



CCM-200A *plus*



Anthocyanin Content Meter

A hand-held device for the non-destructive determination of anthocyanin content in leaves and flowers



- ◆ Non-destructive
- ◆ Accurate and reliable
- ◆ Storage of up to 160,000 data sets
- ◆ Data averaging (2-30 samples)
- ◆ Graphic display
- ◆ Lightweight battery portable
- ◆ Designed for rapid screening

Anthocyanin

Anthocyanin is a red/purple flavonoid pigment found in photosynthetic tissue, flowers and fruit. Its primary functions are:

- Attracting pollinators
- "Sunscreen" against photoinhibition and high light stress
- Protective camouflage against herbivores

Anthocyanin is found in high concentrations in many berry related species.

Research has suggested that anthocyanin may have potential human health benefits in the restriction of the development of some cancers.

References:

Morris J.B., Wang M.L. (2007) Anthocyanin and potential therapeutic traits in *Clitoria*, *Desmodium*, *Catharanthus* and *Hibiscus* species. *ActaHort.* 756, ISHS 2007

van den Berg A.K., Perkins T.D. (2005) Non-destructive estimation of anthocyanin content in Autumn sugar maple leaves. *HortScience* 40(3):685-686

Non-destructive and battery portable

The CCM-200A *plus* is the world's most advanced anthocyanin content meter providing fast, accurate and reliable determinations on intact plants.

The battery portable CCM-200A *plus* provides anthocyanin content determinations in the field without the need for destructive laboratory sampling. Specifically designed for fast field screening, each measurement takes only 2-3 seconds to perform.

Anthocyanin content is expressed in ACI (Anthocyanin Content Index) units.

Data averaging

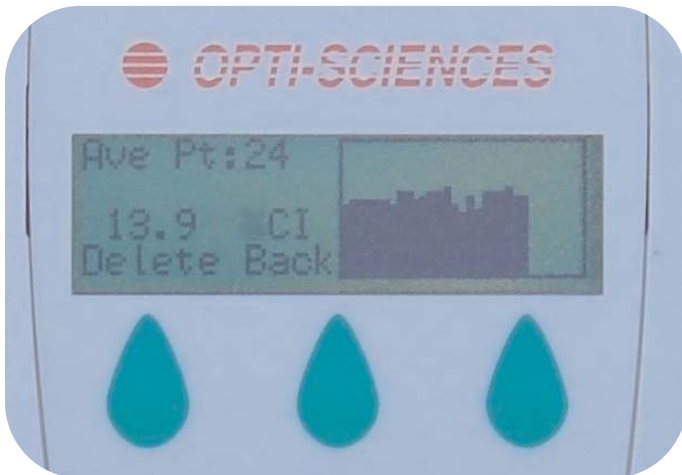
Data may be made as:

- Single measurements
- 2-30 measurements averaged (with graphing)
- 10-30 measurements averaged with applied sigma 2 standard deviation to exclude rogue data points (with graphing).

Large integral data storage

Up to 160,000 anthocyanin content measurements can be stored in the internal memory. There is no requirement for an external data logger, computer or frequent returns to the laboratory to download data. Stored data can be reviewed, in the field, on the display.

Once back in the laboratory, data is quickly and easily transferred to a PC via USB or RS232. Measurements may be output individually by USB or as the complete storage file.



Proven scientific principles

Anthocyanin has distinct optical absorbance characteristics that the CCM-200A *plus* exploits to non-destructively measure relative anthocyanin concentrations.

By measuring the amount of energy absorbed in the 530nm band an estimate of the amount of anthocyanin present in the tissue is possible. Absorbance in the infrared band can be used to quantify and account for leaf thickness, so providing a more accurate ACI value.

The CCM-200A *plus* employs new, precision LED technology to further enhance measurement accuracy and repeatability.



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Technical Specifications

Measured parameters: Optical absorbance in two different wavebands: 530nm (Anthocyanin) and 931nm (Near Infra-Red) providing ACI value

Measured area: 1cm diameter circle

Resolution: 0.1 ACI unit

Repeatability: +/- 1 %

Sampling acquisition time: 2-3 seconds

Source: Custom 2 wavelength LED module

Detectors: Two silicon photodiodes with integral amplifiers for absorbency measurements, power monitoring and temperature compensation

Data modes: Single point, selectable 2-30 point average and a statistical 10-30 point protocol that disregards data beyond a 2 sigma standard deviation

Storage capacity: Up to 160,000 measurements

User Interface: 128 x 32 pixel graphic display, 8 keys for measurements, data manipulation, beep signal status and warnings

Output: USB 1.1 and RS232. By single measurement or complete storage file

Operating temperature range: 0-50°C

Temperature compensation: Temperature compensated source and detector circuitry for minimal drift over full range

Battery: 9V alkaline battery

Auto off interval: 4 minutes (with no key press or download)

Dimensions: 152 x 82 x 25 mm

Weight: 162g

