

Title Dielectric Properties of Flaxseeds as affected by Moisture Content and Bulk Density in the Radio Frequency Range

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Abstract

The dielectric properties of flaxseed were determined in the ranges of 5.92–22.18% dry basis (d.b.) for moisture content, 586.7–722.9 kg m⁻³ for bulk density and 50 kHz–10 MHz for frequency of applied electric field using a parallel-plate capacitor sample holder. Effects of the parameters such as moisture content, bulk density and frequency on the dielectric properties were studied. The relative permittivity, loss factor, loss tangent and the a.c. conductivity were greatly influenced by the moisture content, bulk density and frequency. The moisture content was the most significant factor affecting the dielectric properties of flaxseeds. The relative permittivity and loss factor increased with an increase in moisture content and bulk density and with a decrease in frequency. The dependence of the loss factor and loss tangent on frequency was less regular than that of the relative permittivity. The a.c. conductivity was observed to increase more rapidly with increasing moisture contents than with increasing frequencies. The relative permittivity and loss factor of flaxseeds were adequately estimated by empirical equations composed of moisture content, bulk density and frequency. Also, both models provided a practical and suitable way to predict the relative permittivity and loss factor within the experimental range of study.