BIOCHEMICAL AND MOLECULAR STUDIES ON SOME NITROGEN FIXING BACTERIA

BY

SHAIMAA MOUSTAFA HAMED AHMED
B.Sc. Agric. Sc. (Biochemistry), Ain Shams University, 2002

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ABSTRACT

Shaimaa Moustafa Hamed Ahmed: Biochemical and Molecular Studies on some Nitrogen Fixing Bacteria. Unpublished M.Sc.Thesis, Department of Biochemistry, Faculty of Agriculture, Ain Shams University, 2009.

Nitrogen is most often the limiting nutrient for crop production, since only a fraction of atmospheric nitrogen is made available to the plants through biological nitrogen fixation (BNF). Extending the BNF ability to non-legumes would be a useful technology for increasing crop yields. In this thesis six free living N_2-fixation bacteria (*Azospirllum brasilense* SP^7, *Azospirillum brasilense* NO40, *Azospirillum amazonense*, S1, S2 and S3) were compared for their physiological, molecular characteristics and the effects on growth yield parameters of wheat plant. Nitrogenase activity for the selected strains revealed that *Azospirillum amazonense* showed the highest value (26.2 µmol h^{-1} ml^{-1}). The study of the protein profiles for these bacteria were analyzed by SDS-PAGE and the results showed different profile for each strain. Molecular detection of *glnB*, *nifH*, *nifD*, *UAS*, *IGR* and 16S rDNA genes was confirmed using PCR, DNA sequences for *glnB*, *nifH*, *IGR*, 16S rDNA and southern hybridization for *glnB* gene. The inoculation effects of the selected strains on two wheat varieties (Giza 164 and Giza 186) revealed that *Azospirillum amazonense* produced the highest effect followed by *Azospirillum brasilense* NO40. Based on SDS-PAGE for the inoculated wheat the results indicated a variation in storage protein banding pattern of the grains, however, its magnitude was low.

Key words: Nitrogen fixation, free living, *Azospirllum*, Wheat inoculation, Nitrogenase activity and *nif* genes.

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