

5.2. ANTISEPTICS AND DISINFECTANTS

5.2.1. Introduction

The term **antiseptics** are used for those chemical agents that are used on animate or living bodies (e.g., human body tissue, plant tissue, etc.). The chemical agents used in case of lifeless or inanimate objects (e.g., working area, dishes, bench, etc.) are termed as **disinfectants**. Generally, disinfectants are bactericidal, though they may sometimes be bacteriostatic.

5.2.2. Benzoin

The benzoin has four varieties and their names are **Sumatra, Palembang, Penang, and Siam benzoin**. They are easily identified by their specific look. Sumatra, Penang and Siam benzoin are the three derivatives which are derived from three different plants.

Synonyms

Sumatra Benzoin and Loban.

Biological Source

Benzoin occurs in two forms, i.e., **Sumatra** and **Siam**. The balsamic resin is derived from *Styrax benzoin* Dryand or *Styrax paralleloneurus* Perkins and another species of *Styrax* marketed under the name of **Sumatra Benzoin**. It may also have the balsamic resin obtained from *Styrax tonkinesis* and other species known as **Siam Benzoin** on a commercial scale. It should contain not less than 25% of total balsamic acids calculated in terms of dry alcohol soluble matter.

Family

Styracaceae

5.2.2.1. Occurrence and Distribution

Sumatra benzoin is obtained from the trees grown in south eastern Asia; while Siam benzoin is obtained from the trees grown in Thailand and Vietnam.

5.2.2.2. Organoleptic Evaluation

The organoleptic features of Sumatra and Siam benzoin are as follows:

1) Sumatra Benzoin

- i) **Colour:** Greyish-brown or grey.
- ii) **Odour:** Aromatic and characteristic.
- iii) **Taste:** Sweetish and slightly acrid.
- iv) **Shape:** Occurs in the form of lumps of varying sizes or tears, which are yellowish, milky white.
- v) **Surface:** Uneven.
- vi) **Extra Feature:** On heating, it produces fumes of benzoic and cinnamic acids.

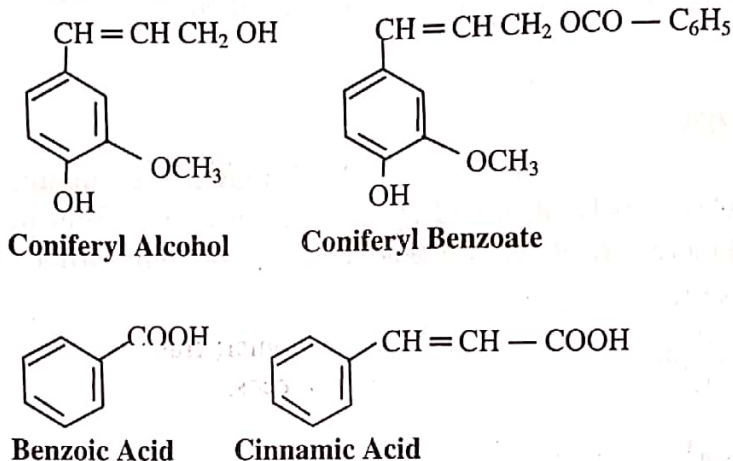
2) Siam Benzoin

- i) **Colour:** Yellowish-brown to rusty-brown.
- ii) **Odour:** Agreeable and vanilla-like.
- iii) **Taste:** Sweetish and slightly acrid.
- iv) **Shape:** Occurs as hard and brittle masses.
- v) **Extra Feature:** On heating, it softens into plastic.

5.2.2.3. Chemical Constituents

Benzoin contains free balsamic acids and esters of balsamic acids.

Sumatra Benzoin: This variety of benzoin has **benzoic acid** (18% or more) and **cinnamic acid** (20%). Cinnamic acid is partially free and partially combined with **benzoresinol** and **sumarisinotannol**. It also has vanillin (1%), styrol, styracin, phenylpropyl cinnamate, and benzaldehyde. With the combination of these constituents, Sumatra benzoin gets its specific odour.



Siam Benzoin: **Benzoic acid** (38%) is the main component of this variety of benzoin. It is partially free and partially combined with **benzoresinol** and **siarasinotannol**. It also consists of **vanillin** and an oily aromatic liquid. In its pure form, it should be completely soluble in alcohol and form traces of ash.

5.2.2.4. Chemical Tests

Benzoin gives the following chemical tests:

- 1) On treating its alcoholic solution with water, a milky white solution develops.
- 2) A small quantity of benzoin is heated in a test tube and the test tube mouth is covered with a glass plate. The contents of the tube are cooled and on viewing the glass plate under a microscope, cinnamic acid crystals should be observed.
- 3) 2.5gm benzoin is shaken with 10ml ether. 2-3ml of this extract is poured in porcelain dish and added with 2-3 drops of sulphuric acid. A deep brown colour develops for Sumatra benzoin and a deep purplish red colour develops for Siam benzoin.
- 4) 4ml potassium permanganate solution is warmed with 1gm benzoin. Odour of benzaldehyde is produced for Sumatra benzoin.

5.2.2.5. Therapeutic Efficacy

Benzoin has the following therapeutic properties:

- 1) It acts as an irritating expectorant, a carminative, and diuretic.
- 2) It is used externally as an antiseptic.
- 3) It is used in the form of compound tincture of benzoin, and as an inhalation for treating upper respiratory tract infection.
- 4) It is used to delay the rancidity of fats and oil in the preparation of benzoate lard.

5.2.3. Myrrh

Myrrh is a sap-like resin which is obtained by making incisions in the bark of trees that belongs to the members of the Commiphora species.

Synonyms

Gum, Bol, and Myrrha.

Biological Source

Myrrh is an oleo-gum-resin obtained from *Commiphora molmol* Engler and also from other *Commiphora* species.

Family

Burseraceae

5.2.3.1. Occurrence and Distribution

Myrrh is widely distributed in North East Africa and Southern Arabia.

5.2.3.2. Organoleptic Evaluation

The organoleptic features of myrrh are:

- 1) **Colour:** Reddish-brown externally and brown internally.
- 2) **Odour and Taste:** Aromatic and agreeable.
- 3) **Size:** 3m in height and 1.5-3.0cm in diameter.
- 4) **Shape:** Occurs as round or irregular tears.
- 5) **Extra Features:** Fractured surface is slightly granular; fragile and has a translucent surface; whitish spots are present on the broken pieces.

5.2.3.3. Chemical Constituents

Myrrh contains yellowish thick volatile oil (10%), gum (60%), resin (25-40%), and bitter principle (3-4%). It has many impurities which make up around 5% of the drug. Ether-soluble resin acids (α , β , and γ commiphora acids) are found in the resin portion of myrrh; the α and β heerabomyrrholic acids are ether-insoluble. Terpenes, cuminic aldehyde, eugenol, etc. are found in the volatile oil of myrrh. The gum is associated with oxidase enzyme.

5.2.3.4. Chemical Tests

Myrrh gives the following chemical tests:

- 1) 0.1gm of the drug and 0.5gm of sand are triturated with solvent ether. The resultant is filtered and evaporated to attain a thin film, which on being treated with bromine vapours produces violet colour.
- 2) On triturating the drug with water, a yellowish-brown emulsion is formed.

5.2.3.5. Therapeutic Efficacy

Myrrh has the following therapeutic properties:

- 1) It is used as a stimulant and an antiseptic.
- 2) It acts as a protective agent.
- 3) It is astringent to the mucous membrane; therefore, its tincture is used in mouthwashes and gargles.

5.2.4. Neem

Neem is a very famous medicinal herb in the field of Ayurvedic medicine system. Around 5000 years ago, it was used as a traditional medicine.

Synonyms

Margosa, arishth, nim tree, and nimba.

Biological Source

Neem consists of all the aerial parts of *Azadirachta indica*.

Family

Meliaceae

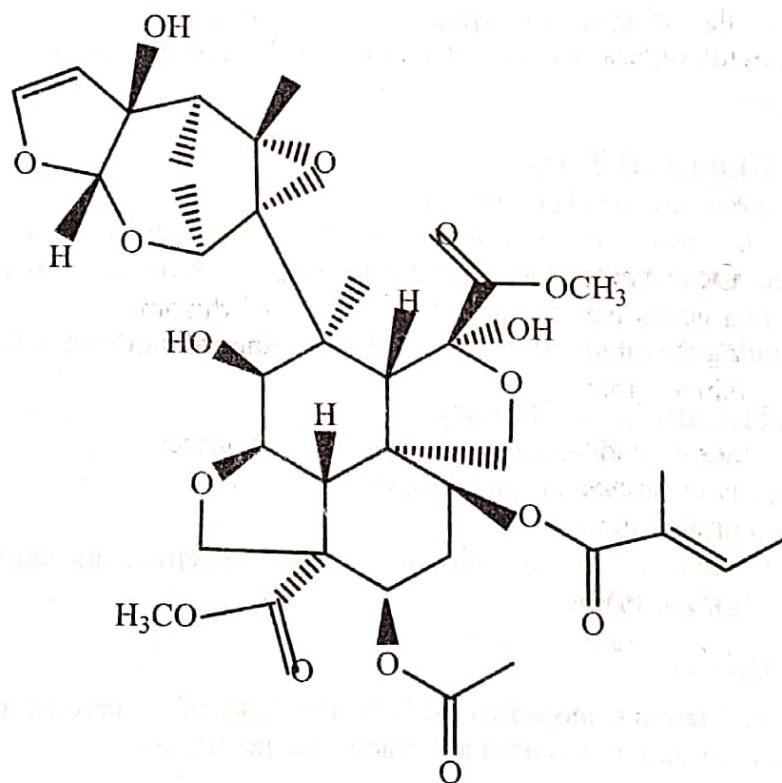
5.2.4.1. Occurrence and Distribution

Neem is widely distributed in India, Pakistan, Bangladesh, Sri Lanka, Thailand, Malaysia, Mauritius, Fiji, South Africa, and East Africa.

5.2.4.2. Organoleptic Evaluation

The organoleptic features of neem are:

- 1) **Leaves:** Alternate, exstipulate, imparipinnate leaflets, lanceolate; 20-25cm in length; closely clustered towards the ends of branches; serrate margin; green coloured; bitter in taste.
- 2) **Bark:** Moderately thick, rough, brown in colour, longitudinally and obliquely furrowed; internally starchy white; characteristic smell; bitter in taste; fracture is fibrous.
- 3) **Flowers:** White and fragrant, arranged axillary; drooping panicles which are up to 25cm long; inflorescences branch up to the third degree and bear 150-250 flowers; an individual flower is 5-6mm long and 8-11mm wide; protandrous; bisexual flowers and male flowers exist on the same plants (polygamous).
- 4) **Fruits:** Glabrous, olive-like drupe varying from elongate oval to nearly roundish shape; ripe fruits are 1.4-2.8 × 1.0-1.0cm; fruit skin (exocarp) is thin; bitter-sweet pulp (mesocarp) is yellowish-white and fibrous; mesocarp is 0.3-0.5cm thick; the white, hard inner shell (endocarp) of the fruit encloses one (rarely two or three) elongated seeds (kernels) having a brown seed coat.



Azadirachtin

5.2.4.3. Chemical Constituents

Nimbidin is the bitter constituent of neem. The seeds contain 45% of oil. In 1968, a complex liminoid compound, **azadirachtin** was isolated from the neem seeds and its structure was established in 1975.

5.2.4.4. Therapeutic Efficacy

The therapeutic uses of neem are:

- 1) Its bark is used as a good bitter tonic, astringent, and an antiperiodic.
- 2) It is used in the treatment of malarial fever.
- 3) Its bark is also used for skin diseases.
- 4) Its leaves are used in the form of poultice over sores, and in the form of decoction in ulcers and eczema.
- 5) Its fresh tender twigs are used for cleaning teeth and in pyorrhoea.
- 6) Its oil, known as **margosa oil**, is used in scrofula, indolent ulcers and sores, ring worm, and other skin diseases.
- 7) It is used as a liniment for treating rheumatism.
- 8) Its oil also has anthelmintic and insecticidal property.

5.2.5. Curcuma

Curcuma is a spice which provides yellow colour to the curry. In India, it is in use for thousands of years as a spice as well as a medicinal herb.

Synonyms

Indian saffron and turmeric.

Biological Source

Curcuma is the dried and fresh rhizomes of *Curcuma longa* Linn. (*C. domestica*). It should contain not less than 4% of volatile oil. *C. amada*, *C. angustifolia*, *C. aromatica*, *C. caesia*, *C. zedoaria*, and *C. longa* are some other varieties of curcuma.

Family

Zingiberaceae

5.2.5.1. Occurrence and Distribution

Curcuma is a genus having around 70 species of rhizomatous herbs. It is found to be growing widely distributed in South-East Asia, especially in India, China, Thailand, Italy, Malaysia, Archipelago, and N. Australia.

India cultivates around 90% of the total output of turmeric in the world. Around 70% of total output is cultivated in **Tamil Nadu** and **Andhra Pradesh**. **Kerala** also produces turmeric of superior quality in large amounts which is exported on a large scale.

5.2.5.2. Organoleptic Evaluation

The organoleptic features of curcuma (figure 5.2) are:

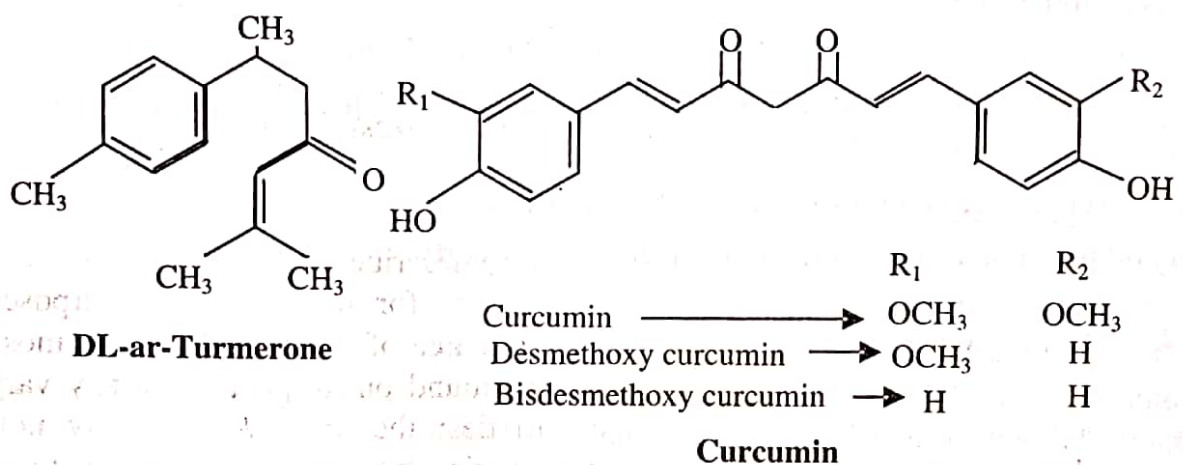
- 1) **Colour:** Yellowish-brown.
- 2) **Odour:** Characteristic.
- 3) **Taste:** Slightly bitter.
- 4) **Shape:** Round rhizomes are oblong, while long varieties are cylindrical and short branched.
- 5) **Surface:** Root scars and annulations are present.
- 6) **Fracture:** Horny and internal surface is orange.



Figure 5.2: Turmeric Rhizome

5.2.5.3. Chemical Constituents

Curcuma consists of volatile oil (1-6.5%), resin, numerous zingiberaceous starch grains, and **curcuminoids** (yellow coloured substances). **Curcumin** (50-60%) is the major constituent of curcuminoids. Curcumin and other related curcuminoids impart the yellow colour in some species. Volatile oil contains mono- and sesquiterpenes (like α and β pinene, α -phellandrene, camphor, camphene, zingiberene, and α , β curcumenes. *C. angustifolia* and *C. caulina* species have high content of starch.



5.2.5.4. Chemical Tests

The chemical tests of curcuma are as follows:

- 1) The powdered drug on treatment with sulphuric acid produces a crimson colour.
- 2) On treating its aqueous solution with boric acid, a reddish-brown colour develops which turns greenish-blue on further addition of alkali.
- 3) On treating its aqueous solution with acetic anhydride and concentrated sulphuric acid, a violet colour develops. When this test is observed under UV light, red fluorescence appears.

5.2.5.5. Therapeutic Efficacy

Curcuma has the following therapeutic uses:

- 1) It is used as a colouring agent for ointments and creams.
- 2) It is used for the detection of boric acid.
- 3) It is used as an anti-inflammatory.
- 4) In China, *C. wenyuin* (*C. aromatica*) is used for cervical cancer.
- 5) It is used as an antiarthritic agent, which has been isolated from *C. aromatic* species.