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Lavender Cultivation - A Way Forward to Jammu's Purple Revolution

Lavender (*Lavandula spica*) is an ornamental plant economically valued for its highly fragrant flower. Lavender oil extracted from flowers is an important ingredient in many commercial products. Cultivation of lavender in the hills of Jammu has changed the face of farming and brought in scent of profit to farmers. Aroma mission launched by Council of Scientific and Industrial Research (CSIR) in 2016 envisaged to bring transformative change in the aroma sector through interventions in the areas of agriculture. It is expected to enable Indian farmers and aroma industry to become global leaders in the production and export of essential oils.

INTRODUCTION

A Mediterranean native, Lavender (*Lavandula spica*) is an aromatic and perennial shrub of family Lamiaceae. It is valued for its highly fragrant flowers, comes in variety of colours like purple, pink, white, mauve etc. It is a popular ornamental plant used in various gardening and landscaping, as well as an arsenal of medicinal and home applications. Lavender oil extracted from flowers is an important ingredient in many commercial products. Its high economic value and ease of cultivation practices is prompting farmers to grow it in



large scale. In India, high altitude areas of Himachal Pradesh, Uttar Pradesh and Jammu Kashmir are suitable for lavender cultivation.

Around 500 farmers in Doda district of Jammu Kashmir have quadrupled their income by switching from cultivation of maize to lavender. Lavender cultivation has revolutionized the income of Doda farmers in a short time. That is the reason of its popularisation as "Jammu's Purple Revolution". Purple revolution is reported to be 17th revolution in India moving towards "Atmanirbhar bharat".

PACKAGE OF PRACTICE FOR LAVENDER CULTIVATION

CLIMATE

It is a temperate crop. It should be grown in higher altitude for obtaining better quality of oil. It can withstand drought and frost conditions but requires adequate sunlight for its proper growth. Yield of flower is less under inappropriate light conditions leading to reduced oil content.

SOIL

Lavender requires calcareous, well aerated soil with higher organic matter. It is sensitive to water logging. It yields essential oil under ideal soil pH of 7-8.3.

PROPAGATION

It can be grown by seeds, layering and rooted cuttings.

1. SEEDS

It requires 2 grams seed per square meter area. Nursery beds of 1m wide should be prepared and seed can be sown either through broadcasting method or in row method with 10-12 cm apart. Sowing depth should be 1 to 2 cm.

2. ROOTED CUTTINGS

Cuttings of 10-15 cm size should be prepared from young top shoots of the plants. The bottom 2/3rd of the cuttings should be stripped from leaves and inserted in proper growing medium.

3. LAYERING

A long healthy stem should be selected and 12-15 cm of foliage removed leaving 10 cm of foliage at the tip of branch and covered with moist soil.

PLANTING

Autumn is suitable for planting lavender. Row to row spacing of 1.70-2 m and plant to plant spacing of 0.50-0.60 m should be maintained.

VARIETIES

There are four commercial lavender varieties as follows

1. TRUE LAVENDER

It is single stalked, 20 to 40 cm long, mostly grown lavender species and thought to be originated in Mediterranean region. Its essential oil content is 0.5% to 1 %.

2. SPIKE LAVENDER

It is native to Mediterranean region.

3. LAVANDIN

It is a hybrid of true and spike lavender, hemispherical in shape. Spikes are 0.6 to 0.9 cm long and branched. Leaves are thin, lanceolate, opposite and green in colour with pubescent. Oil content varies from 0.9 to 3%.

4. SHER-E-KASHMIR

A superior clone released by CIMAP, Lucknow, UP with 100% higher essential oil yields.

IRRIGATION

As it is grown in low rainfall area, it requires irrigation for the first two years, preferably in the flower initiation stage.

MANURES AND FERTILIZERS

N, P, K ratio of 100:40: 40kg is recommended for better yield. 20 kg of N and full dose of P₂O₅ and K₂O should be applied as basal dose. Remaining 80 kg of N should be given in four splits.

INTERCULTURAL OPERATION

Weeds should be removed either by hand or mechanically to provide better aeration. Pruning should be done during the first two years.

INSECT-PESTS AND DISEASES

The main pests that affect lavender are meligitis, *Sophronia humerella* (a butterfly), cecidomia and cuscuta. Pathogens that attack lavender are *Phoma* sp., *Armillaria mellea*, *Botrytis cinerea* causing gray mold and *Rhizoctonia*.

HARVESTING AND YIELD

Lavender starts flowering earlier in warmer and late in high slopes. It should be cut with a stem length of 10 cm. Harvesting is done in August- September. It gives yields 15 kg/ha. Oil content varies from 1.2% to 1.5%.

LAVENDER OIL

Linalyl acetate and linalool are the major constituents of lavender oil. Esters of linalyl acetate gives a pleasant, sweet and fruity aroma to lavender. Cineol, geraniol, limonene, borneol pinene and some tannin are present in lower amount.



LAVENDER ECONOMY

1. Lavender grown in one hectare of land gives about 40 litre of lavender oil and sells at a minimum price of Rs. 10,000 per litre.
2. Lavender water, a byproduct of lavender oil is used for preparation of incense sticks.

Hydrosol, a fluid formed by distillation from flowers, is used for fragrances in soaps and room fresheners.



AROMA MISSION

With the main aim to improvise the lifestyle of small and marginal farmers, focusing primarily on drug discovery from natural products, Aroma mission was launched by Council of Scientific and Industrial Research (CSIR) in 2016. It is anticipated to bring cathartic change through intrusion in agriculture, processing and product development for giving a new height to aroma industry and paving a way for rural employment. The purpose is to boost the

cultivation of aromatic crops for essential oils to meet the demand by the aroma industry.

It is expected that increased demand of essentials or scented oil by aroma industry will provide a new insight for cultivation of lavender to Indian farmers. It is envisaged to provide substantial benefits to the farmers in grabbing higher profits, proper utilization of waste lands and protection of other crops from wild and grazing animals. Along with this, it is also providing an opportunity to become global leaders in the production and export of essential oils.



INSTITUTE WORKING UNDER AROMA MISSION

1. CSIR-Central Institute of Medicinal and Aromatic Plants (CSIR-CIMAP), Lucknow.
2. CSIR- Central Drug Research Institute (CSIR-CDRI), Lucknow.
3. CSIR-National Botanical Research Institute (CSIR-NBRI), Lucknow.
4. CSIR- Unit for Research and Development of Information Products (CSIR-URDIP), Pune.
5. CSIR- Institute of Himalayan Bioresource Technology (CSIR- IHBT), Palamapur.
6. CSIR- Indian Institute of Integrative Medicine (CSIR- IIMM), Jammu.
7. CSIR- Northeast Institute of Science and Technology (CSIR-NEIST), Jorhat.

PROJECTIONS OF AROMA MISSION

- To add 5500 ha of additional area under captive cultivation of aromatic cash crops particularly targeting rainfed or degraded land.

- Provide technical and infrastructural support for distillation and value addition to farmers/growers.
- Enabling effective buy-backs mechanisms to assure remunerative prices to the farmers.
- Will improve value addition to essential oils and aroma ingredients for their integration in global trade economy.

CONTRIBUTION OF CSIR-IIIM IN PURPLE REVOLUTION

In the year 2016, the Central government in association with CSIR launched Aroma Mission to promote lavender cultivation. Initially free lavender saplings were given to farmers and those who have cultivated lavender earlier were sold at a minimal cost of Rs 5-6 per sapling. The farmers sold these flowers with the help of IIIM-Jammu. Candles and Aroma oils manufacturing companies like Ajmal Biotech private limited, Aditi International and Navnetri Gamika procure lavender extracts from the farmers in Doda and other J&K districts like Rajouri, Ramban and Pulwama where the Mission was launched in 2018.

Four distillation units were set up by CSIR-IIIM Jammu in Doda and two more have been proposed to meet the increased demand.

CSIR-IIIM-Jammu have announced the phase 2 of Aroma Mission on Feb 9, 2021 after the success of first phase. The mission aims to spread lavender cultivation upto 1500 hectares within three years from now.

SUCCESS STORY

Bharat Bhushan (41), a bhadrawah farmer from Khillani village in Jammu and Kashmir's Doda district, used to cultivate maize like others. Then he started cultivating lavender in 2010, when the state's tourism department promoted this crop for beautification. Initially he grown in 0.1 hectare of land. As he started earning profit, he completely switched to lavender. Then, in 2016, Aroma Mission was launched to promote cultivation of plants like lavender which have aromatic as well as medicinal properties.

Bhushan have quadrupled his earnings and at present, 20 farmers are working in his lavender fields and nursery. Due to unavailability of machines in time, he decided to install machinery to extract oil from lavender flowers and today, he runs a company to

manufacture aromatic products. His success story and style of farming has not only changed his fortunes but of many others as well. Around 500 farmers from Bhushan's district have seen similar gains after switching from maize to the perennial flowering plant.



CONCLUSION

At present, large scale lavender cultivation is limited to Jammu and Kashmir. Impressed by the success of Doda farmers, governments in Himachal Pradesh, Arunachal Pradesh and Uttarakhand are also motivating their farmers to take up lavender.

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