



TECHNOLOGY *Opportunity*

SENSOR TECHNOLOGY



Plant Chlorophyll Content Meter

When unfavorable growing conditions cause physiological stress in a plant, the chlorophyll content of its leaves typically begins to decrease.

A technology has been developed that detects plant stress by measuring the amount of chlorophyll in the foliage based on the light reflected from the plant.

Tests have shown that the hand-held meter detects plant stress as early as 16 days before any visual indications, such as color change, are present.

Benefits

Compact and Lightweight: Prototype weighs one pound, the case measures 1 x 4 x 2.5 inches; can be made more compact, lighter.

Easy to use: To operate, a user simply points the unit at the light source for calibration, then at the plant for data collection. Physical contact with the plant is not required.

Range and field-of-view versatility: The instrument can analyze a single leaf at 18 inches, an entire tree at 20 yards, and could be used in remote sensing from aircraft.

Low cost: The device can be inexpensively manufactured, uses commercially available components.

Adaptable: The device can analyze any type of broad needle leaf.

Fast: No adaptation period is required, a reading can be completed in a few seconds.

Accurate: Regression analysis of an instrument reading vs. extracted chlorophyll content resulted in excellent statistical correlation ($R^2 > 0.9$).

The Technology



The plant chlorophyll content meter collects light reflected from a target plant and separates it into two different wavelength bands. The light collected in these two channels is processed using photo detectors and amplifiers. A controller in the meter compares the level of light reflected from the target plant with the level of light detected from a light source. The percent of reflection in the two separate wavelength bands from the target plant are compared to provide a ratio that indicates a relative level of plant physiological stress.

Commercial Opportunity

The Plant Chlorophyll Content Meter is a patented NASA technology being made available through the NASA Quick Launch program. This program seeks to simplify the licensing application process and offer reduced licensing fees and annual royalties to stimulate commercial use of NASA-developed technologies. For more information go to:

<https://quicklaunch.ndc.nasa.gov/>

Commercial Applications

Agriculture
Horticulture

Precision Farming
Plant Research

For More Information

If you are interested in pursuing commercialization of this technology or require more information, please contact the:

Office of Chief Technologist

NASA John C. Stennis Space Center

Phone: 228.688.1929

E-mail: ssc-technology@nasa.gov