EXPERIMENT 2 DETERMINATION OF SODIUM CHLORIDE

Structure

2.1 INTRODUCTION

Salt (sodium chloride) is an important ingredient in several food products like pickles, chutneys, and sauces. Brine (dilute salt solution) is the common covering liquid for most of the low acid canned products like vegetables. In products like "pickle in brine", the minimum salt content has been specified.

The approximate salt content in brine solutions can be measured using a salinometer (hygrometer). However, for more accurate determination of sodium chloride, silver nitrate titration method is mostly followed.

Objectives

After studying and performing this experiment, you should be able to:

- determine the salt content of food products.

2.2 EXPERIMENT

2.2.1 Principle

When a sample extract containing sodium chloride to which a few drops of potassium chromate solution is added, is titrated with standard silver nitrate solution, silver nitrate precipitates chloride as silver chloride. Immediately on completion of the precipitation reaction, the excess of silver nitrate reacts with potassium chromate forming reddish brown silver chromate, which is the end point. The quantity of silver nitrate used for the precipitation is the measure of the sodium chloride content of the sample.

$$NaCl + AgNO_3 \rightarrow AgCl + NaNO_3$$

2.2.2 Requirements

Glassware and Other Items

Chemical balance

Burette, 25 ml – 1

Conical flask, 250 ml – 2

Measuring cylinder

Whatman No.1 filter paper circles,

Funnel, 4 inch – 2

Reagents

5% Potassium chromate solution (indicator)

0.1N Silver nitrate solution

Calcium carbonate powder

2.2.3 Procedure

Weigh 25 to 50 g of homogenized sample depending on the salt content. Dilute with distilled water and neutralize with 0.1N sodium hydroxide solution using phenolphthalein as indicator. Transfer to a 250 ml volumetric flask, make up to volume, shake and filter. Titrate an aliquot with 0.1 N silver nitrate solution adding about 1ml of 5% aqueous potassium chromate solution as indicator. Note the volume of silver nitrate solution required to produce the reddish brown end point colour. Carry out a blank titration with distilled water of same volume as the sample aliquot.

2.2.4 Observations

Weight of the sample = W = ——— g

Volume made up = V = ——— ml

Volume taken for titration = V_1 = ——— ml

Volume of silver nitrate solution required for sample = V_2 = ——— ml

Volume of silver nitrate required for blank titration = V_3 = ——— ml

Normality of the $AgNO_3$ solution = N

2.2.5 Calculations

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

Therefore, % NaCl in the sample =

58.45 (sample titre - blank titre) N × volume made up × 100

1000 × aliquot volume taken for titration × weight of sample

i.e. % sodium chloride in the sample = $$\frac{58.45\,(V_2 - V_3)\,N \times V}{10 \times V_1 \times W}$$

2.2.6 Result

Salt content in the sample = ... Percent.

2.3 PRECAUTIONS

The general precautions mentioned in the course 'Introduction' and those indicated in the experiments should be followed meticulously.

Handle silver nitrate and its solution with care. They can leave permanent stain on the skin and cloth.