

EXPERIMENT: 15

AIM:

EXPLAIN QUANTITATIVE ESTIMATION OF SODIUM CHLORIDE

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REQUIREMENTS

A. Glassware & Instruments

1. Burette
2. Conical flask
3. Measuring cylinder
4. filter paper circles
5. Funnel.

B. Chemicals & Reagents

1. 5% Potassium chromate solution (indicator)
2. 0.1N Silver nitrate solution
3. Calcium carbonate powder
4. Sodium chloride.

THEORY

Several food products, such as pickles, chutneys, and sauces, include a significant amount of salt (NaCl). Vegetables and other low-acid canned foods are typically covered with a brine (dilute salt solution) layer. In items such as "pickles in brine," the minimal salt level is stipulated. A salinometer can be used to approximate the salt concentration in brine solutions (hygrometer). However, AgNO_3 titration is most commonly used to determine NaCl with more precision.

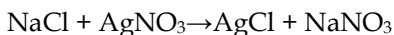
When a sample extract containing sodium chloride and potassium chromate solution is titrated with standard AgNO_3 solution, AgNO_3 precipitates chloride as AgCl . Upon completion of the precipitation reaction, the excess of silver nitrate interacts with potassium chromate to produce reddish-brown silver

chromate, the final product. The sample's NaCl concentration is determined by the quantity of AgNO₃ used for precipitation.

PROCEDURE

1. Weigh between 25 and 50 grammes of the homogenised sample, based on the salt content.
2. Dilute with distillate water and neutralise with 0.1N NaOH solution while using phenolphthalein as an indicator.
3. Transfer the mixture to a 250 ml volumetric flask, dilute to volume, shake, and filter.
4. Titrate an aliquot with a 0.1 N solution of silver nitrate, adding approximately 1 ml of a 5 percent aqueous potassium chromate solution as an indicator.
5. Determine the volume of silver nitrate solution required to create the desired reddish-brown colour.
6. Perform a blank titration with the same volume of distilled water as the sample aliquot.

REACTION



CALCULATIONS

Weight of the sample = $w = \dots\dots\dots$ g

Volume made up = $v = \dots\dots\dots$ ml

Volume taken for titration = $v \sim = \dots\dots\dots$ ml

Volume of silver nitrate solution required for sample = $V_2 = \dots\dots\dots$ ml

Volume of silver nitrate required for blank titration = $V = \dots\dots\dots$ ml

Normality of the AgNO_3 , solution =N

1000 ml 1 N AgNO_3 , solution = 1 g mole of sodium chloride = 58.45g.

Therefore,

$$\begin{aligned} & \% \text{ NaCl in the sample} = \\ & \frac{58.45 (\text{sample titre} - \text{blank titre}) \text{ N} \times \text{volume made up} \times 100}{1000 \times \text{aliquot volume taken for titration} \times \text{weight of sample}} \end{aligned}$$

RESULT

% of NaCl present in sample is.....