بسم الله الرحمن الرحيم

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ROLE OF ECTOMYCORRHIZAE IN IMPROVING THE GROWTH OF WOODEN TREES UNDER ENVIRONMENTAL STRESS CONDITIONS

By

AYA GABER ALI AHMED
B.Sc. Agric. Sci. (General Agricultural Production), Fac. of Agric., Sohag Univ., 2015

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Approval Sheet

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ABSTRACT

Aya Gaber Ali Ahmed "Role of Ectomycorrhizae in Improving the Growth of Wooden Trees Under Environmental Stress Conditions". Unpublished M.Sc. Thesis, University of Ain Shams, Faculty of Agriculture, Department of Microbiology, 2022.

Twenty-three sporocarps (ECM fungal-like) grown near their host trees were obtained from various locations in Egypt. All Isolates were purified according to their morphological characteristics. Only seven isolates were purified isolates (D4, K10, M11, P13, S16, T17, and Pt23) were evaluated for ectomycorrhizal formation with *Eucalyptus* sp., *Azadirachta* sp., and *Pinus* sp. The isolates were identified using 18S rRNA and only three of them (K10, M11, and Pt23) were found to be *Suillus collinitus*, *Protubera* sp., and *Pisolithus tinctorius*, respectively. A comparative evaluation was performed on the effects of some environmental parameters such as type of carbon and nitrogen sources, pH, salinity, and incubation temperature on the mycelial growth of the strains. The growth patterns of the strains showed the maximum growth weight after 24–33 days. Moreover, the effect of different carbon and nitrogen sources revealed the maximum growth weight with glucose, soluble starch, diammonium phosphate, and asparagine. In addition, different pH levels in the form of dry weight and the strains' growth effects on the medium pH at the end of the incubation period revealed the optimum levels ranging from pH 5 to 7 for the tested strains, which were also able to change the used medium pH. The tested strains showed tolerance to a range of 0.5%–4% NaCl, and the optimum temperature was proven to be 20°C–30°C. Finally, two greenhouse experiments were conducted to estimate the effect of ECM strains on the growth performance of *Eucalyptus globulus* and *Eucalyptus citriodora* under salinity stress conditions (6, 8, 10 dS/m) using two types of soils (sand & clay soil).

Keywords: Ectomycorrhizae, *Suillus collinitus*, *Protubera* sp., *Pisolithus tinctorius* and Environmental stresses.

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