

Title Integrated control of *Penicillium digitatum* by the predacious yeast *Saccharomycopsis crataegensis* and sodium bicarbonate on oranges

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Abstract

Our investigation of integrated biological control (IBC) started with an assay testing activity of the predacious yeast *Saccharomycopsis crataegensis* UFMG-DC19.2 against *Penicillium digitatum* LCP 4354, a very aggressive fungus that causes postharvest decay in oranges. Under unfavourable environmental conditions, the yeast showed a high potential for control (39.9% disease severity reduction) of this fungus. This result was decisive for the next step, in which *S. crataegensis* was tested in association with sodium bicarbonate salt, a generally regarded as safe (GRAS) substance. The yeast was able to survive at different concentrations of the salt (1%, 2% and 5%), and continued to grow for a week at the wound site, remaining viable at high population for 14 days on the fruit surface. The yeast alone reduced the severity of decay by 41.7% and sodium bicarbonate alone reduced severity of decay by 19.8%, whereas the application of both led to a delay in the development of symptoms from 2 to 10 days. Ingredients of the formulations were not aggressive to fruits since no lesions were produced in control experiments.