Ministry of Food Processing Industries
Government of India

NIFTEM
Knowledge. Innovation. Outreach

# PROCESSING OF TEJPATA

AATMANIRBHAR BHARAT

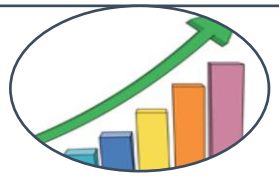
PM Formalisation of Micro Food Processing Enterprises Scheme (PM FME Scheme)

# INTRODUCTION

**Industrial Overview:**

- One of the major strengths of the Indian spice economy is the robust domestic market for spices.
- India produces a wide range of spices and holds a prominent position in world spice production.
- Spices, as a commodity group, comes third after marine products and basmati rice in terms of export value. Spices from the country reach more than 180 countries across the globe through various trade channels.
- The growth of functional foods, beverages, and the cosmetic industry will also drive demand for spice-based nutraceuticals.

# INTRODUCTION



**Market Potential:**

- Spice trade has some of the most lengthy and complex value chains among all commodity groups. Tejpata, Cumin, chili, turmeric, cardamom, black pepper, and ginger are some of the major constituents of Indian spice exports. The essential oils and oleoresins from spices are also a major export component.
- The marketing channel of tejpata is similar to most of the spice commodities.
- The produce is brought to the market either directly by the farmer producer or through village level intermediaries acting as agents of traders located in towns. From small-town traders, the produce is aggregated in major trade centers.
- The bulk of the tejpata produced in the country is consumed in the domestic market.
- Active wholesale markets for the commodity exist mainly in Meghalaya and West Bengal.

# INTRODUCTION

## Raw Material Description

- It has been classified into three different types viz. Indian bay leaf, bay laurel, Indonesian bay leaf, West Indian bay leaf, California bay leaf, and Mexican bay leaf. Indian bay leaf or malabathrum is obtained from *Cinnamomum Tamala*, *Lauraceae*.
- Bay laurel, Mediterranean or European bay leaf is obtained from *Laurus nobilis*, *Lauraceae*.
- California bay leaf is taken from California bay tree (*Umbellularia californica*, Lauraceae). Indonesian bay leaf or Indonesian laurel or more popularly, salam leaf is a bay leaf from the *Myrtaceae* family (*Syzygium polyanthum*).
- It is very uncommon outside Indonesia. West Indian bay leaf is nothing but the leaf of the West Indian bay tree (*Pimenta racemosa*, Myrtaceae) and is used culinarily (especially in Caribbean cuisine) and to produce the cologne called bay rum.
- Mexican bay leaf is obtained from Litsea glaucescens, Lauraceae.
- Mexican bay leaves are long and tapering with slightly fluted edges

# TYPES OF RAW MATERIALS

Mediterranean or European bay leaf

Indian Bay leaf

Indonesian bay leaf

West Indian bay leaf

Mexican bay leaf

Californian bay leaf

# PROCESS & MACHINERY REQUIREMENT

## Harvesting

•The harvesting of tejpata leaf and bark is dependent on the age and growth pattern of the trees.

•Hand plucking is the general practice followed for harvesting tejpata leaves.

•At the time of harvest, the small branches are excised with the leaves and dried in the shade. Along with the harvest, pruning of the trees is also undertaken to avoid the rapid growth of branches.

•Any dead and diseased branches are also removed at this stage. These dried branches are then bundled for the market.

•Leaves are collected (small branches with leaves are also tied into bundles), dried in the sun, and marketed. A single tree of average size yields about 10–20 kg of leaves every year.

# PROCESS & MACHINERY REQUIREMENT

## Processing

• The mature fresh leaves after it is handpicked are allowed to dry on a wire mesh screen by spreading it in a thin layer. It is allowed to dry for at least two weeks in a warm area under shade but not in direct sunlight.

• Hot air mechanical drying at 60°C is considered the best method for producing dry bay leaf.

• Slow drying of leaves in a warmer area away from direct sunlight allows to temper the bitterness from fresh leaves as it tends to be slightly bitter when fresh.

• Freshly dried leaves will have a better deeper flavor and can be stored in an airtight jar or plastic bags away from direct sunlight.

• The major defect that can be present in the tejpata leaves are sticks which may be as large as small its small branches.

# PROCESS & MACHINERY REQUIREMENT

**Raw material Aspects:**

- Indian Cassia or Indian bay leaf is commonly known as tejpata (*Cinnamomum Tamala*) is a small to moderately sized evergreen tree.
- The leaves of this tree are aromatic having a clove-like taste and a faint pepper-like odor. The leaves are used as a flavoring or seasoning in cooking and contain approximately 1.5 to 2% of volatile oil.
- Indian bay leaf or tejpata are larger, olive green in color, and have three prominent leaf veins as compared to the single prominent leaf vein present in European leaf

# PROCESS & MACHINERY REQUIREMENT

**Source of raw material:**

- In India, tejpata trees are mostly cultivated in the states like Kerala, Karnataka, and North Eastern states like the Meghalaya region especially, Gharo, Khasi, Jaintia & Nilgiri hills.
- It grows naturally or is cultivated at an altitude of 900-2500 m above mean sea level in the states like Sikkim, Assam & Mizoram.
- Tejpata leaf production is highest in Meghalaya and the productivity ranges from 30- 70 kg per tree per year.

# PROCESS & MACHINERY REQUIREMENT

**Nutritional composition of *Cinnamomum tamala* per 100 g**

| Composition | USDA | ASTA |
|---|---|---|
| Carbohydrate (g) | 74.96 | 75.40 |
| Water (g) | 5.44 | 4.50 |
| Fat (g) | 8.36 | 8.80 |
| Protein (g) | 7.61 | 7.50 |
| Ash (g) | 3.62 | 3.70 |
| Calcium (g) | 0.83 | 1.00 |
| Potassium (mg) | 529 | 600 |
| Phosphorus (mg) | 113 | 110 |
| Iron (mg) | 43 | 53.3 |
| Sodium (mg) | 23 | 20 |

# HEALTH BENEFITS

- Tejpata is used in the treatment of diabetes
- Aids digestion
- Relieves pain
- Anti-cancer properties
- Treatment of menstrual problems
- Clean teeth
- Treatment of kidney problems
- Treatment of cold and infection
- Induces sleep
- Treatment of nosebleed
- Cardiovascular benefits

# CULINARY USES

- Tejpata has aromatic leaves which are used for culinary and medicinal purposes.
- The bark is also sometimes used for cooking, although it is regarded as inferior to true cinnamon or cassia.
- Bay leaf is used as a spice to impart flavor to a variety of dishes of various cuisines around the world, both vegetarian and non-vegetarian.
- The leaf is used for flavoring stews, dishes that need a long time to cook, and soups.

# PROCESS & MACHINERY REQUIREMENT

**Technologies: Tejpata Leaf Powder**

• Spices are an important part of Indian cuisine.

•Food industry consumes spices in various forms viz. whole, powder, and blends. Powdered spices are easy to use and it saves time and physical effort for preparing different food items.

•Every commercial food service like hotels, restaurants, *etc*. uses powdered spices. Though tejpata is generally used as leaves, powdered form of tejpata is also available as its value-added product.

# PROCESS & MACHINERY REQUIREMENT

**Technologies:** Various operations involved in making tejpata powder are as follows:

- **Cleaning**

This is the initial process for spice making in which the tejpata leaves are manually checked and cleaned by removing impurities like stone, dust, and dirt. Discolored leaves and leaves with visible signs of fungal infection or pest damage are discarded.

- **Drying**

The fresh tejpata leaves are generally dried under shade by spreading them on a mat. In case of rains, there is a need for an artificial tray dryer for the drying process. The leaves can be dried using electric driers at $55^0$ C for 8 hours, which reduces the moisture content to desirable levels. Properly dried leaves can be stored in polythene-lined gunny bags without significant loss in quality.

# PROCESS & MACHINERY REQUIREMENT

## Grinding/ Pulverizing

A grinding machine is used for pulverizing the dried tejpata leaves into powder form. A small- scale manufacturing unit can process up to 100 kg of tejpata leaves into powder in a day using a simple pulverizing machine. An automatic grinding machine can produce 20 to 25 kg/h of tejpata leaf powder. The optimum particle size of the finished tejpata powder ranges from 60-80 µm.

Sieving

The powdered spices are sieved to ensure that spice powder is having a uniform mesh size. The bigger particles can be reground using the pulverizer to attain the desired particle size.

Packaging

Once the spice is converted into powder form, spice powders are weighted as per packing requirements and then sealed. The processed powder is packed in laminated pouches (two or three-layered)and sealed with the help of a sealing machine.

# PROCESS & MACHINERY REQUIREMENT

## Machinery requirement for Tejpata Leaf Powder


Tray dryer

Pulverizer

Vibrating sieve

Packaging machine

# DRY RECOVERY OF TEJPATA

Studies on drying of tejpata leaves carried out at ICAR-IISR, Kozhikode revealed that the dry recovery was 34.71% and other important characteristics of dried leaves like its essential oil and oleoresin are detailed in Table

| Parameter | Value |
|---|---|
| Dry recovery | 34.71% |
| Moisture content | 9.33 % |
| Essential oil Content | 0.53 % |
| Oleoresin content | 5.86 % |

# PROCESS & MACHINERY REQUIREMENT

**Technologies: Tejpata Essential Oil**

• Essential oils are secondary metabolites found in plants.

• In the case of spices, these volatile compounds impart the typical aroma associated with the respective spice. The essential oils are trapped as oil glands inside the plant tissues. They are usually extracted through the process of hydro-distillation. The aromatic leaves are packed in a large container called ‘still’ and a sufficient quantity of water is added to it. The mixture is then brought to a boil.

•Alternatively, live steam is injected into the still.

•Due to the influence of hot water/steam, the essential oil is freed from the oil glands in the plant tissue. The vapor mixture of water and oil is condensed by indirect cooling with water.

•From the condenser, distillate flows into a separator, where the oil separates from the distillate water due to the difference in densities.

# PROCESS & MACHINERY REQUIREMENT

**Technologies:**Distillation methods for isolating essential

### Water Distillation

• In this method, the material is completely immersed in water, which is boiled by applying heat by direct fire, steam jacket, closed steam jacket, closed steam coil, or open steam coil.

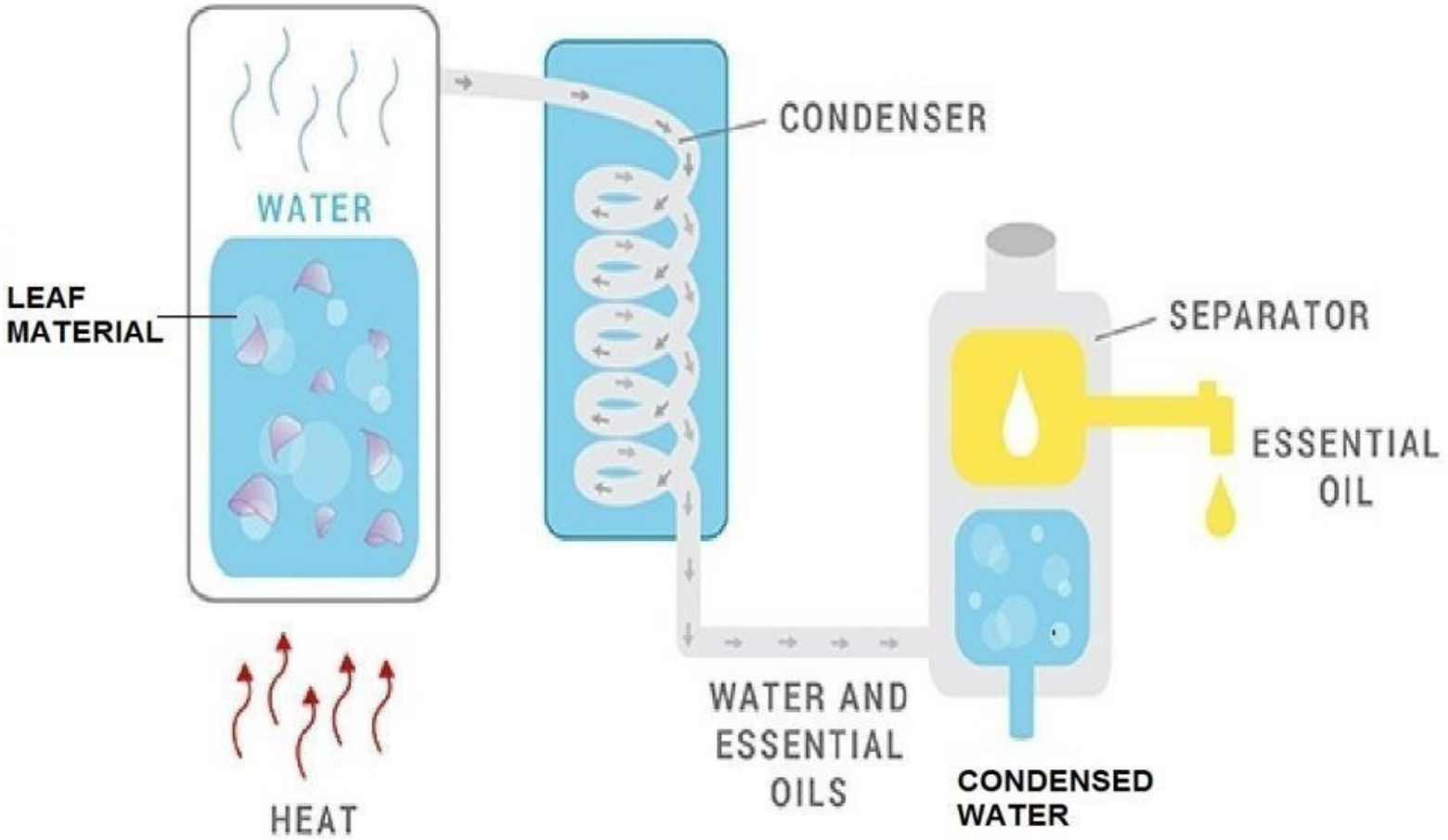
•When the still is heated by direct fire, adequate precautions are necessary to prevent the charge (plant material) from overheating.

• When a steam jacket or closed steam coil is used, there is less danger of overheating. With open steam coils, this danger is avoided. But with open steam, care must be taken to prevent the accumulation of condensed water within the still. Therefore, the still should be well insulated.

• The plant material in the still must be agitated as the water boils, otherwise, agglomerations of dense material will settle at the bottom and become abnormally degraded.

• The laboratory apparatus recommended for trial distillations is called as Clevenger system.

# WATER DISTILLATION SYSTEM



# PROCESS & MACHINERY REQUIREMENT

**Technologies:**There are three types of distillation methods for isolating essential oils

**Water and steam distillation**

• In water and steam distillation, the steam can be generated either in a separate boiler or within the still, although separated from the plant material.

• Like water distillation, water and steam distillation are widely used in rural areas. Moreover, it does not require a great deal more capital expenditure than water distillation.

• Also, the equipment used is generally similar to that used in water distillation, but the plant material is supported above the boiling water on a perforated grid.

• It is common that persons performing water distillation eventually adopt water and steam distillation.

# PROCESS & MACHINERY REQUIREMENT

**Constituents of essential oil in different Chemo types of tejpata**

| Chemotype | Constituents |
|---|---|
| Eugenol type | Eugenol- 66–70% |
| Cinnamic aldehyde type (E) | Cinnamaldehyde- 79.4% |
| Linalool type | Linalool- 54.66% |
| Trans sabinene hydrate-*β*-ocimene type | trans-sabinene hydrate- 28.8%, *β*-ocimene- 17.9% |

# PROCESS & MACHINERY REQUIREMENT

Variation in composition of essential oil of tejpata

| Category | Oil content ( %) | Eugenol (%) | Other components (% composition) |
|---|---|---|---|
| Type I | 1.0 | 77.5 | α-pinene (1.65%), α-phellandrene (10.47%), p-cymene (2.23%) and caryophyllene oxide (1.20%) |
| Type II | 1.3 | 68.1 | α-pinene (2.25%), α-phellandrene (14.50%), p-cymene (4.00%), 1,8-cineole (2.35%), linalool (1.20%), α-terpineol (1.30%) and eugenylacetatete (1.60%) |
| Type III | 0.7 | 57.9 | α-phellandrene(5.45%), p-cymene (2.68%), 1,8-cineole (4.35%), terpinen-4-ol (2.25%), eugenylacetate (8.73%), α-farnesene (7.90%) and caryophyllene oxide (2.90%) |
| Type IV | 1.5 | 82.5 | α-phellandrene (6.38%), p-cymene (1.09%), caryophyllene (1.47%), and eugenyl acetate (4.36%) |

# PM-FME SCHEME

**The objectives of the scheme are:**

- Support for capital investment for up-gradation and formalization with registration for GST, FSSAI hygiene standards and Udyog Aadhar;
- Capacity building through skill training, imparting technical knowledge on food safety, standards & hygiene and quality improvement;
- Hand holding support for preparation of DPR, availing bank loan and up-gradation;
- Support to Farmer Producer Organizations (FPOs), Self Help Groups (SHGs), producers cooperatives for capital investment, common infrastructure and support branding and marketing.
- https://mofpi.nic.in/pmfme/docs/SchemeBrochureI.pdf

For More details Contact:

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