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Biological Control of Fusarium Seedling Blight Disease of Wheat and Barley.

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Fusarium fungi, including *F. culmorum*, cause seedling blight, foot rot, and head blight diseases of cereals, resulting in yield loss. In a screen for potential disease control organisms and agents, *Pseudomonas fluorescens* strains MKB 100 and MKB 249, *P. frederiksbergensis* strain 202, *Pseudomonas* sp. strain MKB 158, and chitosan all significantly reduced the extent of both wheat coleoptile growth retardation and wheat and barley seedling blight caused by *F. culmorum* (by 53 to 91%). Trichodiene synthase is a *Fusarium* enzyme necessary for trichothecene mycotoxin biosynthesis; expression of the gene encoding this enzyme in wheat was 33% lower in stem base tissue coinoculated with *Pseudomonas* sp. strain MKB 158 and *F. culmorum* than in wheat treated with bacterial culture medium and *F. culmorum*. When wheat and barley were grown in soil amended with either chitosan, *P. fluorescens* strain MKB 249, *Pseudomonas* sp. strain MKB 158, or culture filtrates of these bacteria, the level of disease symptoms on *F. culmorum*-inoculated stem base tissue (at 12 days post- *F. culmorum* inoculation) was ≥31% less than the level on *F. culmorum*-inoculated plants grown in culture medium-amended soil. It seems likely that at least part of the biocontrol activity of these bacteria and chitosan may be due to the induction of systemic disease resistance in host plants. Also, in coinoculation

studies, *Pseudomonas* sp. strain MKB 158 induced the expression of a wheat class III plant peroxidase gene (a pathogenesis-related gene).

Chitin/Chitosan Evaluation & Comparisons

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