

Welcome!

Essential Oils

Pharmacognosy

3rd Class, 1st Semester \ Ass. Lecturer Anwar H. Ali



Dream Catchers

Essential Oils

Essential oils, which are called aromatic oils for their distinctive smell, are also called etheric oils; Because of its ability to dissolve in ether, and also called volatile oils because it is characterized by being volatile at high temperatures and does not decompose, unlike fixed oils that do not volatilize, but rather decompose at high temperatures.

What are Essential Oils ?

- Essential Oils are liquids that come from plants. The oils are distilled from the flower, leaves, stems, roots, bark, and resins of plants or they are cold-pressed from the rinds of citrus fruits.
- Think of them as the “immune system” of the plant: everything the plant needed to grow, thrive, and survive is what is extracted.
- They are powerful agents which support every system in your body.
- Essential oils are directly extracted from plants without any chemical manipulation and share very similar structure to human DNA. Because of this our bodies easily recognize the oils and readily absorb them. Your body uses what it needs from the essential oil to support you and your health.

What is an Essential Oil?

For plant what is benefit of Essential oil?

- Essential oils are natural aromatic (volatile) compounds found in various parts of many different types of plants.
- Plants can use essential oils to attract specific insects to pollinate more efficiently or to defend against insects, animals and even other plants.
- Essential oils are antimicrobial and can also help plants protect against fungi, molds and other microbes. They may also assist in preventing water loss.



How are essential oils beneficial?

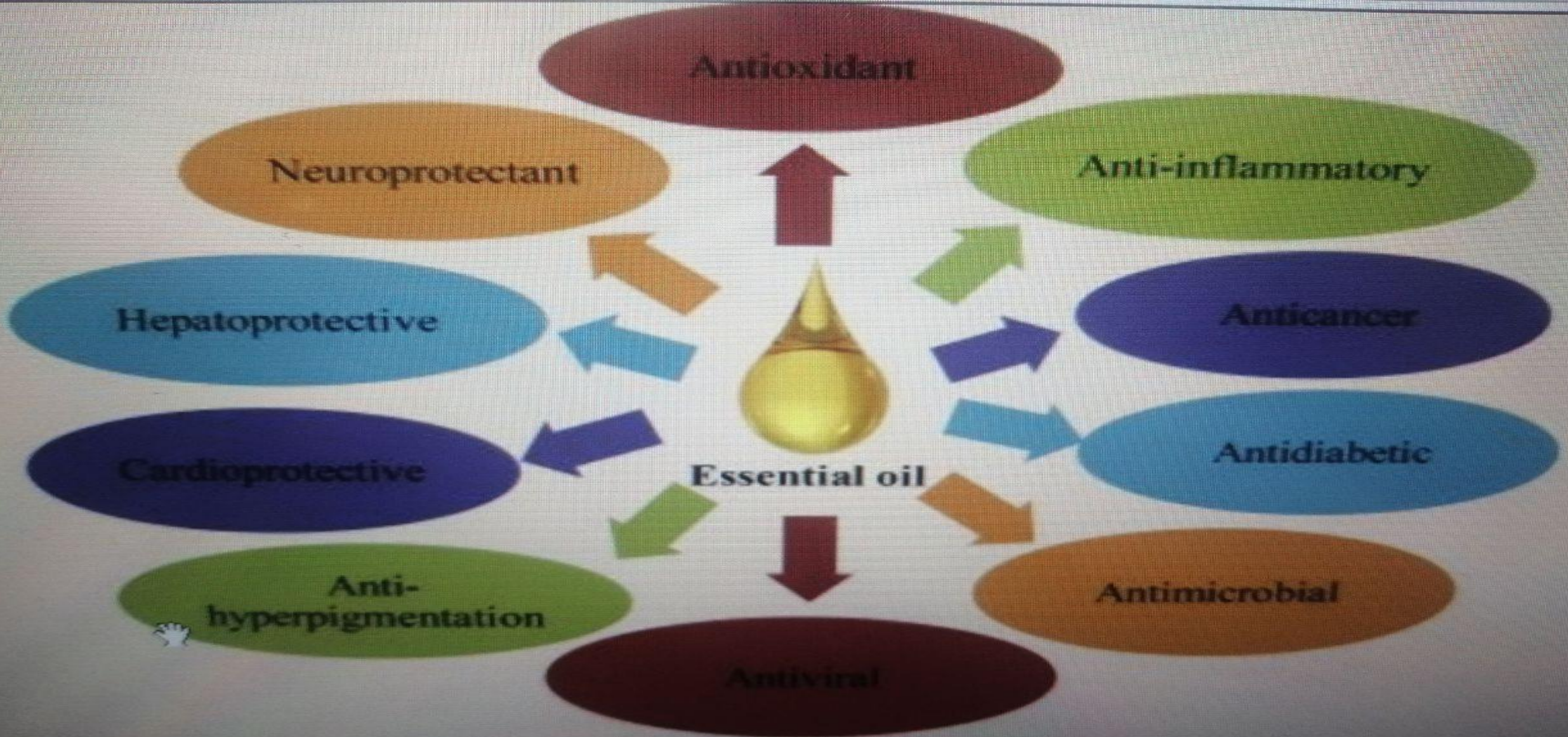
- **Therapeutic Essential oils are taken by the bloodstream and carried to every cell within the entire body, in a matter of minutes.**
- **Essential oils are so small in molecular size that they can easily and quickly penetrate our skin tissue. They are different from fatty oils like coconut and olive oil, which have very large molecules.**
- **Essential oils detoxify cells and blood in the body.**
- **They are powerful antioxidants that create an unfriendly environment for damaged free radicals.**

The medical importance of Essential oil

Medicinal plants that have the ability to produce one or more types of active ingredients which have a distinctive aromatic smell due to the fact that they contain volatile aromatic oils, which are either in the whole plant or may be concentrated in the leaves and flowers.

In general, the active compounds of these volatile oils are the reason for the medical effect of these species, as they are characterized by their antioxidant, anti-fungal, anti-bacterial, anti-viral, anti-tumor activity, memory-enhancing activity, or regulator of sugar or cholesterol in the blood.

Essential Oils Work



Where are essential oils found in plants?

- ❖ Leaves
- ❖ Grasses
- ❖ Flowers
- ❖ Wood, bark, branches
- ❖ Resin
- ❖ Seeds
- ❖ Roots
- ❖ Fruit



Chemical complexity of essential oils

Each essential oil is made up of hundreds of separate chemical constituents

Chemistry varies depending on the conditions under which the plant lived and died



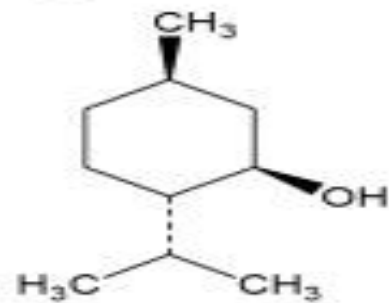
Structure of Essential Oils

- Isoprene – 5 carbons, 8 hydrogens

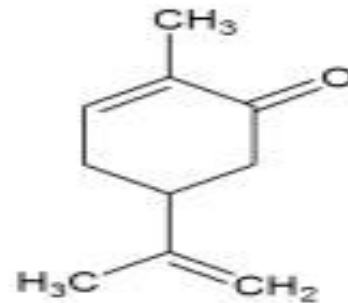


- Terpenes – made of multiples of isoprene units

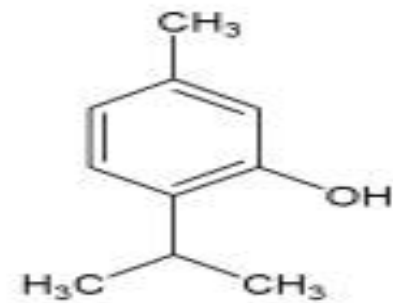
Terpene derivatives



Menthol
(peppermint oil)

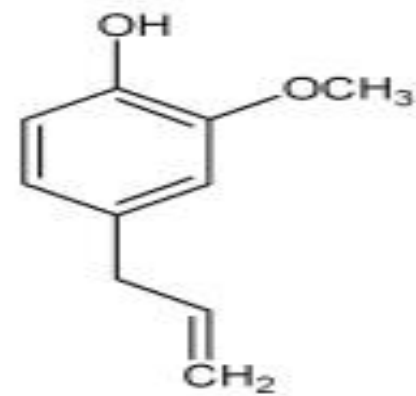


Carvone
(caraway oil)

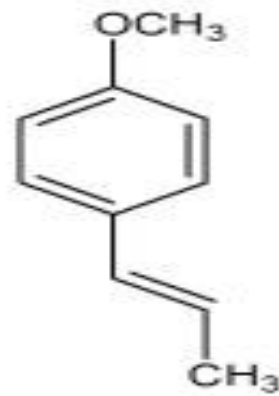


Thymol
(thyme oil)

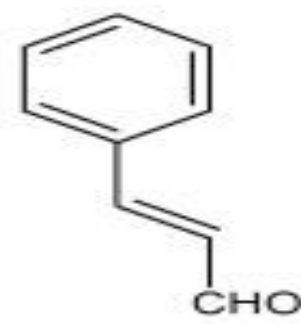
Aromatic compounds



Eugenol
(clove oil)



Anethole
(anise oils)



Cinnamaldehyde
(cinnamon oil)

The most important extraction methods

1- Distillation methods

Water distillation method

Steam distillation method

Water and steam distillation method

The most important extraction methods

2- Extraction by using organic solvents.

3- Extraction by hydraulic press.

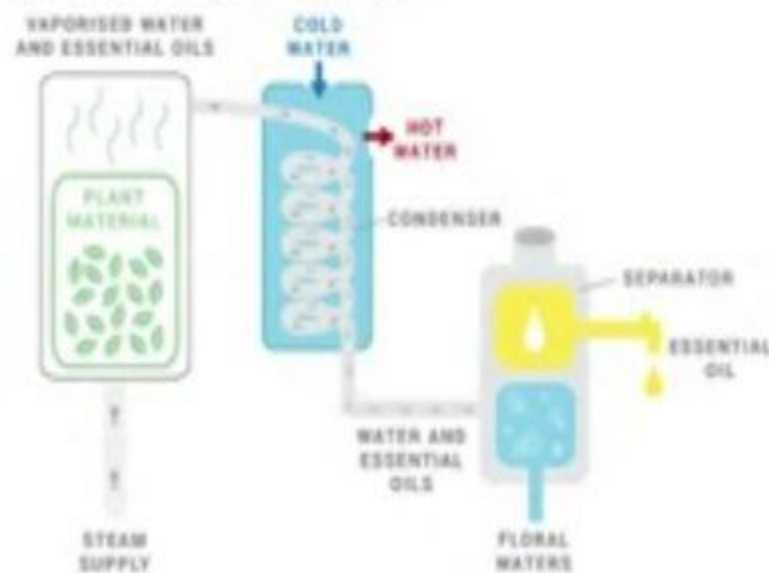
4- Extraction by acid or enzymatic hydrolysis.

5- Extraction by carbon dioxide.

How are Essential Oils Obtained?

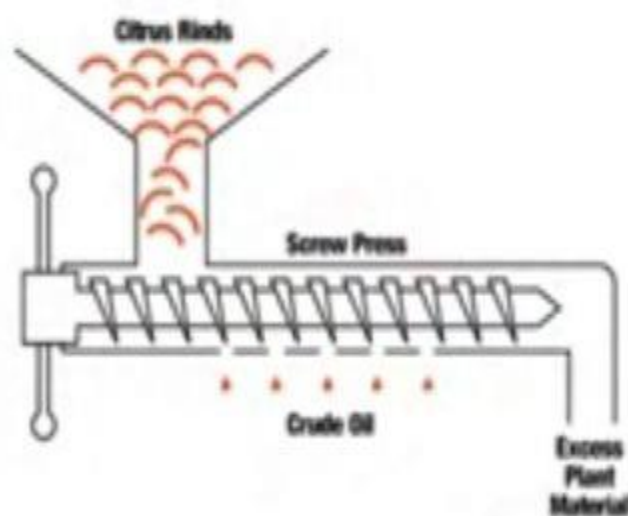
Distillation

In this method, steam is directed through the plant material. The steam vaporizes the lighter chemicals contained within the plant material. The steam is then condensed through a cooling process. This process generates two products: the essential oil, which contains oil-soluble molecules, and the hydrosol, which contains water-soluble molecules.



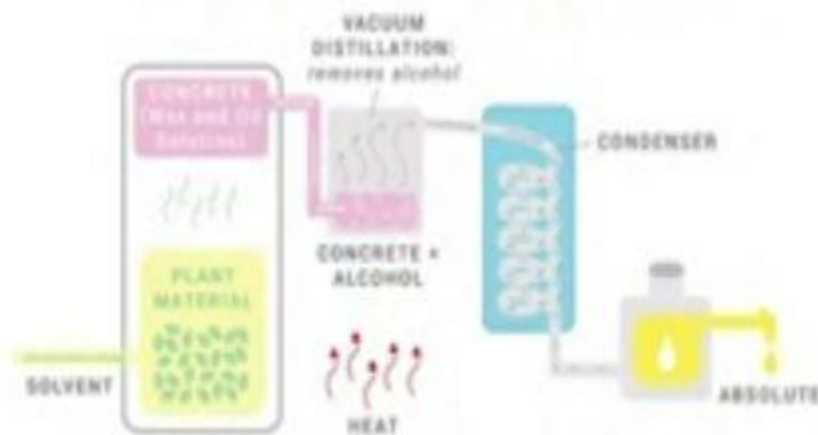
Cold Press/Expression

Expression is used to extract essential oils from citrus fruits. Expression is the process of grating or scraping the peel of a citrus fruit to release the oils. For example, when zesting a lemon, the scent of lemon rises into the air because the volatile oils have been released from sacs found in the peel.

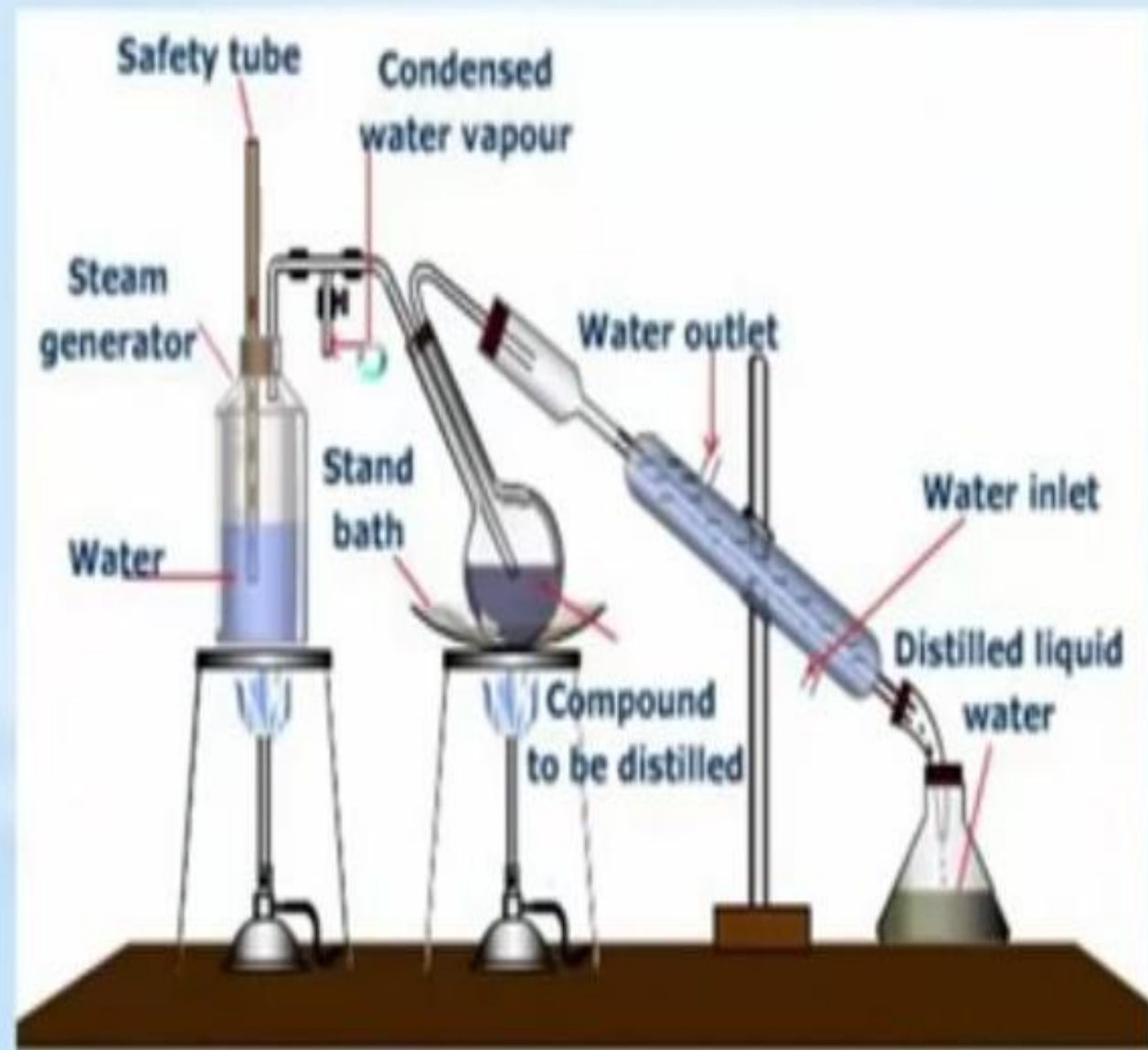


Extraction

Extracts are obtained by adding a solvent (alcohol, hexane, Liquid CO₂, etc.) to the plant material. The solvent is added and eliminated to produce a high-grade extract that is very close to the composition of the natural raw material. Extracts are different from distilled oils in that they contain a wider range of the chemical molecules found in the plant material.



Water and Steam distillation

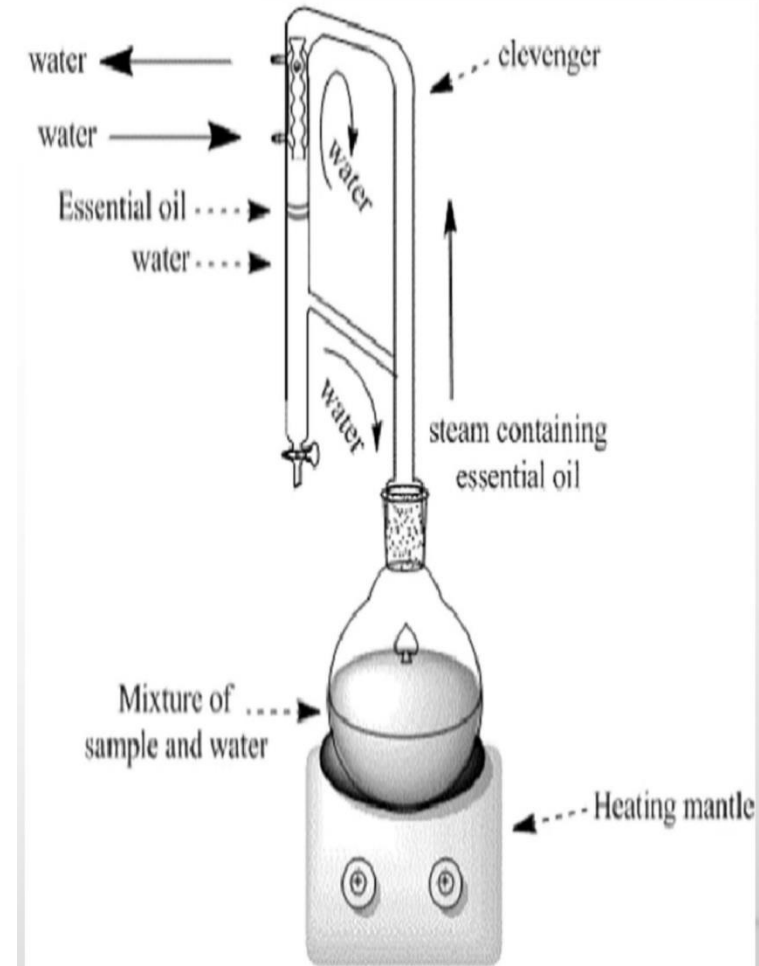


Clevenger apparatus

Extraction of essential oils or volatile oils according to the hydro-distillation technique by using of a clevenger apparatus.

Hydro-distillation depends on the ability of water vapor to carry the essential oil of the plant.

The Clevenger apparatus was named from its inventor, Joseph Franklin Clevenger, who published in 1928.



Heavy volatile oil

e.g.

Botanical name: *Eugenia caryophyllata*

Family: Myrtaceae

Local name: clove القرنفل

Volatile oil concentrated in flowers
which is heavier than water.



Light volatile oil

e.g.

Botanical name: *Salvia officinalis*

Family: Labiatae

Local name: Sage المریمیة

Volatile oil concentrated in leaves
which is lighter than water.



Aromatic plants



Salvia spinosa



Thymus vulgaris



O. basilicum cv. *cinnamon*



O. basilicum cv. *citriodorum*



Melissa officinalis



Lavandula officinalis



Origanum vulgare



O. basilicum cv. *purple*



O. basilicum cv. *green*



Salvia officinalis



Mantha spicata



Mantha longifolia



Rosmarinus officinalis



Teucrium polium

Clove oil

(*Eugenia caryophyllata*)

Family : Myrtaceae

The main component of clove oil - eugenol an important natural antibacterial drug, is used in many fields, including dentistry, pharmaceuticals, and aromatherapy. It is used as an analgesic, antiseptic, disinfectant, and antibacterial because it inhibits the growth or kills most pathogens, such as:

E. scherichia coli, *Bacillus substilis*,, *Aspergillus niger*, *Penicillium chrysogenum*. Oil is recommended for inhalation in the treatment of sore throat, colds .

Peppermint oil

Mentha piperita

Family :Lamiaceae

The active constituents in peppermint oil, which is prepared through distillation of the ground parts of the peppermint plant, include menthol, menthone, cineol, and several other volatile oils. In vitro research shows peppermint oil to be effective in relaxing GI smooth muscle, possibly through an antagonistic effect on calcium channels in the gut. Peppermint oil also has been shown to relax the lower esophageal

Thymol Oil

Family: Lamiaceae

Genus: *Thymus* .

Species: *Thymus vulgaris* L.

Thymol is one of the most important essential oils found in Thyme and known for its antiseptic and antifungal properties .

Lavender (*Lavandula angustifolia*)

Insomnia

Pain

Feelings of anxiety

Headache

Agitation

Labor



Inhalations

- Direct inhalation
 - 1-2 drops on tissue/cotton
- Vaporizers/diffusers (indirect)
 - Candle
 - Electric burner
 - Microdiffusers (10-25 drops)
- Steam inhalation
 - 1-3 drops in steaming water
 - Towel over head, inhale 2-5 minutes
 - Be sure to cover eyes



Spritzer recipe for cold/flu support

1 oz distilled water

2-3 drops Aloe vera

3 drops lavender EO

4 drops eucalyptus EO

3 drops pine EO

4 drops tea tree EO

Fill spray bottle, shake well, spray, inhale

Safety and Toxicity ...

Related to:

CHEMISTRY + DOSE



Chronic Toxicity

Cumulative effects based on frequency, time exposed, concentration

Chronic toxicity may not be noticed or may be mistaken for other things

Headache, nausea, lethargy, skin eruptions

- Toxicity of essential oils by the oral route:

It is very low (between 2-5 g/kg anise, eucalyptus, clove) (greater than 5 g/kg chamomile, lavender) Most toxic essential oils: mustard oil (0.34 g/kg) But these data were obtained in animals . A review of the available literature shows that serious accidents, most of which involve young children are due to a small number of essential oils, ingested in large quantity: clove (eugenol), peppermint (menthol).

- Skin toxicity Essential oils:

They are widely used in perfumery and in the cosmetics. Extensive research has been conducted on their potential toxicity (acute, chronic) by topical

Bioavailability estimates: How much gets in the bloodstream?

Oral	95% (small intestine > liver > kidneys)
Dermal	10% (0-20%) (skin > subcutaneous tissue > blood > liver > kidneys)
Inhalation	30-70% (most lungs > blood > liver > kidneys, some nose > brain)

Excretion: 60-95% of absorbed EO constituent is excreted via urine, remainder in feces (0-10%) and exhaled air (1-20%)

Thank you

