

Evaluation of a Microwave Sensor for Inline Measurement of Roasted and Green whole Coffee Bean Moisture

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SUMMARY

An opportunity exists to reduce the standard deviation of roast and ground coffee moisture by using in-line sensors to measure and control the amount of quench water added to roasted whole beans (RWB) at the exit of a roaster. An in-line microwave moisture sensor was evaluated as a method to predict the moisture of green whole bean (GWB) and RW13 coffee. The sensor was successfully calibrated to predict the moisture of GWB Arabica coffee. Attempts to calibrate the sensor for RWB Arabica coffee were not successful. The calibration slope for RW13 measured 1 minute after roast was approximately zero in the range of 5 to 7% moisture. For unknown reasons, the shape of the RWB calibration curve changed when the same RW13 were measured 60 minutes and 24 hours after roast. The calibration curve was approximately linear for RW13 measured 60 minutes after roast and convex for RWB measured 24 hours after roast. This change in the calibration curve may be due to the instrument measuring changes in moisture binding, moisture equilibration, evolution of CO₂, or other chemistry changes within the RWB. Further work is required to determine the cause of this effect and its potential applicability to coffee processing.