

Title Detection of apple defects using an electronic nose and z nose
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Abstract

Apple defects and spoilage not only reduce commodity economic value, but cause food safety concerns as well. It is essential for fruit quality assurance and safety to rapidly detect fruit physical damage and spoilage. This article presents the application of an electronic nose (Cyranose 320) and zNose to the development of a nondestructive, rapid and cost effective system for the detection of defects of apples. The key compounds associated with apple aroma were identified and the “smellprints” of these key compounds were established by the electronic nose and zNose. Healthy and damaged apples were kept in 2L glass jars for 6 hours for preconcentration before measuring. Principal Component Analysis (PCA) models were developed based on the Enose and zNose data. Maholanobis distance was applied for discriminant analysis. Experiments showed that the Enose and zNose are both capable of detecting the volatile differences between healthy apples and damaged apples. After five days deterioration, the correct classification rate for the Enose was 83.3%, and for the zNose was 100%. After seven days, the correct classification rate was 100% for both instruments. For the next stage, a non-linear model and sensor fusion technique will be developed.