

A-96

MECHANISMS OF FRUIT DEFENSE AND PATHOGEN COLONIZATION BY POSTHARVEST PATHOGENS OF AVOCADO FRUITS

D. Prusky

Department of Postharvest Science of Fresh Produce, Volcani Center, Bet Dagan, Israel. E-mail: dovprusk@agri.gov.il

Side rots and stem end rots are destructive postharvest diseases in avocado and other tropical fruits. The pathogens infect tropical fruits throughout the period of fruit growth, but remain quiescent for weeks or months while the fruit is immature. Upon harvest and fruit ripening, quiescent infections are activated, causing extensive damage to the fruit.

Quiescent infection appears to be a fungal response to adverse physiological conditions temporarily imposed by the host. The quiescence of *C. gloeosporioides* in unripe avocado fruit has been attributed to the presence of high concentrations of several preformed antifungal compounds, the most active the 1-acetoxy-2-hydroxy-4-oxo-heneicosa-12,15-diene and the 1-acetoxy-2-hydroxy-4-oxo-heneicosa-5,12,15-triene. The catabolism of the diene/triene compounds after harvest is attributed to the oxidation by lipoxygenase whose activity is in turn regulated by a flavonoid, epicatechin, a non-specific inhibitor present in the pericarp of unripe fruits but not ripe fruits. Two approaches may affect fruit resistance: the prevention of antifungal compound metabolism by the present of significant levels of epicatechin and/or their induced synthesis. Induction of epicatechin occurs by activating the phenylpropanoid pathway. Induced synthesis occurs parallel to the activation of a C⁹ stearoyl-acyl carrier protein (ACP) desaturase, and C¹² fatty acid desaturase and a fatty acid elongase.

Furthermore postharvest pathogens have shown to have a critical effect in the regulation of the mechanism of resistance by secreting enzymes that metabolize epicatechin. Furthermore avocado pathogen may alkalinize the infection point by secreting significant amount of ammonia that changed the local pH of the tissue and enhanced the secretion of pathogenicity factors inducing fruit susceptibility.

Several post harvest post- and pre harvest treatments may regulate the level of the antifungal compounds: as selection of cultivars with high epicatechin concentration, treatments with growth regulators, CO₂ treatment and specific grafting combinations.

The general understanding of the plant reaction to fungal attack and the fungal factors expressed during pathogenicity are of primary importance for the manipulation of resistance and can lead to create the basis for novel crop protection strategies in avocado fruits.