Title Unifying parameters for a vhf unified grain moisture algorithm

Author Peter Meszaros and David B. Funk

Citation 2005 ASAE Annual International Meeting, Tampa Convention Center, Tampa, Florida, 17-20 July 2005, Paper Number 053132, 12 p.

Keywords Dielectric; Moisture; Grain; Physical and Chemical properties

Abstract

The Unified Grain Moisture Algorithm is capable of improved accuracy and allows the combination of many grain types into a single "unified calibration". The purposes of this research were to further refine the unifying parameters for grain types that had already been "calibrated," and establish processes for determining unifying parameters from the chemical and physical properties of grains. The data used in this research were obtained as part of the USDA-Grain Inspection, Packers and Stockyards Administration's Annual Moisture Calibration Study. More than 5000 grain samples were tested with a Hewlett-Packard 4291A Material/Impedance Analyzer. Temperature tests were done with a VHF prototype system at Corvinus University of Budapest. Typical chemical and physical parameters for each of the major grain types were obtained from the literature. The data were analyzed by multivariate chemometric methods. One of the most important unifying parameters (Slope) and the temperature correction coefficient were successfully modeled. The Offset and Translation unifying parameters were not modeled successfully, but these parameters can be estimated relatively easily through limited grain tests. These results confirmed the feasibility of simplifying the calibration process by predicting critical parameters from grain chemical and physical parameters.