLIMATE

1. Flourishes under fairly high rainfall and humid conditions.
2. Long days and high temperatures are favourable for plant growth and oil production.
3. It can grow up to an altitude of 900 m.
4. Moderately tolerant to drought and frost.
5. Under partially shaded conditions - low oil contents.

CULTIVATION METHOD – PLANTING AND NURSERY

Planting time - third week of February and transplanting done in the middle of April.

Nursery - Raised seed beds of 15 × 4 × 9 ft size

Farm yard manure addition - 10 kg per bed.

Seeds - 200-300 g enough to raise the seedlings in one hectare of land.

Sown depth - 2 cm after mixing with sand.

Seed germination - 8-12 days

LAND PREPARATION AND TRANSPLANTATION

Recommended farm yard manure addition - 15 t/ha.

Transplantation seedlings - six weeks old and having 4-5 leaves

For high herbage and oil yield preferred spacing - 40 × 40 cm, 40 × 50 cm and 50 × 30 cm

Seedlings are ready for transplanting - 6 weeks time.

For healthy seedlings - spray of 2% urea solution,15 to 20 days before transplanting.

CROP NUTRITION

Before planting farm yard manure / compost addition- 10 t/ha.

Compost must not be of city waste and human excreta.

Optimum fertilizer dose recommended - 120 kg N, 60 kg of P2 O5 and K2 O per hectare.

Basal dose - Half the dose of N and the entire dose of P2 O5 and K2 O.

Micronutrients increase the oil yield significantly. - Cobalt and Manganese

At concentration - 50 and 100 ppm

For saline and alkaline soils - 120 kg N, 105 kg each of P2 O5 and K2 O per hectare is recommended

WEEDING AND INTERCULTURE

First weeding - one month after planting,

Second weeding - 4 weeks after the first.

No further weeding after this as the plants become bushy, naturally suppressing the weeds.

One hoeing sufficient – after two months of planting

The crop may also be earthed-up at this stage.

APPLICATIONS

Leaves contain ascorbic acid - 83 mg/100 g) & carotene 2.5 mg/100 g.

Leaf juice have disphoretic, antiperiodic, stimulating, expectorant and antipyretic properties.

Uses in catarrh and bronchitis & as drops to relieve earache.

Application to the skin in ringworm.

Infusion of the leaves as a stomachic.

If taken internally, it strengthens the liver and heart and is a good appetizer.

APPLICATION

Cures amenorrhoea and promotes the secretion of milk in lactating women.

Leaves chewed give relief from toothache.

Leaf-juice is applied to reduce inflammations.

Root decoction act as a disphoretic in malarial fevers.

The powdered root, if taken twice daily for seven days cures spermatorrhoea.

BASIL SEEDS

Seeds are mucilaginous and demulcent used in disorders of the genito-urinary system.

The seeds rubbed in water are given for irritation
coughs, gonorrhea, labour pains and dysentery.

The seeds rubbed with cow's milk are given for vomiting and diarrhea.

The juice of the fresh leaves, flower-tops and the slender roots are considered to be good antidotes for snakebite and scorpion sting.

BASIL USES

Tribals use the plant in cholera, cough, postnatal complaints, hemorrhagic septicemia and dog bite.

The volatile oil possess antibacterial and insecticidal properties.

It inhibits the in vitro growth of Mycobacterium tuberculosis and Micrococcus pyrognes var. aureus.

It has marked insecticidal activity against mosquitoes.

DISEASES AND CONTROL

Powdery mildew by Oidium spp. controlled by spraying wettable sulphur 4 g/l water.

Seedling blight caused by Rhizoctonia solani.

Root-rot caused by Rhizoctonia bataticola.

the latter two diseases are managed by:

1. improved phyto-sanitary measures and,

2. by drenching the nursery-beds with a solution of mercurial fungicide.

PESTS AND CONTROL

Larvae of leaf-rollers sticking to the under surface of the leaves fold them backwards lengthwise, thus webbing them.

Malathion (0.2%) may be sprayed to control this insect.

HARVESTING YIELD AND PROCESSING

Harvesting - done in full bloom state.

First harvest - 90-95 days after planting.

Afterwards – can be harvested at every 65-75 days, intervals.

Harvesting - on bright, sunny days gives good quality oil-yield.

It is not desirable to harvest the crop if it has rained the previous day.

HARVESTING YIELD AND PROCESSING

The crop should be cut 15-20 cm above ground-level.

The harvested allowed to wilt for 4-5 hours in the field itself to reduce the moisture content and the bulkiness.

About 5 ton/hectare of fresh herbage can be obtained 2 to 3 times a year.

DISTILLATION OF OIL

Distillation – should be done in fresh form.

Oil quality and yield maintained up to 6-8 hours after harvest, if delayed may result in gradual loss of quality.

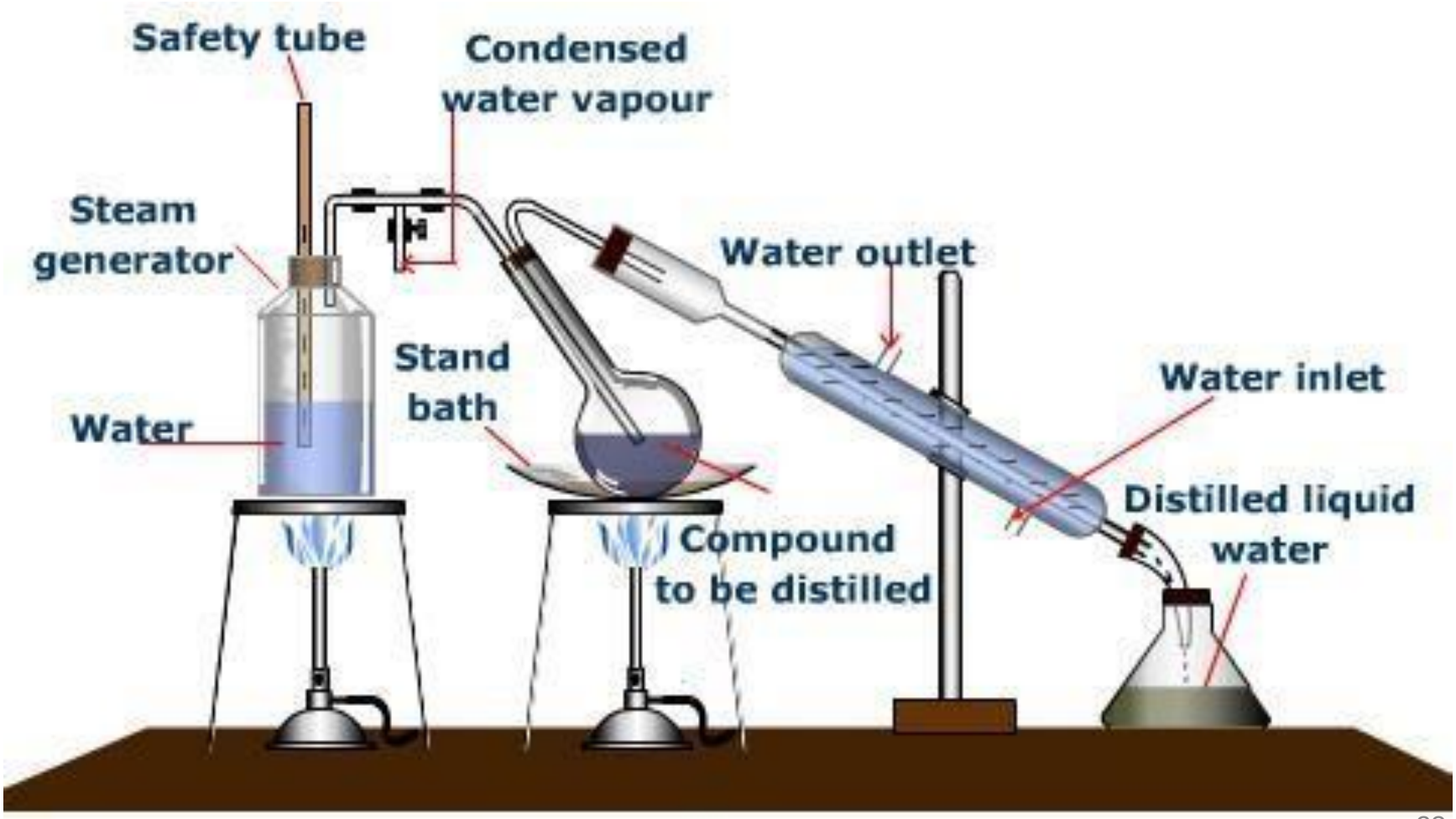
Steam-distillation is superior to water distillation.

Whole herb contains 0.1 to 0.23% essential oil.

The oil yield depend upon type, season and place of origin.

The oil-yield 10-23 kg/ha approx.

STEAM DISTILLATION



STEAM DISTILLATION PROCESS

- Distillation is the process of separating the components or substances from a liquid mixture by using selective boiling and condensation.
- Distillation may result in essentially complete separation (nearly pure components), or it may be a partial separation that increases the concentration of selected components in the mixture. In either case, the process exploits differences in the volatility of the mixture's components.
- In industrial chemistry, distillation is a unit operation of practically universal importance, but it is a physical separation process, not a chemical reaction.
- Steam distillation is a special type of distillation (a separation process) for temperature sensitive materials like natural aromatic compounds.

STEAM DISTILLATION PROCESS

- It once was a popular laboratory method for purification of organic compounds, but has become less common due to the proliferation of vacuum distillation.

- This process effectively enables distillation at lower temperatures, reducing the deterioration of the desired products.

- If the substances to be distilled are very sensitive to heat, steam distillation may be applied under reduced pressure, thereby reducing the operating temperature further.

- After distillation the vapours are condensed. Usually the immediate product is a two-phase system of water and the organic distillate, allowing separation of the components by decantation, partitioning or other suitable methods.

STEAM DISTILLATION UNIT APPLICATION

- It is employed in the manufacture of essential oils, for use in perfumes for example. In this method, steam is passed through plant material containing desired oils.
- Eucalyptus oil and orange oil are also obtained by this method in the industrial scale.
- Steam distillation is also used to separate intermediate or final products during synthesis of complex organic compounds.
- Also widely used in petroleum refineries and petrochemical plants.

National Institute of Food Technology and Entrepreneurship and Management
Ministry of Food Processing Industries
Plot No. 97, Sector-56, HSIIDC, Industrial Estate, Kundli, Sonipat, Haryana-131028

Website: http:www.niftem.ac.in
Email: pmfmecell@niftem.ac.in
Call: 0130-2281089