

Changes in Chromatographically Assessed Fatty Acid Profile during Technology of Dairy Products

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Abstract : Dairy product manufacturers constantly are looking for new markets for their production. And in most cases, the problem of product compliance with the composition requirements of foreign products is highlighted. This is especially true of the composition of milk fat in dairy products. It is well known that there are many factors such as feeding ratio, season, cow breed, stage of lactation that affect the fatty acid composition in milk. However, there is less evidence on the impact of the technological process on the composition of fatty acids in raw milk and products made from it. In this study the influence of the technological process on fat composition in 82% fat butter, 15% fat curd, 3.6% fat yogurt and 2.5% fat UHT milk was determined. The samples were collected at each stage of production, starting with raw milk and ending with the final product in the Lithuanian milk-processing company. Fatty acids methyl esters were quantified using a GC (Clarus 680, Perkin Elmer) equipped with flame ionization detector (FID) and a capillary column SP-2560, 100 m x 0.25 mm id x 0.20 µm. Fatty acids peaks were identified using Supelco® 37 Component FAME Mix. The concentration of each fatty acid was expressed in percent of the total fatty acid amount. In the case of UHT milk production, it was compared raw milk, cream, milk mixture, and UHT milk but significant differences were not estimated between these stages. Analyzing stages of the yogurt production (raw milk, pasteurized milk, and milk with a starter culture and yogurt), no significant changes were detected between stages as well. A slight difference was observed with C4:0 - a percentage of this fatty acid was less ($p=0.053$) in the final stage than in milk with the starter culture. During butter production, the composition of fatty acids in raw cream, buttermilk, and butter did not change significantly. Only C14:0 decreased in the butter then compared to buttermilk. The curd fatty acid analysis showed the increase of C6:0, C8:0, C10:0, C11:0, C12:0 C14:0 and C17:0 at the final stage when compared to raw milk, cream, milk mixture, and whey. Meantime the increase of C18:1n9c (in comparison with milk mixture and curd) and C18:2n6c (in comparison with raw milk, milk mixture, and curd) was estimated in cream. The results of this study suggest that the technological process did not affect the composition of fatty acids in UHT milk, yogurt, butter, and curd but had the impact on the concentration of individual fatty acids. In general, all of the fatty acids from the raw milk were converted into the final product, only some of them slightly changed the concentration. Therefore, in order to ensure an appropriate composition of certain fatty acids in the final product, producers must carefully choose the raw milk. Acknowledgment: This research was funded by Lithuanian Ministry of Agriculture (No. MT-17-13).

Keywords : dairy products, fat composition, fatty acids, technological process

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