

Compact Optical Spectroscopy: The Future of Food Analytics in Your Pocket

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EXTENDED ABSTRACT

Optical spectroscopy is a game-changer for food analysis, offering a cost-effective and eco-friendly alternative to traditional methods. With rapid, non-destructive measurements that eliminate the need for harmful chemicals and solvents, optical spectroscopy is revolutionizing green analytics for food quality and safety. Its minimal sample preparation saves time and resources, making it increasingly popular in the industry.

Moreover, by leveraging chemometrics or other AI algorithms to enhance the interpretation of complex data, optical spectroscopy allows for simultaneous analysis of multiple food components simultaneously. Just a quick light shot, combined with advanced spectroscopic training, provides comprehensive quantitative and qualitative assessments of various nutraceutical indicators all at once. It's a smart, sustainable way to ensure the best in food quality and safety.

While the mid-infrared band is known for its detailed molecular fingerprinting, the near-infrared (NIR) region is generating a buzz in food applications. This is where the absorption of overtones and combinations of molecular vibrations involving C-H, O-H, and N-H bonds occur, revealing crucial insights into food composition.

Photonic technologies initially developed for telecommunications, generated an explosion of compact light sources, detectors, micro-spectrometers, spectral sensors, fiber optics, and micro-photonic components. These innovations are now transforming food control, providing compact, robust, and low-cost instruments that are perfect for online applications by users with minimal technical training. This surge in new devices is driving a steady increase in NIR applications for food analysis.

In this talk, we'll explore the latest and most compact NIR spectroscopy devices, including pocket-sized and smartphone-connected models. We'll discuss their applications in food analysis and

showcase their potential through live demos during coffee breaks. Get ready to see how these powerful tools can revolutionize food quality and safety, and discover opportunities for future collaborations.

