Title Mechanism of action of *Metschnikowia pulcherrima* strain mach1 against *Botrytis cinerea* on apple

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Abstract

We studied the mechanism of action of the biocontrol yeast *Metschnikowia pulcherrima* strain MACH1 against grey mould (*Botrtyis cinerea*) on apple. We tested the ability of MACH1 to compete with the postharvest pathogen for acquisition of nutrients, especially for iron compounds. The yeast produced a pigment called pulcherrimin in presence of iron and showed antagonistic activity against *B. cinerea in vitro* and *in vivo*. Quantitative assay of extracellular enzymes from MACH1 culture filtrates showed that it was able to produce chitinase and beta-1,3-glucanase, and the study indicated the probable influence of these lytic enzymes in the biological control of grey mould. In addition, the state of host tissues in response to MACH1 treatment and challenge inoculation with *B. cinerea* was studied. The results revealed the greater accumulation of defense enzymes, peroxidase, polyphenol oxidase and phenylalanine ammonia lyase in apples treated with MACH1 and challenged with *B. cinerea* compared to untreated controls. The prolonged activity of defense enzymes in apples treated with MACH1 was able to limit the further growth of the pathogenic fungus in host tissues. In conclusion, the study revealed that competition for nutrients, production of extracellular enzymes and enhancement of host resistance by MACH1 could act together in the biological control of postharvest pathogens in apples.