

OPTICAL MEASUREMENTS OF POLYPHENOLS



Thanks to more than 15 years of research, FORCE-A designs, develops and markets optical diagnosis tools for plants. The Dualex[®] is a portable optical sensor that measures the polyphenols content of the leaf epidermis in a real-time and non-destructive way.

TOOLS TO MEASURE EPIDERMAL POLYPHENOLS

The Dualex[®] leaf clips are easy to use in order to determine plant health status and to measure specifically flavonols, anthocyanins and hydroxycinnamic acids.

- Dualex[®] Flav for Flavonols
- Dualex[®] Anth for Anthocyanins
- Dualex[®] HCA for HydroxyCinnamic Acids (chlorogenic, chicoric acids, etc.)

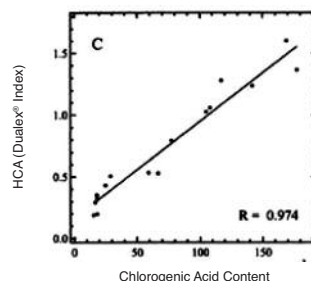
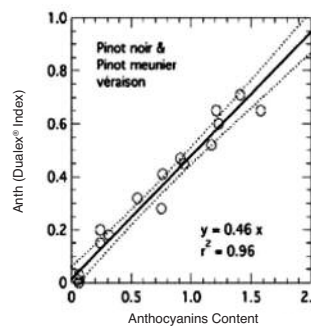
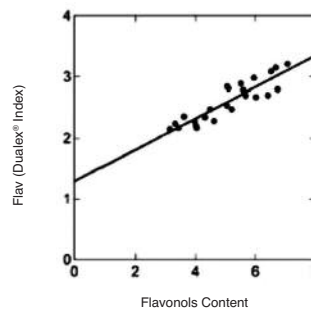
The patented technology used in the Dualex[®] Series is based on chlorophyll fluorescence and the screening effect due to polyphenols from the leaf epidermis. It is insensitive to variable chlorophyll fluorescence and independent of leaf chlorophyll content.

Measurements are non-destructive, very fast and simple. They do not need any calibration and can be performed under ambient light conditions. No preparation is required.

APPLICATIONS

Dualex[®] 3 Series assess quickly and quantitatively polyphenols content in fruits and vegetables (leaves and skins) for the following themes:

- Polyphenolic antioxidants
- Phytopathology
- Harvest quality assessment
- Nutraceuticals and medicinal food
- Colouring (anthocyanins, flavonols)
- Nutrition deficiency
- Light protection, low temperatures
- Variety selection



This technology allows to get:

- Polyphenols measurements
- Quick measurements (<1s)
- Non-destructive measurements
- Real-time and in situ diagnosis

DUALEX® 3 SERIES TECHNICAL SPECIFICATIONS

Measured material	Plant leaves (option: berries or peels)
Measured parameters	Optical absorbance in UV-A (375 nm for flavonols content) Optical absorbance in visible (530 nm anthocyanins content) Optical absorbance in UV-B (315 nm for hydroxycinnamic acids content)
Measurement process	Main button pressure or clips closing (free choice)
Max. insertion depth	70 mm
Measured area	5 mm in diameter
Acquisition time	< 500 ms
Storage capacity	40 000 multiparametric data
Data classification	2 levels
Polyphenols rates	From 0.00 to 3.00 (Dualetx® units, convertible to $\mu\text{g}/\text{cm}^2$ after calibration)
Absorbance accuracy (σ)	< 0.01
Temperature range	From 5 to 35°C (variation of absorbance < 2%)
Light sources	2 Light-Emitting-Diodes (LED): FLAV: 1 UV-A and 1 Red ANTH: 1 Green and 1 Red HCA: 1 UV-B and 1 Red
Detector	1 Silicium Photodiode
User interface	2 X 16 LCD panel Sound warning
Data downloading	Serial port for data transfer (option: serial-USB converter) Data organization compatible with Excel sheets
Power source	Li-ion rechargeable batteries (proprietary)
Autonomy	10 hours
Charging time	2 hours
Total weight	950 g (with battery)
Leaf-clips size	185 mm X 43 mm X 33 mm
Case size	150 mm X 100 mm X 55 mm
Optional adapter	Solid fluorescent film for non-chlorophyll-bearing samples
Language	English

Warning: As FORCE-A is continuously improving its products, technical specifications are subject to change without notice.

