FELIX INSTRUMENTS
APPLIED FOOD SCIENCE

F-750
Produce Quality Meter

Quantify Quality

The F-750 Produce Quality Meter is a portable measurement tool that analyzes both the internal and external traits that contribute to produce quality. NIR (Near Infrared analysis) has been used in fixed installations to provide **Objective Quantifiable Quality standards** in produce sorting for years. Our portable battery operated device allows a grower to take NIR analysis into the field where better and more consistent maturity determination can **add value to a crop before harvest.**

The F-750 reports quantitative estimates of substances (e.g. Chlorophyll), traits that involve multiple substances (e.g. ripeness, TSS, DM) and qualitative metrics (e.g. flavor index, personal preference index).

How it Works

Building a Model

- 10 – 200 fruit subjects are measured using the F-750 Produce Quality Meter
- The quality parameter of interest is measured on each of the subjects using an alternative destructive method (ie; Brix is measured using a refractometer).
- The included model building software combines the data from step 1 and step 2 to create a new model.
- The F-750 can now use the newly created model to non-destructively estimate the parameter of interest.

A custom quality index can be created using several models. For example: a specific Brix range, color range, acidity range, and dry matter range may be combined to create an eating quality index for your target subject.

Calculating Measurements

Unlike traditional spectroscopy which uses the ratio of spectral bands, F-750 measurements are calculated using a PLS based model built from a training set using user or software selected spectra from 310-1100 nm.

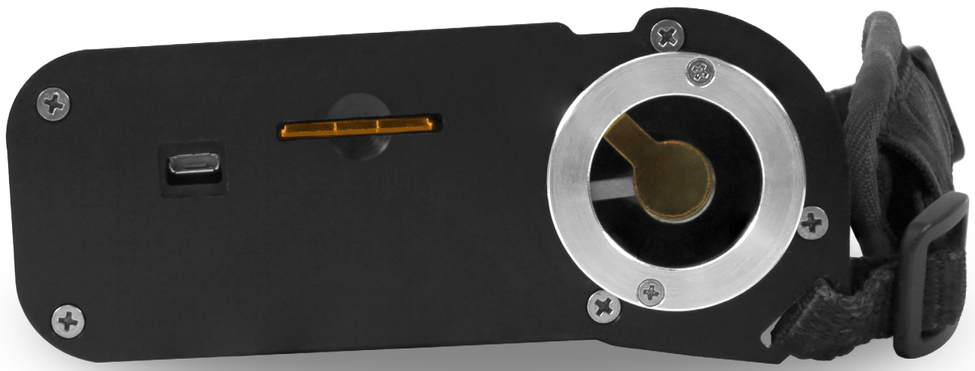
The model building software uses non-linear iterative partial least squares regression (NIPLS) to create coefficients that weight each wavelength based on their relationship to the known values. The F-750 calculates the second derivative spectra for the specimen and applies the training set coefficients to each wavelength to deliver the actual measurement figure.

Quantifying the Accuracy of Measurements

The difference between the specimen spectra and training set spectra along with the ratio of the actual influence vs. the intended weight of each coefficient, are combined to deliver an accurate confidence score with each measurement.

Product Features

- Non-destructive estimation of fruit maturity and sweetness related parameters:
  - Total Soluble Solids (Brix)
  - Dry Matter
  - Internal Color
  - External Color
  - Titratable Acid
- GPS for easy crop mapping
- Transflective display for outdoor viewing
- Rechargeable/replaceable batteries
- SD card data storage



SD WiFi

Preharvest Maturity Assessment

Postharvest Quality Inspection

F-750 Specifications

Spectrometer	Carl Zeiss MMS-1 Spectrometer
Range	310-1100
Spectral Sample Size	3nm
Spectral Resolution	8-13nm
Light Source	Xenon Tungsten Lamp
Lens	Glass, coated to enhance NIR
Shutter	Gold-plated reference standard
Display	Sunlight visible transflective LCD screen
PC Interface	USB and SD Card
Data Recorded with Each Measurement	Raw Data, Reflectance, Absorbance, First Derivative Absorbance, Second Derivative Absorbance
Power Source	Removable 3100 milliamp hour lithium-ion battery
Battery Life	1600+ Measurements
Data Storage	Removable 4 GB SD card
Body	Heavy-duty annodized aluminum body
Weight	1.05 kg

References

The F-750 has been proven to be an effective instrument creating useful data sets. Applications for the F-750 include: crop management and harvest decisions in the field, in cold storage, ripening rooms, and retail outlets. For a more detailed view of relevant applications, please refer to the references below:

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Kerry B. Walsh[AC], John A. Guthrie[B] and Justin W Burney[A] (2000) Aust. J Application of commercially available, low-cost, miniaturised NIR spectrometers to the assessment of the sugar content of intact fruit. Plant Physiol, 27: 1175-1186

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Kerry B.Walsh[1], Robert L. Long[1] and Simon G. Middelton[2] (2007) Use of near infra-red spectroscopy in evaluation of source-sink manipulation to increase the soluble sugar content of stonefruit. Journal of Horticultural Science & Biotechnology, (82:2) 316–322

Downey, G. (1996) measured NIR interactance (700–1100) spectra from six selected sites on the dorsal and ventral surfaces of each fish side on farmed salmon, resulting in 294 spectra from different sites The measurements were done through skin and scales by an unspecified fiber-optic interactance probe. Referencechemical values of fat and moisture were determined from excised flesh from the different NIR measurement sites. Fat ranges for the sites were 2.3–23.0% and moisture 57.9–74.7%. Spectral measurements on the dorsal surface gave lowest prediction errors (bias corrected) for fat 2.0% and moisture 1.45%." Non-invasive and non-destructive percutanous analysis of farmed salmon flesh by near infra-red spectroscopy. Food Chem. 55:305–311.

Cozzolino, D., Parker, M., Dambergs, R. G., Herderich, M. and Gishen, M. (2006) AIn the Vis region (400–700 nm) the spectra with very low absorption were those from Day 0 of the fermentations, that is, grape must before fermentation commenced. Samples taken after Day 0 showed a marked increase in anthocyanin absorption around 540 nm, thus demonstrating the extraction of these phenolic pigments from grape skins into the wine as the fermentaition proceeded. Chemometrics and visible-near infrared spectroscopic monitoring of red wine fermentation in a pilot scale. Biotechnol. Bioeng., 95: 1101–1107. doi: 10.1002/bit.21067

Phul P. Subedi [a] , Kerry B. Walsh [a], and David. W. Hopkins [b] (2012) Assessment of titratable acidity in fruit using short wave near infrared spectroscopy. Part B: intact fruit studies. Near Infrared Spectrosc., (20) 459-463