Experiment 7

Aim of the experiment : To determine the Chloride ion (Cl^-) present in a given sample by argentometric method by using **N/100 $AgNO_3$** solution

Apparatus required:

1. Burette
2. Pipette
3. Conical Flask
4. Beaker

Chemical Required:

1. Standard $AgNO_3$ solution
2. K_2CrO_4 solution
3. Water Sample

Principle:

Chlorides are present in water as NaCl , Mg_2Cl and $CaCl_2$. Although chlorides are not harmful, their concentration above 200 ppm imparts a peculiar taste to water , thus rendering the water unacceptable for drinking purposes.

When $AgNO_3$ solution is released from the burette to the water sample containing Cl^- , first Ag^+ reacts with Cl^- and forms a yellowish white precipitate of AgCl . After completing reaction with Cl^- , with the addition of one extra drop of $AgNO_3$ imparts a red color to the solution due to formation of Ag_2CrO_4

Chemical Reaction:

$$Ag + Cl^- \rightleftharpoons AgCl$$
$$2Ag^+ + CrO_4^{2-} \rightleftharpoons Ag_2CrO_4$$
$$2Ag_2CrO_4 + 2Cl^- \rightleftharpoons 2AgCl + CrO_4^{2-}$$
$$2AgNO_3 + K_2CrO_4 \rightleftharpoons Ag_2CrO_4 + 2KNO_3$$

Observation Table:

No . of Observation	Volume of water sample in ml.	Burette Reading (ml)			Remarks
		Initial	Final	Difference	
1	25	0	5	5	**Rough**
2	25	5	9.9	4.9	**Concordant**
3	25	9.9	14.8	4.9	**Concordant**
4	25	14.8	19.7	4.9	**Concordant**

Calculation:

N_1 = Normality of water sample due to Cl^- = ?
V_1 = Volume of water taken for titration = 25ml
N_2 = Normality of $AgNO_3$ solution. = 0.01 N
V_2 = Volume of $AgNO_3$ solution required for the equivalence point. = 4.9 ml

$N_1 = \frac{N2V2}{V1} = \frac{0.01 \, x \, 4.9}{25} = \frac{0.049}{25} =$ **0.00196 N**

Strength of Cl^- ion = N_1 x 35.5 g/l = 0.00196 x 35.5 g/l = **0.06958 g/l**
= N_1 x 35.5 x 1000 ppm = 0.00196 x 35.5 x 1000 ppm
= **69.58 ppm**

Conclusion:

The Chloride ion present in a given sample by argentometric method by using **N/100 $AgNO_3$** solution is **69.58 ppm**.