

# Practical Pharmacognosy

3rd. Stage  
1<sup>st</sup> semester

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**Lab.5**

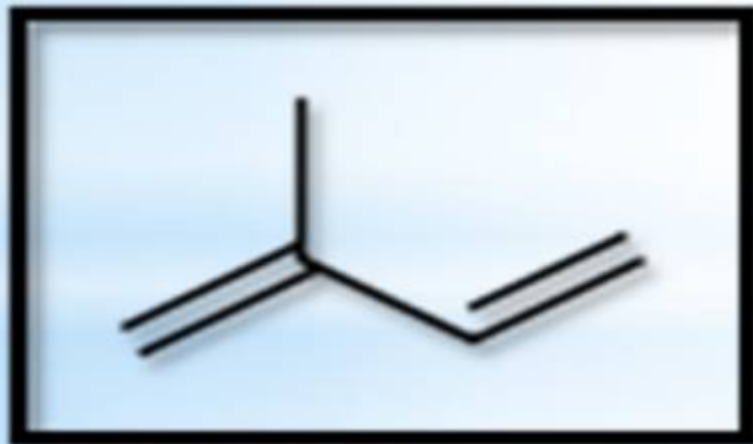


# *Volatile Oils*

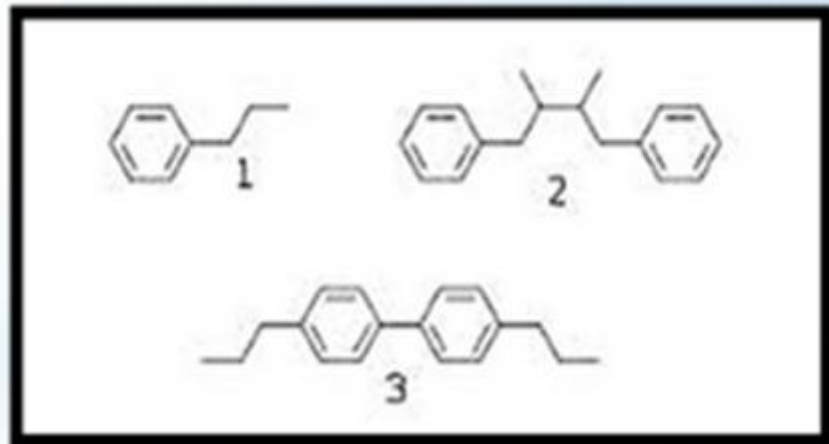
- They are odorous principles found in various plant parts.
- Because they **evaporate** when exposed to the air at room temperatures, they are called **volatile oils**; they are also called **essential or ethereal oils**.
- Volatile oils are colorless as a rule, particularly when they are **fresh**, 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 **phenylpropanoids**. (These compounds contain the C<sub>6</sub> phenyl ring with an attached C<sub>3</sub> 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 R<sub>f</sub> value.

*Thank you*

