

Title: BIOLOGICAL CONTROL OF TOXIGENIC *Fusarium verticillioides* USING *Bacillus* spp. ISOLATED FROM MAIZE

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Abstract: The infection of maize grains with *Fusarium verticillioides* leads to quantitative and qualitative losses, the least mainly in due to the production of Fumonisin B1. Fumonisin B1 is a potentially carcinogenic mycotoxin and the prevention of fungal infection is the only way to avoid mycotoxin exposure to consumers. Biological control can be an alternative to the synthetic fungicides aiming fungal development prevention. The objectives of this study were to evaluate the *in vitro* effect of previously isolated *Bacillus* spp. from maize root system on mycelial growth rate, spore production and spore germination and survivability of toxigenic *Fusarium verticillioides*. Three *Bacillus* sp. isolates that previously presented antifungal ability were tested. To evaluate the effect of rhizobacteria on *F. verticillioides* micelial growth rate (MGR), the bacterial isolates were poured into petri dishes containing Maize Meal Extract Agar (MMEA) before solidification. Further, fungal agar plugs were inoculated centrally on the plates and the cultures were incubated. Fungal diameters were measured daily and the mycelial growth rate were determined by linear regression. After the incubation period, the cultures were also used to evaluate the effect of rhizobacteria on the sporulation of *F. verticillioides*. The cultures were washed and the number of spores on the suspension were counted. The number of spores per cm² of mycelium was determined. To analyze the effect of the *Bacillus* spp. on spore germination, *F. verticillioides* spores and a rhizobacterial suspension were simultaneously inoculated on tubes containing MMEA broth. After the incubation period, 200 spores were counted and the percentage of germination was compared with control treatments. After counting, these spore suspensions were inoculated on plates containing DRBC to colony forming units counts and observe spore survivability. The three rhizobacterial isolates used, named RF69, RP103 and RP242 were able to reduce *F. verticillioides* MGR by 53, 91 and 92%, respectively. The *Bacillus* spp. were also capable to significantly reduce fungal spore production on the conditions tested. Finally, all three isolates were capable to reduce spore germination in approximately 100% and significantly reduce spore viability and survival. All three *Bacillus* sp. Showed high capability on reducing *F. verticillioides* growth, spore production, germination and viability and demonstrated great potential to be used as biocontrol agents.

Key-words: Fumonisin B1, Mycotoxins, Biological control, *Fusarium verticillioides*; maize

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