

Title Role of hydrogen peroxide in the development of postharvest disease in oranges caused by *Penicillium digitatum*

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Abstract

Plant cell strategies against pathogens include mechanisms directed at weakening or killing the pathogen. These include the accumulation of reactive oxygen species (ROSs) such as H₂O₂ and the superoxide anion, in a process known as the oxidative burst. The ROSs generated during these reactions have direct antimicrobial activity that inhibits fungal spore germination, and could be involved in other processes such as induction of systemic responses. Our objective was to understand the role of H₂O₂ in the response of oranges infected with *Penicillium digitatum* or treated with the biocontrol agent *Pantoea agglomerans* CPA-2. The participation of antioxidant enzymes such as superoxide dismutase and catalase, and the peroxidases was also investigated. H₂O₂ levels and enzymatic activities were evaluated in Valencia oranges, after infection with the pathogen or treatment with the antagonist. We used fruit just at harvest and after postharvest storage. Similar levels of H₂O₂ were observed after 72 h in all fruits. However, a decrease was observed in fruits with visible symptoms of decay, and high levels of H₂O₂ were found in fruits without the pathogen. Changes in enzyme activities were also observed due to the presence of *P. digitatum* or *P. agglomerans*. The different behaviour observed in oranges in the presence of pathogen or antagonist might be explained in terms of a suppression or induction of hydrogen peroxide metabolism.