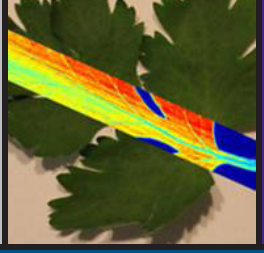
middleton SPECTRAL VISION

macroPhor



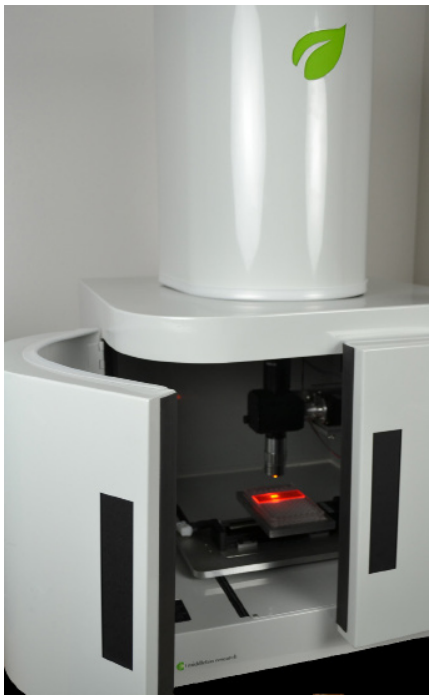
PRODUCT SHEET
MRC-924-001

macroPhor Lab: Hyperspectral VNIR & Fluorescence Imaging System

Overview

The macroPhor Lab is a unique laboratory instrument that can be used for making both standard VNIR hyperspectral imaging measurements and hyperspectral fluorescence measurements. The same high sensitivity VNIR hyperspectral camera can be used for both types of measurements, requiring only a simple change to the optics. The high magnification and resolution of the system make this instrument ideal for characterizing small samples, such as plant leaves and other plant parts with overlapping fluorophores.

The laboratory scanner is completely enclosed to block out all external light during light-sensitive fluorescence measurements. The system includes a small motorized sampling stage that will move the sample in both the Y-axis for sample alignment and the X-axis for sample scanning during data collection. The vertical Z-axis is also motorized for focus adjustment of the camera.

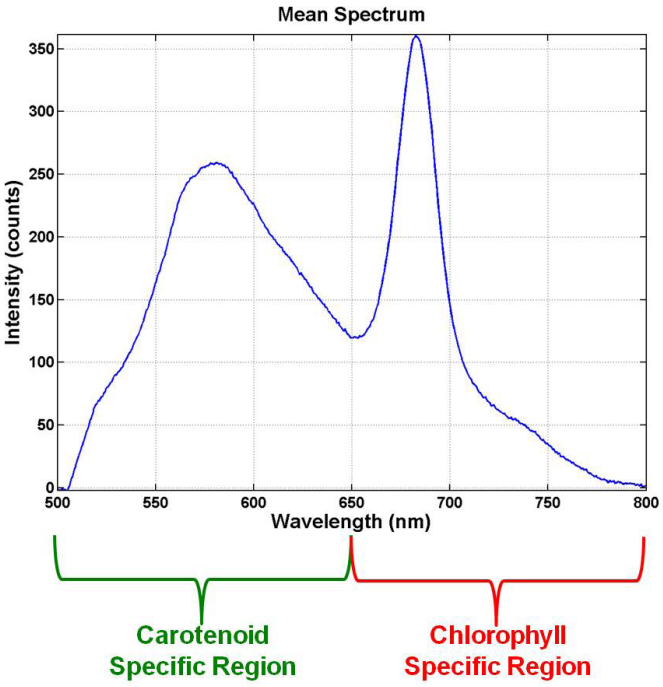


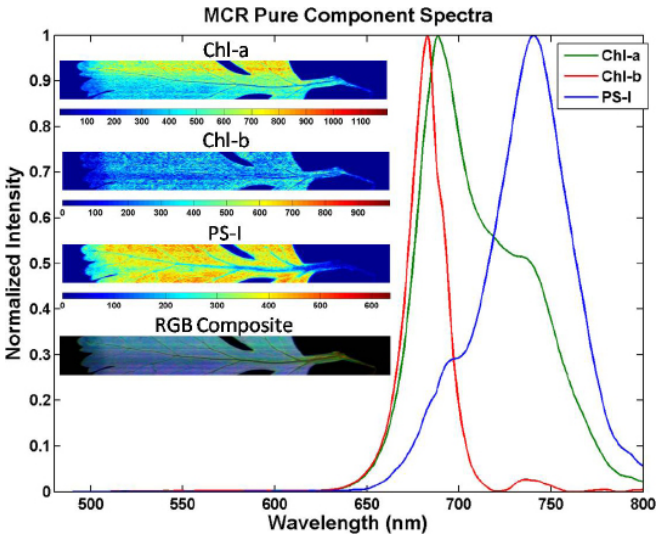
Fluorescence Measurements

Fluorescence spectroscopy is useful in several fields, including agricultural, biochemical, medical, and chemical research fields, to map the locations and amounts of fluorophores.

Using laser excitation, a hyperspectral image is collected by exciting the fluorophores in the sample. The sample is moved underneath the focused laser line and the fluorescence emission at each wavelength is collected using the high sensitivity hyperspectral camera.

Each spatial pixel of the image contains a full spectrum (500-800 nm). The collected image contains all the information about the carotenoid and chlorophyll fluorescence as well as other fluorescing species. The example below shows a selection of factors for the fluorescence imaging of a spinach leaf.

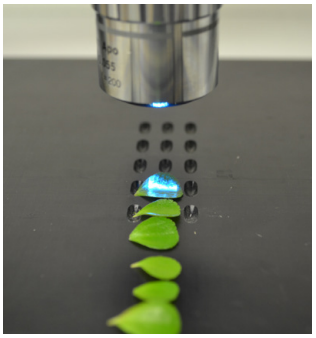


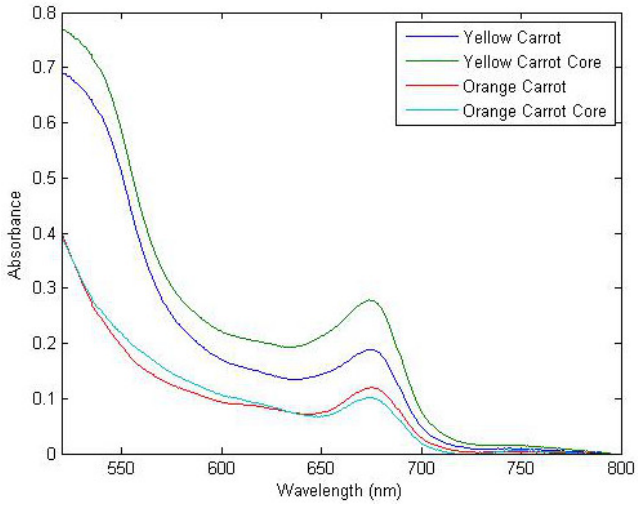


VNIR Measurements

A uniquelly beneficial feature of the macroPhor system is that it can be used for both fluorescence measurements as well as standard high resolution VNIR hyperspectral measurements of the same samples without modifications to the system.

To achieve this, the macroPhor system comes equipped with a small halogen light source assembly to illuminate the sample area. A standard hyperspectral imaging lens could also replace the microscopic fore optics assembly for dedicated VNIR measurements. The images below show the same optics being used for a fluorescence measurement of leaves (left) and a VNIR measurement of carrot slices (right).



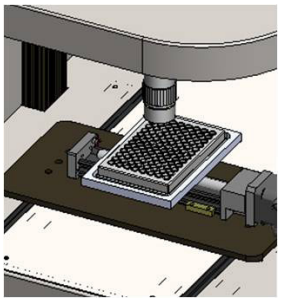


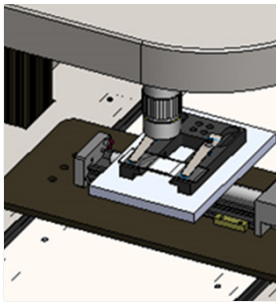
Sample Stages

The macroPhor can be ordered with different sample stages based on sample-handling needs. Custom sample stages may also be available upon request.

The three standard sample stages currently being offered are:

- 96-well plate, 24-well plate holders
- Open Tray (metal or glass)
- Microscope Slide Mount





Specifications and Ordering Information

Optical*

Field of View Options:

- 7 mm FOV at 34 mm working distance using a 2X infinity-corrected Mitutoyo apochromatic objective
- 22 mm FOV at 3 in. working distance using a macro lens

Excitation Source: 488 nm (Default)

- Excitation filter module: 488 nm, interchangeable, Olympus compatible
- Max laser output: 30 mW

Sensor: MRC-923-001 High-Sensitivity VNIR Hyperspectral Camera
Optical Resolution: 7.5 nm (Default)
Spatial Resolution: 2000 pixels

***Other magnifications, optical resolutions, and different excitation wavelengths are available with additional optical components.** Contact a product specialist at Middleton Spectral Vision for more information or to discuss the specs of the application.

Mechanical

Size: Approximately 15" (W) x 20" (D) x 30" (H)
Sample Stage Options:

- 96-well plate, 24-well plate holders
- Open Tray
- Microscope Slide Mount

Stage Movement:

- Motorized scan direction (X)
- Motorized across-stage direction (Y)

Focus Adjustment: Motorized focus adjustment (Z)

Electrical

110/220 VAC
Instrument Controller/Data Analysis Computer includes:

- CameraLink framegrabber card (if applicable for camera)
- Solid-state hard drive (for faster data collection)
- Large capacity data storage drive
- Display, mouse, keyboard

Software

Instrument Controller/Data Collection Software (Included)

- Data output: ENVI BIL format

MRC-930-021 KemoQuant Analysis Software (Optional)