

Title Study of Adsorption and Desorption Equilibrium Relationships for Three Different Corn Types Using the Modified Chung-Pfost Equation

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Abstract

The Modified Chung-Pfost equation is one of the most accepted equilibrium moisture content (EMC) models for corn. In the past, considerable effort has been made to find a universal set of parameters to accurately represent the EMC for most of the commercially available corn hybrids. Unfortunately, such a universal set of parameters has not yet been found. In this study, three different corn types (yellow dent, waxy and white) harvested during the 2003 fall harvest season were used to run a set of desorption and adsorption EMC/ERH experiments. The range of temperature and moisture content (MC) for the tests were designed to cover the typical operating conditions for natural air / low temperature in-bin drying systems in the Midwest during the fall (0 to 25°C and 12 to 20% for temperature and MC, respectively). A statistical procedure was used to determine the best adsorption and desorption parameters for the Modified Chung-Pfost equation for each corn type. The main conclusions of this study were that the different corn types investigated had different EMC/ERH relationships; the adsorption and desorption relationships were different for each corn type; and the prediction of EMC/ERH using the current ASAE Standard set of parameters was significantly different to the white and waxy corn EMC/ERH data reported in this research.