Title 10–1800-MHz dielectric properties of fresh apples during storage

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Abstract

The dielectric properties of fresh apples of three cultivars were measured at 24 °C over 10 weeks in storage at 4 °C to determine whether these properties might be used to determine quality factors such as soluble solids content (SSC), firmness, moisture content and pH. The dielectric constants and dielectric loss factors at 51 frequencies from 10 to 1800 MHz were determined for external surface and interior tissue measurements along with moisture content, firmness, and SSC and pH of juice expelled from the internal tissues. Dielectric properties of the three apple cultivars are presented graphically for all frequencies, and correlations between the dielectric properties and measured quality factors are discussed. Although a high correlation was observed in a linear relationship between the dielectric constant divided by SSC and the dielectric loss factor divided by SSC in the complex plane, the SSC was not predicted well from that relationship, and no high correlations were found between the dielectric properties and SSC, moisture content, firmness, or pH. The dielectric constant and loss factor remained essentially constant during the 10-week storage period.