

**Title** Detection of onion postharvest diseases by analyses of headspace volatiles using a gas sensor array and GC-MS

**Author** Changying Li, Norman E. Schmidt and Ron Gitaitis

**Citation** LWT - Food Science and Technology, Volume 44, Issue 4, May 2011, Pages 1019-1025

**Keywords** Onions; Postharvest disease; Gas sensor array; GC-MS

### **Abstract**

Onion postharvest diseases cause significant losses in storage. Volatile sensing by the gas sensor array technology could be used as a promising alternative method to detect onion diseases. Onions were inoculated with *Botrytis allii* and *Burkholderia cepacia*, causal pathogen for Botrytisneck rot and sour skin, respectively. In the first phase of this study, 30 onions with equal number of *B. allii* inoculated and control healthy onions were measured by the gas sensor array from 8 to 11 days after inoculation (dai) and the principal component analysis (PCA) score plot demonstrated that the gas sensor array responded differently to Botrytisneck rot infected onions from those of healthy onions. In the second phase, 30 onions with 10 for each of the three treatments (Botrytisneck rot, sour skin, control) were measured by the gas sensor array on 5, 6, and 7 dai. The PCA score plot illustrated that three treatments formed three distinct clusters, while a hierarchical cluster analysis dendrogram indicated that the response of the gas sensor array to Botrytisneck rot and sour skin were similar. The correct classification rate of the linear discriminant model for three treatments was over 97.8%. Results from GC-MS showed that total 24 major volatiles were identified from the headspace of three treatments. Sixteen compounds were uniquely present in *B. allii* and *B. cepacia* inoculated onion bulbs. Total amount of volatile compounds detected in pathogen inoculated bulbs was one to two orders of magnitude higher than that of control healthy bulbs. This study demonstrated the feasibility of using a gas sensor array to detect two onion postharvest diseases in storage.