Abstract

Banana (*Musa acuminata*) is a perishable fruit subjected to anthracnose, crown rot and blossom end rot at the postharvest stage. The present study focused on developing an integrated method to control postharvest diseases of banana by combining antagonistic bacteria occurring naturally in the fructosphere with hot water treatment. Twenty-five temperature and exposure time combinations were tested for their ability to control anthracnose and crown rot and their influence on postharvest quality parameters such as peel colour, hardness and Brix value of fruit. Optimum temperature and exposure time for postharvest hot water treatment of banana were determined to be 50 °C and 3 min, respectively. Temperatures higher than 50 °C reduced the colour of fruit peel and gave a pale appearance to fruit even after ripening. Exposure times longer than 5 min substantially reduced the Brix value. A member of the *Burkholderia cepacia* complex, isolated from the fructosphere of banana was effective as an antagonist of postharvest pathogens even after 5 years of storage in sterile distilled water at ambient temperature. The isolate of *B. cepacia* used was different from the already identified species of the *B. cepacia* complex. The most effective concentration of *B. cepacia* was determined to be 10^{10} CFU/ml for in vivo control of anthracnose and crown rot. The most effective control was achieved by repeated dipping of bananas in bacterial solution or by adding a wetter (Tween 20) to the bacterial solution. Combining hot water treatment with the bacterial antagonist also gave more effective control of anthracnose, crown rot and blossom end rot than using the two treatments individually. Higher efficacy of this integrated method was confirmed further by its greater control of artificially infected anthracnose. The present study provides valuable options for non-chemical control of postharvest diseases of banana using an antagonistic bacterium and hot water treatment either individually or together.