Chemistry of Active Constituents

Food storage products (Primary metabolites)

1- Starch 2- Mucilages 3- Protein 4- Fixed oil, Fats and Wax

5- Calcium oxalate 6- Calcium carbonate

Uses of the starch

1- As **disintegrant** in **tablet manufacturing**

2- **Antidote** for iodine toxicity

3- As **dusting powder** for **skin** preparation

4- As **nutrient**

5- As **starting material** for **preparation** of **liquid glucose**, **dextrose**, **dextrin**, **soluble starch** and **insoluble starch.**

Commercial starches

Maize, Wheat, Rice and **Potato** starch

2- Mucilages:

- They are **polysaccharide**, white **amorphous** powder
- They are found in **the cortical cells** of **roots**, **rhizomes**, **endosperm** cells or **special cells**

Uses: as **lubricant**, **demulcent** or **emollient**

Chemical test:

- With **ruthenium red** reagent →give **red** colour
- With **corallin soda** reagent →give **red** colour

3- Protein

- **Storage protein** present in **living cell** in the form of **amorphous mass or** sometimes **filling** the **cell** as **endosperm or** in the form of **definite grains known aleurone grains.**

Chemical test

- With **Millon's reagent** →whole **grain** take **red colour** on **warming**

4- Fixed oil, Fats and Wax

- They are **mixtures** of **esters of fatty acids** with **glycerol**
- They are **greasy**, **non-volatile**, **viscous** (oil), **semisolid** (**fats**) or **solid wax**
- The are **insoluble** in **water** or **cold alcohol**

  but **soluble** in **non-polar** organic solvents **(Why???)**

Chemical tests

1- With **Sudan III** stained **red**

2- With **chlorophyll tincture** stained **green**

Products of metabolism
(Secondary metabolites)

I- Alkaloids

II- Volatile oil

III- Glycosides

IV- Tannins

V-Resin

VI- Oleo-gum

VII-Oleo-gum-resin

VIII- Gum

Products of metabolism

I- Alkaloids

Heterocyclic, **nitrogenous**, **basic** **pharmacologically** active compounds.

- **Occurrence and distribution**

- **They occur mainly in dicotyledones: Solanaceae**
  but (labiatae and rosaceae are free)
- **in monocotyledons: Liliaceae**

- They are **precipitated** by **reagent** containing **heavy metals** as:

1- Mayer's reagent (K-HgI) **2- Wagner's reagent (I_2-KI)** **3- Kraut's reagent (KBi-I)** **4- Marme's reagent (K-CdI)**

5- $HgCl_2$ **Or** by some **acids** as **tannic** acid and **picric** acid

II- Volatile oils:

- **Important odourous principle** in the **plants**

- **Due to** their **evaporation** at **ordinary temperature** and **air** they are **called volatile oils**

- They are **not esters** of fatty acids (**C.F. Fixed** oil) and undergo **resinification** (**not rancidity**)

- They are **mixture** of **hydrocarbons** and **oxygenated compounds** (**oxides**, **alcohol**, **aldehyde** …etc)

- They are **secreted** in the **plant** by **special cells**, **ducts**, **glands**, **glandular hairs.**

Example of oils: **Clove oil, Chamomile oil, peppermint oil** …etc

Dherapeutic actions and uses of volatile oils

- **Carminative, antispasmodic, Diuretic, Anthelmintic, Mild antiseptic, …… etc**
- **Widely used in perfumery,**
- **Widely used as spices for flavoring of food**

Chemical tests

- **With Sudan III reagent give red colour**