**Stability of yoghurt drinks prepared at different homogenization conditions assessed with an analytical centrifuge**

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Cultured milk drinks have become popular because they are tasty, healthy, and convenient for an urbanized lifestyle. They have longer shelf life than plain milk, and they are easy to consume everywhere – for example while commuting. There are a variety of commercial versions with different content of milk protein ‑ some with living bacterial culture and others which have been heat treated after fermentation for the sake of attaining long shelf life without need for refrigeration. The milk protein should be dispersed and uniformly suspended as microscopic pieces (“particles”), and stabilizers are normally included with the ingredients to ensure the suspension does not change over time.

We prepared yoghurt drinks with 1.2 % milk protein and investigated their physical stability; they were stabilized with either CMC or pectin, homogenized at either 100 or 300 bar after blending all ingredients, and then pasteurized. Our aim was twofold, viz. quantifying the relative importance of the homogenization condition for the ensuing stability, and determining whether or not pseudoplasticity or gelled texture helped keeping the milk protein suspended. The stability was quantified with a Lumifuge, a centrifuge with which the settling of a dispersed phase can be followed optically and sampled electronically during the centrifugation. The samples were also characterized for the population of sizes of dispersed particles by light scattering, for viscosity at diverse shear rates, and for the adsorption of stabilizer to dispersed protein.

We found that the rate of settling was almost proportional to the square of the RPM (revolutions per minute) of the centrifugation, as would be expected from Stokes’ Law for suspensions in Newtonian liquid systems. The modest deviation from this proportionality was an upward curvature in some of the diagrams of settling rate (y-axis) against RPM2 (x-axis) in accordance with modest pseudoplasticity measured with a rheometer. Samples with appropriate stabilizer dosage showed the least ‑ and practically no ‑ pseudoplasticity. The rate of settling decreased with the stabilizer dosage, while for the same dosage it was smaller for drinks homogenized at 300 bar than for drinks homogenized at 100 bar. The particle size fractiles (10%, 50% and 90%) followed a similar but less distinct trend. It was further noted that the samples with adequate stabilizer dosage showed no growth in particle size upon heat treatment, nor upon centrifuging and then re-suspending the samples. Only under-dosed samples showed particle growth upon heat treatment.

We conclude that pseudoplasticity or gelling did not contribute to stabilizing our samples. Increasing the homogenization pressure from 100 to 300 bar moderately improved the stability. The provoked separation by centrifugation was settling of particles that were shaped during the preparation of the samples and which did not change their size during the centrifugation.