Title Evaluation of Integrated Electronic Nose Systems for Discriminating Fusarium Infected Grain

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Abstract

An integrated electronic nose system containing two types of sensing arrays (conducting polymer and metal oxide sensing arrays) was evaluated for its performance in identifying the deoxynivalenol (DON) content in stored barley. The signals from both he electronic nose systems were pre-processed separately by various signal-processing techniques and the features were extracted (area under the curve). From the extracted features radial basis function-based neural network classification models were developed to classify the barley samples based on the DON content into 2 groups: "acceptable" (DON < 0.5 µg/g) and "unacceptable" (DON≥ 0.5 µg/g). The classification models were attempted using 34 features and 38 features for both the scaled signals and the unscaled signals. Overall, the total maximum classification accuracy obtained was 69.23%. The maximum within group classification accuracies obtained were 84.78% and 47.37% for the "acceptable" and "unacceptable" barley samples, respectively. The study proves that there is potential in using an electronic nose system for identifying mycotoxins in stored grains, and necessitated future studies in this direction.