

Maize seed coating with microsclerotia of *Metarhizium* spp. as biostimulant and protection against *Spodoptera frugiperda*

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The use of microsclerotia (MS) of the entomopathogenic fungi *Metarhizium* spp. may be an alternative for pest control due to its long persistence in soil and production of infective conidia in situ. In this study we produce MS of 48 isolates of *Metarhizium* spp. and selected three most productive isolates to be used in maize seed coating for two purposes: enhancement of plants growth and protection against *Spodoptera frugiperda* (Lepidoptera: Noctuidae). MS were cultured in liquid medium with carbon: nitrogen (C:N) ratio of 10:1. The role of *Metarhizium* as a biostimulant was measured on 30-day-old plants grown from seeds inoculated with microsclerotia of the three selected isolates. Survival of *S. frugiperda* 3rd instar larvae was evaluated on maize plants grown from MS-coated seeds. MS yields were 1.2×10³, 1.8×10³ and 3.6×10³ MS mL⁻¹ within 4 days of fermentation for *M. anisopliae* ESALQ1814, *M. robertsii* ESALQ2450 and *Metarhizium* sp. indeterminate ESALQ1638, respectively. The germination rates of MS for these isolates were always above 90% in 24h incubation period, while conidia concentration from sporogenic MS after 7 days incubation on water agar reached 1.33×10⁸ - 1.31×10⁹ conidia g⁻¹ of MS granules. The isolates of *Metarhizium* ESALQ1638 improved somehow maize plant growth; higher shoot height and root size, while increased plant biomass was shown with ESALQ1814 and ESALQ2450. Mortality of *S. frugiperda* was 55-64% and median survival time (ST50) was 5-6 days when larvae were fed on maize plant inoculated with any of the three *Metarhizium* species. Due to the lack of mycosis on larvae by *Metarhizium* spp., we postulate that the indirect detrimental effect on *S. frugiperda* survival was probably linked with plant biochemical defenses. Our results prompt the feasibility and effectiveness of using MS of *Metarhizium* spp. in maize seed coating with a dual benefit in plant growth promotion and protection against insect feeding.

Palavras-Chave: Fungal entomopathogen; Plant biostimulant; Liquid fermentation

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