OPTI-SCIENCES, INC.

MPM-100 GPS

Measures:

Chlorophyll Content

Anthocyanin Content

Flavonol Content

NFI (Nitrogen-Flavonol Indicator)

For leaves & Grape - Berry Caps

Glass slide with Berry caps

Uses proven techniques to measure different plant pigments at the same time.

Uses ratio fluorescence to measure anthocyanin content and flavonol content.

Uses leaf transmission in the far red and near infrared to measure **chlorophyll content.**

Uses the resulting chlorophyll content measurement and flavonol content. measurement to determine the **nitrogen - flavonol indicator**

The MPM-100 or "Multi-Pigment-Meter", uses a combination of techniques to measure these very different parameters, in proven ways, *at the same time.*

The standard wavelengths are below:

Chlorophyll content: T850nm / T720nm
Flavonol content: F660nm / F325nm
Anthocyanin content: F660nm / F525nm
NFI: (T850nm/T710nm) / (F660nm/F375nm)

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MPM-100 Multi-Pigment-Meter

Chlorophyll Content

Chlorophyll Content is a very sensitive test for nitrogen and sulfur plant stress. For that reason, chlorophyll content measurement use is common for nitrogen fertilizer management. When test plant measurements drop to 90% of values from a well fertilized plant, it is time to add nitrogen. This system measures at different wavelengths than most chlorophyll meters to also allow determination of “Nitrogen Balance Index”. Chlorophyll content has been used for measuring many other types of plant stress as well.

Chlorophyll content: T850nm / T720nm

Flavonol Content

Flavonols appear yellow in plants. Evidence shows that they help photo-protect plants in the UV light spectrum and scavenge reactive oxygen species to protect plant photosynthesis. Flavonols are a good indicator of plant nitrogen status. The yellow color may also attract pollinators.

Flavonol content: The result of ratio fluorescence F660nm / F325nm

Anthocyanin Content

Anthocyanins in plants can be red, blue, purple or colorless depending on pH environment.

Research shows that they may have a role in extreme plant temperature protection, the attraction of pollinating animals and the promotion of animal seed distribution.

Anthocyanin content: The result of ratio fluorescence F660nm / F525nm

NFI or Nitrogen Flavonol Index

Chlorophyll and flavonols are good indicators of nitrogen status in plants. Under optimal conditions. plants produce chlorophyll and few flavonoids. Under nitrogen deficiency, plants produce more flavonoids or carbon based compounds. NFI is less sensitive to leaf age and leaf thickness than standard chlorophyll content measurements.

Nitrogen Flavonol Index: The result of chlorophyll measurement divided by Flavonol measurement. (T850nm / T720nm) / (F660nm / F325nm)

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Ratio fluorescence methods have advantages. They will work on very small samples as well as opaque samples. Both the anthocyanin and flavonol measuring methods are ratio fluorescence methods.

The chlorophyll content method uses leaf light absorption at two wavelengths and so it will not work with opaque samples or samples smaller than 9 mm in width.

Measuring Berry Caps

The MPM-100 will *measure relative grape ripeness.* By taking thin skin grape "berry caps" with a razor blade. As long as there is at least a small amount of chlorophyll present, the instrument works well with repeatable results.

Technical Specifications

Measured Parameters: Relative chlorophyll content values, relative flavonol values, relative anthocyanin values and relative nitrogen-flavonol index.

Measurement Area: 9.5 mm diameter circle.

Repeatability: +/- 1%

Noise: <+/- 2%

Source: Chlorophyll content - Medical grade LED at 720nm & Infrared LED at 850nm.
Flavonol content - LED at 375 nm & and an LED at 660 nm
Anthocyanin content - LED at 525 nm & an LED at 660 nm.

Detector: Solid state, high sensitivity detectors. Band limiting filter sets provided.

Detection: Modulated light digitally controlled to minimize background detection. Temperature compensation included for light source and detector

Storage Capacity: 2 gigabyte of non-volatile flash memory

Modes: Single point measurement, averaging from 2-8 measurements, median and mean values.

User Interface: 240 x 320 pixel Color touch screen

Output: USB

Temperature Range: 0-50 Deg C

Power Source: 2 Rechargeable AA batteries. Charger supplied along with 4 AA batteries.

Auto Off Interval: (no key press or download) programable from 0 to 20 minutes.

Size: 7.8cm x 5cm x 18cm

Weigh: 0.6 lbs

Measuring time: 5 seconds

GPS: The location accuracy is excellent. It can be accurate up to about 0.3 meters or in the worst case, up to 2.5 meters. It records longitude, latitude, number of satellites and DOP.

Components included: MPM-100 GPS meter, battery charger, 4 AA NiMH rechargeable batteries, USB cable, carrying case and manual. Calibration slide.

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