

Aim - Estimation of Salt (Sodium Chloride) in given sample

Principle: Excess silver nitrate is added to the salt solution prepared from the sample. The silver nitrate reacts with chloride ion according to: $\text{Ag}^+ + \text{Cl}^- \rightarrow \text{AgCl}$ (precipitate). The silver nitrate left behind after precipitation is determined by titrating against ammonium thiocyanate/ potassium thiocyanate using ferric alum as indicator. The results are expressed as % of sodium chloride or in g/L, depending on the sample type (the molar weight of NaCl is 58.443 g/mol).

Materials:

- 0.05N silver nitrate (AgNO_3): Exactly 9.493g of silver nitrate into 1 litre of distilled water. Stored in an amber coloured bottle.
 - a) To standardize- Take 10 ml of standard 0.1 N NaCl solution in a conical flask.
 - b) Add 1 ml of potassium chromate indicator and titrate the contents against silver nitrate solution till appearance of faint red colour (end point).
 - c) Calculate the exact normality of AgNO_3 using the relationship $N_1V_1=N_2V_2$
- 0.1 N Ammonium thiocyanate (NH_4CNS) : 8g of NH_4CNS is dissolved in 1 litre of distilled water
 - a) To standardize- Take 10ml of standard AgNO_3 solution in a conical flask.
 - b) Add 10 ml of ferric alum indicator and titrate the contents against ammonium thiocyanate solution till appearance of faint blood red colour (end point).
 - c) Calculate the exact normality of NH_4CNS by using the relation $N_1V_1 = N_2V_2$
- 0.1N NaCl: 5.846g of NaCl is dissolved in 1 litre of distilled water.
- Potassium chromate indicator: 5% solution is prepared in distilled water.
- Conc. HNO_3
- Saturated ferric alum indicator: 5g ferric alum (ammonium ferric sulphate) in 50ml distilled water. To it add 5ml conc. HNO_3 and boiled slowly until the nitrous fumes (brown colour fume) are expelled. Then the solution is cooled and diluted to 200ml.

Method:

1. Take 0.3-0.5g sample in a 250 ml conical flask.
2. Add about 0.1(N) AgNO_3 solution to it.

3. Add 20 ml of conc. HNO_3 and boil the mixture gently on hot plate for about 15 min until all solids except AgCl dissolve.
4. Then cool the conical flask and add 50ml of distilled water and followed by 5ml of ferric alum indicator.
5. Titrate against 0.1(N) NH_4CNS solution
6. Look for the appearance of permanently light brown colour.
7. Subtract the volume of 0.1(N) NH_4CNS used from the volume of 0.1(N) AgNO_3 added and calculated the NaCl (%) from the difference.
8. Run a blank simultaneously with 40ml AgNO_3

Calculation:

Sodium Chloride (%) =

Where,

S = Titrate value (blank-sample)

W = Weight of sample