Lab 5: Extraction System.

Extraction is the process in which the plant tissues are treated with specific solvents whereby the medicinally active constituents are dissolved out, cell tissues and most of inactive or inert components remain un-dissolved.
The plant material used for extraction should be properly identified. The choice of the plant material for extraction depends on its nature and the components required being isolated.
The solvents used for extraction purposes is known as "**Menstruum**" and residue left after extracting the desired constituents is known as "**Marc**.**"**

- The medicinal value of natural herb of the plant is due to the active constituents.
- It is generally benefit to extract the active constituents to formulate a control doses form of that active constituents rather than using the bulk quantity.

Solvents Used for the Extraction of Herbs

From the stand point of pharmacy, the purpose of a solvent is to remove from a solid, either in part or in its entirety such substances that may be reduced in the liquid.

When the material has extracted, the "**Menstruum**" is known as **"Vehicle**" or "**Carrier"** of the extracted materials. Solvents differ widely from each other, not only in differing boiling points, but how they act or react with substances in which they come in contact.

An Ideal Solvent for the Extraction of the Herbs should meet the Following Criteria

1. It should be non-toxic and selective, i.e. it should dissolve only the required constituent with minimum amount of the inert materials .
2. It should not cause the extract to complex or dissociate.
3. It should promote rapid physiologic absorption of the extract .
4. It should be easily evaporated at low heat.
5. There are large number of solvents (Menstruum) used for extraction of herbs, but the selection of the suitable solvents capable of extracting the active constituents depends upon the chemical properties of active constituents as well as the qualities of the solvent.

6. The solvents commonly used for the extraction of the herbs include water, alcohol and theire different dilutions.

Water

- It is a good solvent for the extraction of many types of active constituents such as alkaloidal salts, coloring agents, glycosides, sugars, anthraquinone derivatives and tannins. It can also act as menstruum for many organic acids and small proportions of volatile oils.
- Water is not a suitable menstruum (Solvent) for constituents like waxes, fats, fixed oil and alkaloidal bases due to their insolubility in water. Water is not selective as it can dissolve a wide range of substances and leads to hydrolysis of many substances.
- Water soluble herbs are aloe, glycyrrhiza, linseed, senna leaves, senna pods, ginger etc.

Alcohol

Alcohol or ethanol can dissolve a large number of chemical constituents such as alkaloids, alkaloidal salts, glycosides, tannins, anthraquinone derivatives, volatile oils and resins, but constituents like albumin, waxes, fats, fixed oils and sucrose are insoluble in alcohol .

* Generally dilute alcohols (hydroalcoholic solutions) are used for many extractions, but in some cases stronger alcohol may be used to prevent the extraction of unwanted substances such as gums .

* It is non-toxic in the quantities present in medicinal substances. It is reasonably selective.

In an herb containing a number of chemical substances such as alkaloidal salts, glycosides, albumin and gum, water will dissolve all the substances.

Whereas dilute alcohol will dissolve only in alkaloidal salts and glycosides.

Alcohol soluble herbs are benzoin, ginger, valerian, myrrh etc.

CH3-CH2-O-CH2-CH3

Ether

Soluble Constituents are oils, fats, waxes, resins and alkaloidal bases.

Highly inflammable (flammable) produces physiologically effects.

Ether soluble herbs are capsicum, linseed, nutmeg etc.

Chloroform

Soluble constituents are oils, fats, waxes, resins and alkaloidal bases.
Non inflammable.

Glycerin

Soluble constituents are tannins.
Non inflammable and viscous liquid .

Light Petroleum

Soluble constituents are oils, fats, waxes, resins and alkaloidal bases.
Highly inflammable and very volatile.

Propylene Glycol

Soluble constituents are progesterone, phenobarbitone sodium.
Colorless, odourless, viscous liquid, miscible with water, alcohol and chloroform.