IMPROVING MICROBIAL INOCULANTS QUALITY FOR COMMERCIAL USES

By

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B.Sc. Agric. Sci. (Biotechnology), Fac. Agric., Cairo Univ., 2003
M.Sc. Agric. Sci. (Microbiology), Fac. Agric., Cairo Univ., 2012

THESIS

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APPROVAL SHEET

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ABSTRACT

Two hundred rhizobial isolates were obtained from root nodules, eighty from peanut, sixty from soybean, and sixty from pea. The three legumes are widely cultivated in different ecological areas covering sixteen Egyptian Governorates (AL-Ismailia, AL-Sharqia, AL-Dakahlia and AL–Qalyubia) in East Delta (Alexandria, Al-Behera and Kafr El sheikh) in West Delta (AL-Gharbia and AL-Monufia) in Middle Delta (AL–Giza, AL-Fayoum, Bani suef and AL-Menia) in Middle Egypt and (Assuit, Sohag and Aswan) in Upper Egypt.

The diversity of rhizobial isolates was assessed using several characterization techniques including growth rate on different growth media, reaction to salinity concentrations, temperature, pH, different antibiotics (IAR), and nitrogen fixation efficiency. DNA-PCR fingerprinting of the isolates was done using REP, ERIC and BOXA1 primers as well as fluorescence antibody (FA). A large percentage of the indigenous rhizobial population was efficient in fixing nitrogen. The study identified several efficient strains for each crop which can be recommended as inoculant strains to increase biological nitrogen fixation of the target legumes growing in soils of different ecological zones in Egypt including soils affected by high salinity and those exposed to high temperatures.

The study shows the diversity of rhizobial isolates of each legume and it identifies the best approach for tracking the inoculant strains using serological technique (FA) and/or molecular approach. This will be very valuable for further studies targeting inoculation success and competition for nodulation.

Keywords: *Rhizobium*, legumes crops, Nodulation, Nitrogen fixation, FA Molasses and DNA-PCR.

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CONTENTS

Page

LIST OF TABLES