
EXPERIMENT 28 DETERMINATION OF PEROXIDE VALUE OF OILS AND FATS

Structure

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28.0 OBJECTIVES

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

- learn to perform determination of peroxide value of oils and fats.

28.1 INTRODUCTION

The peroxide value is a measure of the peroxides contained in a sample of fat, expressed as milli-equivalents of peroxide per kg of the material.

28.2 PRINCIPLE

The material in an acetic acid-chloroform medium, is treated with an aqueous solution of potassium iodide. The liberated iodine is titrated with standard sodium thiosulphate solution.

28.3 REQUIREMENTS

Apparatus

Pipette - Graduated, 1 ml capacity.

Conical flask - Glass-stoppered, 250 ml capacity.

Reagents

Acetic Acid-Chloroform Solution - Mix three parts by volume of glacial acetic acid, with 2 parts by volume of chloroform.

KI Solution - Saturated. Prepare saturated solution of potassium iodide in recently boiled distilled water. Store in the dark.

Na₂S₂O₃ Solution - 0.1 N, accurately standardized.

Na₂S₂O₃ Solution - 0.01 N. This solution is prepared by diluting 100 ml of accurately standardized solution of 0.1 N Na₂S₂O₃ to 1 litre with freshly boiled and cooled distilled water.

Starch Solution - 1 % by mass

28.4 PROCEDURE

Weigh 5.00 ± 0.05 g of sample of fat in a 250 ml glass stoppered conical flask and then add 30 ml of the acetic acid-chloroform solution. Swirl the flask until the sample is dissolved. Add 0.5 ml of saturated potassium iodide solution. Allow the solution to stand exactly one minute with occasional shaking and then add 30 ml of distilled water. Titrate with 0.1 N sodium thiosulphate solution with constant and vigorous shaking. Continue titration until the yellow colour almost disappears, Add 0.5 ml of starch solution and continue titration till the blue colour just disappears. If the titre value is less than 0.5 ml, repeat the determination using 0.01 N $\text{Na}_2\text{S}_2\text{O}_3$ solution. Conduct a blank determination of the reagents in the same way. The titration in blank determination should not exceed 0.1 ml of the 0.1 N $\text{Na}_2\text{S}_2\text{O}_3$ solution.

28.5 CALCULATION

$$\text{Peroxide value, meq./kg} = \frac{1000 (S-B) \times N}{W}$$

Where,

S = Volume, in ml, of $\text{Na}_2\text{S}_2\text{O}_3$ solution used up by the sample,

B = Volume, in ml, of $\text{Na}_2\text{S}_2\text{O}_3$ solution used in the blank,

N = Normality of $\text{Na}_2\text{S}_2\text{O}_3$ solution, and

W = weight, in g, of the sample taken.

28.6 RESULTS AND INFERENCE

The difference between the results of two determinations carried out simultaneously or in rapid succession by the same analyst (repeatability) shall not exceed 0.1 meq/kg. The peroxide value of fresh edible oils is usually within 10 meq/kg.

28.7 PRECAUTIONS

- Standard solutions used should be properly standardized.
- Maintain dark conditions during the experimentation should be properly maintained.