

Effects of processing conditions on physicochemical characteristics of emulsions stabilized with milk fat globule membrane material

Thi Thanh Que Phan, Md Asaduzzaman, Eveline Fredrick, Thien Trung Le, Koen Dewettinck

Laboratory of Food Technology and Engineering, Department of Food Safety and Food Quality, Ghent University, Gent, Belgium

The aim of this work was to evaluate the effects of homogenization pressures on several physicochemical properties of emulsions prepared with milk fat globule membrane (MFGM) fragments. Emulsions of 35% (w/w) soybean oil were made with milk fat globule membrane material, which was isolated from a reconstituted buttermilk using microfiltration, using a two-step homogenizer. Emulsions were also made with sodium caseinate for comparison. The final protein content in both types of emulsions was standardized at 2.3g/100g. Five homogenization pressure settings, namely 0/20, 30/20, 90/20, 150/20 and 210/20 bar were studied. The particle size distribution, apparent viscosity, and emulsion stability were measured. Viscosity of emulsions was observed to depend on both the stabilizing materials and homogenization pressures. For all emulsions, the average droplet diameters decreased with increasing pressures. Aggregation appeared with emulsions made with sodium caseinate at high pressures (150/20bar and above). Emulsions prepared with MFGM material showed good stability and had monomodal particle size distributions when the pressures were 30/20bar and above at all pressures, emulsions stabilized with MFGM materials had smaller droplet sizes compared with those stabilized with sodium caseinate.

(Key words: milk fat globule membrane, emulsion, homogenization pressure)