**Title** Integrated control of postharvest anthracnose disease and quality of papaya using *Bacillus subtilis* strain B34 enhanced with sodium bicarbonate and aloe vera gel

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**Abstract**

The potential of using *Bacillus subtilis* by itself or enhanced with sodium bicarbonate (SBC) and aloe vera gel for the control of postharvest anthracnose disease of papaya fruit, and subsequently, their effects on postharvest quality of fruit was investigated. This strain was isolated from papaya fruit surface and screened for *in vitro* antagonism toward *Colletotrichum gloeosporioides* and identified, based on Biolog Omnilog identification and phylogenetic analysis of 16S rDNA sequences. However *B. subtilis* B34 when supplemented with 2% SBC and 20% aloe vera gel gave a complete control of the disease in inoculated fruits stored at 12°C and 90-95% RH for 18 days, which was comparable to fungicide treatment. In naturally infected fruits, this combined treatment offered a greater control by reducing 99% of the disease which was superior to that obtained using fungicide, benocide. Furthermore, the combination of *B. subtilis* SBC-aloe vera gel provided a significantly effective control by reducing climacteric ethylene evolution, slower respiration rate, maintained fruit finnness, decreased weight loss and delayed the changes in external color without impairing any of the other fruit quality parameters during storage at 12°C for 28 days. Therefore, the combination of *B. subtilis* strain B34, SBC and aloe vera gel could be an alternative to synthetic fungicides for the control of postharvest anthracnose disease as well as quality of papaya.