Document Title: Description, AN, DA7200 Cranberry		Part # and Rev. 13502-00	
		Release Date:	
Rev.	Description	Revision By	Date

Production Filename: 13502 (In Product Library)

Path to Working Files: DecaDoc\Application Notes\Master

Dimensions: 8.5 inch wide, 11 inch tall

Material: Paper, 92 Bright White or better, 75g/m² or heavier

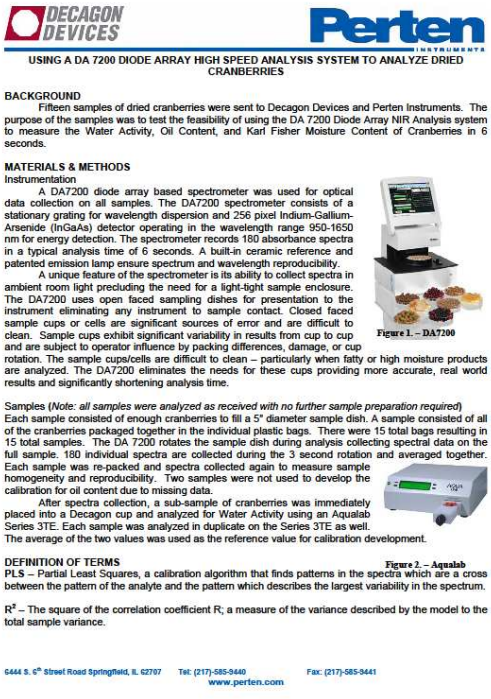
Colors: Color Print on White

Printer: HP Color LaserJet 8550-PS

Finish: None

Adhesive: None

Special Notes: Illustrations are Ref Only ** Not to Scale ** (Shown page 1 of 3)



DECAGON DEVICES Perten INSTRUMENTS

USING A DA 7200 DIODE ARRAY HIGH SPEED ANALYSIS SYSTEM TO ANALYZE DRIED CRANBERRIES

BACKGROUND

Fifteen samples of dried cranberries were sent to Decagon Devices and Perten Instruments. The purpose of the samples was to test the feasibility of using the DA 7200 Diode Array NIR Analysis system to measure the Water Activity, Oil Content, and Karl Fisher Moisture Content of Cranberries in 6 seconds.

MATERIALS & METHODS

Instrumentation

A DA7200 diode array based spectrometer was used for optical data collection on all samples. The DA7200 spectrometer consists of a stationary grating for wavelength dispersion and 256 pixel Indium-Gallium-Arsenide (InGaAs) detector operating in the wavelength range 950-1650 nm for energy detection. The spectrometer records 160 absorbance spectra in a typical analysis time of 6 seconds. A built-in ceramic reference and patented emission lamp ensure spectrum and wavelength reproducibility.

A unique feature of the spectrometer is its ability to collect spectra in ambient room light precluding the need for a light-tight sample enclosure. The DA7200 uses open faced sampling dishes for presentation to the instrument eliminating any instrument to sample contact. Closed faced sample cups or cells are significant sources of error and are difficult to clean. Sample cups exhibit significant variability in results from cup to cup and are subject to operator influence by packing differences, damage, or cup rotation. The sample cups/cells are difficult to clean – particularly when fatty or high moisture products are analyzed. The DA7200 eliminates the needs for these cups providing more accurate, real world results and significantly shortening analysis time.

Figure 1. – DA7200

Samples (*Note: all samples were analyzed as received with no further sample preparation required*)
Each sample consisted of enough cranberries to fill a 5" diameter sample dish. A sample consisted of all of the cranberries packaged together in the individual plastic bags. There were 15 total bags resulting in 15 total samples. The DA 7200 rotates the sample dish during analysis collecting spectral data on the full sample. 180 individual spectra are collected during the 3 second rotation and averaged together. Each sample was re-packed and spectra collected again to measure sample homogeneity and reproducibility. Two samples were not used to develop the calibration for oil content due to missing data.

After spectra collection, a sub-sample of cranberries was immediately placed into a Decagon cup and analyzed for Water Activity using an Aqualab Series 3TE. Each sample was analyzed in duplicate on the Series 3TE as well. The average of the two values was used as the reference value for calibration development.

Figure 2. – Aqualab

DEFINITION OF TERMS

PLS – Partial Least Squares, a calibration algorithm that finds patterns in the spectra which are a cross between the pattern of the analyte and the pattern which describes the largest variability in the spectrum.

R^2 – The square of the correlation coefficient R; a measure of the variance described by the model to the total sample variance.

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