Ain Shams University
Women's College for Arts,
Science and Education

Microbial Interaction in Relation to Plant Growth Performance in Heavy Metals Contaminated Soil

A Thesis
Submitted in Partial Fulfilment of the Requirements for the Degree of Master of Science

In

Microbiology

By

Safa Shaaban Hafez Mohamed
B. Sc. Microbiology and Chemistry
2004

To

Botany Department, Women's College for Arts, Science and Education, Ain Shams University
2010

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I would like to dedicate this work to

My father

My mother

and

My husband

For supporting me through this work.

This thesis

has not been submitted

for a degree at this or any other

University

Safa Shaaban Hafez

Women's College for Arts,
Science and Education
Botany department

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Safa S. Hafez

Abstract

Isolation, enumeration and identification of arbuscular mycorrhizal fungi and actinomycetes were carried out. The isolates were obtained from soil and *Zea mays* plant roots irrigated with water effluents from three locations contaminated with heavy metals.

A pot experiment was conducted using the most resistant actinomycetes (*Streptomyces catenulae*) and AM fungi to study the heavy metals tolerance in faba bean and peanut plants grown on sand culture amended with a common heavy metals in the collected samples (Zn, Mn and Fe) as individually, mixture as well as sewage sludge at different concentrations.

The yield parameters determined in the two used plants included nodulation status, photosynthetic pigments, biochemical constituents, antioxidant enzymes, NPK content, mycorrhizal colonization, spores number, tolerance index and biological yield.

The obtained results showed that application of AM fungi and *S. catenulae* can lead to significant increase for most of the previous yield parameters of the two plants treated with the heavy metals and sewage sludge but not exceed to concentrations 250 ppm and 2% respectively.

Keywords: Heavy metals, sewage sludge, Arbuscular mycorrhizae, *Streptomyces catenulae*, faba bean, peanut, bioremediation.

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