

5.3.11. Cinnamon (9)

Cinnamon obtained from the inner bark of the trees of genus *Cinnamomum* is majorly used in sweet and savoury foods.

Synonyms

Cinnamon bark, Kalmi-Dalchini, and Ceylon cinnamon.

Biological Source

Cinnamon is the dried inner bark of the shoots of coppiced trees of *Cinnamomum zeylanicum* Nees., (syn. *Cinnamomum verum*). It should contain 1.0% or more of volatile oil.

Family

Lauraceae

5.3.11.1. Occurrence and Distribution

Originally, the spice cinnamon was found near Sri Lanka and Malabar Coast of India. Jamaica and Brazil are also the sites of cinnamon. But mostly the demand of cinnamon is fulfilled by Sri Lanka, therefore, a true cinnamon is referred to as **Sri Lanka cinnamon**.

5.3.11.2. Organoleptic Evaluation

The organoleptic features of cinnamon bark are (figure 5.15):

- 1) **Colour:** The outer surface is dull yellowish-brown, while the inner surface is dark yellowish-brown.
- 2) **Odour:** Fragrant.
- 3) **Shape:** Found in the form of compound quills.
- 4) **Size:** 1m in length, 1cm in diameter, and 0.5mm is the thickness.
- 5) **Taste:** Aromatic and sweet followed by warm sensation.
- 6) **Fracture:** Splintery.
- 7) **Surface:** On the outer surface wavy longitudinal striations with small holes of scars left by the branches are present, while on the inner surface longitudinal striations are found.

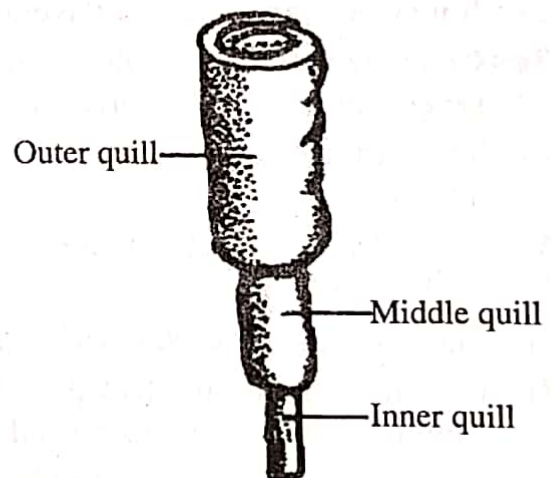
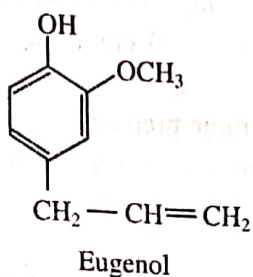


Figure 5.15: Compound Quill of Cinnamon

5.3.11.3. Chemical Constituents

Cinnamon contains many essential constituents such as **volatile oil** (0.5-1.0%) and **phlobatannins** (1.2%). Other constituents found in cinnamon bark are mucilage, calcium oxalate, starch grains, and mannitol. Among these, volatile oil is considered to be the active constituent which on distillation appears light yellow in colour. However, its colour changes during storage and becomes red. Cinnamon bark yields approximately 14-16-90.0% alcohol-soluble extractive.



Cinnamon oil (yellow to red in colour) is composed of a variety of constituents such as **cinnamaldehyde** (60-70%), **eugenol** (5-10%), **benzaldehyde**, **cuminaldehyde**, and **terpenes** (phellandrene, pinene, cymene, caryophyllene, etc.).

5.3.11.4. Chemical Test

Cinnamon can be identified by the following tests:

- 1) When a drop of ferric chloride solution is added to a drop of cinnamon oil, a pale green colour appears. This pale green colour is achieved as cinnamic aldehyde on reacting with ferric chloride gives brown colour and eugenol yields blue colour. The pale green colour is the combination of brown and blue colours.
- 2) The oil yields brown colour with oil of cassia due to the presence of cinnamic aldehyde.

5.3.11.5. Therapeutic Efficacy

Cinnamon has the following therapeutic applications supporting the development of modern medicine:

- 1) It is highly enriched in carminative, stomachic, and mild astringent properties.
- 2) It may be employed as a flavouring agent, stimulant, an aromatic, and an antiseptic.
- 3) Cinnamaldehyde (chemical constituent of Cassia cinnamon) is able to defend against several fungal and bacterial infections.
- 4) The bark can be used to treat type 2 diabetes by maintaining the levels of glucose and lipids.
- 5) An extract, CEppt obtained from cinnamon bark is used in the treatment of Alzheimer's disease.
- 6) The bark may be used to fight against HIV.
- 7) It inhibits the destructive process of multiple sclerosis. With the use of cinnamon, administration of expensive and unpleasant drugs is avoided.
- 8) Consumption of cinnamon reduces the negative effects of high fat meals.
- 9) Its bark can be used in the healing of chronic wounds.

5.3.12. Clove

The unopened pink coloured buds of cloves are found in evergreen clove trees. Same as the other spices, they are available throughout the year. Cloves are known to provide a warm, sweet, and aromatic taste.

Synonyms

Caryophyllum, Clove flower, and Clove buds.

Biological Source

Clove is the dried flower buds of *Eugenia caryophyllus*. It should contain 15% (v/w) or more of clove oil.

Family

Myrtaceae

5.3.12.1. Occurrence and Distribution

Cloves were initially grown in the regions of Amboyna and Molucca islands. In the recent times, they are cultivated in Zanzibar, Pemba Penang, Madagascar, Caribbean islands, Sri Lanka, and India.

Nilgiri, Tenkasi-hills, and Kanyakumari district of Tamil Nadu are the regions in India where cloves are grown. Kottayam and Quilon districts of Kerala are also famous for cultivation of clove.

5.3.12.2. Organoleptic Evaluation

The organoleptic features of cloves are (figure 5.16):

- 1) **Colour:** Crimson to dark brown.

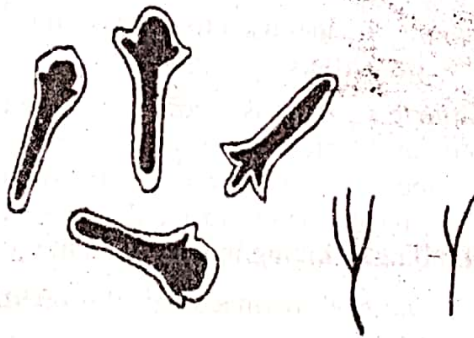


Figure 5.16: Cloves and Clove Stalks

- 2) **Odour:** Slightly aromatic.
- 3) **Taste:** Pungent and aromatic followed by numbness.
- 4) **Size:** About 10-17.5mm in length, 4mm in width, and 2mm thick.
- 5) **Shape:** Hypanthium is surmounted with 4 thick acute divergent sepals. These sepals are covered by dome-shaped corolla which consists of unexpanded membranous petals, several stamens, and a single stiff prominent style.

5.3.12.3. Chemical Constituents

Clove contains about volatile oil (15-20%) and tannins (10-13%) in the form of gallotannic acid, resin, chromone, and eugenin. About 70-90% of eugenol, eugenol acetate, caryophyllenes, and trace amounts of esters, ketones, and alcohols are present in the volatile oil of clove.

5.3.12.4. Chemical Tests

On treating a transverse section of clove with strong potassium hydroxide solution, needle-shaped crystals of potassium eugenate are yielded.

5.3.12.5. Therapeutic Efficacy

Clove has a major contribution in modern medicine:

- 1) It is used for the treatment of the following digestive disorders:
 - i) **Aerophagia:** Its oil provides relief from gas or accumulated flatulence problems in the digestive tract.
 - ii) **Difficult Digestions:** It helps to stimulate gastric acid and allows the food to disintegrate smoothly, thus, supporting digestion.
 - iii) **Lack of Appetite:** It also helps to improve appetite.
 - iv) **Vomits and Dizziness:** It is widely used in the treatment of vomiting, dizziness, and motion sickness.
 - v) **Diarrhoea in Travel:** It shows astringent actions. Traditionally, the clove has been used in the treatment of diarrhoea occurring while travelling.
 - vi) **Intestinal Worms:** It is also used as a vermifuge to remove the intestinal worms.
- 2) **Respiratory Diseases:** It is well-known for its pharmacological properties, i.e., expectorant, antibacterial, and anti-inflammatory properties. It also acts as an effective drug in the treatment of the following respiratory abnormalities:
 - i) **Bronchitis:** It acts as a good expectorant and has anti-inflammatory properties, thus, used to expel the mucus smoothly and to reduce the bronchi inflammation.
 - ii) **Colds:** It is also used to cure colds.
 - iii) **Cough:** Its oil preparations are also used to improve the symptoms of coughing because of its antitussive properties.
 - iv) **Altitude Sickness:** Altitude sickness is a condition in which a person is unable to get enough oxygen and suffers from an unpleasant sensation at higher altitudes or many feet above the sea level. To avoid such a condition, clove plays a vital role. It also assists the climbers, skiers, sportsmen, and tourists to breathe easily while climbing or hiking in the mountains.
- 3) **Other Disorders:** Due to its various pharmacological properties, clove is also used to elude many other irregularities:
 - i) **Modifier of the Flavour:** Its oil enhances the essence and taste of other medicinal formulations when used in combined form.
 - ii) **Tooth Decay:** Its oil is used in many dental applications, such as pain reliever, anaesthetic, antiseptic for mouth, etc
 - iii) Clove oil combined with zinc oxide forms a compound called **zinc eugenolate**, which is a paste the dentists use to fill the gaps caused by dental caries.