

Effect of nanoemulsion droplet size on foaming structure and properties of dairy milk

ABSTRACT

Milk foam is desirable in the dairy industry due to its smoothness and lightness to the product. However, various aspects connected to milk quality, composition, and processing impact foaming, resulting in spontaneous instability of the foam due to milk fat. The extent to which milk fat influences milk foaming qualities is determined not only by fat amount and physical state (solid vs. liquid fat), but also by fat globule size. It has been observed that reducing the size of fat globules in whole milk increases foamability and foam stability. Nanoemulsion are thermodynamically unstable colloidal dispersions made from oil, emulsifier, and water. The aimed of this study was to analyze the effect of different fat globule sizes to determine the foamability and foam stability of the milk foam by ultrasonication. The pasteurized milk was treated by the ultrasonication with different time of exposure. The viscosity of the milk sample showed almost the same due to slightly different on the milk fat globules of 5 mins (209.5 nm) and 10 mins (209.8 nm) ultrasonicated. The milk sample with 10 minutes ultrasonicated successfully produced of high foamability with zeta potential value 0.634 mV. However, the foam stability of the 5 mins ultrasonicated have high stability than 10 mins. It is expected that reduction in fat globules of the milk increase the foamability of the milk samples. The discovery of nanoemulsion dairy milk fat increase foam qualities, which has future promise in the dairy milk-based beverage business.