Identification of Milk Types Using Front Face and Synchronous Scanning Fluorescence Spectroscopy

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Egyptian Journal of Food Science, 48 (1): 73-80 (2020)	مكان النشر

Abstract: Fluorescence spectroscopy is a technique used to determine fluorescence spectrum that emits by fluorescent compounds. Milk has more than one fluorescent compounds such as tryptophan, vitamin A. Quick identification of milk types is needed for milk quality control and safety. The ability of two different fluorescence spectroscopy techniques (front face fluorescence spectroscopy; FFFS and synchronous scanning fluorescence spectroscopy; SFS) was determined to differentiate 40 milk samples according to their species (10 samples for each of buffalo's, cow's, goat's and sheep's milk). The statistical methods, principal component analysis (PCA) and factorial discriminant analysis (FDA) were used for better understanding the obtained results. FDA was applied separately on the first five principal components obtained from PCA which performed on the two different fluorescence techniques. Results obtained from FDA showed that 100% of correct classification was obtained for data sets from the two different fluorescence techniques. The obtained results confirmed that both the FFFS and SFS were capable of differentiating milk species.

Keywords: Milk, Synchronous fluorescence spectroscopy, Front-face fluorescence spectroscopy, Factorial discriminate analysis, Principal component analysis, Chemometric tools.