09/10/19

Unit - 5th

Extraction

* Extraction is defined as process which is used to separate the phytoconstituent from the insoluble matrix of the plant.

* It is of two type

i) Extraction of solid from the solid part on material.

ii) Solvent extraction which is used the extract the liquid from the liquid.

* There are several factor which effect the extraction procedure.

1) The nature of extracting solvent ⇒ based on the concept of like dissolve like polar material can be extracted from polar solvent while non-polar material will be extracted from the non-polar solvent.

2) The plant particle size ⇒ The drug should be in powder form as it will reduce the particle size & provide

the better penithation of the solvent & also the every particle of the plant material will be in contact with in the solvent.

3) Solvent to plant material ratio ⇒

Fresh solvent must be introduce after a particular time as ~~exe~~ excesive amount of solvent be leads to the high cost and it will also ~~les~~ the extraction efficancy.

4) Tempreture ⇒

Tempreture must be accessed during the extraction ~~produre~~ procedure at high temp. may cast the lost of solvent.

5) Menstrum ⇒

It is the solvent which is used for extraction and to dissolve the active medicament presents inside the plant & animal tissue

6) Marc ⇒

It is an inert insoluble material ~~less~~ a left after exhaustion the plant material.

2) Conventional method of Extraction ⇒

Infusion ⇒

It is the procedure in which the crude drug and the vegetable crude drug it introduce in the boil water and the then solution allowed to cooled & filter for the administration.

Note ⇒ The infusion to be administered should be freshly prepared.

Vegetable Crude drug + Boiled water (menstrum)

↓

Cool

↓

Filter

Concentrated Infusion ⇒

In this alcohal is used as a menstrum

Decoction ⇒

It is the process in which the hand crude drug is mixed with the water and allowed to boiled for some time and

then the mixture in allowed to cool filter it and dispense.

Hand crude drug + water
↓ Boil
Cool
↓
Filter
↓
Dispence.

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Digestion

In this method gentalheat is applied over the substance to be extracted as it will help the solvent to dissolve more drug from the substance.

Maceration

The drug sample is mixed with the menstruum and allowed to stand for 7 days with and ocational shaking and after 7 days the mixture is being strain by pressing to collect the remaining mark both the filtrated are mixed to collect the

result in solution.
This process is used for preparing the tincture

Drug + Solvent ⟶ Stand for 7 days with accassional shake
↓
Strain
↓
Press to collect marc
↓
Strain + Marc
↓
Filter
↓
Extracted fluid.

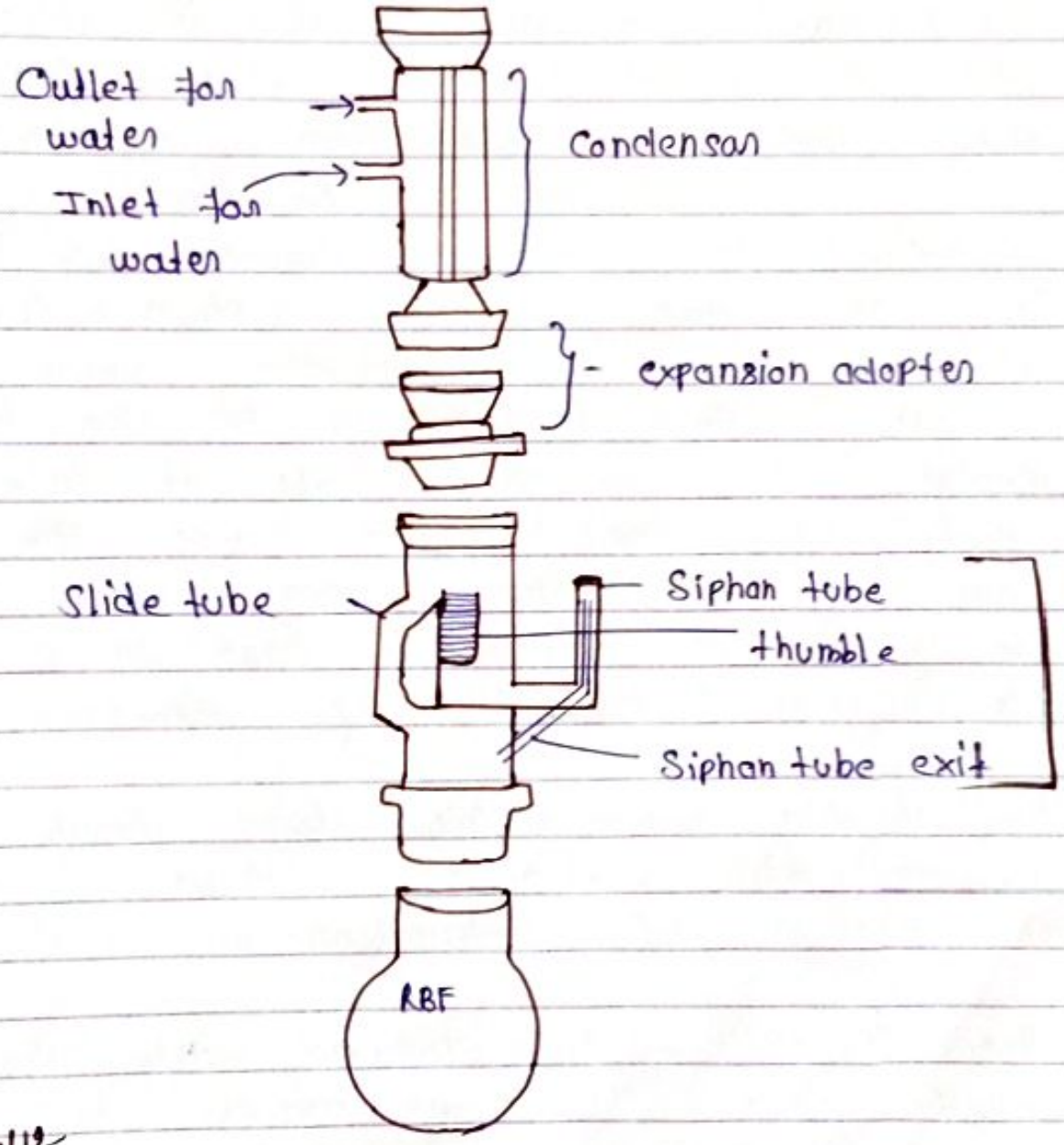
i) Double & Triple Maceration

Double maceration is used to prepared the conc. infusion while triple maceration is used in those cases where the sample can not be pressed to collect the infusion as in case of Liquorice.

iv Soxhlet Extraction

Tem. 70-90°C

It is invented by Franz von Soxhlet in 1879 for the extraction of lipid.



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- The material to be extracted is ~~finally~~ coarsly powder and packed inside in the thimble by packing inside the

filter paper on by covering it cotton. from the cotton top in odour to avoids the entry of drug particle in the siphan tube.

- Thimble any siphan tube is called as the soxhlet extraction which is attached to the round bottom flask from the condenser on top from ↓ menstrum is the extract added slowly once the solvent is list to the top of the sephan tube it will nevent back to the round bottom flask which is attech to the heating mental the condenser has at inlet & outlet for the water once the solvent begain to boil the vaper travel to the condenser and fall back in a thimble in the form of hand liquid.

- The thimble cantaining drug begain the process of extracting solvent & begains the process of extraction.

- The solvent get empitied into the round bottom flask the procer will repeat for several cycal till the procer procedure get completed.

Advantage →

- This process is automatic & contineous.
- Process is time saving and cost effecting

Disadvantage →

- In this processes the extracted phytoconstituent will boil contineously with the solvent which may affect the quality of the extracted phytochemical there for this method is not suitable for thermolabile phytoconstituents.

Perpolation

It is the most common method for the preparation of a tinture and fluid extract

It involves three steps first

Imbibition
Maceration
Perpolation

1) Imbibition →

In this process the plant material is introduce into the percolator and allowed to stand for four

hours during this process the plant material will get swell and solvent will get inside the powder sample.

2) **Maceration ⇒**

During this process and extra solvent is being added to the previous sample and allowed to retain for 24 hours with ocational shaking this causes saturation of the powder sample with the solvent.

3. **Perpolation ⇒**

It allowed the saturated menstrum to settel down and drug is collected from the colom.

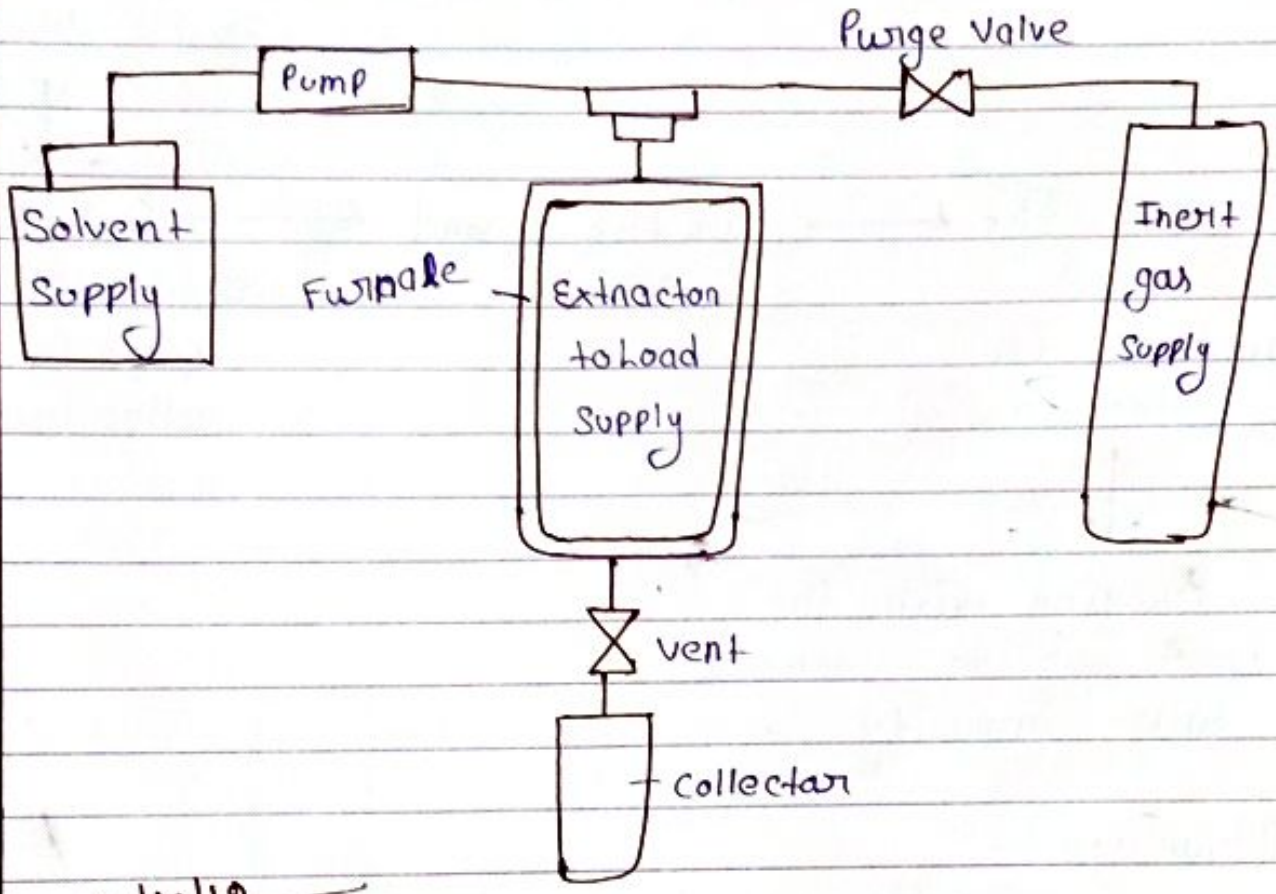
For the perpolation, perpolator is used which is conical in shape and having opening adduct of and adjectable colser in the bottom to allowed passes of fluid at convient rate.

Pressrized Fluid Extraction

It is also known accelerated solvent extraction or high pressure solvent extraction.

This process is carried out at high pressur

to accellerate the extraction process and high pressure.



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The solvent is filled into the solvent supply chamber and sample is put into the extraction cool temp. maintain to 80 to 100°c & pressure is maintain about 10 to 20 pascal for some time the extracted material is collected into the collection vial & allow the second solvent to run and collect the extracted material in collection vial by purging it with the inert gas to remove any impurity & to avoid lump formation.

Sample in extraction cell → Solvent from Solvent supply → temp. 80 to 100° & Pressure 10 to 20

↓

collect the extracted material in collection vial ← Run the second Solvent ← Collect the extracted material in collection vial

↓

Purging with the inert gas to remove any impurity.

Advantage :-

- It can be used with the less quantity of sample.
- Process is fast & can save the time.
- It is suitable with the phytoconstituent available in less quantity.
- It is cost effective.

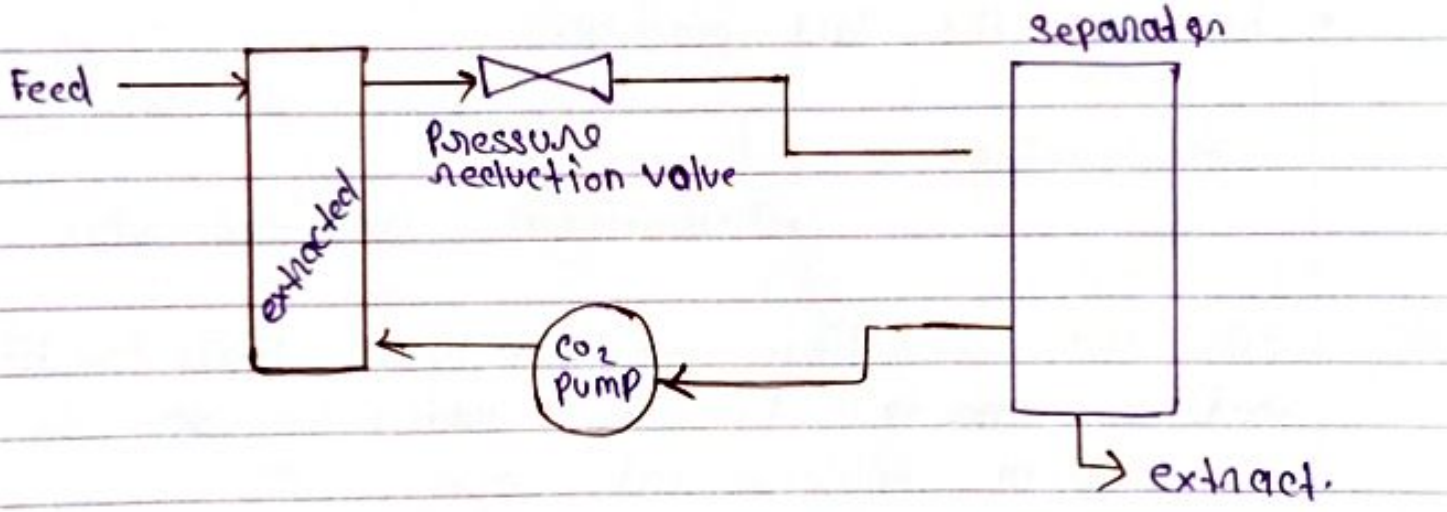
Dis-advantage ⇒

It is not suitable for the thermolabile substance.

Super Critical Fluid extraction

Super critical fluid are those fluid ware the liquid & upper phase of a substance is in distinguishable at a suntain pressure & temp. that is these fluid cantain the property ble the liquid phase & gas phase.

Use:- The process is used to remove any unvantage entities from the product that is during the decaffination process.



The material to be extracted is feed into the extractor along with the solvent gets in contact with the co_2 from co_2 pump with high pressure (about 350 pascal) the extracted phytoconstituent is sent to the separator with the low pressur (150-120 pascal) the rough the pressure reduction valve the extracted material is collected wild the

CO_2 is again sent back to the CO_2 pump.

This is the semibatch process as the flow of CO_2 is constitheous while the material needs to be extracted is feed into the batches in the extracter.

Advantage ⇒

- It provide an advantage of selecting the pressure as the pressure 100 is used to extract.
- This is the fast process.

Disadvantage ⇒

- Oparational cast is very high.
- For the extraction of nonpolar Phyto constituent. modifare needs to be added dew to the nonpolar nature of CO_2.

Use.

- It is used to extract ginger oil, Rosemarni oil, sinnamal bar oil, nut meg oil.
- for the decaffination of tea & coffie.

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Spectroscopy →

It is the phenomena of absorption and emmision of electromagnatic radiation by matter.

UV visible spectroscopy ⇒

It deals with the and absorption of UV radiation the colourless compound absorbed the UV radiation in the range of 200 to 400 nm why while the coloured compound absorbed the visible radiation in the range of 400 - 800 nm.

Application ⇒

Qualitative Analysis ⇒

The graph is ploted ble the absorption on Y axis & wave length on x-axis the graph is termed as the absorption curve the wave length atlist maximum absorption occur known as λ_{max} It will remain unchange by Yes or Yes the conc. the colour substance absorbed radiation of different wave length.

Quantitative Analysis ⇒

It is the graph is ploted ble the absorbance & conc. of a substance in sample solution

Infra red of vibational radiation

It is a technique in which infra Redlight is used to study its intraction with the molecules the spectro generated during IR give the information about the functional group of the compound.

Application -

It is used to identified the functional group and to elucidate the structure of the compound.

It is also used to determine impunities in the compound as IR gives additional Peak due to the present of impunities.

Mask Spectroscopy = on Positive ion spect.

It is particular used to determine the molecular weight of compound is mask spectroscopy is result are produce are produce in the form of graph known as mask spectrum. Which is a plot of intencity v/s mask to change ratio.

It does not require electromagnatic feed for excitation.

Application :-

- Structure elluciclation
- Impunity detection.

Electrophonisis

It is the movement of charge particle under the influence of electric feed it is of two type.

1. Cataphonosis
2. Anaphonasis

1) Cataphonosis ⇒ It involves the movement of electron of +ve charged particle towards the -ve electrode under the influence of magnatic feed.

2) Anaphonosis ⇒ It involves the movement of -ve charged electrons towards the +ve electrode.

A

NMR

The neuclei are electricaly charged & have speen that cause them to behave like a magnete.

The neucleus having speen at higher energy generate a magneting feed in opposite direction to external magneting feed ware as the neuclew the speen at lower energy generate a magneting feed in the direction of external magnating feed.