Abstract

Moisture content (MC) is a crucial indicator used for assessing the degree of freeze-drying (FD) of Agaricus bisporus. This study illustrated a novel approach to quickly and visually detect MC in A. bisporus during FD using hyperspectral imaging (HSI) system along with several spectral preprocessing methods and models. The proposed approach employs a support vector machine (SVM) to establish a quantitative function between the physical indicator and the spectra obtained from the acquired hyperspectral images in the full mean spectral range. In the study stability competitive adaptive reweighted sampling (SCARS) was also used to choose key wavelengths most relevant to MC. Multiplicative scattering correction (MSC) was used to improve the precision and robustness of models. Moreover, SCARS-MSC-SVM was selected as the most appropriate model whereby, the values of R2 C, R2 CV, R2 P, and RPD were 0.9281, 0.9025, 0.8026, and 2.08, respectively. Furthermore, pseudo-color maps were developed to illustrate color changes, and gradual MC decrease from the edge of the mushroom to the core during the FD process, enabling monitoring of the processing progress. Results demonstrated the potential of HSI to rapidly, accurately, non-destructively, and visually display the MC of A. bisporus during the FD process.