EXPERIMENT 20  DETERMINATION OF SPECIFIC GRAVITY OF OILS AND FATS

Structure

20.0 Objectives
20.1 Introduction
20.2 Principle
20.3 Requirements
20.4 Procedure
20.5 Calculation
20.6 Results and Inference
20.7 Precautions

20.0 OBJECTIVES

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

• learn to perform determination of specific gravity of oils and fats.

20.1 INTRODUCTION

Specific gravity is usually determined with a specific gravity bottle or pyknometer. Specific gravity alone is of limited value in locating the presence of other substances but in conjunction with other data it is of immense utility.

20.2 PRINCIPLE

The specific gravity bottle method is a gravimetric method in which the weight of sample is divided with the weight of water of same volume at same temperature. This method is more accurate and gives quick result.

20.3 REQUIREMENTS

Apparatus

Specific gravity bottle or pyknometer - with well-fitting ground glass joints. To calibrate, clean and dry the bottle or pyknometer thoroughly, weigh and then fill with recently boiled and cooled water at about 25°C after removing the cap of the side arm. Fill to overflowing by holding the bottle or pyknometer on its side in such a manner as to prevent the entrapment of air bubbles. Insert the stopper and immerse in a water-bath at the desired test temperature ±0.2°C. Keep the entire bulb completely covered with water and hold at that temperature for 30 minutes. Carefully remove any water, which has exuded from the capillary opening. Remove from the bath, wipe completely dry, replace the cap, cool to room temperature and weigh. Calculate the weight of water. This is a constant for the bottle or pyknometer, but should be checked periodically.
**20.4 PROCEDURE**

Melt the sample, if necessary, and filter through a filter paper to remove any impurities and the last traces of moisture, make sure that the sample is completely dry. Cool the sample to 30°C or warm to the desired test temperature. Fill the bottle with the oil previously cooled to about 25°C or the melted fat to overflowing, holding the bottle on its side in such a manner as to prevent the entrapment of air bubbles after removing the cap of the side arm. Insert the stopper, immerse in the water-bath at 30.0 ± 0.2°C and hold for 30 minutes. Carefully wipe off any oil, which has come through the capillary opening. Remove the bottle from the bath, clean and dry it thoroughly. Replace the cap of the side arm, cool to room temperature and weigh.

**20.5 CALCULATION**

Specific gravity at 30°C/30°C = \( \frac{(A-B)}{(C-B)} \)

where,

A = weight, in g, of the specific gravity bottle with oil at 30°C,
B = weight, in g, of the specific gravity bottle, and
C = weight, in g, of the specific gravity bottle with water at 30°C.

**20.6 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 0.01. Specific gravity for most of the edible oils range between 0.90 to 0.93.

**20.7 PRECAUTIONS**

- Only a certified thermometer covering the range of specific gravity determination temperature should be employed.
- There should be complete absence of air bubbles in oil body.