

Effect of fat content and homogenization on milk creaming



INTRODUCTION

Milk is a colloidal dispersion of particles (droplets of fat, micelles of proteins, lactose ...) in an aqueous phase.

There are many different industrial treatments of milk that lead to production of different milks: 1. sterilization (UHT, pasteurization, micro-filtration...) 2. centrifugation to fully or partially remove the cream 3. Addition of vitamins, calcium or other minerals, flavors etc. 4. reduction of lactose and so on. Depending on the final product, a "homogenization process" can be performed to uniform the size of fat globules, in order to delay the creaming phenomena and consequently extend the shelf life of milk.

In this application note, we propose a method to detect the effect of homogenization process on the stability of milk with different fat content.

KEY BENEFITS

VERSATILE

NO DILUTION

FAST AND ACCURATE

MATERIALS

Four different milks from the same supplier were analysed in a volume of 20 ml at 25°C over 12 hours:

1. A homogenized full-cream milk;
2. A non-homogenized full-cream milk;
3. A homogenized semi-skimmed milk;
4. A non-homogenized semi-skimmed milk.

Full-cream milk : 3.6% fat content;
Semi-skimmed milk : 1.5% fat content;
Homogenized (H) : by UHT;
Non-homogenized (NH) : by microfiltration.

EXPERIMENTAL RESULTS

The results obtained with Turbiscan for the four samples show similar backscattering profiles.

An example backscattering profile is shown in figure 1, the curves show the evolution of the delta-backscattered (ΔBS) light intensity (% , Y-axis) versus the sample height (mm, X-axis) and as a function of aging time from the blue to red curves.

BS decreases at the bottom of the samples, which is characteristic of a diminution of the concentration of dispersed particles in this area corresponding to a clarification phenomenon.

BS increases at the top of the samples, which is characteristic of an increase in concentration in this zone, in this case it means an increase in of fat droplets at the top corresponding to a creaming phenomenon.

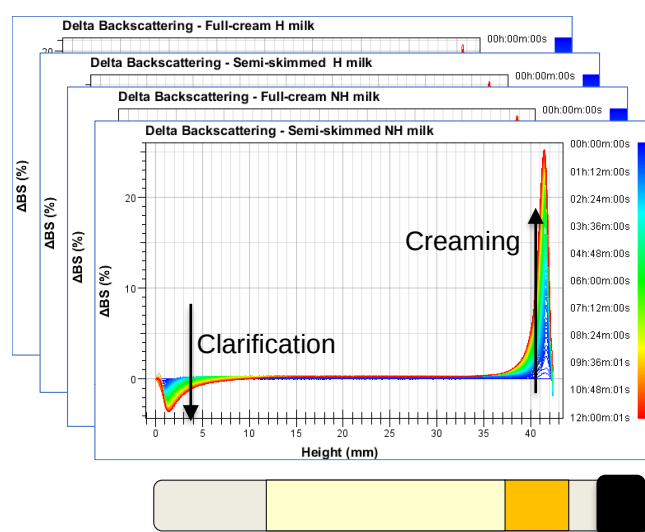


Figure 1: Delta backscattering ΔBS level (%) versus time for samples 1, 2, 3 and 4 at 25°C

The different milks are characterized by measuring:

- The global stability (TSI)
- Thickness of creaming layer