

Title Correlation for the automatic identification of drying endpoint in near-ambient dryers:
Application to malting barley

Author A. Ryniecki, M. Gawrysiak-Witulska and J. Wawrzyniak

Citation Biosystems Engineering, Volume 98, Issue 4, December 2007, Pages 437-445

Keywords barley; malting barley; drying endpoint

Abstract

A method was developed for the automatic endpoint determination of near-ambient barley drying in static deep beds, based on a correlation to infer grain moisture content of the top layer, using a continuous on-line measurement of relative humidity and temperature of outlet air. The correlation was based on an equilibrium isotherm equation, modified by an empirical constant accounting for the non-equilibrium nature of drying. The modifying constant was fitted using results from nine laboratory experiments and validated in an on-farm drying experiment. Three desorption isotherm equations, specific for barley, were investigated: modified Henderson, Chung and Chung–Pfof equations. The correlation relationship developed from the Chung–Pfof isotherm equation and modified by the authors by the addition of a constant of $0.0213 \text{ kg kg}^{-1} \text{ d.b.}$ predicted moisture content in a 2-m-thick fixed-bed of malting barley cv. *Annabell* during the final phase of drying better than the other equations (in a climate that is the mixture of maritime and continental climates). The estimated accuracy of the proposed method is sufficient for practical applications with the post-harvest conservation of barley.