Practical Exercise 11

Study of homogenizer, homogenization of milk and determination of homogenizer efficiency

Objective

Study of homogenizer, homogenization of milk and determination of homogenizer efficiency

Requirements

Homogenizer, 1 litre measuring cylinder

A. Study of homogenizer

Homogenizer is used to break the fat globules present in milk into smaller size. Homogenization process helps to prevent cream separation and formation of cream layer.

Observation

Make and model _____

Capacity _____ kg/h

Pressure 1st stage _____

Pressure 2nd stage _____

B. Procedure for determination of homogenizer efficiency

Analytical methods for determining homogenisation efficiency can be divided into two groups.

1. Studies of creaming rate

The oldest way of determining the creaming rate is to take a sample, store it for a given time, and analyse the fat contents of different layers in the sample. A sample around 1,000 ml is stored for 48 hours, after which the fat content of the top 100 ml is determined as well as the fat content of the rest. Homogenisation is reckoned to be sufficient if 0.90 times the top fat content is less than the bottom fat content.

The NIZO method is based on the same principle, but with this method a sample around 25 ml is centrifuged for 30 minutes at 1,000 rpm, 40°C and a radius of 250 mm. The fat content of the 20 ml at the bottom is divided by the fat content of the whole sample, and the ratio is multiplied by 100. The resulting index is called the NIZO value. The NIZO value of pasteurised milk is normally 50 – 80%.

2. Size distribution analysis

The size distribution of the particles or droplets in a sample can be determined in a well defined way by using a laser diffraction unit, which sends a laser beam through a sample in a cuvette. The light will be scattered depending on the size and numbers of particles in the sample. The result is presented as size distribution curves.

REVIEW QUESTIONS

1. What is the primary purpose of homogenization?
2. What are the advantages of homogenization?
3. Briefly describe NIZO process.
4. Briefly describe size distribution analysis.