

Title Biochemical and transcriptomic analysis of host responses to yeast biocontrol agents of postharvest pathogens

Author Samir Droby, Vera Hershkovitz, Ginat Raphael, Michael Wisniewski

Citation Abstracts of 7th International Postharvest Symposium 2012 (IPS2012). 25-29 June, 2012. Putra World Trade Centre (PWTC), Kuala Lumpur, Malaysia. 238 pages.

Keywords biocontrol; grapefruit

Abstract

Although the bio control activity of antagonistic yeasts has been demonstrated on a variety of commodities, the mode of action of these microbial bio control agents has not been fully elucidated. Antagonistic yeasts of postharvest pathogens have been reported to induce several biochemical defence responses in host tissues of surface-wounded fruit. The interaction of yeast cells with fruit tissue resulted in major responses of the fruit that included enhanced production ROS, phytoalexins, fungal cell wall degrading enzymes and the formation of structural barriers such as deposition of papillae and lignin in host cell walls. We have also shown that interaction of yeast cells with fruit tissue alter volatile profile by down-regulation or up-regulation of certain compounds.

To gain a better understanding of the molecular changes taking place in fruit tissue following the application of the yeast *Metschnikowia fructicola*, microarray analysis was performed on grapefruit surface wounds. The data indicated that 1007 putative unigenes showed significant expression changes following wounding and yeast application compared to wounded controls. Microarray results of select genes were validated by RT -qPCR. The data indicated that yeast application induced expression of *Rbo*, *MAPK* and *MAPKK*, G-proteins, *CHI*, *PAL*, *CHS*, *4CL*. In contrast, three genes *POD*, *SOD* and *CAT* were down regulated in grapefruit peel tissue treated with the yeast cells. Suppression was correlated with significantly higher levels of hydrogen peroxide, superoxide anion and hydroxyl radical production in yeast-treated surface wounds. This study provides the first global picture of gene expression changes in grapefruit in response to the yeast antagonists.