Title Response of ECH_2O probe and TDR probe in the determination of dielectric characteristics of rough rice during drying process

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Abstract

The purpose of this study is to examine the dielectric characteristics of rough rice during the drying process by using ECH_2O probe and TDR probe for monitoring the moisture content of rough rice. Re-wetted rough rice was gradually air-dried, and the ECH_2O and TDR waveform during the drying process were monitored by using EC-5 and EC-TE ECH_2O probes and conventional two-wire and short-ended TDR probe, across a range of measurement frequencies 70 MHz for ECH_2O probe and around 1GHz for TDR probe. In the drying process, the moisture content (m) of rough rice decreased gradually with the passage of time and finally attained about 11-15% w.b. accompanied by about 5% volume shrinkage. The relative dielectric constant (ε) evaluated from these waveforms obtained by TDR generally increased with the moisture content. The high correlation between m and ε demonstrates that the m value can be estimated from ε obtained from these probes with sufficient accuracy. A high correlation between m and m_{cal} could be established. The term m_{cal} stands for moisture content obtained from the equation that expressed the relation between m and ε.