

Title Electronic olfactometric discrimination of lemon contamination from *Penicillium* spp. during storage

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Abstract

The most common and serious diseases which occur in Italy during storage and marketing of citrus fruit are green and blue moulds incited respectively by *Penicillium digitatum* and *P. italicum*. These diseases can cause significant economic losses during storage and transport. Volatiles compounds produced when fruit are spoiling represent a rapid and early indication of the upcoming deterioration. Thus can be considered a promising field of application for electronic nose technology as previously reported, where the instrument's sensibility was not tested. Objective of our research was to investigate the sensibility of a quartz piezoelectric electronic nose (Merlino LibraNose, Technobiochip Italy) to detect low amount of fruit affected by *P. digitatum* among sound fruit. Mature fruits (primofiore crop) from *Citrus limon* (L.) Burm "Femminello siracusano" were used in this experiment. Sound and sound plus infected fruits were allocated respectively in two different Plexiglas air isolated cabinets. (control vs cabinet containing infected fruit). The percentages of infected fruit utilized were 1 and 5%. The sound fruit used to fill the shelves of cabinets were previously treated with the fungicide Imazalil (1000 ppm a.i.) to avoid mould spreading and the consecutive increasing in the percentage of infection. Measures of volatiles compounds were carried out in the atmosphere of cabinet for four days after each percentage of infected fruit was transferred. Similar detections were carried out in the control cabinet. The average value of 6 sensor's signal of the infected samples, increased of the 4.9% with respect to the control for the lower infection rate, reaching a value of 22.3% for the higher one (5%). Moreover, multivariate classification (PLS-DA) was able to discriminate with good performance between values regarding sound and infected fruits.