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6 **MONITORING OF ORGANIC POTATO (CV. Anuschka) DURING HOT-AIR DRYING**
7 **USING Vis/NIR HYPERSPECTRAL IMAGING**

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20 **ABSTRACT**

21 The potential of hyperspectral imaging in the Vis/NIR range (500÷1010 nm) was evaluated
22 for monitoring of the quality of potato slices (*Solanum tuberosum* L. var. Anuschka) of 5-, 7- and 9-
23 mm thicknesses subjected to hot-air drying process at 50°C. The study investigated 3 different feature
24 selection methods for the prediction of dry basis moisture content, hue angle and
25 luminance/yellowness (L^*b^{*-1}) ratio of potato slices using the partial least squares regression (PLS).
26 The feature selection strategies tested include interval partial least squares regression (iPLS)
27 configured in forward selection mode; differences between raw reflectance values for each possible

28 pair of wavelengths ($R[\lambda_1]-R[\lambda_2]$), and; ratios between raw reflectance values for each possible pair
29 of wavelengths ($R[\lambda_1]:R[\lambda_2]$). Moreover, the combination of both best-performing features and spatial
30 domain was tested.

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

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

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