

Effects of Microbial Biofertilization on Nodulation, Nitrogen Fixation, and Yield of Lablab purpureus

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Abstract : A collection of 20 isolates from fresh Nodules of the legume plant Lablab purpureus was isolated. These isolates have been authenticated by seedling inoculation grown in jars containing sand. The results obtained after two months of culture have revealed that the 20 isolates (100% of the isolates) are able to nodulate their host plants. The results obtained were analyzed statistically by ANOVA using the software statistica and had shown that the effect of the inoculation has significantly improved all the growth parameters (the height of the plant and the dry weight of the aerial parts and roots, and the number of nodules). We have evaluated the tolerance of all strains of the collection to the major stress factors as the salinity, pH and extreme temperature. The osmotolerance reached a concentration up to 1710mm of NaCl. The strains were also able to grow on a wide range of pH, ranging from 4.5 to 9.5, and temperature, between 4°C and 40°C. Also, we tested the effect of the acidity, aluminum and ferric deficit on the Lablab-rhizobia symbiosis. Lablab purpureus has not been affected by the presence of high concentrations of aluminum. On the other hand, iron deficiency has caused a net decrease in the dry biomass of the aerial part. The results of all the phenotypic characters have been treated by the statistical Minitab software, the numerical analysis had shown that these bacterial strains are divided into two distinct groups at a level of similarity of 86 %. The SDS-PAGE was carried out to determine the profile of the total protein of the strains. The coefficients of similarity of polypeptide bands between the isolates and strains reference (Bradyrhizobium, Mesorizobium sp.) confirm that our strain belongs to the groups of rhizobia.

Keywords : SDS-PAGE, rhizobia, symbiosis, phenotypic characterization, Lablab purpureus

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