

# MPM-100 Multi Pigment Meter with GPS



**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
- ✓ Graphic color touchscreen display

## Chlorophyll Content $T_{850nm}$ / $T_{720nm}$

- 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 $F_{660nm}$ / $F_{325nm}$

- 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 $F_{660nm}$ / $F_{525nm}$

- 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 ( $T_{850}/T_{720}$ ) / Flavonol ( $F_{660}/F_{325}$ )

- 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 Ghazlena, 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.

## 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:- Chlorophyll content:**

Medical grade LED at 720nm & IR LED at 850nm

**Flavonol content:** LED at 325nm & LED at 660nm

**Anthocyanin content:** LED at 525nm & LED at 660nm

**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

**Measuring time:** 5s

**GPS:** Location accuracy: 0.3m to 2.5m. Longitude, latitude, number of satellites and DOP

**Components Included:**

MPM-100 Multi-Pigment Meter, Battery charger and Adaptor, 4 AA NiMH Rechargeable Batteries, USB cable, Stylus, Carrying Case and Manual.

**Warranty Period:** 12 months