ABSTRACT

The potential of hyperspectral imaging in the Vis/NIR range (500÷1010 nm) was evaluated for monitoring the quality of potato slices (Solanum tuberosum L. var. Anuschka) of 5-, 7- and 9-mm thicknesses subjected to hot-air drying process at 50°C. The study investigated 3 different feature selection methods for the prediction of dry basis moisture content, hue angle and luminance/yellowness ($L^*b^*$) ratio of potato slices using the partial least squares regression (PLS). The feature selection strategies tested include interval partial least squares regression (iPLS) configured in forward selection mode; differences between raw reflectance values for each possible
pair of wavelengths ($R[\lambda_1]-R[\lambda_2]$), and; ratios between raw reflectance values for each possible pair of wavelengths ($R[\lambda_1]:R[\lambda_2]$). Moreover, the combination of both best-performing features and spatial domain was tested.

Excellent results were obtained using the iPLS algorithm. However, features from both datasets of raw reflectance differences and ratios represent suitable alternatives for development of low-complex prediction models. Finally, the dry basis moisture content was high accurately predicted by combining spectral data (i.e. $R[511]-R[994]$) and spatial domain (i.e. relative area shrinkage of potato slice). The results indicate the feasibility of a smart drying system based on Vis/NIR hyperspectral imaging.

**Keywords:** Solanum tuberosum L., potato slice, convective air drying, smart drying, chemometrics

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