

Abstract

The roles of enzymatic browning and lignification as resistance mechanisms against *Penicillium expansum* were investigated in 'Golden Delicious' apples picked at different maturity stages. To determine enzymatic browning, the browning potential of the pulp was determined on different fruit, with or without ascorbate, and with or without 4-methylpyrocatechol, substrate of polyphenol oxidase (PPO), and guaiacol, to obtain maximal peroxidase (POX) activity. Moreover, the activity of PPO and POX enzymes was determined at each harvest date and lignin content was measured at harvest and after storage in order to correlate it with disease resistance. Initially, when pulp tissue was treated with ascorbate, decay incidence was negatively correlated with browning. In this mechanism, the enzymatic activities of PPO and POX did not limit the reaction. In contrast, the availability of their substrates was limiting. When fruit were pre-incubated with 4-methylpyrocatechol, an increase in susceptibility to the pathogen was observed in immature apples (harvest 1). On the other hand, pre-incubation with guaiacol led to increased resistance in the immature fruit. Lignin content was highly negatively correlated with decay incidence. These results provide evidence that enzymatic browning is not a determining factor of apple resistance. In contrast, POX activity appeared to be an important factor especially through its action on lignification, which appeared to be involved in the resistance of apple fruit to *P. expansum*.