



Trichoderma asperellum* secreted 6-pentyl- α -pyrone protects maize plants from the late wilt pathogen, *Magnaportheopsis maydis

DEGANI O. (1,2), KHATIB S. (1,2), GORDANI A. (1,2), BECHER P. (1,2), HARRIS R. (1)

(1) Migal – Galilee Research Institute, Kiryat-Shmona, ISRAEL

(2) Tel-Hai College, Tel-Hai, ISRAEL

Abstract

Late wilt disease, caused by the fungus *M. maydis*, threatens commercial maize production in high-risk areas. Thus, searching for control options against the pathogen is one of the top priorities in Israel, Egypt, and other countries. Disease-resistant maize genotypes can reduce yield loss. Yet, aggressive variants of the fungus can overcome host resistance. The current study aimed at inspecting *Trichoderma asperellum*, a maize endophyte, and its secreted metabolites, particularly the purified 6-pentyl- α -pyrone (6-PP), against the pathogen. First, adding *T. asperellum* directly to seeds with sowing provides significant protection to sprouts (up to 42 days) in a growth room, with more than two-fold growth promotion and reduced pathogen root infection (detected by real-time PCR). The same procedure applied in a commercial field reduced the cobs' symptoms by 11%, resulting in nine-fold lower pathogen DNA levels in the stem tissue. Second, the *T. asperellum* secreted 6-PP compound (30 $\mu\text{g}/\text{seed}$) was used in seed coating and tested against the *T. asperellum* secretory metabolites' crude (diluted to 50%). At the season's end, these treatments improved plant biomass by 90–120% and cob weight by 60%. Moreover, the treatments significantly ($p < 0.05$) reduced the symptoms (up to 20%) and pathogen infection (94–98%). The current study's results reveal the potential of 6-PP as a new fungicide against *M. maydis*. Such a treatment may protect maize plants from other soil diseases.