

APPLICATION OF A MULTI-WAVELENGTH NIR DIODE LASER ARRAY FOR NON-DESTRUCTIVE FOOD ANALYSIS

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Near infrared (NIR) spectroscopy has become a widely used method in food and beverage analysis because of its speed, accuracy and the simplicity of sample preparation. One of the basic requirements of NIR instruments is a wide dynamic range if weak, or small, absorption changes or concentrations are to be measured. Thus the instrument must be sufficiently luminous, and efficient, to enable measurements to be made in a reasonably short time, as for some applications (e.g. sorting) short response times are essential.

Diode lasers function the same way as lasers but linewidths are not as narrow as typical lasers. In this work an array of seven laser diodes (in the range of 750-1100 nm) with energy outputs of around hundred milliwatts each were combined with a fast diode array spectrometer (400-1100 nm, 1024 pixels, integration time from 3 ms) as detector.

Measurements in transmission mode were performed in solutions of sugars in aqueous solutions and in deuteriumoxide. The feasibility of non-destructive measurements in transmission mode was investigated for different fruits and vegetables.