

Title Assessment of soft X-ray imaging for detection of fungal infection in wheat
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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.