

The MicroNIR™ Spectrometer

Available from the Australian distributor Raymax Lasers® in Sydney NSW
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Enabling Handheld, Portable, and On-line Near-Infrared Applications

Infrared spectroscopy is a widely used technology for quantitative and qualitative analyses of solids, liquids, and gases in applications in food and agriculture, medical, pharmaceutical, and environmental sensing. The advent of miniaturization has been spurred by the need for on-site, non-destructive, point-of-use, and rapid analyses of samples in law-enforcement applications, homeland security, food safety, on-line process control, and counterfeit detection of pharmaceutical products to name a few.

Utilizing advanced thin-film coating design and manufacturing technology in linear variable filters (LVF), JDSU is introducing an ultra-compact, lightweight, cost-effective near-infrared (NIR) spectrometer that relies on an LVF as the dispersing element.

The LVF is a bandpass filter coating that has been intentionally wedged in one direction. Since the center wavelength of the bandpass is a function of the coating thickness, the wavelength transmitted through the filter will vary in a linear fashion in the direction of the wedge. The JDSU line of LVF spectral sensors uses an LVF coupled to a linear detector array to create a sensor capable of providing spectral information for a wide variety of commercial, industrial, and scientific applications.

The LVF detector, light source, collection optics, and electronics are fully integrated in a palm-size device. The MicroNIR™ Pro spectrometer is offered with model building and real-time prediction software capability for at-line, on-line, and field-use applications.



Key Features

- Ultra-compact: 45 mm diameter x 42 mm high
- Lightweight: <60 grams
- Robust architecture; no moving parts
- Integrated light source and collection optics
- Wavelength range: 950-1650 nm; 1150-2150 nm
- Diffuse reflectance or transmission measurement
- USB powered

The MicroNIR™ spectrometer can be customized as needed to address the specific needs of an end-use application.

Video about JDSU MicroNIR™ spectrometer

<https://www.youtube.com/watch?v=tkqrmRld6Mc&feature=youtu.be>

Research papers and presentations relating to the MicroNIR™

Near infrared spectroscopic authentication of seafood

N. O'Brien et al., J. Near Infrared Spectrosc. 21, 299–305 (2013)

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Near infrared (NIR) spectroscopic investigations of whole fish and fish fillets with a miniaturised, hand-held instrument were performed to demonstrate the feasibility of discriminating high-quality, expensive from lower-quality, less expensive, substitutes and responding to the increasing concerns regarding fraud and deception in seafood marketing. Generally, such problems can occur due to the mislabeling of products in the harvesting and processing system or species substitution at the restaurant level. To test the possibility of distinguishing superior from lower quality fish species, NIR spectra were measured in diffuse reflection from the skin and meat of the investigated fish. Subsequently, the spectra were evaluated by principal component analysis and further classified by soft independent modelling of class analogies. In the present communication, the results obtained with respect to the authentication of two different species of mullet, cod and trout, respectively, will be discussed in some detail.

Qualitative and quantitative pharmaceutical analysis with a novel hand-held miniature near infrared spectrometer

M. Alcalà et al., J. Near Infrared Spectrosc. 21, 445–457 (2013)

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Although miniaturisation of vibrational spectrometers began approximately a decade ago, only within the last couple of years have real hand-held Raman, infrared and near infrared (NIR) scanning spectrometers become commercially available. On the customer end the development of portable instrumentation was driven by the request for more flexibility of on-site measurements and on the manufacturer side it was supported by the potential and advantages of micro-electromechanical systems (MEMS) production and the implementation of new technologies. With reference to NIR spectroscopy the expectations for a real hand-held system (<100 g) have been recently realised by a pocket-sized spectrometer with a linear variable filter technology (LVF) as monochromator principle and the additional benefit of significantly reduced costs compared to other portable systems. For a real breakthrough and impact of this instrument, however, it had to be demonstrated that competitive analytical results can be achieved. In this respect, the present communication has put to test the performance of this micro-NIR system with reference to selected qualitative and quantitative pharmaceutical applications.

Miniature near-infrared spectrometer for point-of-use chemical analysis

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Miniature Near-Infrared (NIR) Spectrometer Engine For Handheld Applications

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MicroNIR™: Evaluating a Handheld Near-Infrared (NIR) Spectrometer for Raw Material Identification.

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InfraTrac: Silver Spring Innovation Center, Silver Spring.

JDSU: Optical Security and Performance Products, Santa Rosa.

NIR2013 Proceedings, 2-7 June, La Grande-Motte, France. A4 – Unusual Uses Bellon-Maurel V., Williams P., Downey G., Eds

Pocket-Size Near-Infrared Spectrometer for Narcotic Materials Identification

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