

Abstract

Postharvest physical and metabolic stresses to fresh produce are common, although stress signs may not become visible until they reach the marketplace. This investigation arose from the need to identify metabolic changes resulting from different stresses after harvest. The aim of this work was to develop methodology to analyze metabolic changes that determine the life during postharvest of Citrus fruits. We developed a new analytical system to measure respiration and volatile production in fresh fruit simulating storage conditions but avoiding anaerobic conditions and allowing for the detection of metabolic changes before visible symptoms.

The system developed can detect changes in respiration and volatile production (acetaldehyde and ethanol) within short time periods in Citrus fruits under stress. Inoculation of Verna lemons with *P. digitatum* increased respiration rates before any infection symptoms became visible making changes in respiration rates--a potential useful parameter to indicate potential problems as result of infection by microorganisms. Waxing increases latency for *P. digitatum* and reduces its growth rate on the surface of the fruit, therefore extending shelflife. With the developed methodology, it is possible to design a growth model for *P. digitatum* based on the metabolic changes suffered by the fruit in which two phases are evident: an incubation phase and a logarithmic growth phase.

The continuous analytical system has allowed the detection of a direct relationship between the respiration rate and fruit senescence making it a useful tool for the detection of stress situations that can potentially limit shelflife.