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## **Influence of shear forces on the structure and flow behaviour of casein micelles**

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Casein micelles (CM) are complex, highly hydrated colloidal particles of spherical shape in milk with many structural similarities to microgels. During processing, CM are subjected to a wide range of shear stress whose effects on molecular structure are unknown. Viscosity curves of CM suspensions were measured over a broad temperature and concentration range. The measured relative viscosity increased with increasing concentration and decreasing temperature. CM suspensions with  $w \leq 0.11$  behaved like Newtonian fluids. Above this concentration, shear thinning was observed with Newtonian behaviour at low and high shear range. The experimental data were fitted in good approximation with a viscosity model for microgels. Additionally, the flow behaviour of CM is determined over a wide range of milieu and process conditions (e.g. ionic strengths and pH values), fitted with the above mentioned viscosity model for microgels and explained by experimentally proven molecular structural changes. For this purpose, Rheo-SANS experiments are used for the first time in the area of CM research to gain structural information depending on shear stress and to validate the limits of the viscosity model for microgels. Rheo-SANS experiments will be carried out in dependence of selected concentrations, temperatures, ionic strengths and pH/pD values.

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