



KONICA MINOLTA

CHLOROPHYLL METER SPAD-502



A lightweight handheld meter for measuring the chlorophyll content of leaves without causing damage to plants.

The SPAD-502 is a compact meter designed to help users improve crop quality and increase crop yield by providing an indication of the amount of chlorophyll present in plant leaves. The chlorophyll content of plant leaves is related to the

condition of the plant, and thus can be used to determine when additional fertilizer is necessary. By optimizing nutrient conditions, healthier plants can be grown, resulting in a larger crop yield of higher quality.

Features

Compact and lightweight for portability

The SPAD-502 is small enough to fit in a pocket and is extremely lightweight (only 225g) so it can be easily taken anywhere.

Quick, easy measurements

Measurements are taken by simply inserting a leaf and closing the measuring head. It is not necessary to cut the leaf, so the same leaf can be measured throughout the growing process.

Water-resistant

The SPAD-502 is water-resistant, so it can be used outside even in the rain.

*It is not immersible, and should not be cleaned with water.

Low power consumption

The SPAD-502 uses LED light sources, resulting in extremely low power consumption. One set of two AA-size alkaline-manganese batteries can provide approximately 20,000 measurements.

Small measuring area

The measuring area is only 2×3 mm, allowing measurements of even small leaves. A sliding depth stop is included for accurate positioning of sample leaves.

High accuracy

High measuring accuracy (± 1.0 SPAD unit for rice-plant leaves) allows close examination of growing conditions.

Data memory

The SPAD-502 has memory space for 30 measurements. Data in memory can be recalled or deleted at a later time, and the average value of all data in memory can be automatically calculated.

Reading checker

A reading checker enables users to check that the SPAD-502 is functioning correctly and providing accurate readings.

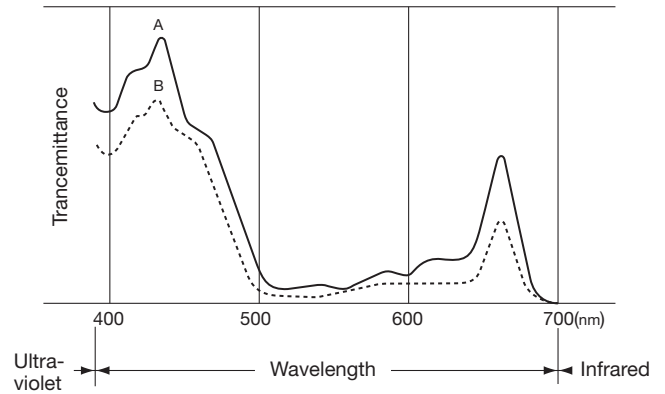
The essentials of imaging

Theory

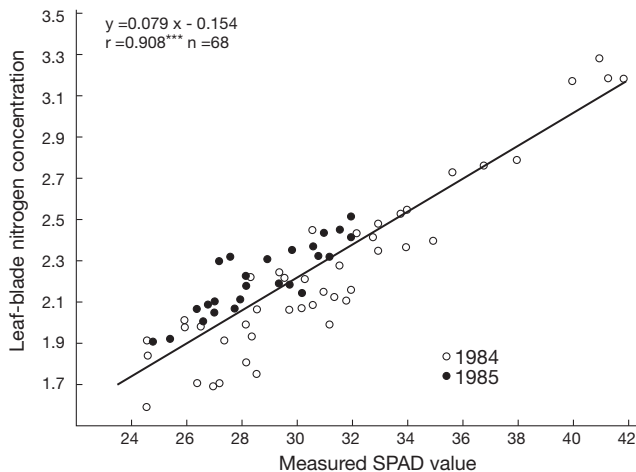
The SPAD-502 determines the relative amount of chlorophyll present by measuring the absorbance of the leaf in two wavelength regions.

The graph at right shows the spectral absorbance of chlorophyll extracted from two leaf samples using 80% acetone. From the diagram, it can be seen that chlorophyll has absorbance peaks in the blue (400-500nm) and red (600-700nm) regions, with no transmittance in the near-infrared region.

To take advantage of this characteristic of chlorophyll, the SPAD-502 measures the absorbances of the leaf in the red and near-infrared regions. Using these two transmittances, the meter calculates a numerical SPAD value which is proportional to the amount of chlorophyll present in the leaf.

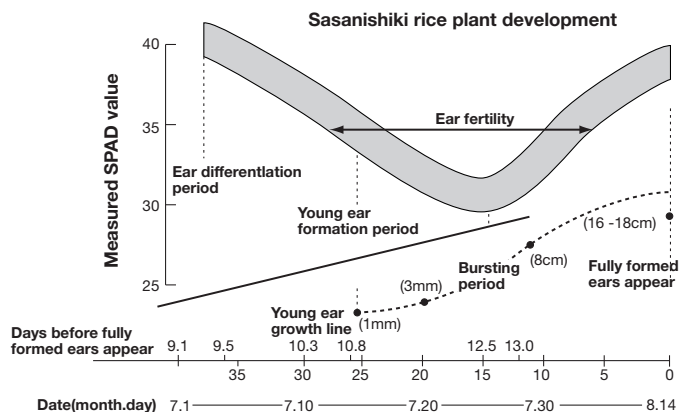


Applications



Checking the nutritional condition of plants

The chlorophyll present in the plant leaves is closely related to the nutritional condition of the plant. As can be seen from the graph below, the chlorophyll content (represented by the measured SPAD value) will increase in proportion to the amount of nitrogen (an important plant nutrient) present in the leaf. For a particular plant species, a higher SPAD value indicates a healthier plant.



Determining when additional fertilizer is necessary

A decrease in the SPAD value indicates a decrease in the chlorophyll content and nitrogen concentration. This decrease may be due to a lack of nitrogen available in the soil. This problem can be solved by adding fertilizer to the soil.

For example, it was determined from past experience that for Sasanishiki rice plants a SPAD value of 35 or above was desirable to produce a target yield of 600kg/10a. During the differentiation and formation of ears, a period of rapid plant development, the SPAD value fell to between 29 and 32, indicating that additional fertilizer was necessary.

SPECIFICATIONS

Type: Handheld meter for measuring chlorophyll using optical density difference at two wavelengths

Measurement sample: Crop leaves

Measurement system: Optical density difference at two wavelengths

Measurement area: 2 × 3mm

Light source: 2 LEDs (light-emitting diodes)

Receptor: 1 SPD (silicon photodiode)

Display: Measurement data: 3-digit LCD with decimal point
Data number: 2-digit LCD

Data memory: Space for 30 data sets

Controls: Power switch, AVERAGE key, ALL DATA DELETE key, ONE DATA DELETE key, and DATA RECALL key

Power source: 2 AA-size alkaline-manganese (1.5V) batteries

Battery line: More than 20,000 measurements

Minimum interval between measurements: Less than 2 seconds

Accuracy: Within ± 1.0 SPAD unit (at room conditions, SPAD value between 0 and 50)

Repeatability: Within ± 0.3 SPAD units (SPAD value between 0 and 50)

Reproducibility: Within ± 0.5 SPAD units (SPAD value between 0 and 50)

Temperature drift: Less than ± 0.4 SPAD units/°C

Temperature range: Operation: 0 to 50°C; Storage: - 20 to +55°C

Dimensions: 164 × 78 × 49mm (6-7/16 × 3-1/16 × 1-15/16 in.)

Weight: 225g (7-15/16 oz.) (not including batteries)

Other: Warning buzzer; User calibration function

Specification subject to change without notice

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