Abstract

A study of multivariate analysis for orange varieties was carried out, and the potential of visible and near infrared reflectance spectroscopy (Vis/NIRS) for its ability to nondestructively differentiate orange varieties was evaluated. A total of 320 orange samples (80 for each variety) were investigated for Vis/NIRS on 325–1075 nm using a field spectroradiometer. Multivariate classification methods including principal component analysis (PCA), back propagation neural network (BPNN) and partial least squares discriminant analysis (PLSDA) were adopted to classify oranges. Sixteen principal components from PCA were used as the input of BPNN model, and the identification accuracy of four orange varieties reached 100%. The prediction result of PLSDA, i.e., standard error of prediction (SEP) 0.24497, correlation coefficient (R) 0.97843, root mean square error of prediction (RMSEP) 0.24268, and identification accuracy 90% indicate that PLSDA is an alternative model for orange identification. With the comparison of these two models, it shows that BPNN combined with PCA obtained better classification effect than that of PLSDA. The overall results demonstrate that Vis/NIRS technology with multivariate analysis models is promising for the rapid and reliable determination for identification of orange varieties.