Practical Pharmacognosy

3rd. Stage

1st semester

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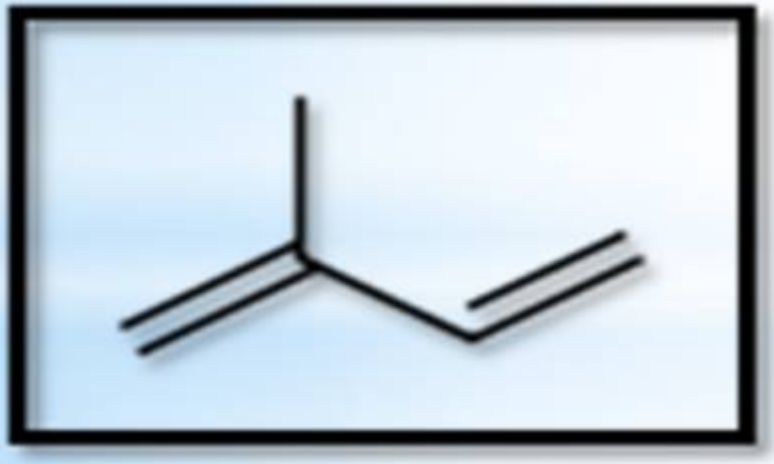
Lab.7

Volatile Oils

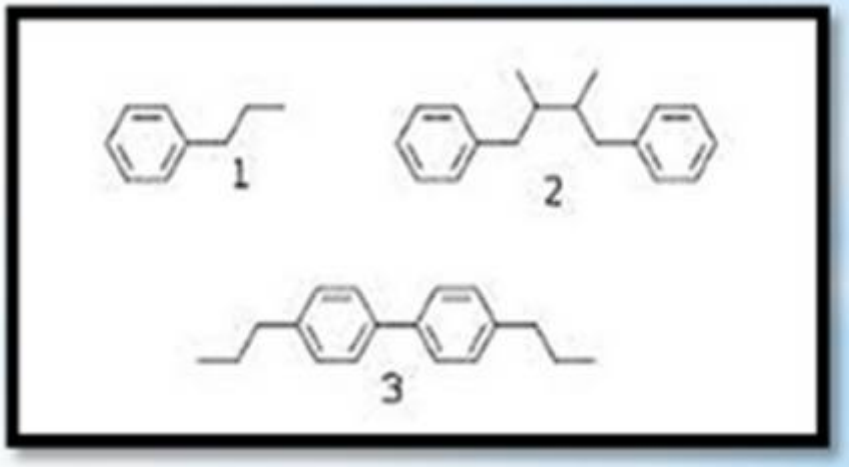
- They are odorous principles found in various plant parts.
- Because they **evaporate** when exposed to the air at room temperatures, they are called volatile oils; they are also called essential or ethereal oils.
- Volatile oils are colorless as a rule, particularly when they are **fresh**, but on long standing they may **oxidize** and resinify, thus **darkening** in color, to prevent this darkening, they should be:

- **stored in a cool**
- **dry place in tightly Stoppard**
- **preferably full**
- **amber glass containers.**

- As a rule, volatile oils are **immiscible with water**, but they are sufficiently soluble to impart their odor to water.
- They are soluble in **ether, alcohol** and **most organic** solvents.
- Many volatile oils consist largely of **terpenes** (terpenes are natural products whose structures may be divided into **isoprene units**). Another major group of volatile oil constituents are the **phenylpropanoid**s. (These compounds contain the C6 phenyl ring with an attached C3 propane side chain).



Isoprene unit



Phenylpropanoids

Generally:

volatile oils and volatile oil-containing drugs are divided in to the following classes:

1.Hydrocarbons.

2.Alcohols.

3.Aldehydes.

4.Ketones.

5.Phenols.

6.Phenolic ethers.

7.Oxides.

8.Esters.

- Essential oils are derived from various sections of plants:

- **Leaves**- Rosemary, Basil, Eucalyptus.
- **Flowers**- Rose, Lavender, Clove.
- **Seeds**- Almonds, Anise, cumin.
- **Bark**- Cinnamon.
- **Rhizome-** Ginger.

Pharmacological Uses of Volatile Oils:

- Carminative as for Rosemary oil.
- Antitussive as for Eucalyptus.
- Antiseptic as Clove oil.
- Aromatherapy, alternative medicine as Lavender Oil.

Isolation and Identification of the Volatile Oils:

Aim: Determination of the volatile content of crude drugs by steam distillation method.

Equipment : Clevenger type as an apparatus.

Clevenger Apparatus

(Oil heavier than Water)

Clevenger Apparatus

(Oil lighter than water)

Procedure:

1)Weigh out 20 gm of the plant material (coarse powder) and place into a distilling flask; add few pieces of porous earthenware.

2)Add 200 ml distilled water to the flask and shake well. Add another 200ml of water by rinsing the neck of the flask.

3)Connect the distilling flask with the still head of the apparatus. By the means of the pipette or washing bottle, fill the receiver with water until over flows.

4)Connect the condenser of the apparatus with the cooling water (from the tap).

5)Heat the distilling flask until the boiling starts. Record the time of the beginning of distillation, and continue the distillation for one hour.

6)Switch off heating. Allow the graduated receiver to cool. Read off the volume of the volatile oil (count all small divisions in the receiver of the layer of oil).

7)Calculate the %v/w of the volatile oil content of drug.

Identification of Volatile Oils By Chromatography:

By the use of thin layer chromatography (T.L.C).

- The stationary phase = Silica gel G.
- The mobile phase = Chloroform: Benzene (3:1).
- The standard compound = Peppermint Oil.
- The spray reagent =Vanilline _Sulphuric acid / Ethanol (10%v/v).
- Mechanism of separation = Adsorption.
- Developing = Ascending.

Procedure:

1)Prepare 100ml of mobile phase, and place it in the glass tank.

2)Cover the tank with glass lid and allow standing for 45 minutes before use.

3)Apply the sample spot and the standard spot on the silica gel plates, on the base line.

4)Put the silica gel plate in the glass tank and allow the mobile phase to rise to about two-third the plate.

5)Remove the plate from the tank, and allow drying and then detecting the spots by the use of the spray reagent and heat the plates at 120◦C until the spot's color intensity is reached in the oven. Detect the spot and calculate the Rf value.

Thank you