

# **CONTROL OF CONTINUOUS MICROWAVE DRYING PROCESS OF PEANUTS USING REMOTE TEMPERATURE MEASUREMENT**

D. Boldor<sup>1\*</sup>, T.H. Sanders<sup>2</sup>, S.A. Hale<sup>3</sup>

<sup>1</sup>Department of Biological and Agricultural Engineering, Louisiana State University

<sup>2</sup> USDA - ARS, Market Quality and Handling Research Unit, North Carolina State University

<sup>3</sup>Department of Biological and Agricultural Engineering, North Carolina State University

Feedback control of the continuous microwave drying of farmer stock peanuts (*Arachis hypogaea* L.) of different varieties and initial moisture contents was investigated using the peanut's surface temperature as the controlled variable and microwave power level as the manipulated variable. The surface temperature at different location along the waveguide was measured using infrared thermocouples, and process parameters (process gain, time constants, and dead-time) were evaluated using process reaction curves. A PI (proportional, integral) controller was added in the software routine that controlled the microwave generator's power level. The servo scenario (set point change) was simulated in software to determine the tuning parameters (controller gain and integral time) of the PI controller. The results of the simulation were implemented in the real process, and the tuning parameters were readjusted for optimal performance. The potential for a more advanced control of the process based on complete surface temperature distribution measured with an infrared camera placed was evaluated.