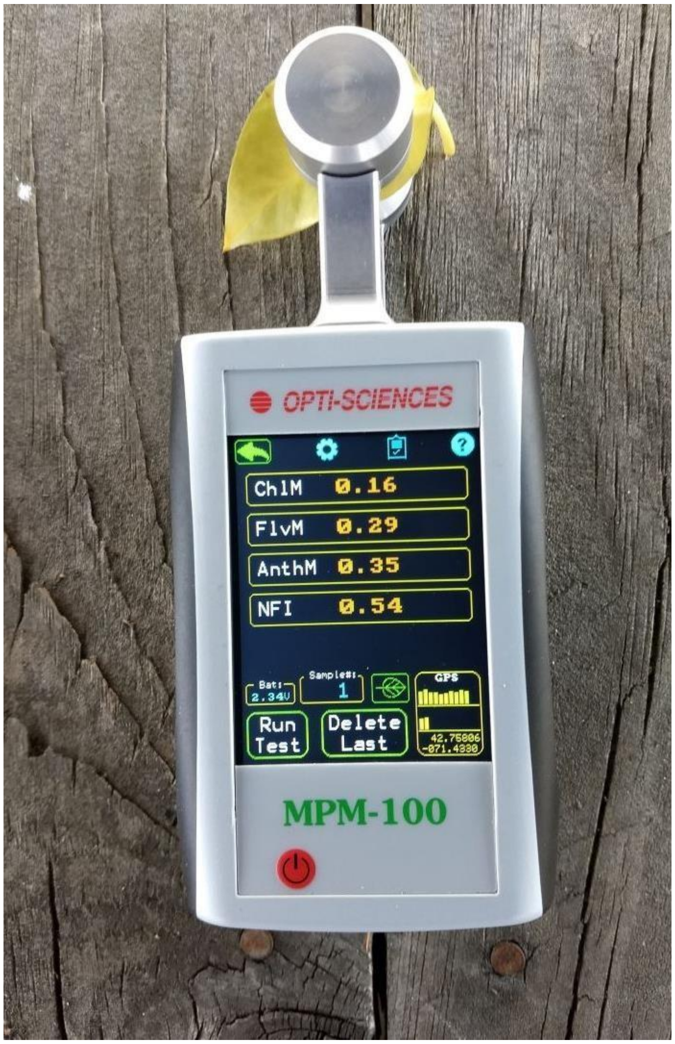
MPM-100 Multi Pigment Meter *with* ***GPS***

ADC BioScientific Ltd.



Measures:

Chlorophyll Content
Anthocyanin Content
Flavonol Content
Nitrogen-Flavonol Index (NFI)

In Leaves and Grape Caps

Advantages

- ✓ 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 and flavonol content measurements to determine a **nitrogen-flavonol index, NFI**
- ✓ Discrete single measurements
- ✓ Sample averaging (mean or median) of 2 to 8 samples
- ✓ 4GB internal memory
- ✓ USB output of labelled .csv data files, open in spreadsheet software
- ✓ Large, colour touchscreen display

Chlorophyll Content T850nm / T720nm

- Highly sensitive test for nitrogen and sulfur plant stress.
- Commonly used for nitrogen fertilizer management (e.g. N addition required when test plant chlorophyll falls to 90% of well-fertilized plant value).
- MPM-100 measures chlorophyll by leaf transmission of light at different wavelengths than most chlorophyll meters, for calculation of "Nitrogen Balance Index".

Flavonol Content F660nm / F325nm

- A subclass of Flavonoids: flavonols provide photo-protection in the UV light spectrum and scavenge reactive oxygen species to protect plant photosynthesis.
- Flavonols are a good indicator of plant nitrogen status. Yellow pigment may also attract pollinators.

Anthocyanin Content F660nm / F525nm

- Anthocyanins in plants can be red, blue, purple or colourless depending on pH environment.
- Research suggests roles in extreme plant temperature protection, the attraction of pollinating animals and the promotion of animal seed distribution.

Nitrogen-Flavonol Index Chlorophyll (T850/T720) / Flavonol (F660/F325)

- Chlorophyll and flavonols are good indicators of N status in plants.
- Under N deficiency, plants produce more flavonoids or carbon-based compounds.
- Less sensitive to leaf age and thickness than standard chlorophyll measurements.

Assessment of Grape Ripeness

Flavonol and Anthocyanin contents are also very useful in determining grape maturity in the wine industry.

MPM-100 ***measures relative grape ripeness.*** **Thin, grape skin "berry caps" are taken with a razorblade. As long as there is at least a small amount of chlorophyll present, results are repeatable and accurate with MPM-100.**

(a) Z.G. Cerovic, N.Moise, G. Agatic, G. Latouchea, N. Ben Ghozlena, S. Meyera (2008) "New portable optical sensors for the assessment of wine grape phenolic maturity based on berry fluorescence". Journal of Food Composition and Analysis Vol.21, Iss.8, December 2008, p.650-654.

Ratio Fluorescence Method

- ✓ Provides non-destructive measurement of several important plant chemicals at the same time.
- ✓ Successful measurements on even very small or opaque samples.

Anthocyanin and Flavonol Measurement:
By modulated, Ratio Fluorescence.
Samples can be opaque and smaller than the leaf clip area.

Chlorophyll Measurement:
Leaf light absorption at two wavelengths.
Samples must be > 9mm wide and not opaque.

***MPM-100** and **MPM-100/SPAD** options

TECHNICAL SPECIFICATIONS

Measured Parameters:
Relative Chlorophyll Content, Flavonol, Anthocyanin and Nitrogen-Flavonol Index
Measurement Area: 9.5mm diameter circle
Distance from edge of measuring head to measurement area: 9mm
Repeatability: +/- 1%
Noise: <+/- 2%
Sources:
Flavonol content: LED at 325nm & LED at 660nm
Anthocyanin content: LED at 525nm & LED at 660nm
Chlorophyll content: Medical grade LED at 720nm & IR LED at 850nm.

Alternative FOR CHLOROPHYLL CONTENT:
To be specified at time of purchase:
MPM-100/S (SPAD®) Red LED at 650nm & IR LED at 940nm in the transmittance channels and produces "SPADa" units. **The MPM-100/S does not determine the Nitrogen Flavonol Index.**

Fluorescence Detector: Single channel Si Photodiode with detection: 720nm to 900nm range
Transmittance Detectors:
Single channel Si Photodiode with diffuser to measure from 405nm to 950nm

Detection: Modulated light digitally controlled to minimize background detection
Temperature compensation included for light source and detector
Storage Capacity: 2GB of non-volatile flash memory
Modes: Single point measurement, averaging of 2 to 8 measurements, median and mean

User Interface: 240 x 320px color touchscreen
Output: USB 1.1
Temperature Range: 0-50°C
Power Source: 2 Rechargeable AA batteries & charger
'Auto Off' Interval: (no key press or download) Programmable from 0 to 20 minutes
Size: 78mm x 180mm x 50mm
Weight: 275g / 0.6lb

Selected publications

Ali, A., Cavallaro, V., Santoro, P., Mori, J., Ferrante, A., & Cocetta, G. (2024). Quality and physiological evaluation of tomato subjected to different supplemental lighting systems. *Scientia Horticulturae*, *323*, 112469. https://doi.org/10.1016/j.scienta.2023.112469

Ali, A., Santoro, P., Ferrante, A., & Cocetta, G. (2023). Investigating pulsed LED effectiveness as an alternative to continuous LED through morpho-physiological evaluation of baby leaf lettuce (Lactuca sativa L. var. Acephala). *South African Journal of Botany*, *160*, 560–570. https://doi.org/10.1016/j.sajb.2023.07.052

Ali, A., Santoro, P., Mori, J., Ferrante, A., & Cocetta, G. (2023). Effect of UV-B elicitation on spearmint's (Mentha spicata L.) morpho-physiological traits and secondary metabolites production. *Plant Growth Regulation*. https://doi.org/10.1007/s10725-023-01028-7

Cavallaro, V., Bulgari, R., Florio, F. E., Restuccia, P., Vinci, G., Guffanti, D., Vignati, S., & Ferrante, A. (2023). Postharvest strategies for preventing flower wilting and leaf yellowing in cut Ranunculus flowers. *Frontiers in Horticulture*, *2*, 1183754. https://doi.org/10.3389/FHORT.2023.1183754

Dainelli, M., Pignattelli, S., Bazihizina, N., Falsini, S., Papini, A., Baccelli, I., Mancuso, S., Coppi, A., Castellani, M. B., Colzi, I., & Gonnelli, C. (2023). Can microplastics threaten plant productivity and fruit quality? Insights from Micro-Tom and Micro-PET/PVC. *Science of The Total Environment*, *895*, 165119. https://doi.org/10.1016/J.SCITOTENV.2023.165119

Franzoni, G., Vignati, S., Guffanti, D., Florio, F. E., Gibin, M., Petrini, A., Colombani, C., Cocetta, G., & Ferrante, A. (2023). Qualitative responses of rocket cultivars to biostimulants application. *Acta Horticulturae*, *1377*, 853–859. https://doi.org/10.17660/ACTAHORTIC.2023.1377.106

Xu, X., Sun, Y., & Liu, F. (2022). Modulating leaf thickness and calcium content impact on strawberry plant thermotolerance and water consumption. *Plant Growth Regulation*, *98*(3), 539–556. https://doi.org/10.1007/S10725-022-00884-Z/FIGURES/5

Cerovic, Z. G., Moise, N., Agati, G., Latouche, G., Ben Ghozlen, N., & Meyer, S. (2008). New portable optical sensors for the assessment of winegrape phenolic maturity based on berry fluorescence. *Journal of Food Composition and Analysis*, *21*(8), 650–654. https://doi.org/10.1016/J.JFCA.2008.03.012

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