
EXPERIMENT 15 DETERMINATION OF pH OF FOOD PRODUCTS BY USING pH METER

Structure

- 15.0 Objectives
- 15.1 Introduction
- 15.2 Principle
- 15.3 Requirements
- 15.4 Procedure
- 15.5 Results and Inference
- 15.6 Precautions

15.0 OBJECTIVES

After attending to this experiment, we shall be able to :

- learn to perform determination of pH of food products by using pH meter.

15.1 INTRODUCTION

The pH value or hydrogen ion concentration is a measure of the acidity or alkalinity (basicity) of a solution. A neutral solution has a pH value of 7, an acid solution has pH value less than 7, and a basic solution has a pH value greater than 7. A change of one pH unit corresponds to a 10-fold change of hydrogen ion concentration of the solution.

15.2 PRINCIPLE

It is expressed as follows: $\text{pH} = -\log [\text{H}^+]$, where (H⁺) is the hydrogen ion concentration of solution in moles per litre. The pH value is determined by measurement of the electromotive force of a cell consisting of an indicator electrode (an electrode responsive to hydrogen ions *viz.*, glass electrode) immersed in the test solution and a reference electrode (calomel electrode), contact between the test solution and the reference electrode is usually achieved by means of a liquid junction, which forms part of the reference electrode. The electromotive force measured with a pH meter, that is, a high impedance voltmeter calibrated in terms of pH.

15.3 REQUIREMENTS

Apparatus

Electrodes and Potentiometric Equipment - Calibrated against known buffer solution.

Conical Flask

Reagents

Buffer Solutions - of known pH values of 4.0, 7.0 and 10.0.

15.4 PROCEDURE

Place 10 g of the test sample in a dry conical flask and add 100 ml of cool, recently boiled distilled water. Agitate the flask until an even suspension, free from lumps, is obtained. Allow suspension to stand at 25°C for 30 minutes, agitating continuously or intermittently in such a manner as to keep the starch particles in suspension. Let it stand for 10 more minutes. Decant the supernatant liquid into the electrode vessel and immediately determine pH using a potentiometer and electrodes which have been calibrated against known buffer solutions.

15.5 RESULTS AND INFERENCE

The absolute difference between two independent single test results, obtained using the same method on identical test material in the same laboratory by the same operator using the same equipment within a short interval of time, will not more than 5% cases exceed 0.04 pH units.

15.6 PRECAUTIONS

- The temperature of test sample solution during the time of analysis should be reported along with pH value.
- Boiled and cooled distilled water should be used for the dilution/dispersion of sample.
- Oil and grease may interfere by coating the pH electrode and causing a sluggish response. These coatings can usually be removed by gentle wiping or detergent washing, followed by distilled water rinsing. An additional treatment with hydrochloric acid (1%) may be necessary to remove any remaining film.