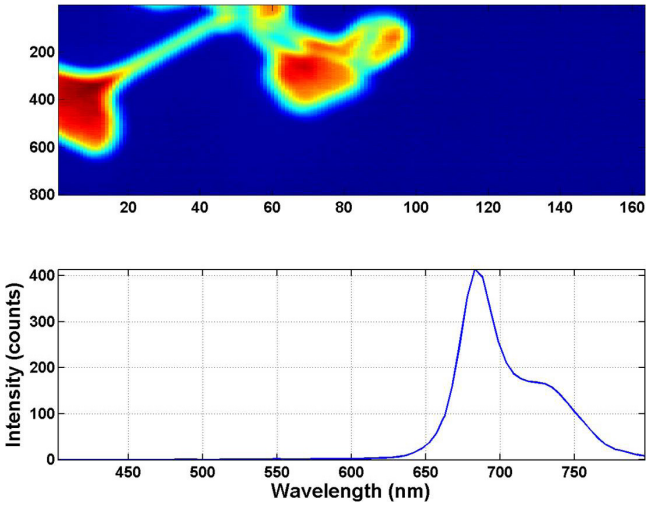
APPLICATION NOTE

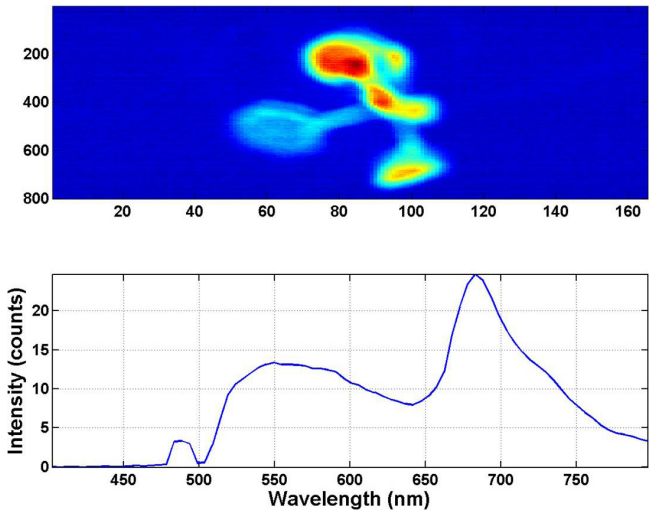
Hyperspectral Fluorescence Measurements of Arabidopsis

Arabidopsis Treated with Pathogen

In collaboration with the University of Wisconsin Botany department, Middleton Spectral Vision performed a set of experiments with Arabidopsis plants. The purpose of the experiments was to evaluate the ability of the macroPhor fluorescence imaging system to quantify the health status of the plants.



Healthy plant: Mean image (average of all spectral bands) and mean spectrum (average of all spatial pixels)



Bacterial laden plant: Mean image (average of all spectral bands) and mean spectrum (average of all spatial pixels)

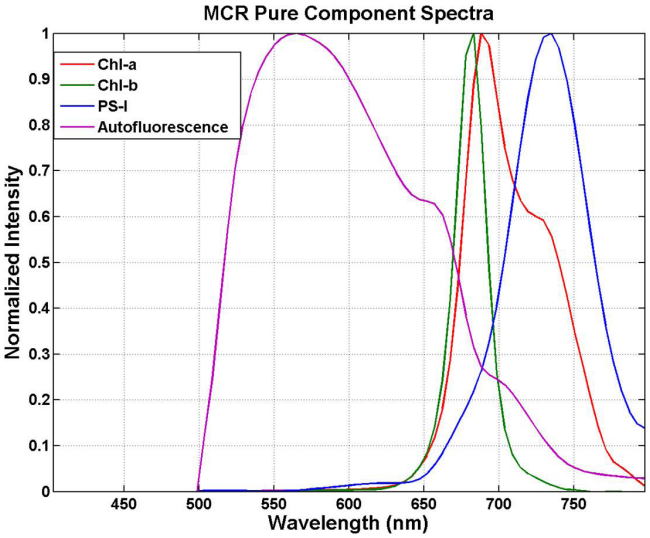
The Arabidopsis were grown on agarose plates. Some of the plants were laden with Pseudomonas bacterial growth which eventually kills the plant.

Images were collected with the macroPhor Hyperspectral Fluorescence Imaging System of comparing the bacterial laden plant with the healthy plant.

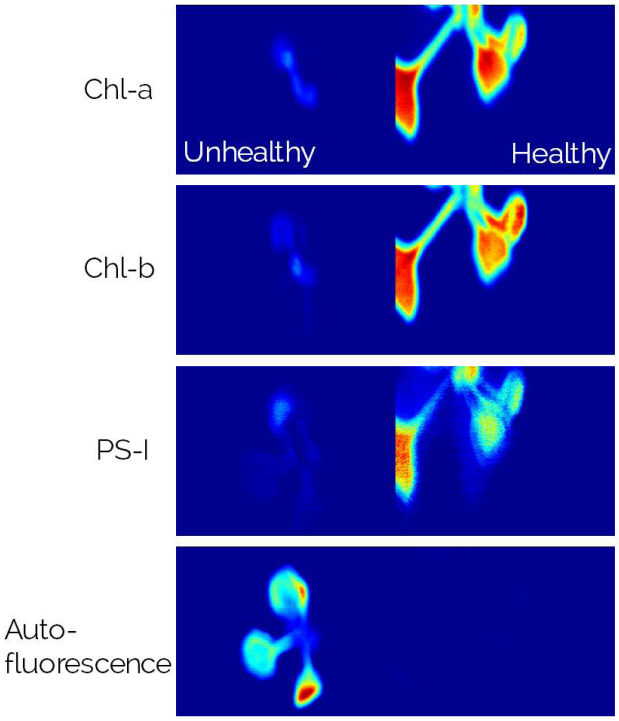
The mean hyperspectral image (average of all spectral bands) and mean spectrum (average of all spatial pixels) are shown for the two samples.

Multivariate Curve Resolution Analysis

Multivariate Curve Resolution (MCR) was used to extract the endogenous photosynthetic pigments and other auto-fluorescence species that may be indicators of bacteria and plant health. The components that were discovered are shown here.



The macroPhor system detected a clear difference in the relative intensities of the spectral components Chl-a, Chl-b, PS-I, and autofluorescence between the healthy and unhealthy plants.



MCR Results: There is a clear difference in the intensities of the spectral components between the healthy and unhealthy plants.

Below are RGB false-colored images showing changes in the relative intensities of the photosynthetic pigments (red: Chl-a, green: Chl-b, blue: PS-I).