

**USE OF BIOCHEMICAL METHODS TO
STUDY THE TAXONOMIC RELATIONSHIPS
OF *Trichoderma* spp. ISOLATED FROM
COTTON ROOTS**

By

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Thesis

**Submitted in Partial Fulfillment of the
Requirements for the Degree of
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**Department of Botany
Faculty of Science
Ain Shams University**

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رسالة مقدمة من

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ABSTRACT

Trichoderma spp. were isolated from roots of cotton plants showing the typical symptoms of seedling damping-off or root rot of adult plants. Identification of 15 randomly selected isolates of *Trichoderma* to species level revealed that 8 isolates (53.3%) were belonging to *T. longibrachiatum*, while 7 isolates (46.7%) were belonging to *T. harzianum*. The beneficial and deleterious effects of *Trichoderma* isolates on growth of cotton seedlings were evaluated by planting cotton seeds in autoclaved soil infested with *Trichoderma* isolates. The deleterious isolates were pathogenic during the postemergence stage, while the beneficial isolates significantly promoted seedling height. Biocontrol capacity of *Trichoderma* spp. against soilborne fungi involved in cotton seedling damping-off was evaluated by planting cotton seeds in autoclaved soil infested with a mixture of the soilborne fungi commonly involved in the disease. Before planting, seeds were treated with a fine powder consisted of a mixture of sorghum and *Trichoderma* spp. The tested isolates of *Trichoderma* spp. could be classified into 3 distinct groups based on their biocontrol capacity. The first group included the isolates, which were effective biocontrol agents. Isolates of this group significantly increased the percentage of the surviving seedlings. Some isolates of this group also significantly increased dry weight of the surviving seedlings. The second group included the isolates, which significantly reduced seedling height. Some isolates of this group also reduced the percentage of the surviving seedlings. The third group included the isolates, which were neither biocontrol agents nor pathogens. Double diffusion, immunoelectrophoresis, polyacrylamid gel electrophoresis (PAGE) of proteins, sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) of proteins, and PAGE of isozymes (esterase and peroxidase) were employed as biochemical methods to study the taxonomic relationships of *Trichoderma* spp. Of these methods, PAGE, and SDS-PAGE of proteins and esterase isozymes were reliable for grouping isolates of *T. longibrachiatum* and *T. harzianum*.

Keywords: *Trichoderma*, cotton, pathogenicity, biocontrol capacity, serology, electrophoresis of proteins and isozymes.

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