An overview on biocontrol of postharvest diseases of citrus and stone fruits using potential yeast antagonists

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Abstract

Several yeast antagonists i.e., Candida kruisii, Trichosporon pullulans, Saccharomyces transvalensis, Candida tropicalis, Rhodotorella mucilaginosa; and Saccharomyces cerevisiae and Debaromyces carsoni were selected and their potential efficacy was proved against Penicillium digitatum or Penicillium expansum on citrus and stone fruit, respectively, as two strategic horticultural crops in Egypt. Their efficacy is identified as antagonistic effect through restricting mycelial growth of the causal pathogens and reducing rot percentages on fruit surface injuries while maintaining fruit characteristics. Enhancement of the biocontrol efficacy of potential yeast antagonists against green mould of citrus was achieved through combination with each of 2-deoxy-D-glucose at (0.1%), sodium bicarbonate (1%) on oranges or with calcium chloride (1%), sorbic acid (0.5%) on lemons. The mode of action by which these potential yeasts provide protection against P. digitatum or P. expansum on either citrus or stone fruit are potential production of β-1,3-D-glucanase in fruit tissue, and decrease of peroxidase, polyphenyloxidase in stone fruit tissues. An increase of total sugar and phenol contents in fruit was evident as a result of application of each of Debaromyces carsonii and Scharomyces cerevisiae in stone fruit tissues. Direct interaction between each of yeast antagonists and Penicillium digitatum through EMS study following co-inoculation into citrus surface wounds was characterized and showed attachment interaction between the antagonists and the pathogen.