Abstract

The potential of soft X-ray imaging to detect fungal infection in wheat was investigated. Healthy wheat kernels and kernels infected with the common storage fungi namely Aspergillus niger, A. glaucus group, and Penicillium spp. were scanned using a soft X-ray imaging system and algorithms were developed to extract the image features and for classification. A total of 34 image features (maximum, minimum, mean, median, variance, standard deviation, and 28 grey-level co-occurrence matrix (GLCM) features) were extracted and given as input to statistical discriminant classifiers (linear, quadratic, and Mahalanobis) and back-propagation neural network (BPNN) classifier. A two-class Mahalanobis discriminant classifier classified 92.2–98.9% fungal-infected wheat kernels. Linear discriminant classifier gave better results than other statistical (quadratic and Mahalanobis) and neural network classifiers in identifying healthy kernels with more than 82% classification accuracy. In most of the cases, the statistical classifiers gave better classification accuracies and lower false positive errors than the BPNN classifier