Abstract

The emulsion system is an important aspect of milk quality and stability, hence the purpose of this study was to determine the effect of changes in the emulsion system on the technological properties of milk. In order to achieve the aim of the study, a review of the literature on the biofunctional properties of milk fat globule membranes and buttermilk as its source was performed. In the next stages, the following were examined: the influence of buttermilk powder addition and the conditions of the homogenization process on the stability of the emulsion and colloidal milk system; the impact of full-stream and partial high-pressure homogenization (HPH) on thermal stability (HS) and the properties of the milk emulsion system, and the possibility of using buttermilk in the production of low-fat yogurt.

The effect of HPH in the temperature range of 4°C-60°C on reducing the size of fat globules was found, to a greater extent the higher the temperature used. The viscosity and HS of milk decreased after homogenization and increased after the addition of buttermilk powder in the range of 0.3%-1.5%.

Milk fat globules sizes were found to decrease with increasing temperature after full-stream HPH, while partial HPH resulted in agglomeration. The colour of the milk processed by full-stream HPH was 1.5-2.0 times higher compared to milk subjected to partial HPH treatment.

The addition of buttermilk powder in yogurt production did not affect the rate of milk acidification. Yogurt with the addition of buttermilk powder was characterized by a lower content of phospholipids and a slightly higher loss of phospholipids during storage, as well as a higher content of lactic acid compared to yogurt with skimmed milk powder. There were no differences in the content and profile of fatty acids between the analysed yogurts.

Modification of homogenization parameters may improve the technological properties of dairy products with the addition of buttermilk, i.e. HS and viscosity. Full-stream HPH stabilizes the milk emulsion phase to a greater extent than partial HPH. It is possible to use buttermilk as an additive to improve the stability of the emulsion system of milk and as an additive in the production of yogurt with new functionalities.