Abstract

Healthy and midge-damaged wheat kernels obtained from five growing locations across western Canada were imaged using a near-infrared (NIR) hyperspectral imaging system (700–1100 nm) and an area-scan colour camera. Six statistical features (maximum, minimum, mean, median, standard deviation, and variance) and histogram features from the significant wavelength images of hyperspectral data were extracted and given as input to three statistical classifiers (linear, quadratic, and Mahalanobis). From the colour images, a total of 230 features (123 colour, 56 textural, and 51 morphological features) were extracted and the top ten features were selected and given as input to the statistical classifiers. The NIR hyperspectral image features combined with the top 10 colour image features gave the highest average accuracy of 95.3–99.3% in classifying healthy and midge-damaged wheat kernels.