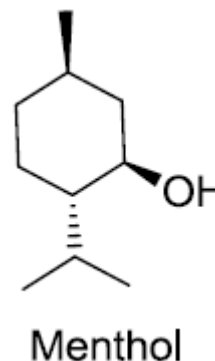


Pw 05: Extraction of Essential Oils from Mint (*Mentha* spp.)

Mint is one of the most well-known **medicinal plants**.

Archaeologists have found mint leaves in Egyptian tombs. Its use was documented among the Greeks and Romans to relieve pain or purge the sick. Forgotten for a time in the West, it only returned to traditional pharmacopoeia in the 18th century. Since then, it has been one of the first plants to be widely used by the pharmaceutical industry. Menthol has thus become a classic found on pharmacy shelves. Mint is also found in many candies, syrups, or used as a flavor to improve the taste of certain medications.



Botanical Description of Mint

Mint is a highly aromatic plant that can reach up to 80 cm in height. It belongs to the **Lamiaceae** family. The most commonly used variety in herbal medicine is **peppermint**. It has a **serrate-leaved structure** with **square stems**. The plant is green in color and is harvested annually. It is sown in the spring and harvested in the summer. Mint is found in **Europe, Asia, and North America**.

Medicinal Properties of Mint

- **Digestive disorders:** effective for constipation or diarrhea.
- **Urinary disorders:** diuretic effect.
- **Cough and cold:** soothing effect.
- **Pain relief:** for joint pain, muscle aches, and headaches.
- **Respiratory problems:** effective against bronchitis-like conditions.
- **Skin conditions:** relieves pain caused by insect and animal bites and helps prevent cracked skin.

To obtain **one liter of peppermint essential oil**, **400 kg** of the plant are required.

The **essential oil** extracted from **American peppermint** contains mainly:

- **Menthol (40%)**
- **Menthone (20%)**
- **Neomenthol (4%)**

- **Cineole (4%)**

Extraction of Mint Essential Oil from Mint Leaves

Step 1: Preparation

100 g of mint leaves are placed into a **500 mL** round-bottom flask with 300 mL of distilled water. Under the effect of heat, the plant cells containing aromatic substances burst (**decoction**).

As these substances are volatile, they can be recovered through **hydrodistillation** (or **steam distillation**).

Step 2: Hydrodistillation / Steam Distillation

Collect **100 mL** of distillate. Due to the low content of essential oil in mint and its partial solubility in water, **two distinct layers** are not visible in the distillate.

Step 3: Extraction Using a Separatory Funnel

To extract the essential oil from water, perform an extraction using **10 mL of diethyl ether** in a **250 mL separatory funnel**. Carry out a **salting-out (relargage)** by saturating the lower aqueous phase with salt and shaking vigorously until the cloudiness disappears. Add about **2 mL of sodium chloride (saturated solution of NaCl)** to help separate the essential oil.

After the two phases are separated, discard the aqueous phase and **recover the ether phase (organic phase)**, which contains the **mint essential oil**.

Questions

1. Draw the setup used for the **hydrodistillation** of mint essential oils.
2. What is the **principle** of hydrodistillation?
3. What is the **function of the condenser**?
4. What is the **purpose of salting out (relargage)**?
5. Why is **decantation** performed?
6. Draw the **separatory funnel** and indicate in which part the **mint essential oil** is located.
7. Calculate the **yield** of the extracted essential oil.