

ABSTRACT

Due to insufficient intake of polyunsaturated fatty acids, people should look for ways of increasing its consumption in frequently consumed products. The source of these fatty acids can be fermented milk with the addition of vegetable oils. Lactic acid bacteria can increase the amount of CLA in fermented milk products, as a result of linoleic acid transformations, especially in free form.

The purpose of the work was to determine the addition of cold pressed vegetable oils, the type of starter culture and the storage time in refrigeration condition on composition and quality properties of fermented milk. The impact of these many factors and the ability of the used microorganisms to synthesize CLA and other fatty acids in the lipid fraction of fermented milk were also determined. Work in the first stage consisted of producing kefir from kefir grains with the addition of 0.03% and 2% of walnut and camelina oil in laboratory conditions. Then, probiotic kefir (with kefir grains and DVS culture) and probiotic yoghurts with 0.03% of walnut oil were produced. In the last stage, enzymatically hydrolyzed walnut oil was used for research. It was produced probiotic milk acidified by mesophilic starter culture and probiotic yoghurts with a 0.03% and 0.1% addition of oil hydrolyzed with two lipases (from *Candida rugosa* and porcine pancreas).

The results of microbiological analyzes showed that the addition of vegetable oils caused an increase in the number of all determined groups of microorganisms in kefir made of kefir grains with the addition 0.03% and 2% walnut and camelina oil. For probiotic kefir made with kefir grains and DVS culture, the addition of 0.03% of walnut oil increased the number of streptococci and yeast. The presence of 0.03% of walnut oil in probiotic yogurt and probiotic kefir caused a reduction in the number of *Lactobacilli*, while this addition had a positive effect on the survival of bacteria of the genus *Streptococcus thermophilus* and *Lactobacillus acidophilus* in probiotic yogurt, also in hydrolyzed form. The addition of hydrolyzed walnut oil had a positive effect on the survival rate of all the tested microorganisms. The addition of 0.03% of walnut oil increased the viscosity of probiotic yoghurts, and did not affect the texture parameters of kefir traditionally produced using kefir grains and probiotic kefir. The addition of the same oil in hydrolyzed form resulted in obtaining less compact probiotic acidified milk and yogurt. In sensory evaluation on a 5-point scale, the use of walnut oil turned out to be more advantageous than camelina, mainly due to the taste, and the addition of this oil to probiotic yogurt. In sensory evaluation on a 9-point hedonic scale, panelists determined

the characteristics of probiotic acidified milk and probiotic yogurt as desirable. Hydrolysis of walnut oil with lipase from *Candida rugosa* compared to the use of pork pancreatic lipase, resulted in the release of a bigger amount of long chain fatty acids, including linoleic acid. The addition of 0.1% of oil hydrolyzed with lipase from *Candida rugosa* to probiotic yogurt resulted in a higher content of free linoleic acid, which increased the amount of CLA formed. It was also shown that the microflora of kefir grains, microorganisms of the kefir starter culture and the addition of two strains of probiotic bacteria did not increase the CLA content in kefir with oil. However, during the fermentation process of these products beneficial increase of the PUFA content was observed. The bacteria of the yogurt starter culture together with the bacteria *Bifidobacterium animalis* ssp. *lactis* BB-12 and *L. acidophilus* La-5 and a 0.03% addition of the walnut oil caused an increase in the amount of polyunsaturated fatty acids and CLA.

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