

Title Application of linear/non-linear classification algorithms in discrimination of pork storage time using Fourier transform near infrared (FT-NIR) spectroscopy

Author Quansheng Chen, Jianrong Cai, Xinmin Wan and Jiewen Zhao

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Abstract

To address the rapid and nondestructive determination of pork storage time associated with its freshness, Fourier transform near infrared (FT-NIR) spectroscopy technique, with the help of classification algorithm, was attempted in this work. To investigate the effects of different linear and non-linear classification algorithms on the discrimination results, linear discriminant analysis (LDA), K-nearest neighbors (KNN), and back propagation artificial neural network (BP-ANN) were used to develop the discrimination models, respectively. The number of principal components (PCs) and other parameters were optimized by cross-validation in developing discrimination models. Experimental results showed that the performance of BP-ANN model was superior to others, and the optimal BP-ANN model was achieved when 5 PCs were included. The discrimination rates of the BP-ANN model were 99.26% and 96.21% in the training and prediction sets, respectively. The overall results sufficiently demonstrate that the FT-NIR spectroscopy technique combined with BP-ANN classification algorithm has the potential to determine pork storage time associated with its freshness.