

Title Anti-oxidant activity of oranges after infection with the pathogen *Penicillium digitatum* or treatment with the biocontrol agent *Pantoea agglomerans* CPA-2

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Abstract

The suppression or generation of hydrogen peroxide (H₂O₂) in fruit as well as the changes in the superoxide dismutase (SOD) and catalase (CAT) activities due to *Penicillium digitatum* infection were evaluated on oranges. These biochemical parameters were also determined when oranges were treated with the biocontrol agent *Pantoea agglomerans* CPA-2. After harvest, oranges were divided in two batches of fruit: one was used immediately and another stored at 4 °C for 2 months. In both cases, H₂O₂ content and changes in enzyme activities were determined at specific time intervals in oranges inoculated with *P. digitatum* or treated with *P. agglomerans*. Similar levels of H₂O₂ were observed during the first 3 days after inoculation in all treatment (control, infected and treated fruit). A short time after, CPA-2 treated fruit showed an accumulation of H₂O₂ while infected fruit exhibited a sharp decrease in H₂O₂ levels. An increase of SOD and CAT activities was also observed in CPA-2 treated oranges; in contrast, infected fruit showed a significant reduction of both enzymatic activities. This biochemical approach suggests that *P. digitatum* suppresses H₂O₂ production as well as SOD and CAT activities in orange tissue as response to infection process. In contrast, the biocontrol agent *P. agglomerans* CPA-2 triggers H₂O₂ production and both enzymatic activities probably as a mechanism of action to prevent citrus fruit against future infections of green mold. Our data suggest that *P. agglomerans* CPA-2 may act as antagonist against green mold not only by competition for nutrients and space but also by inducing oxidative response in orange tissue.