Synchronous Fluorescence Fingerprint as the Identity Card of Food Products

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Most of food products are generally complex mixture consisting of different kinds of components. Their composition is often unknown because detail qualitative and quantitative analysis requires many isolation steps and time and money consuming procedures. Synchronous scanning fluorescence spectra are very valuable aid for the identification and graphical definition of complex mixture. Complete analysis is quick and simple.

Food products contain very often fluorescent components. Fluorescence involves controlling of two wavelenghts independently and provides two spectra for each sample. It is possible to obtain emission spectra at a variety of excitation wavelengths and vice versa. One way of utilising all of the information is to show the data simultaneously. This is the basis of the three dimensional plot method. The information can be presented also in the form of a contour map, where the contour lines represent regions of the same fluorescence intensity (Fig. 1A). The circular patterns resulting from fluorescence can be used to identify particular samples as a "fingerprint" technique [2].

An alternative approach is to scan both monochromators synchronously with a fixed wavelength between them ($\Delta\lambda$). Synchronous fluorescence spectra [1, 3, 4, 5] are more advantageous for the identification of complex mixture. The spectrum obtained by synchronous scanning varies with the wavelength span $\Delta\lambda$. To obtain all information about composition of complex mixture, it is necessary to scan synchronous spectra with different wavelength intervals $\Delta\lambda$ = 10–110 nm.

The combination of both above mentioned fingerprint techniques yields contour plot map of synchronous scan spectra recorded at various wavelength intervals. Synchronous fluorescence fingerprint (SFF) in comparison to "classic" fluorescence fingerprint is more sensitive and detailed. because of simultaneous presentation and registration of both phenomena: scattering ($\Delta\lambda$ = 10–30 nm) and fluorescence ($\Delta\lambda$ higher than 50 nm).

Classic fluorescence contour map and SFF of beers produced by two different producers can be compared. The classic contour map of two different beers looks similarly but SFF is more detailed and it may serve as an identity card for the product.

This is an excellent method for characterization and graphic definition of the complex mixture.

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