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Seed coating with natural biostimulants: A practical tool for the control of wheat diseasesMaissa Ben Jabeur¹, Zayneb Kthiri¹, Essaid Ait barka² and Walid Hamada¹¹National institute of Agronomy of Tunis, Tunisia²University of Reims-Champagne-Ardenne, France

Septoria leaf blotch and Fusarium head blight are two major diseases causing severe losses in durum wheat. Coating seeds with beneficial micro-organisms and plant extracts appears to be a promising approach to maintain the productivity of plants under stress condition. In this study, we evaluated the endophytic bacterium, *Burkholderia phytofirmans* strain *PsJN*, thyme essential oil, the antagonist *Trichoderma harzianum*, the yeast *Meyerozyma guilliermondii*, and their different associations for their ability to control the diseases mentioned both under controlled conditions and in field. Seeds of a sensitive Tunisian cultivar of durum wheat "Karim" were coated with *B. phytofirmans* (10^8 CFU/ml) and *T. harzianum* (10^6 spores/ml), thyme essential oil (5 ppm), *M. guilliermondii* (10^8 spores/ml). Under controlled conditions, Septoria leaf blotch was monitored in pots while Fusarium head blight was assessed in hydroponic system. Treatments

reduced pycnidial coverage of septoria to 10% compared to control (40%). Cytology and enzymatic analysis showed that these treatments enhance plant resistance with increased catalases activity, reduced peroxidases activity and H₂O₂ levels and reduced fungal colonization and development in leaf cells. In field, coated seedlings showed a reduced septoria leaf blotch attack to an average 10-20% compared to control (43%). As for Fusarium head blight, under controlled conditions, severity was reduced of about 30%, with reduced peroxidases activity in roots, enhanced phenolic compounds content in leaves and roots and reduced colonization and macroconidia abundance in root cells. Moreover, molecular analysis on leaves sampled after 21 days of growth showed clearly by QRT-PCR overexpression of genes involved in several defense response pathways.

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