

Title Control of postharvest green mold of citrus fruit by application of endophytic *Paenibacillus polymyxa* strain SG-6

Author Kaiping Lai, Shaohua Chen, Meiyang Hu, Qiongbo Hu, Peng Geng, Qunfang Weng and Jianwen Jia

Citation Postharvest Biology and Technology. Volume 69, July 2012, Pages 40–48

Keywords Antagonist; *Paenibacillus polymyxa*; *Penicillium digitatum*; Citrus fruit; Biocontrol; Postharvest disease

Abstract

A bacterial strain SG-6, isolated as an endophyte from the root tissue of *Sophora tonkinensis*, was identified as *Paenibacillus polymyxa* based on morphology, 16S rDNA gene analysis and Biolog tests. The strain was found to be highly effective in reducing postharvest green mold decay of citrus fruit caused by *Penicillium digitatum*. In an *in vitro* assay by dual-culture of strain SG-6 and *P. digitatum* on potato dextrose agar plates, the bacterium significantly inhibited growth of *P. digitatum*. Conidial germination of the pathogen was greatly inhibited in the presence of the living bacterial cell suspensions. In tests of *in vivo* activity, the unwashed cell suspension of strain SG-6 was more effective than the washed cell suspension and culture filtrate. Green mold control improved when the period between treatment with strain SG-6 and inoculation with the pathogen was increased. The concentration of the antagonist also had a significant effect on biocontrol effectiveness. At the concentration of 1×10^9 cells mL⁻¹ of strain SG-6, the disease incidence and lesion diameter declined to 18.3% and 5.5 mm, respectively, which were significantly lower than control after 5 d of incubation at 25 °C. Population of strain SG-6 increased rapidly in citrus fruit wounds when inoculated at 25 °C but remained static at 6 °C. The bacterium also significantly reduced the natural development of green mold decay of citrus fruit following storage at 25 °C for 4 weeks or at 6 °C for 4 weeks followed by 25 °C for 2 weeks. Furthermore, it did not impair the quality parameters, including weight loss, firmness, total soluble solids, ascorbic acid, and titratable acidity. To our knowledge, this is the first report about antagonistic *P. polymyxa* strain SG-6 as a promising biocontrol agent against postharvest green mold of citrus fruit.