



## CHEMOMETRIC APPROACH BASED ON FATTY ACID COMPOSITION AND $\delta^{13}\text{C}$ ANALYSIS FOR VERIFICATION OF ORGANIC RAW MILK FROM COWS WITH DIFFERENT DIET

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### ABSTRACT

The growing interest in organic farming, which involves a significant percentage of "green grass" and hay in the animal diet and increasing the output of milk labeled "100% grass-fed," induces an urgent necessity for authentication such value-added products. The aim of this study was to develop the integrated approach for discrimination of organic milk from farms with silage-haylage and grass-hay cow diet. The research was based on the characterization of fatty acid composition and carbon stable isotopes ratios ( $\delta^{13}\text{C}$ ), and included data processing with chemometric approach.

It has been shown that absolute value ranges of most fatty acids didn't allow to discriminate the milk from different organic farms, although the difference in certain fatty acids content between separate seasons has been proven to be statistically significant. This integrated approach with application of the principal components analysis envisaged that the analyzed parameters were normalized by the maximum value and the data matrix consisted of not only absolute values of the fatty acids content, but also additional derivative parameters (the sum of cis-, trans-isomers etc.). The approach proved the significance of content values of C16:1 trans-9, C18:1 trans-11, C18:3 cis-9,12,15, C18:2 trans-9,12 and conjugates of linoleic acid for milk samples discrimination. Thus, the analysis of the total data set of absolute and derivative normalized parameters by the method of principal components analysis allows to distinguish completely the organic milk with different share of green grass and hay in cows diet both the stalling and pasture periods.

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