Prediction of moisture content uniformity of microwave-vacuum dried mangoes as affected by different shapes using NIR hyperspectral imaging

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Prediction of Moisture Content Uniformity of Microwave-Vacuum Dried Mangoes as Affected by Different Shapes Using NIR Hyperspectral Imaging

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Abstract

The prediction of moisture content uniformity on mango slices as affected by four different shapes (square, rectangle, regular triangle, and round shape) during microwave-vacuum drying (MVD) was investigated using near-infrared hyperspectral imaging in combination with multivariate chemometric analysis. Appling spectral pretreatment of a 2nd derivative followed by mean-center to raw spectra was found to be greatly beneficial for the reduction of noise and scattering levels. Seven wavelengths (951, 977, 1138, 1362, 1386, 1420, and 1440 nm) with larger absolute values of regression coefficients derived from a partial least square regression model were identified as feature variables for moisture prediction. An optimized model based on the selected wavelengths was developed using multivariate linear regression, achieving a high prediction accuracy with R_p^2 = 0.993 and *RMSEP* = 1.282%. From the moisture distribution map, a similar non-uniform drying pattern was found on square, rectangle and regular triangle-shaped samples, while round-shaped mango slices achieved better drying results. The current study suggested that NIR hyperspectral imaging was a promising technique in predicting the

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