Continuous Hot Method

Soxhlet extraction.

Soxhlet Apparatus: is lab equipment these devices allow for continuous treatment of a sample with a **volatile solvent** (such as ether, alcohol, or benzene) over a **period of hours** or **days** to extract compounds of interest.

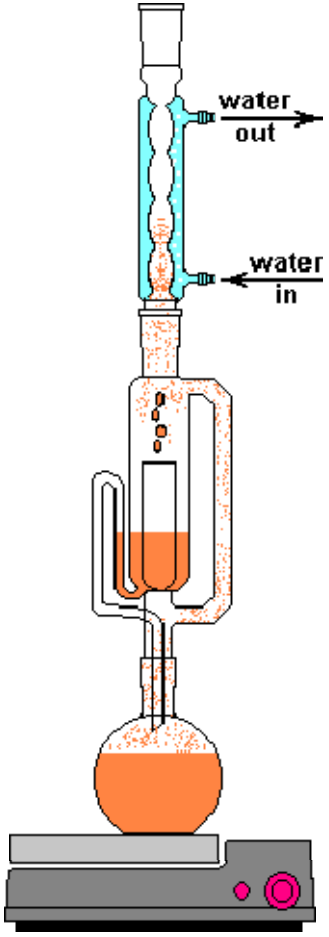
Sexhlet has 4 main section:

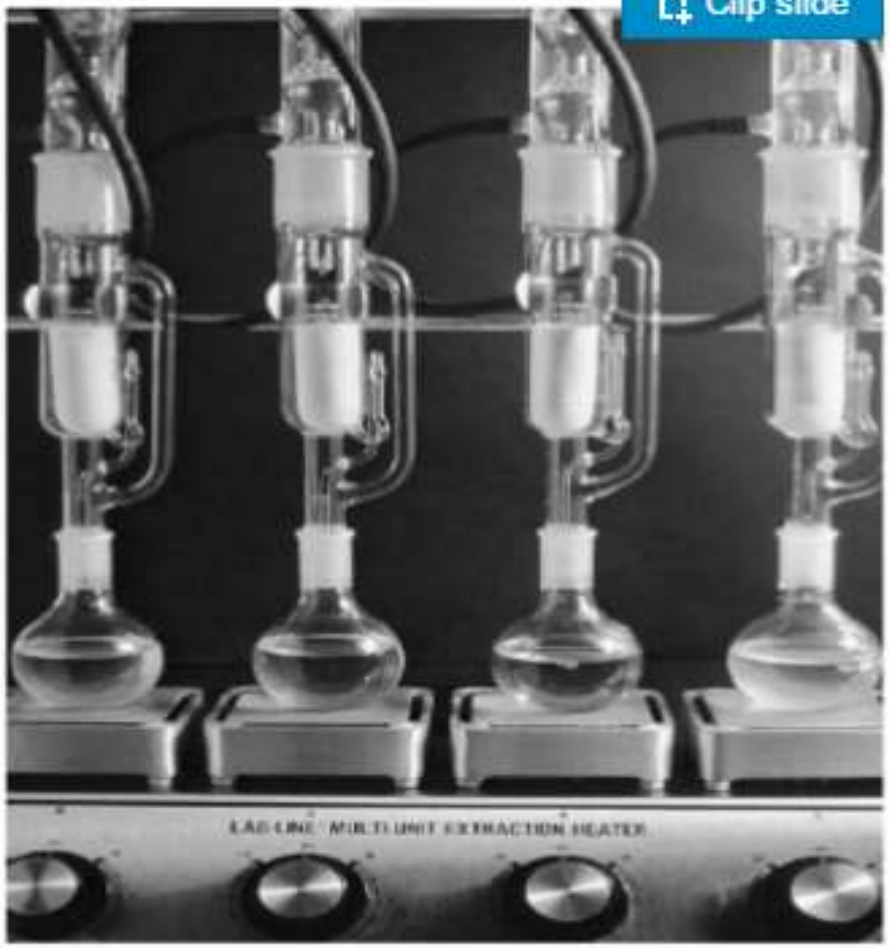
Round glass or round flask

Main chamber of soxhlet

Condenser

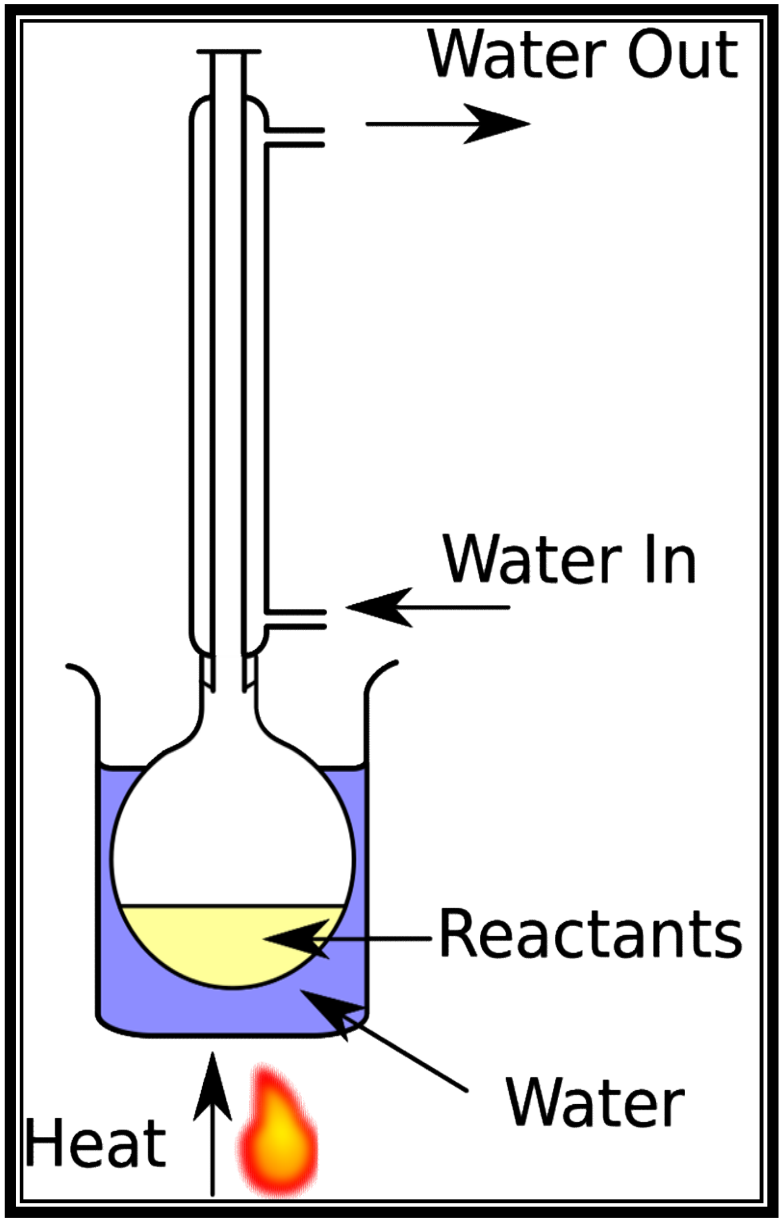
Thimble


water
out
water
in


Clip slide

Ordinary reflex method

In this method, the **plant material is placed in the round flask** & proper amount of solvent is added, then the pear condenser inserted & a continuous heat is applied.



Reflex has 2 main section:

- Round flask
- Condenser

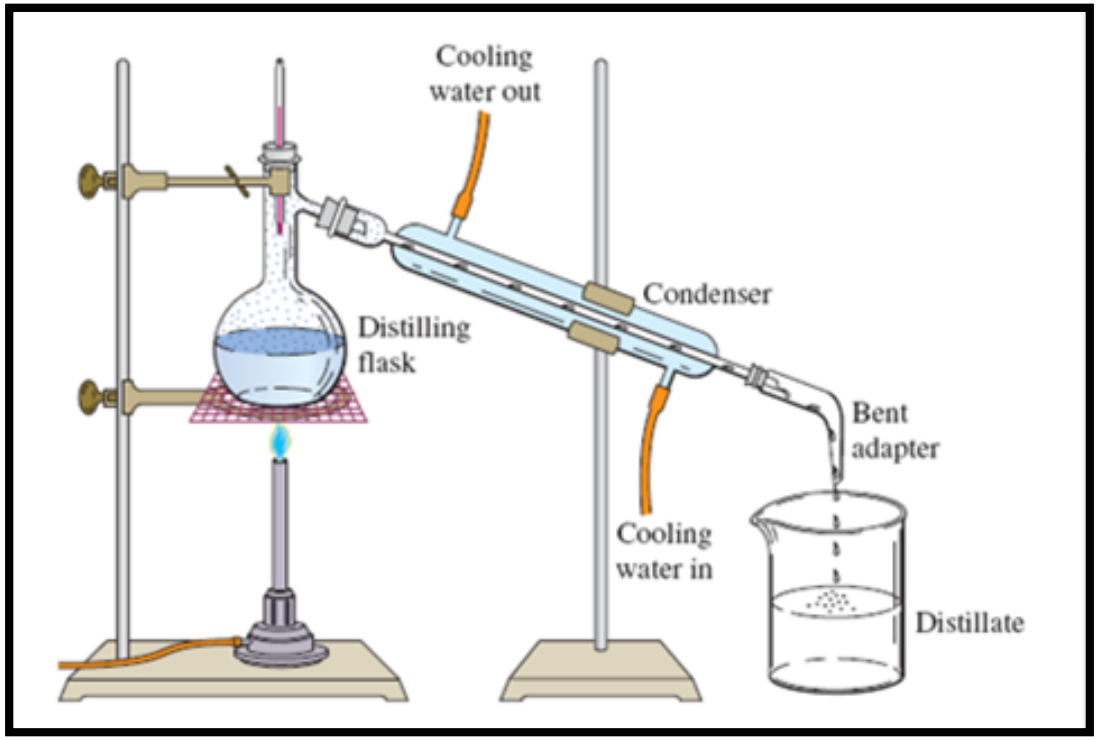
NOTES:

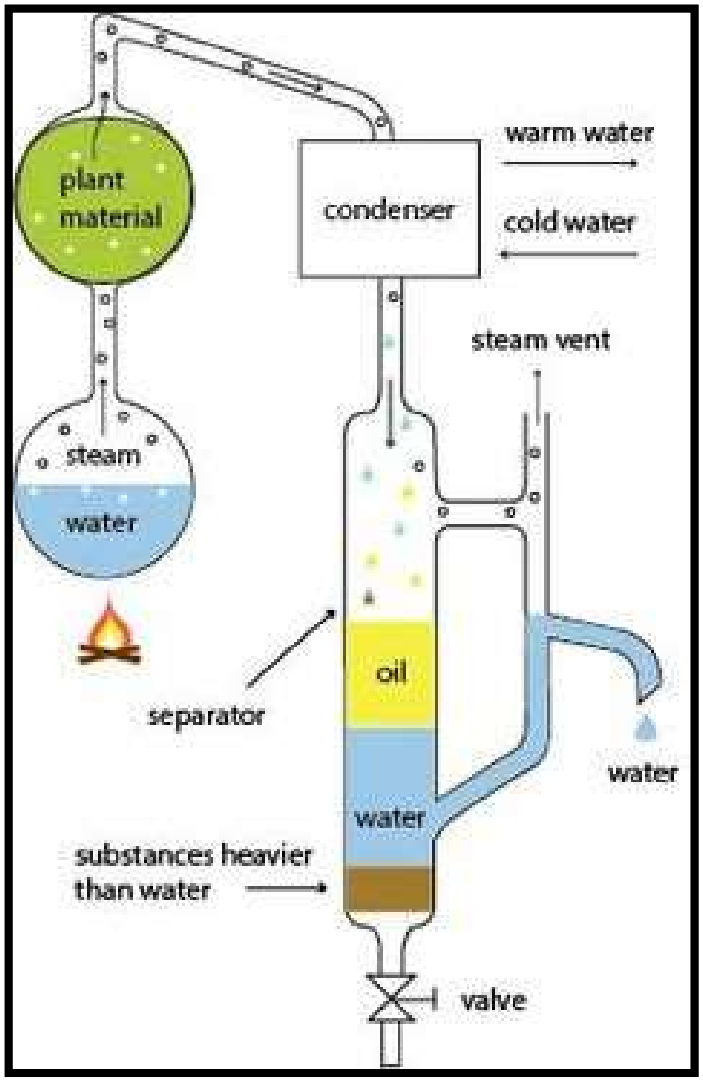
*The extraction take about 6-8 hrs

*This method is less efficient than soxhlet method because the solvent is with direct connection with material & the solvent may be saturated with the extracted material.

Distillation method
(Steam distillation)

- Volatile oils are usually obtained by steam distillation of the plant part containing the oil with water in a proper **Clevenger apparatus** in which the plant is placed in the flask & enough water is added to the flask.
- Organic compounds are separated using steam, so as not to degrade the essential oil. Essential oils are what is used for perfume, food, medicines or atomizers. The Clevenger Apparatus conducts the distillation process by boiling, condensing and decantation to separate the oil.
- Heat is applied & the extraction process (or distillation) occurs.


Cooling
water out
Condenser
Distilling
flask
Bent
adapter
Cooling
water in
Distillate


plant
material
condenser
warm water
cold water
steam vent
steam
water
oil
separator
water
water
substances heavier
than water
valve

5. Factors Affecting Choice of Extraction Process

The final choice of the process to be used for the extraction of a drug will depend on a number of factors, including:

5.1: Character of Drug

- If hard and tough (such as nux vomica) use percolation.
- If soft and parenchymatous (such as gentian) use maceration.
- If 'unpowderable' (such as squill) use maceration.
- If an 'unorganized drug (such as benzoin) use maceration.
- If preferable to avoid powdering (such as senna fruits) use maceration.
- **Thus, knowledge of the pharmacognosy of the drug is essential to selection of the extraction process that will give the best result.s**

Contd.

5.2: Therapeutic value of the drug

When the drug has considerable therapeutic value, the maximum extraction is required, so that percolation is used, as in belladonna. If the drug has little therapeutic value, however, the efficiency of extraction is unimportant and maceration is adequate; for example, "flavours" (lemon), or "bitters", (gentian).

5.3: Stability of drug

Continuous extraction should be avoided when the constituents of the drug are thermo-labile.

5.4: Cost of drug

- From the economic point of view, it is desirable to obtain complete extraction of an expensive drug, so that percolation should be used; Ginger is an example of this type.

- For cheap drugs, the reduced efficiency of maceration is acceptable in view of the lower cost of the process. In particular, the cost of size reduction to a powdered state is avoided, whereas this is a significant part of the percolation process.

5.5: Solvent

- If the desired constituents demand a solvent other than a pure boiling solvent or an azeotrope, continuous extraction should be used.

Take a rest