

Title Characterization of a bacterial biocontrol strain B106 and its efficacies on controlling banana leaf spot and post-harvest anthracnose diseases

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Abstract

An antagonistic bacterial strain B106 was isolated from the rhizospheric soil of a banana plant in Nanning city, Guangxi, China, and identified as *Bacillus subtilis* based on its 16S rDNA sequence homology with the related bacteria from GenBank as well as physiological and biochemical characters. The cultural conditions were optimized for enhancing the efficacy of the antagonist against banana leaf spot caused by *Pseudocercospora musae* (teleomorph: *Mycosphaerella musicola*) and post-harvest anthracnose by *Colletotrichum musae*. The optimized cultural condition for strain B106 to express higher antagonistic activity against *P. musae* was the combination of 31 °C, pH 6.0, EM medium and 5-day-incubation. However, the optimized cultural condition for the bacterium to produce higher biomass was the combination of 31–34 °C, pH 6.5, EM medium and 3-day-incubation. The results based on greenhouse tests showed that 72.3% efficacy of the antagonist on controlling the banana leaf spot disease was obtained 10 days after pathogen inoculation. The efficacies of strain B106 (1×10^8 CFU ml⁻¹) on controlling both the banana leaf spot diseases in the field and the anthracnose disease at post-harvest stage were 48.3% and 48.6%, respectively, under the optimized cultural condition for the strain to express higher antagonistic activity. The experimental data indicated that the antagonistic strain was a promising biocontrol agent against the banana diseases.