I International Symposium on Microbiology and Biotechnology

ANNALS OF SIMB2012
DIAZOTROPHIC BACTERIA DIVERSITY IN ROOT SYSTEM OF *Eucalyptus globulus* PLANTATION IN TWO DIFFERENT REGION OF PORTUGAL

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*Eucalyptus globulus* is the forest species more cultivated in Portugal, being the main raw material to paper and cellulose production. The nutritional demand of eucalypt is high and their growth are related to the good availability of nutrients in the soil, among them, mainly the nitrogen. The diazotrophic bacteria can contribute to the nitrogen nutrition. The nifH gene is one of the bacterial genes responsible to transcribe the enzyme nitrogenase, making part of the complex responsible of nitrogen fixation. This gene is conserved and can be used to study the diversity of diazotrophic bacteria. The objective of this work was evaluating the presence and diversity of diazotrophic bacteria associated to the root system of *E. globulus*, in different plantations. These plantations belong to the group Portucel Soporcel, and are localized in Odemira and Penafiel, respectively, South and North of Portugal. In both plantations, we sampled roots in area that received or not nitrogen fertilization, and the samples were collected in the summer and winter seasons. The root samples were stored in ice during transportation and frozen at -20 °C, until to be used. The DNA extraction was followed by nested PCR-DGGE using nifH gene. The bands in the gel were sequencing and analyzed by comparison in databases (Genbank [NCBI]). The diazotrophic bacterial community was affected by the season in Odemira and by the nitrogen fertilization in Penafiel. The cluster analyses of band fingerprints in both regions showed two distinct clusters. In the Penafiel region the main group of diazotrophic bacteria was belong to Betaproteobacteria, followed by Alphaproteobacteria, while in Odemira was Alphaproteobacteria, followed by Betaproteobacteria. Although in low rate, Gamaproteobacteria was present in both areas and Deltaproteobacteria was found only in Penafiel. Markedly, our results in the two distinct regions reveal that the diversity of diazotrophic bacteria can be affected by season and nitrogen fertilization and also by the others environmental factors, including soil characteristics.

Acknowledgements: CAPES, CNPq, FAPEMIG, PORTUCEL-SOPORCEL