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# Introduction

Rosemary, botanically known as Rosmarinus officinalis, is a herbaceous perennial aromatic plant that belongs to the family Lamiaceae. It is originated from the Mediterranean regions of Europe, Asia, minor and North Africa. The name rosemary is derived from the Latin word 'rosmarinus', which means "dew of the sea". The ancient Greeks refers rosemary as 'antos', which means the blossom of excellence, because of its incense-like aroma. The herb is used as the "symbol of remembrance". It is widely cultivated in the regions of France, Italy, Spain, Tunisia, Yugoslavia, Morocco and Portugal mainly for its valuable essential oil. It grows upto a height of 60 - 200 cm and has small needle like - pointed leaves. The leaves, flowering tops, and twigs produce essential oil and oleoresin, which are used in recipes, traditional medicine, modern medicine, aromatherapy, as perfume and in flavoring industries. In Tamil Nadu, Rosemary is cultivated at limited extent in Talavadi Hills of Erode district, Ooty, Nilgiri hills.

# USES OF ROSEMARY OIL Culinary purpose

Fresh and dried leaves are commonly used as herb in traditional Mediterranean cuisine, and also used in the preparation of tisane (Herbal Tea). They are often used in cooking and when burned, emits an unique mustard odor. The fresh tender leaf tops are used to garnish and add flavour to the beverages, soups, pickles, and other dishes. The leaves are used as a condiment in variety of dishes. The dried and powdered leaves are added to flavour while cooking fish, chicken, soups, meats, soups, sauces, dressings, jams and preserves. They are commonly used in sage-infused pork and veal stuffings, as well as biscuits.

## **Medicinal Purpose**

The oil extracted from rosemary leaves has many therapeutic properties like antiangiogenic effect, anticancer, antiplatelet, antimicrobial, anti- parasitic, antianti-inflammatory, oxidant, analgesic, hepato-protective, antidepressant, diuretic, emmenagogue, analgesic, rubefacient. stimulant, sudorific, hepatic, hypertensive, cholagogue, cordial, astringent, digestive, carminative and tonic. The diuretic



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properties of the oil can help in reducing water retention during menstruation. It helps in nervous exhaustion, neuralgia, mental fatigue, headaches and migraines. It also helps in palpitations, poor circulation, arteriosclerosis and varicose veins. It is effective for bronchitis, asthma, whooping cough, catarrh and sinus. The antibacterial properties of the oil make it ideal for treating intestinal infections and diarrhea, as well as colitis, dyspepsia, flatulence, hepatic diseases, jaundice, and pain caused rheumatism, arthritis, by muscular discomfort, and gout. It also contains stimulant properties thereby improving the memory, hair growth and effective for skin and scalp disorders.

#### **COMPOSITION OF OIL**

The oil obtained from rosemary contains major components like 1,8-cineol (15- 20 %), camphor (15- 25 %), borneol (16-20 %), bornyl acetate (up to 7 %), a -pinene (25 %); in addition, the oil contains minor amounts of p-pinene, terpinolene, thujene, copalene, linalool, camphene, subinene, myrcene, p-cymene, terpinene, a -terpineol, caryophyllene, methyl chavicol, a-phellandrene, aterpinene, limonene and thymol.

#### CLIMATE

Rosemary prefers Mediterranean type of climate with low humidity, a moderate winter, and mild summer for its optimal growth. The climates of Bangalore and Nilgiris in India, were determined to be ideal for its successful cultivation.

#### SOIL

In India, the plant thrives well in light loamy soils of Nilgiris and sandy loam soils of Bangalore. The crop requires soil pH of 6.5-7.0 for its optimal growth.

#### **TYPES AND VARIETIES**

There are two types of rosemary cultivated namely French rosemary and Italian rosemary. The French types produce white- colored flowers and contains superior oil quality The Italian types produce purple color flowers and the oil is comparatively less superior to the French types.

There are two improved varieties; Ooty-1 released by TNAU and CIM-Hariyali by CIMAP.

# PROPAGATION Seed Propagation

The crop can also be propagated through seeding. The most suitable season to raise the nursery is between September and November. The seeds develop well at a temperature of 14 - 15°C. 8-10 weeks old seedlings are ready for transplanting in main field.

#### **Vegetative Propagation**

Cuttings of 10-15 cm are cut from healthy mother plants. Half of the leaves from the bottom are removed. The cuttings are then planted in nursery beds. After 6-8 weeks, the rooted cuttings are ready to be transplanted into the main field.

#### **PREPARATION OF LAND**

The land is well prepared by ploughing and harrowing repeatedly. About



15-20 tonnes of well-rotten FYM is incorporated into the soil at the final ploughing. Beds of convenient size are made and divided.





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#### **PLANTING**

Rooted cuttings or seedlings that are eight to ten weeks old are transplanted in the main field generally at the spacing of



45 cm x 120 cm. According to the Central Institute of Medicinal and Aromatic Plants (CIMAP) in Lucknow, a plant spacing of 45 x 45 cm is ideal for maximum production. The highest production of oil is achieved with

approximately 50,000 plants per ha.

#### MANURES AND FERTILISERS

15-20 tons of FYM, NPK at 20: 40: 40 kg/ha are applied as the base dose. After each harvest, 80 kg/ha of nitrogen is applied in four equal split doses to encourage vegetative growth. CIMAP, Lucknow, recommends



applying 300 kg N/ha/year to achieve maximum yield.

#### **IRRIGATION**

Generally, rosemary is a droughttolerant crop which can survive by withstanding longer drought periods. Initially, the seedlings are irrigated twice a week till they get established. After, the crop can be irrigated at weekly once.

### WEED MANAGEMENT

During the crop growth, 5-6 earthing up and weeding's are given so as



to improve the soil aeration. When the crop is 2-3 years old, the bushes are clipped to promote the growth of new vegetative shoots, which will increase oil vield.

#### PEST AND DISEASES

Rosemary is infested by spider mites, mealy bugs, whiteflies and thrips. Among the pests, Mites have been reported to cause considerable crop loss. Ethion (0.05%) can be used to manage the pest. Late blight disease is caused by Rhizoctonia sp., a soil-borne fungus, Phytocoris rosmarini, and Orthotylus *ribesi*. This can be controlled by drenching with Mancozeb (1%) at 8-10 days interval.

#### HARVESTING AND YIELD

The crop is harvested after 8 months of planting which will commence at 50 % of flowering stage and continue till 70 - 90 % inflorescence emergence. When the shoots mature to their maximum size but have not become woody, they are chopped for distillation. Subsequent harvests can be done at an interval of 3-4 months. Distilling the hardwood is not recommended as it imparts turpentine flavour. About 12 to 15 tonnes of herbage/ ha/year is obtained, yielding about 85 to 100 kg of oil per hectare. Fresh leaves yield about 1% of oil and shade-dried leaves yield about 3% of oil.

#### **EXTRACTION OF OIL**

The harvested tender tops and leaves are washed so to remove the adhering soil matters and shade - dried for 10- 15 days in Niligiri conditions. The dried leaves are then subjected to the steam distillation for about 2 hours.







#### **CONCLUSION**

as an ·al ·al Rosemary is emerging important aromatic herb, being a potential source of antimicrobial molecules, a botanical nutraceutical, a functional food, and as natural alternative to pesticides. The demand for its valuable oil has been steadily increasing throughout the world in recent years for its numerous therapeutic properties. But still rosemary has been cultivated only at a limited extent. Therefore, adequate research has to be carried focusing on its varietal improvement, profiling its bioactive compounds, modern method of oil extraction and adulteration detection.

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