INFLORESCENCE

It is the arrangement of flowers in various ways. The whole flower or the part of the flower are used medicinally. The inflorescence are classified on the basis of limited or unlimited growth of main axis (Peduncle)length of peduncle, presence or absence of pedicels in the flowers, etc. These are the different types of inflorescence which are used in drug.

(a) Raceme - Mustard, Digitalis.
(b) Panicle - Goldmohar
(c) Cymose - Jasmine
(d) Umbel - Coriander, Carway, Fennel.
(e) Hypanthodium - Fig.
(f) Capitula - Arnica, Sunflower, Pyrethrum.

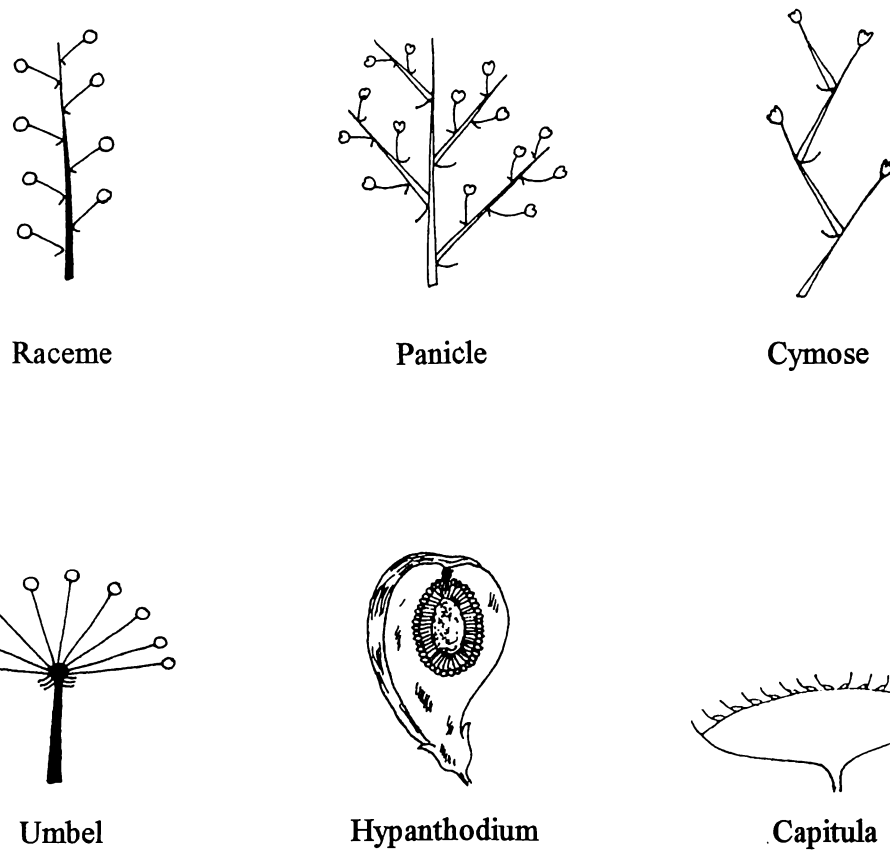

Fig. 3.5 : Types of inflorescence

cells. Cell content either in free state or present within the cells should be observed carefully. During microscopical study, drawings are very essential for the identification of a crude drug. It has significant role in the study of qualitative and quantitative evaluation of crude drugs and adulterated powder drugs. This can be achieved by counting a specific anatomical feature such as stomatal index, stomatal number, vein-islet number, palisade ratio, vein termination number. Calcium oxalate crystals, starch grains, phloem fibres ,etc. are measured with the help of ocular and stage micrometer. Lycopodium spore methods are used for the determination of starch grains in wheat or ginger powder. It is also used for calculating the number of pollen grains in pyrethrum powder.

PHYSICAL EVALUATION

It is very essential for the determination of quality and purity of drugs. In this evaluation, physical constants are determined wherever possible e.g. viscosity for drug containing gums, froth number for saponin containing drugs, swelling factor for mucilage containing drugs. Extractive value and solubility in different solvents, refractive index, optical rotation, density, specific gravity, ash-value, volatile oil content, boiling point, melting point, freezing point, moisture content, spectroscopic analysis, radioimmuno assays, etc. are useful parameters for evaluation of drugs. Some of them are described below.

1. **Moisture content** : The presence of excessive moisture content in a drug will deteriorate its quality due to activation of certain enzymes and growth of micro-organisms. The moisture content can be determined by a standard procedure i.e. Karl Fischer methods. Pharmacopoeias prescribe standard limits for crude drugs are as under :

Drugs	Moisture content (%) w/w should be not more than
Digitalis	5
Tolu Balsam	4
Aloe	10
Starch	15
Acacia	15

2. **Melting point** : It is a useful parameter for determining the purity of crude drugs. Pure phytochemicals and other chemical compound give a very sharp and constant

Isolation & identification tests

Different methods for isolation and identification tests of individual constituents are used on the basis of their chemical groups such as Alkaloids, Glycoside, Volatile oil, Saponin, Resin,, etc.

Therapeutic and Pharmaceutical uses

Terpenoids that exists in nature, may be used as medicinal agents for pharmaceutical purpose. For example.

(i) Arjunolic acid	: Diuretic
(ii) Asiatic & brahmic acids	: Antibacterial & in treatment of wound
(iii) Cannabinoid Δ^9 THC	: Anticancer activity.
(iv) Glycyrrhitinic acid	: In treatment of rheumatoid, arthritis and addision's disease.
(v) Gossypol	: As male antifertility agent.
(vi) Volatile constituents	: Flavouring agents.

GLYCOSIDES

Glycosides are compounds that contain aglycone and glycone molecule. These are widely present in plants and rarely in animals. In plant ß - D glucose sugar moiety is present. Glycosides on hydrolysis produce aglycone (genin) and glycone (sugar) molecules.

Chemically glycosides are considered as sugar ethers (acetals).

$$\text{Glycoside} \xrightarrow[\text{Acid/enzyme}]{\text{Hydrolysis}} \underset{\text{(genin)}}{\text{Aglycone}} + \underset{\text{(sugar)}}{\text{Glycone}}$$

Properties : Most of the glycosides are crystalline, colourless compounds (anthracene glycoside - red or orange; flavanoids - yellow in colour) and optically levo-rotatary. Glycosides are soluble in water and alcohol but insoluble in other organic solvent like chloroform, carbon tetrachloride, petroleum ether; while aglycone moiety is soluble in organic solvent but insoluble in aqueous solvent.

Classification : Glycosides are classified on the basis of linkage between glycone and aglycone moiety and also on the basis of chemical nature of aglycon (genin) molecule.

(terpenoids) i.e. aldehyde, ester, alcohol, phenol, etc. The terpenoids are responsible for odour and taste. The terpeneless volatile oils are possessing better fragrance.

Phenyl propanoids are also an important group of volatile oils. These compounds contain a phenylic nucleus attached to three carbon side chains (propane, allyl, etc.). The examples of such volatile oils are eugenol, methyl salicylate, anethol, cinnamaldehyde, etc,.

ISOLATION OF VOLATILE OILS

The following methods are used for isolation of volatile oils, first method (distillation) is widely applicable.

(1) **Distillation** : The process of converting liquid into vapour and again condensing to liquid is called distillation. The method of distillation depends on the condition of plant material. There are three methods used for oil distillation.

a) **Water distillation** : This process is used in those plant materials which can not be destroyed by boiling. The material is boiled with water and vapours are condensed, volatile oil is separated. Isolation of turpentine oil is the main example of this method.

b) **Water and steam distillation** : In this process dry and fresh plant material is used, which may be injured by boiling. The material is grounded and dipped in water. A stream of steam is passed in macerated material. The oily layers condense and distillate is separated e.g. clove oil, cinnamon oil.

c) **Direct steam distillation** : This process is used for fresh plant materials which contain moisture in considerable amount, so there is no need of maceration. The fresh plant materials like peppermint, spearmint are placed in perforated basket or tray. The steam under pressure is passed through fresh plant material and volatile oil is collected with condensed vapours.

(2) **Expression** : Some volatile oils are obtained by expression because they can't be obtained by distillation process without decomposition.

(a) **Sponge method** : The fruit is cut and pulp is removed with a sharp knife. The peel is soaked in water for few hours and peel curvature is reversed and oil gland present on peel is ruptured. Ejected oil is absorbed on sponge and is squeezed. The oil is separated and filtered.

(b) **Ecuelle a Piquer method** : Ecuelle a piquer means "a bowl for pricking". In this process oil gland present over peel is ruptured with the help of pin (about 0.5 cm long). Lemon peel is rotated with hand and oil is sucked.