



XVIIth World Congress of the International Commission of Agricultural and Biosystems Engineering (CIGR)

Hosted by the Canadian Society for Bioengineering (CSBE/SCGAB)
Québec City, Canada June 13-17, 2010



INTELLIGENT CONTROL BASED ON EXPERT SYSTEM FOR GRAIN DRYING

HANG ZHU¹, WENFU WU¹, YUBIN LAN², FENG HAN¹

¹ Department of Biological and Agriculture Engineering of Jilin University, 5988# Renmin Street, Chang Chun City, Jilin Province, P.R.China 130022, zhuhang_jlu@live.com

² Agricultural Engineer, USDA-ARS-SPARC-APMRU, 2771 F&B Road, College Station, TX 77845

CSBE100826 – Presented at Section VI: Postharvest Technology, Food and Process Engineering Conference

ABSTRACT Drying is an integrative technique concerning diversified subjects such as heat and mass transfer, food properties, modelling, computer science, etc. In grain drying, the main objective is to achieve a desired moisture content with minimum consumption of energy in the shortest drying time. However, achieving this objective can be very difficult in grain drying process because of its multiple variables, long time delays and nonlinearity. In this paper, an intelligent control approach based on expert system (ES) is presented to achieve this objective. Expert systems provide powerful and flexible means for obtaining solutions to a large variety of engineering problems that cannot be solved by traditional methods. On the basis of this analysis, an on-line grain drying intelligent control and ES based on process parameter reasoning are designed for a cross-current drier. Finally, an on-line measurement and intelligent control software is developed by Lab VIEW. The practical control results show that the on-line measurement and intelligent control system of the dryer product has a satisfying control performance.

Keywords: Expert system; Lab VIEW; Intelligent control; Grain drying