

Abstract

We detected the generation of the reactive oxygen species (ROS) superoxide anion (O⁻²) and hydrogen peroxide (H₂O₂) in apple wounds immediately after wounding, and assessed the relationships between (i) timely colonization of apple wounds by biocontrol yeasts, (ii) resistance of these microorganisms to oxidative stress caused by ROS, and (iii) their antagonism against postharvest wound pathogens. We analyzed a model system consisting of two yeasts with higher (*Cryptococcus laurentii* LS-28) or lower (*Rhodotorula glutinis* LS-11) antagonistic activity against the postharvest pathogens *Botrytis cinerea* and *Penicillium expansum*. LS-28 exhibited faster and greater colonization of wounds than LS-11. In contrast to LS-28, the number of LS-11 cells dropped 1 and 2 h after application, and then increased only later. In vitro, LS-28 was more resistant to ROS-generated oxidative stress. The combined application of biocontrol yeasts and ROS-deactivating enzymes in apple wounds prevented the decrease in number of LS-11 cells mentioned above, and enhanced colonization and antagonistic activity of both biocontrol yeasts against *B. cinerea* and *P. expansum*. Polar lipids of LS-11 contained the more unsaturated and oxidizable alpha-linolenic acid, which was absent in LS-28. Resistance to oxidative stress could be a key mechanism of biocontrol yeasts antagonism against postharvest wound pathogens.