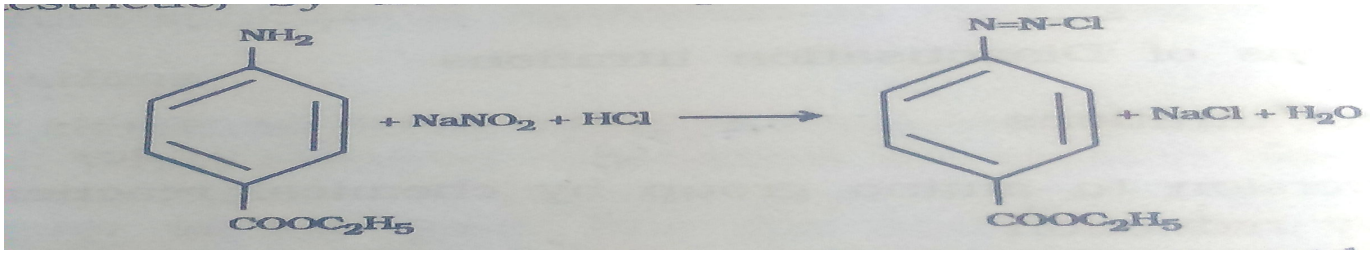
DIAZOTISATION TITRATION

Q1. Write down the principle involved in Diazotisation titration ?

Ans : Principle : Diazotisation titration are carried out for the estimation of drugs containing primary aromatic amino group example Benzocaine , Dapsone etc. or they can be converted to have such groups by simple reaction for example drugs such as paracetamol can be converted to amino group by hydrolysis and metronidazole by reduction reaction.

The aromatic amino group is diazotized (that has two linked nitrogen atoms (azo) as a terminal functional group.) by reaction with **Sodium nitrite** solution in **cold acid solution** .forms **nitrous acid (HNO2)** which diazotizes the compound. The end point can be determined using **external indicator method using starch iodide paper .**



Starch iodide paper is prepared by immersing a filter paper in starch mucilage and potassium iodide solution .

The colour change of indicator paper is because of the reaction :

KI + HCL ⟶ KCl + HI

$2HI + 2HNO_2 \longrightarrow I_2 + 2NO + 2H_2O$

The iodine formed reacts with starch mucilage to give the blue colour.

The end point can also be determined by potentiometric method or dead stop point technique.

Note :*Diazo* *refers to a type of organic compound called* ***diazo compound*** *that has two linked nitrogen atoms (azo) as a terminal functional group. The general formula is $R_2C=N_2$. The simplest example of a diazo compound is diazomethane. The electronic structure of diazo compounds involves a positive charge on the central nitrogen and negative charge distributed between the terminal nitrogen and the carbon.*

In this type of titration as we use sodium nitrite and any aromatic amino group containing drug can be estimated by titrating drug against sodium nitrite it become necessary to standardize sodium nitrite (means we have to find the strength of sodium nitrite so that we can estimate aromatic amino group containing drug)

Q2. Preapare and Standardise 0.1 M Sodium Nitrite

Ans: Standardization of 0.1 M Sodium Nitrite :

Molecular weight of Sodium nitrite = 68.9

Molecular weight of Sulphanilamide = 172.2

Preparation of 0.1 M Sodium nitrite :

1)6.9 g of sodium nitrite is dissolved in 1000ml water and is standardized .

2) 0.5 g of Sulphanilamide previously dried at 105 C for three hours is transferred to a suitable beaker.

3) 50 ml of water and 20 ml of hydrochloric acid is added , stirred and cooled to 15 ^{0}C .

4)The contents of the beaker are titrated against 0.1 M Sodium nitrite solution .

Calculation :

M1V1 = M2V2

M1 = Molarity of Sodium nitrite solution

V1 = Volume of Sodium nitrite (Burette reading)

M2 = Molarity of sulphanilamide

V2 = Volume of sulphanilamide solution

M1 = M2V2 / V1

Q3. Write down the application of Diazotisation titration ?

Ans: 1) Drugs which can estimated directly with sodium nitrite solution e.g Benzocaine , Dapsone , Primaquine phosphate tablets, Procaine,.

All sulpha drugs containing free aaromatic amino group like sulphacetamide sodium , sulphalene , sulphadoxine etc.

***2) Drugs* can be converted to have amino groups by simple reaction like reduction as these drugs contain aromatic nitro group which can be reduced by using reducing agent to get aromatic amino group which can be then diazotized by sodium nitrite**

E.g : Metronidazole , Chloramphenicol.

3) *Drugs* can be converted to have amino groups by simple reaction like hydrolysis as these drugs are derivative of amino group like acetyl or phthalyl or succinyl derivative ater hydrolysis to free amino group these drugs can be titrated with nitrite solution .

E.g ; Paracetamol , Phthalyl sulphathiazole (phthalyl derivative) , Succinyl sulphathiazole (succinyl derivative).