

# PHARMACOGNOSY

## LAB 1

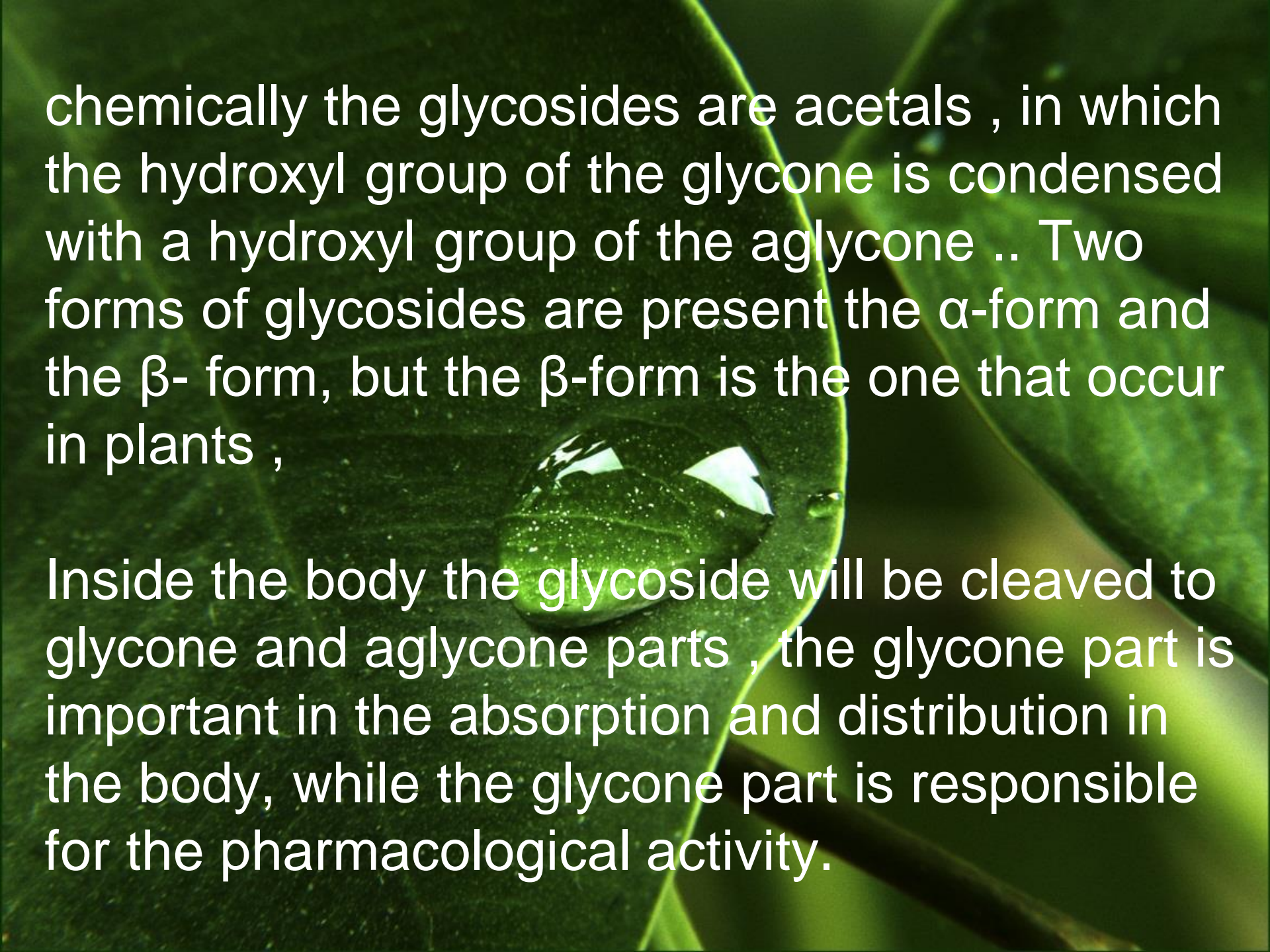
• *Eat healthy and stay healthy*



# Glycosides

- Glycosides are compounds that yield on hydrolysis , one or more sugar among the other products of hydrolysis. The sugar part is known as **glycone** and the non-sugar part is the **aglycone** .





chemically the glycosides are acetals , in which the hydroxyl group of the glycone is condensed with a hydroxyl group of the aglycone .. Two forms of glycosides are present the  $\alpha$ -form and the  $\beta$ - form, but the  $\beta$ -form is the one that occur in plants ,

Inside the body the glycoside will be cleaved to glycone and aglycone parts , the glycone part is important in the absorption and distribution in the body, while the aglycone part is responsible for the pharmacological activity.


Generally all glycosides are hydrolyzed by boiling with mineral acids, on the other hand the presence of specific enzymes in the plant tissue, are able to hydrolyzed the glycosides, such as the **emulsin** enzyme which is present in the almond kernel, and the **myrosin** enzyme which is found in the black mustard seeds.

## **Generally in the extraction of the glycosides we need the following points**

1. A polar solvent, which is mostly alcohol, but not water, since water may induce fermentation , in addition water needs high temperatures due to its high boiling point.
2. Neutralization of the extract with base, since the presence of acid lead to hydrolysis of the glycoside.
3. Use of heat is to inhibit the activity of the hydrolytic enzyme that is present in the plant cell.

**The glycosides are classified according to the chemical nature of the aglycone to:-**

- Cardio active glycosides
- Anthraquinone glycosides
- Saponin glycosides
- Cyanophore glycosides
- Isothiocyanate glycosides
- Flavonol glycosides
- Alcohol glycosides
- Aldehyde glycosides
- Lactone glycosides
- Phenol glycosides



According to **the chemical group** of the aglycone involved into the acetal union:

O-glycoside (OH group)

S-glycoside (SH group).

N-glycoside (NH group).

C-glycoside (C group).

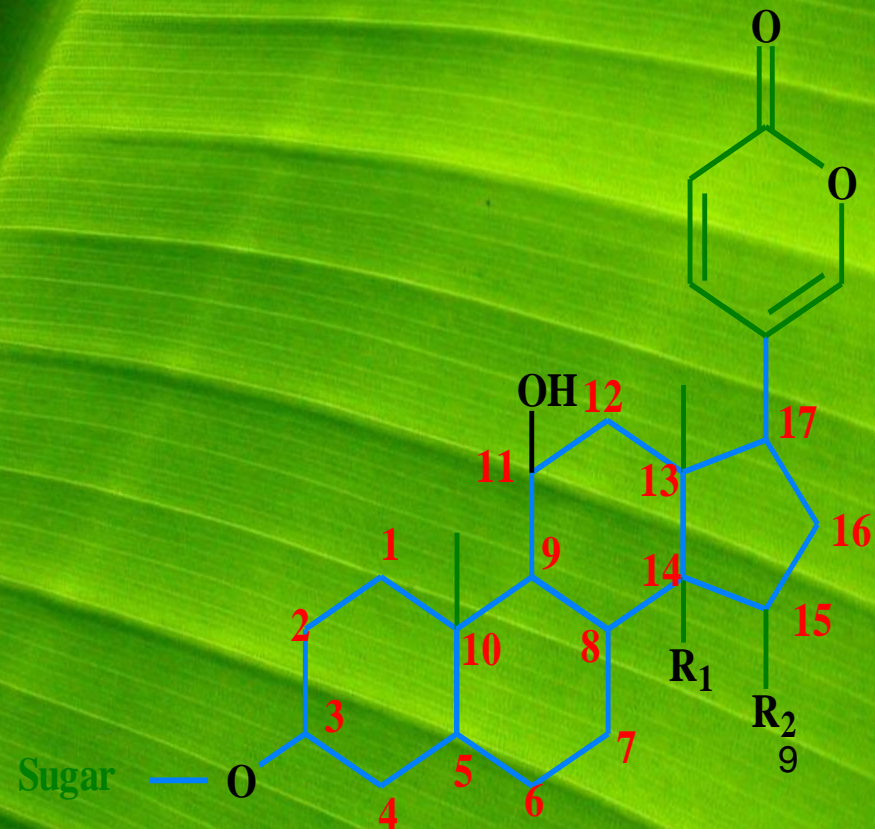
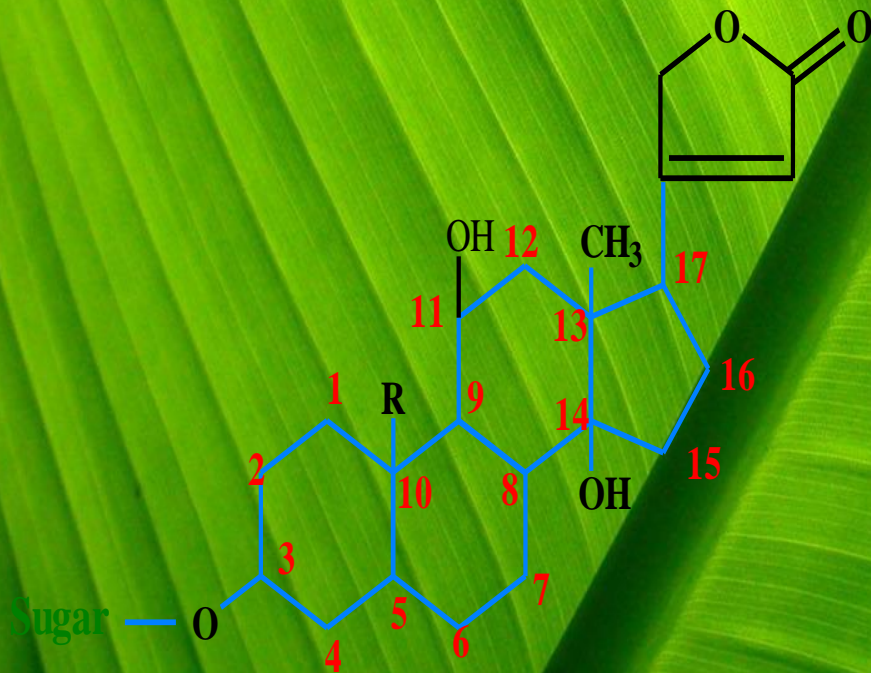
## CARDIO ACTIVE GLYCOSIDES.

- They are named so, due to their action on the heart muscle. The aglycone part here is a steroid. Which is chemically cyclopenta phenanthrene .
- The steroidal aglycones are two types, cardenolide ( $\alpha$ - $\beta$  unsaturated-5 member lactones' ring) and bufadienolide(doubly unsaturated 6-member lactones' ring)
- The more prevalent in nature is the cardenolide type.

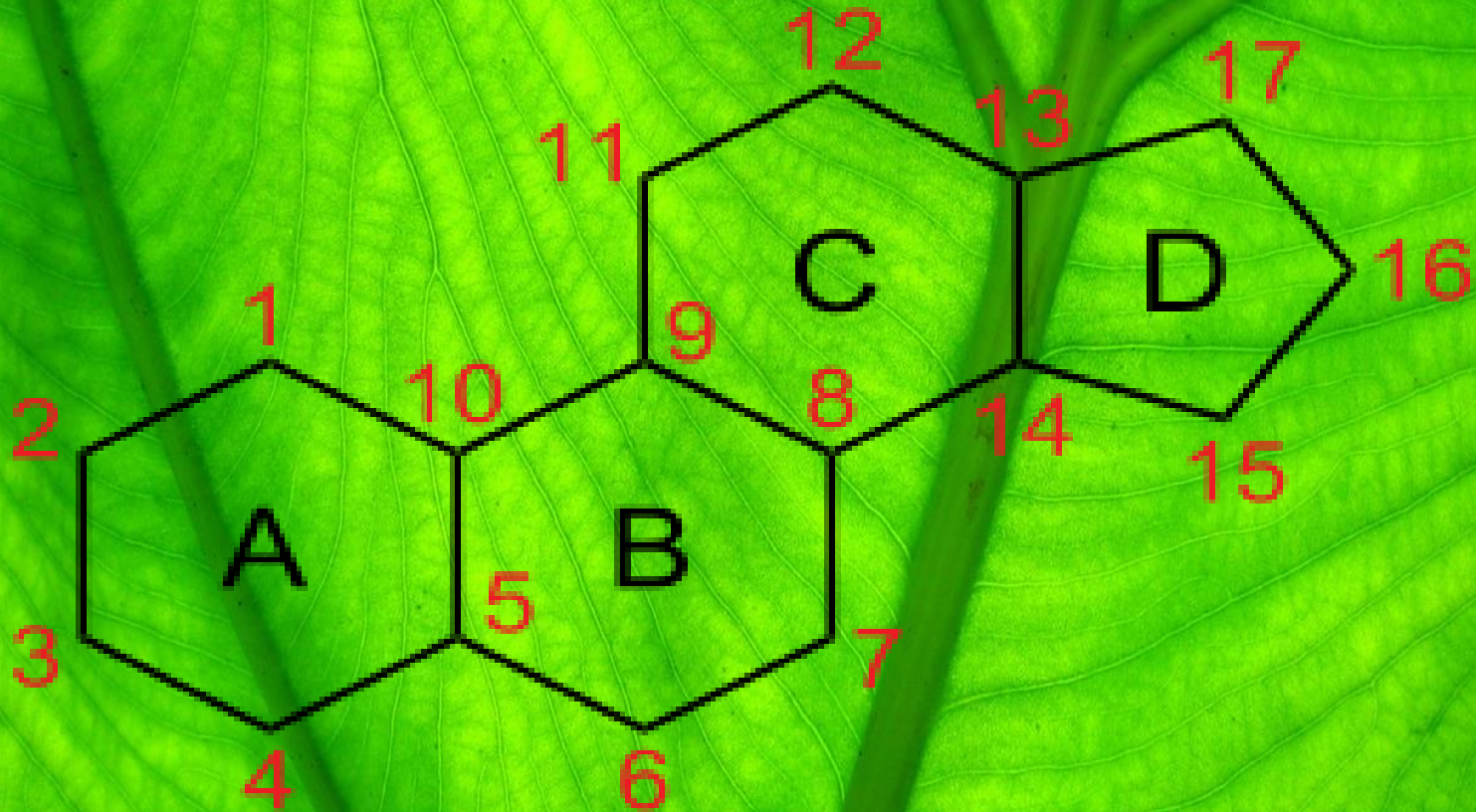


For maximum activity of the cardio active glycosides the following points are important

- 17- $\beta$ -lactone (cardenolide or bufadienolide)
- 3- $\beta$ -OH
- 14- $\beta$ -OH

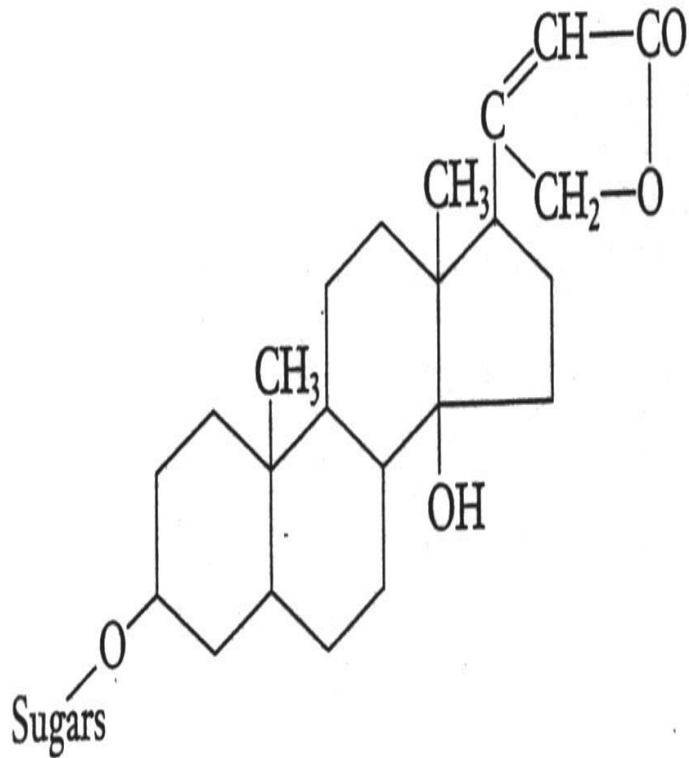


The cyclopenta phenanthrene nucleus is as follows.



# Plants containing cardio active glycosides

- Digitalis (digitalis or fox glove) **Digitalis purpurea** of the family **Scrophulariaceae**. This plant contains a number of glycosides as digitoxin , gitoxin and gitaloxin



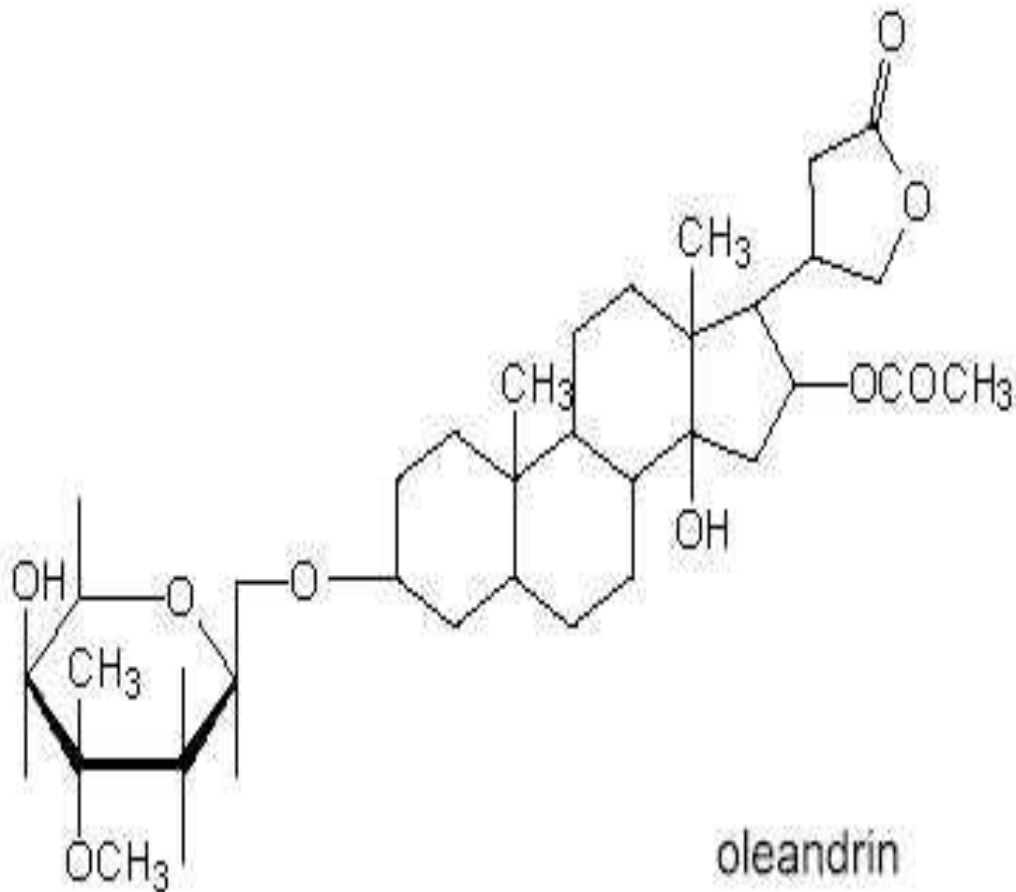
**Digitalis lanata** of the same family, from which the digoxin is obtained.



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The plant used in our laboratory is Nerium oleander of the family Apocyanaceae. Here the glycoside is oleanderin .



# THE ISOLATION AND IDENTIFICATION OF THE CARDIO ACTIVE GLYCOSIDES

- **EXTRACTION:-**

- **Aim :-** to isolate the cardio active glycoside

- **Procedure.**

**Maceration**

**10gm of leaves+70% ethanol(100ml)**

**(filtration)**

**alcoholic extract (60 ml )**

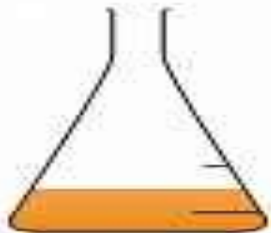
**add25ml of lead sub acetate**

Filtration or (centrifugation)

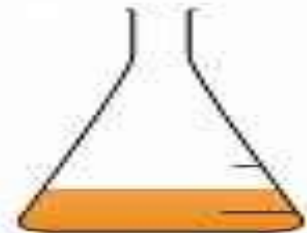
take the supernatant into a flask and  
add 35 ml of 10% sodium phosphate solution

filtration

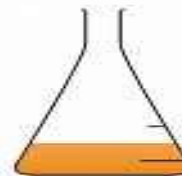
**FRACTION B.**



**FRACTION A.**



# FRACTION A.



- put in a separatory funnel



then shake it with 50 ml of chloroform –ethanol (3:1 v/v).



Take the organic layer



reduce the volume to about 1ml on rotary evaporator or (water bath).