Analisys of Cereal Flours by Fluorescence Spectroscopy and PARAFAC

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Abstract : Rapid and sensitive analytical technologies for food analysis are needed to respond to the growing public interest in food quality and safety. In this context, fluorescence spectroscopy offers several inherent advantages for the characterization of food products: high sensitivity, low price, objective, relatively fast and non-destructive. The objective of this work was to investigate the potential of fluorescence spectroscopy coupled with multi-way technique for characterization of cereal flours. Fluorescence landscape also known as excitation-emission matrix (EEM) spectroscopy utilizes multiple-color illumination, with the full fluorescence spectrum recorded for each excitation wavelength. EEM was measured on various types of cereal flours (wheat, oat, barley, rye, corn, buckwheat and rice). Obtained spectra were analyzed using PARAllel FACtor analysis (PARAFAC) in order to decompose the spectra and identify underlying fluorescent components. Results of the analysis indicated the presence of four fluorophores in cereal flours. It has been observed that relative concentration of fluorophores varies between different groups of flours. Based on these findings we can conclude that application of PARAFAC analysis on fluorescence data is a good foundation for further qualitative analysis of cereal flours.

Keywords : cereals, fluors, fluorescence, PARAFAC
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