

An Insight into the Paddy Soil Denitrifying Bacteria and Their Relation with Soil Phospholipid Fatty Acid Profile

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Abstract : This study characterizes the metabolic versatility of denitrifying bacterial communities residing in the paddy soil using the GC-MS based Phospholipid Fatty Acid (PLFA) analyses simultaneously with nosZ gene based PCR-DGGE (Polymerase Chain Reaction-Denaturing Gradient Gel Electrophoresis) and real time Q-PCR analysis. We have analyzed the abundance of nitrous oxide reductase (nosZ) genes, which was subsequently related to soil PLFA profile and DGGE based denitrifier community structure. Soil denitrifying bacterial community comprised majority or dominance of Ochrobactrum sp. following Cupriavidus and uncultured bacteria strains in paddy soil of selected sites. Initially, we have analyzed the abundance of the nitrous oxide reductase gene (nosZ), which was found to be related with PLFA based lipid profile. Chandauli of Eastern UP, India represented greater amount of lipid content (C18-C20) and denitrifier's diversity. This study suggests the positive correlation between soil PLFA profiles, DGGE, and Q-PCR data. Thus, a close networking among metabolic abilities and taxonomic composition of soil microbial communities existed, and subsequently, such work at greater extent could be helpful in managing nutrient dynamics as well as microbial dynamics of paddy soil ecosystem.

Keywords : denaturing gradient gel electrophoresis, DGGE, nitrifying and denitrifying bacteria, PLFA, Q-PCR

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