CALIBRATION OF JOHN DEERE MOISTURE CHEK™ 16060 METER FOR USE WITH GROUND WALNUT SAMPLES

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ABSTRACT

Calibration data were developed to allow use of a John Deere Moisture Chek™ 16060 hand-held grain moisture meter for ground walnut samples. Actual moisture contents can be determined by subtracting 4.1% from meter readings on the Sunflower:stripe scale. Samples tested immediately after removal from the dryer may read as much as 1% greater than actual moisture content.

BACKGROUND

Hand-held grain moisture meters are used by walnut dehydrator operators to measure moisture content of ground samples and monitor the progress of drying. The only hand-held meter readily available for new purchase is the John Deere Moisture Chek™ Model 16060, available from John Deere distributorships. This meter has built-in calibrations for a variety of grains, but not ground walnuts.

PROCEDURES

Twenty-six samples of walnuts of various varieties and moisture contents were collected from a commercial dehydrator on two days during the 1997 harvest season. Samples were allowed to cool for 5-10 minutes, then ground in a hand operated meat grinder or electric blender. For nineteen of these samples, moisture readings were made immediately after grinding on three sub samples randomly drawn from each sample, using the Sunflower:stripe scale of the Moisture Chek™ unit. All samples were then held overnight in sealed containers to allow shell and kernel fractions to equilibrate (reach uniform moisture levels), then tested again (three sub sample readings per sample). Samples were then weighed, air oven dried at 220°F to 0% moisture, and re-weighed to determine their actual wet basis moisture content.

RESULTS AND CONCLUSIONS

The figure shows the relationship between average Moisture Chek™ Sunflower:stripe readings of samples held overnight and actual air oven moisture content. Simple linear regression analysis of the data produced a line with equation, $y = -4.1 + 0.9984x$, $R^2 = 0.951$. Because slope of the line is nearly equal to 1, actual moisture content can be estimated by subtracting 4.1% from the Sunflower:stripe reading. This conversion is based on samples allowed to equilibrate overnight.

The Moisture Chek™ meter can be programmed to automatically make numerical calibration adjustments and directly display the actual moisture content of samples. Instructions for this adjustment are included in the meter's instruction booklet.

Samples taken from nearly dry batches and read immediately had average Sunflower:stripe readings approximately 1% lower than readings taken from the same samples after overnight equilibration (data not shown). This type of error is fairly common with electronic moisture meters. Dehydrator operators

should add one percentage point to moisture readings based on samples taken directly from the dryer, as a first approximation of the real moisture. The exact adjustment may vary during the season and be different for different drying facilities. Dryer operators will need to determine their own particular adjustment based on moistures determined by their receiver or buyer.