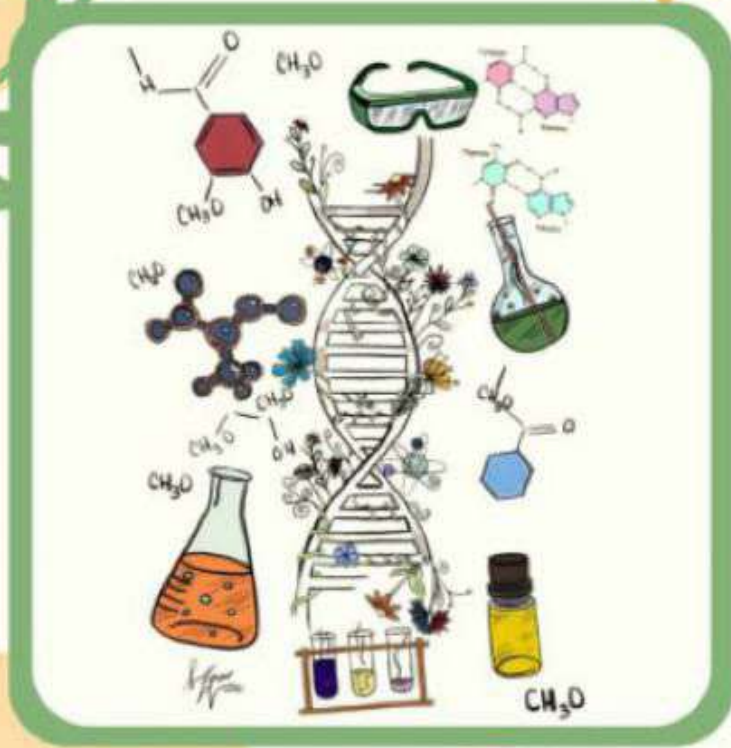


تفريغ عقاقير



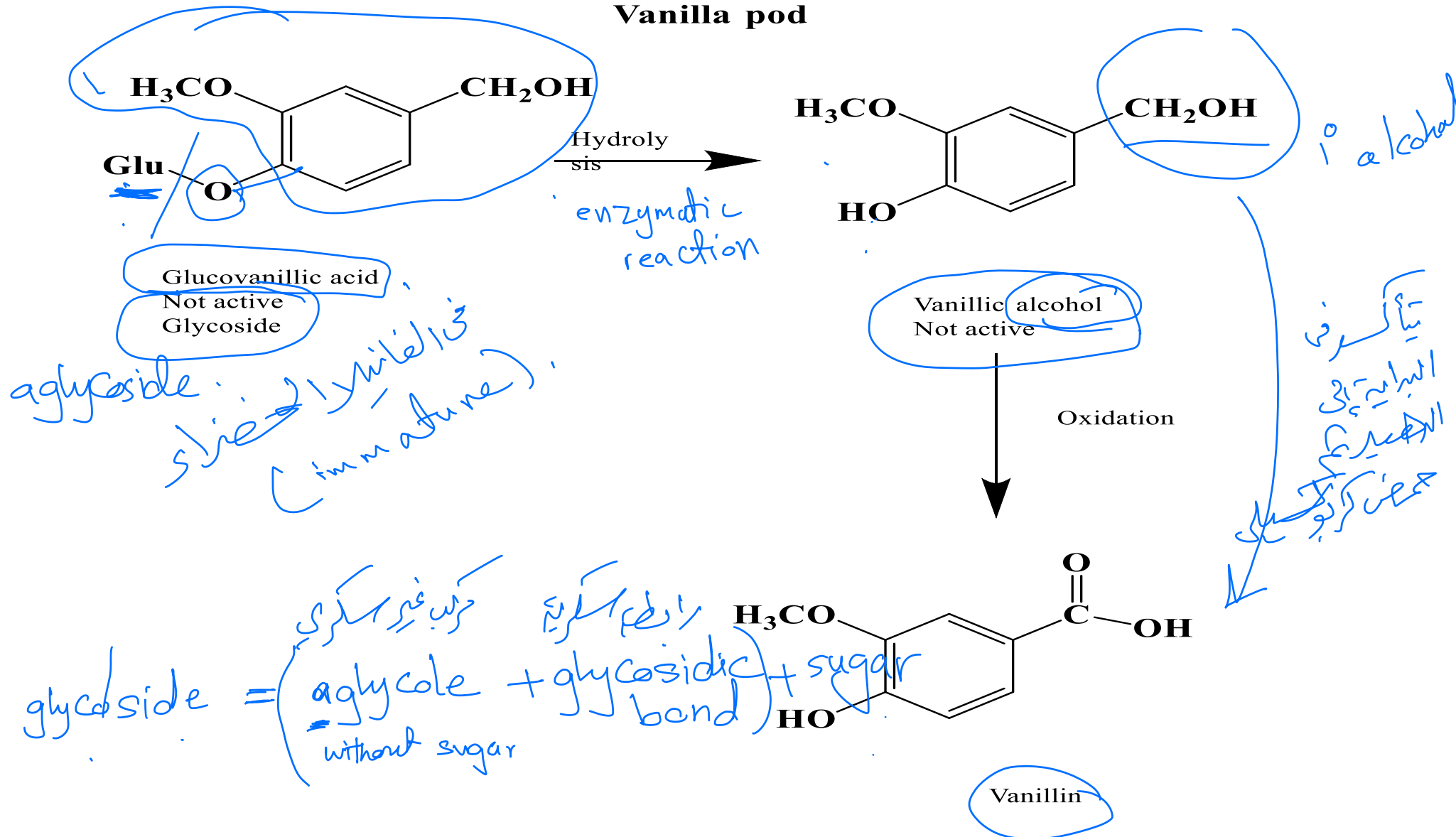
اسم الموضوع: نهاية السابتر الثاني

إعداد الصيدلاني/ة: محمد ياسين



Some active constituents need to be processed (slow drying is allowed)

Liberation of active vanillin by enzymatic process from *Gentiana Luten* and Vanilla pod



3. Acellular products

They are plant isolates like volatile oil, balsams, resins and fixed oils.

Methods to extract acellular products (Volatile oils):

- 1. **destructive distillation**: wood of Scotch pine (used for dermatitis)
- 2. **Steam distillation using Clavenger tube**: plant material is heated with water and steam is passed through the mixture and condensed. This needs a round-bottomed flask **دورق** that contains water or alcohol (usually water), the plant is inserted inside it with the water, then it's attached into a condenser, also a collecting tube should be there to collect the extracted oil, distillation also requires a heat source, **if the treated material is very sensitive for heat (thermo labile) the steam distillation can't be used then, but other methods like:**
 - ~ **Hydrosteam distillation**: here the plant is separated from the water by a membrane, the plant part is inserted to the membrane and by water heating, the vapor passes this membrane to the plant material, the v.o. is then extracted.

3. Acelleular products

- 3. **Expression** العصر used **pharmaceutically for citrus oils only**, fruits are turned by a stainless steel perforated roll , each pore is attached into an opening ending into a collector, upon turning these pores are induced.
- 4. **Solvent extraction , using alcohol** , not used in pharmaceutical industry.
- 5. **Enzymatic hydrolysis** : very uncommon , some **V.O. that has a sugar part** force to use this method to extract the non-sugar part (previously mentioned example: Vanilla).
- 6. **Enfleurage** : in expensive perfume industry , an old method that uses sheets of waxes or fatty solid materials , the plant is inserted into these glassy sheets , then put in woody frames for a week or 2 weeks in a dark area , then the plant part used is removed and the sheets then are treated with alcohol to produce a concentrate of these v.o.

طريقة
استخلاص
العطر
من الزهور

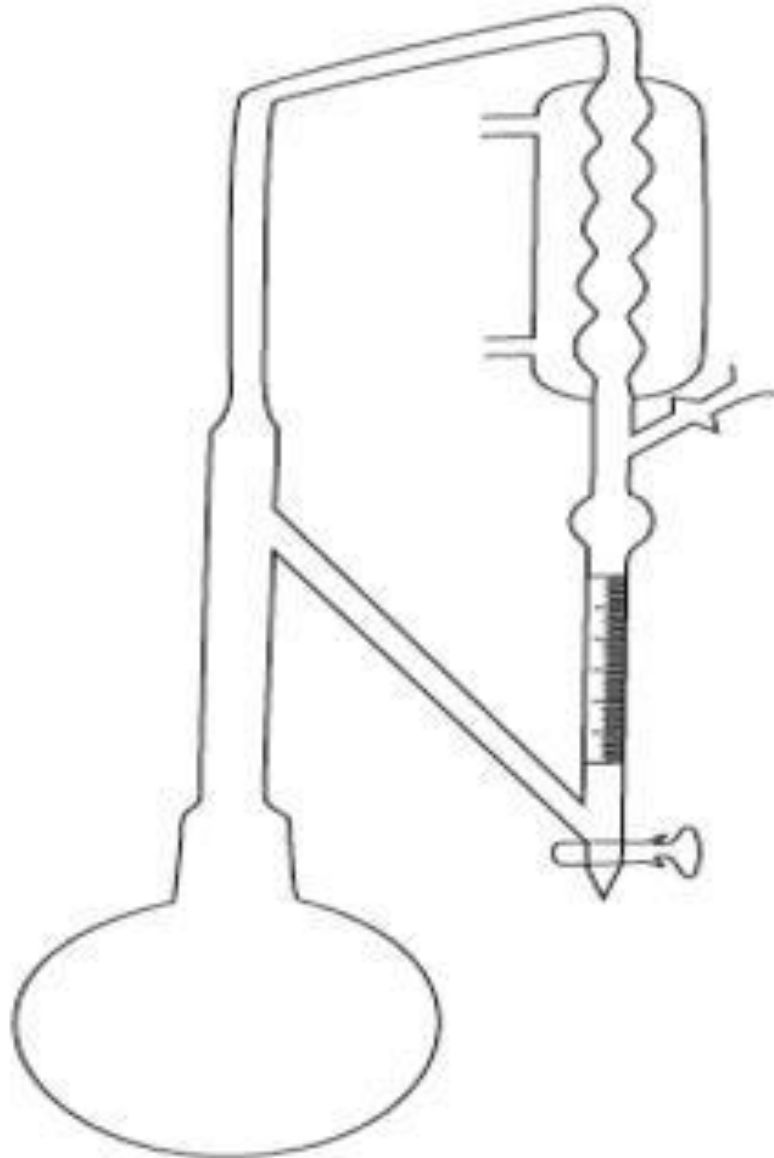


U

outside cell

3. Acellular products

VOLATILE OIL STEAM DISTILLATION



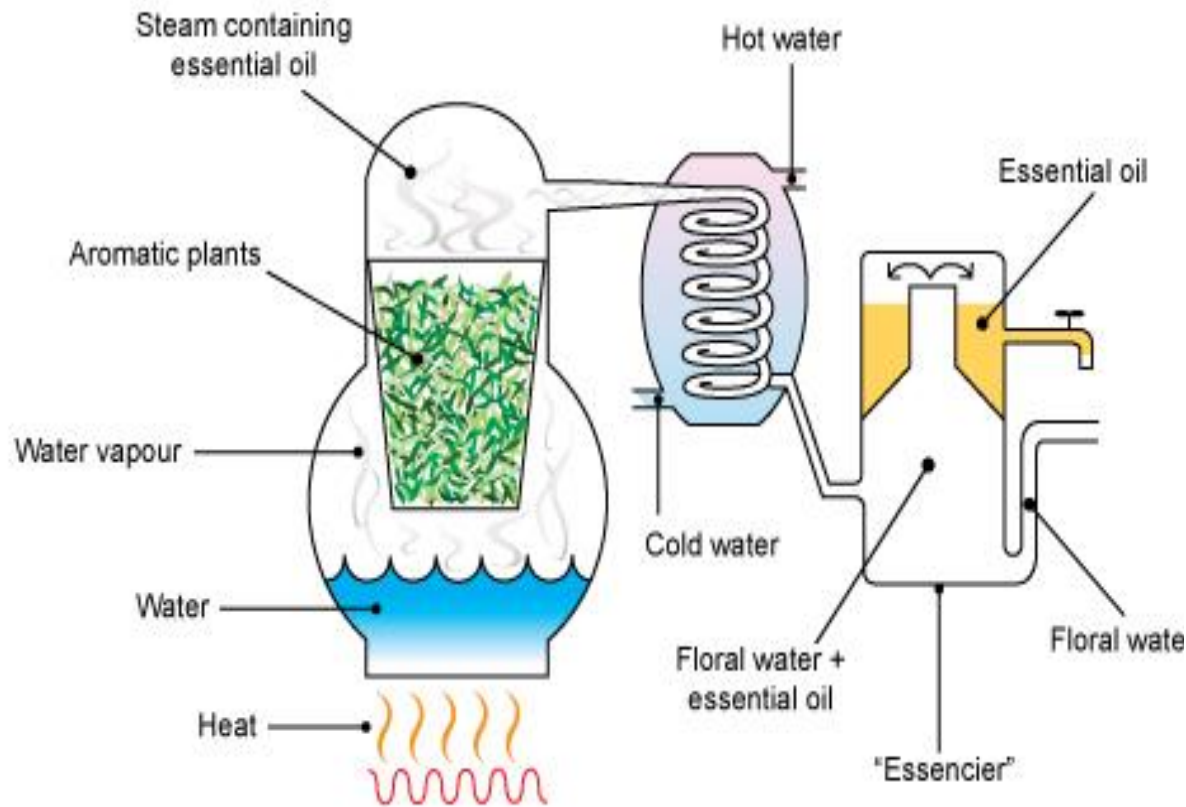
Clevenger tube

Figure 1. Clevenger-type apparatus — *Appareil de type Clevenger.*

3. Acellular products

VOLATILE OIL STEAM DISTILLATION

Hydro-steam distillation



Clavenger tube

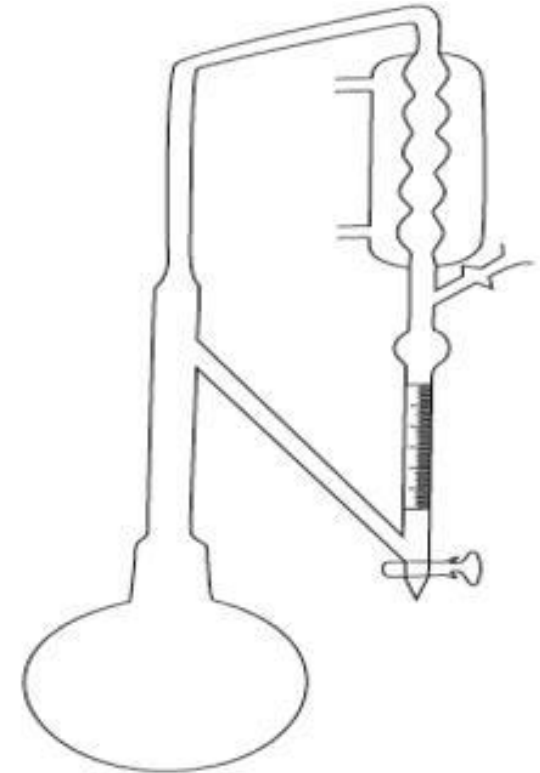


Figure 1. Clavenger-type apparatus — *Appareil de type Clavenger.*

عملية التقطير لتحضير الزيوت الطيارة

VOLATILE OIL STEAM DISTILLATION

مثال
جاء العود

- Principle: When water is mixed with another immiscible liquid and both are boiled together boiling will occur at lower temperature than the water's boiling point
- Plant material is heated with water and steam is passed through the mixture and condensed *There is a difference in B.P. of volatile oil & H₂O*
- Disadvantage of steam distillation: *collecting duct.*
- 1. unstable material may be destroyed *الدور*
- 2. other substances in the plant may affect the composition of the oil *لا نعمل لهم hydro steam distillation*
- Ex. In Citrus spp. The acidic nature cause a number of acid catalyzed rearrangements so another method should be used. *الميل*

فصل
الحرارة

عند مزج مادة غير ذائبة في الماء في الماء فغالباً ما تقلل درجة غليانها عن (لأن درجة غليانها) الزيوت الطيارة (يتطاير في الماء) الزيوت الطيارة (تتغير وتجمع collect) دائماً

و مع استخراج التبخير فصل لدرجات غليانه الماء ← يتغير الماء ويتكثف ويخرج للهواء
مثال عليها نخل خبث (زيت اليانسون) (عملية)

4. Galenical preparations and extracts

مستحضر طبي من أصل نباتي

- Galenical: مستحضر طبي من أصل نباتي
- Galenical preparations: Are extracts of plant materials used in therapy.
- Methods of extraction to any plant:
- **A. Infusion** : drug stood in hot or cold water or other solvent for a short period of time.
- Ex. Preparation of plants containing volatile oil.

الساخن سريع من البارد

مثل الخنج / البابونج

لماذا لا نطبخ الخنج ؟

لأن الزيوت العطرية تطاير بالاطبخ بعين نفقدها للهواء (decoction)

أما بالتقع (infusion) الزرع في الصبغة تبقي بالماء

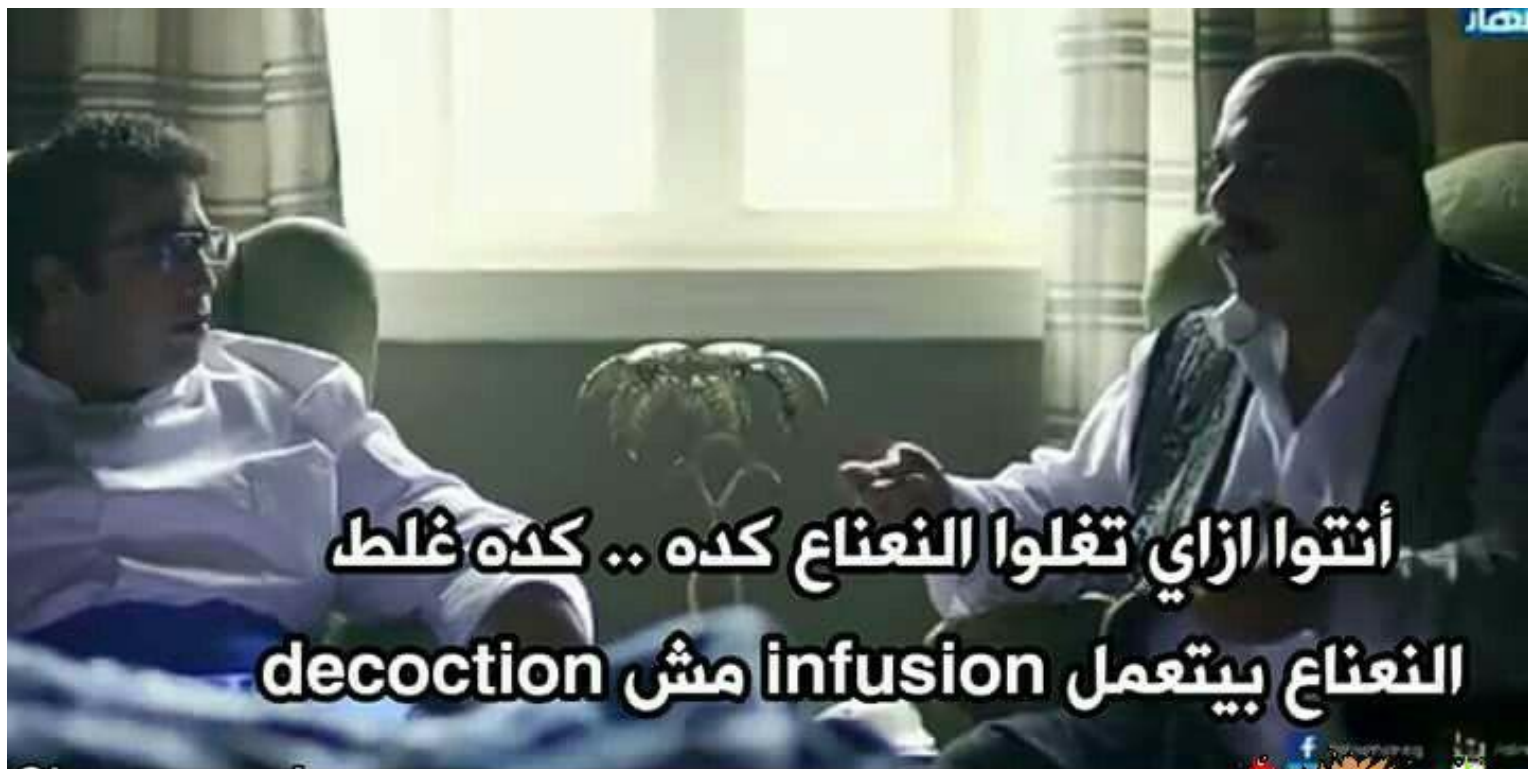
Methods of extraction to any plant:

- **B. Decoction:** ^{نخلي} drug boiled with water or solvent.
- Ex.: roots, ^{ginger} rhizomes and ^{مثل القرفة لحاء} barks
- **C. Maceration:** ^{تقع لفترات طويلة} prolonged infusion (2-3 weeks), ^{in H₂O or} often in aqueous ^{مثال الكركديه / الروز حاربي (مصل لبنان)} alcohol
- **D. Percolation:** Maceration followed by a slow flow of fresh solvent through the ground material.
- **E. Hot extraction:** repeated infusion with hot solvent example : Soxhlet extraction



like coffee machine
coffee powder = plant material
Filter
hot water

in Lab



أنتوا ازاي تغلوا النعناع كده .. كده غلط
النعناع بيتعمل infusion مش decoction

@kareem ayyad



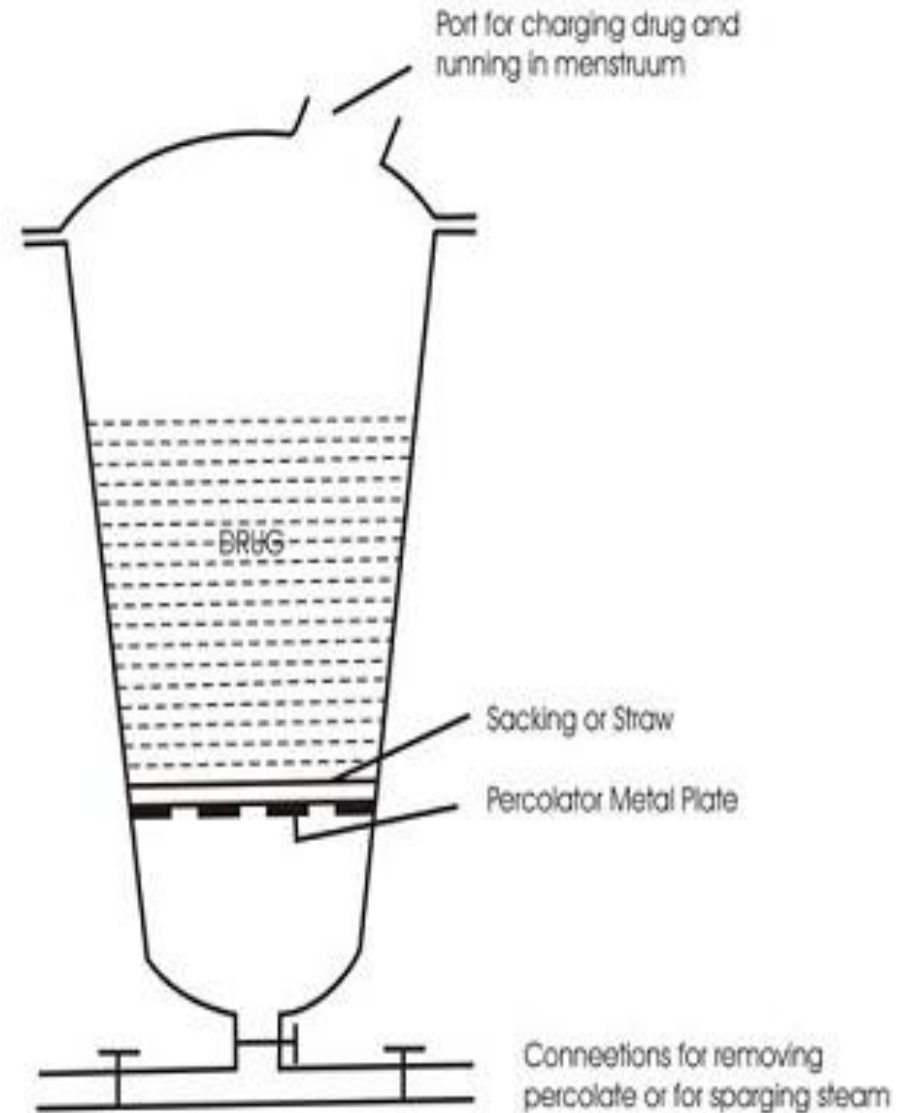
يا بني بطل بقي الهبل اللي بتقوله دا
انت صدقت إنك دكتور بجد ولا إيه



➤ COMMON METHODS OF PLANT EXTRACTION

- **Percolation:**

In this method, the plant material is subjected to a **slow flow** of fresh solvent at intervals until **sufficient active ingredient** is extracted.



Commercial scale (about 1 ton capacity) percolator



E. Soxhlet extraction:

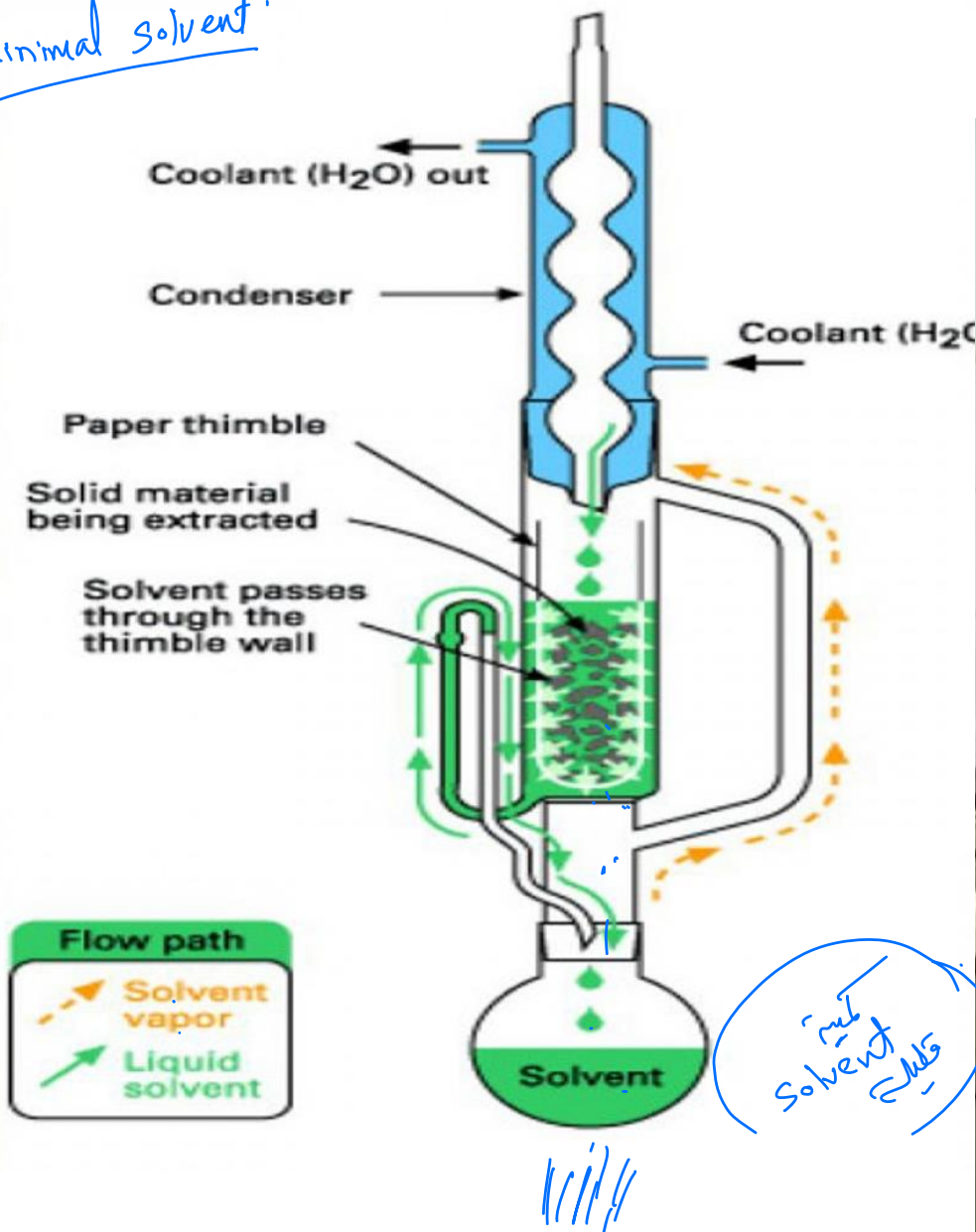
- Soxhlet extraction is only required where the desired compound has a limited solubility in a solvent, and the impurity is insoluble in that solvent.

- If the desired compound has a high solubility in a solvent then a simple filtration can be used to separate the compound from the insoluble substance.
- The advantage of this system is that instead of many portions of warm solvent being passed through the sample, just one batch of solvent is recycled.
- This method cannot be used for thermolabile compounds as prolonged heating may lead to degradation of compounds.

solvent is recycled!
بم تدره (تارده استخراج)
minimal solvent.

Soxhlet extraction

Extraction: Withdrawal of soluble constituents from crude drug by treatment with solvent

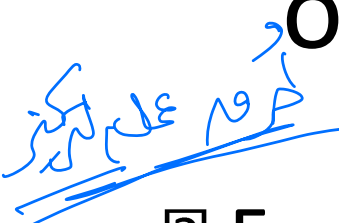


Concentration of filtrate to dryness

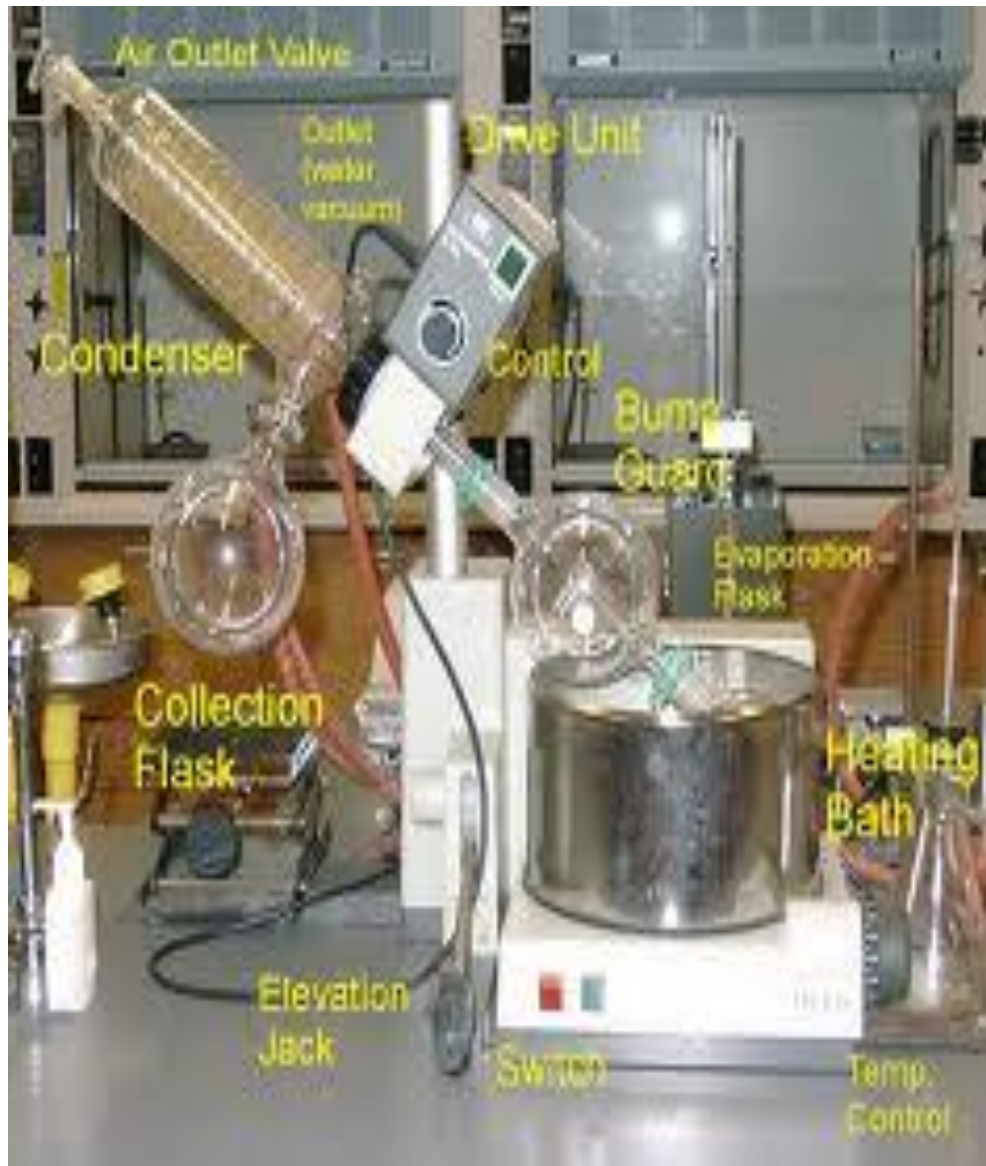
طارة لزجة مثل العجول

- The filtered plant part (liquid portion) must be reduced to paste-like, cakey, and finally powdered form through standard techniques.
- The essence of concentrating filtrate to dryness is to:
why?
- [?] (Calculate) the active ingredient present after the extraction by calculation of percentage yield.
- [?] To obtain dose of plant extract in milligram or gram that can be further constituted in a known volume of vehicle for experimental animals dosing.

The enriched extract from maceration or extractors, concentrated by;

- 
- [?] Feding into a water bath, oven, hot plate, heating mantle, ...etc to produce a thick concentrated extract free from solvent.
 - [?] Or the concentration could be done using rotary evaporator in order to remove excess solvents from samples by applying heat to a rotating vessel at a reduced pressure.
 - [?] A freeze dryer or lyophilizer can also be used to concentrate and dry the filtrate extract (only aqueous) at reduced temperature

➤ COMMON METHODS OF CONCENTRATING FILTRATE TO DRYNESS



Rotatory evaporator

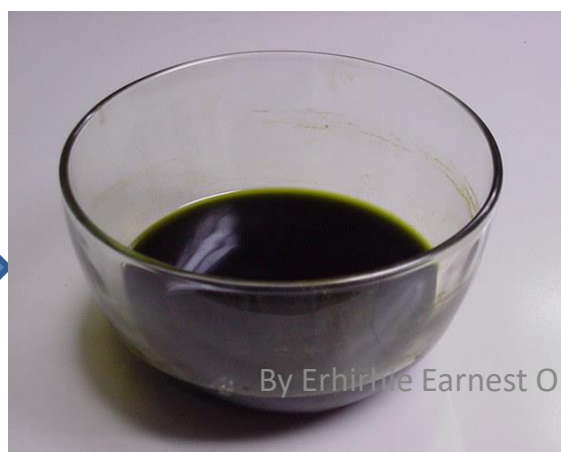


Heating mantle



Freeze dryer (Lyophilizer)

GRAPHICAL OUTLINE



By Erhirhe Earnest O.