

Talk

Application of LED technology for food quality control



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ABSTRACT

Motivation: Currently, there are numerous chemical methods to analyze compounds, however, these involve a large investment and highly qualified personnel. In this work, Light Emission Diode has been used as a cheap and simple method to easily detect, the existence of: a) cheese whey in different representative samples of water b) rice syrup in different types of commercial honeys.

Methods: Six different colour LEDs (orange, pink, ultraviolet, blue, green and white) were used in this research as a light source to measure the emission spectra of water and honey samples. The water and honey samples were prepared adding known concentrations of cheese whey(from 1% to 20%, 1800 samples) and rice syrup (1%-8%, 480 samples), to waters from five different rivers and reservoirs in Madrid; and to five different honeys, respectively. The phenomenon measured with this technology is fluorescence. The emitted fluorescence is measured at a right angle from the light source, using a fiber spectrometer. The output of the spectrometer is collected in a computer. It is necessary to apply a linear regression model to obtain the concentration from the intensity values. This information is taken from a fluorescence emission spectrum.

Results: In the whey emission spectra (for each LED), the increase in cheese whey concentrations were seen by an increase in its intensity. The honey spectra have different profiles as well as intensities for each honey, so the difference in syrup concentration is also detected by an intensity increase. In addition, the analysis of the measurements has obtained an efficiency of approximately 90%.

Conclusions: It has been demonstrated that LED technology can be a potential and important first approach to determine contaminants or adulterants in water and honey samples. It is also a cheap and user-friendly technique which could be useful in the food quality control sector.

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