Effect of Soil Bacterial Communities by Paclobutrazol

王彥文、劉淑瑛 ; 林重宏

E-mail: 9806546@mail.dyu.edu.tw

ABSTRACT

Paclobutrazol (PP333) is a plant growth retardant, due to its known function on the inhibition of Gibberellins acid (GA) biosynthesis. In agricultural practices paclobutrazol applied to arrest the vegetative growth so as to increase the reproductive growth of many orchard as well as grain crops. However, paclobutrazol is very stable in soil, overdose or dose accumulation would cause the accumulation of paclobutrazol residue in soil resulting in the extensive inhibition of plant growth and the inhibition even lasting to the following plant cultivation. This study focus on the comparison of field soil bacterial communities treated with paclobutrazol. Denaturing gradient gel electrophoresis (DGGE) was applied to the analysis the soils were collected from paclobutrazol contaminated mango and waxapple orchards (Southern Taiwan) and paclobutrazol applied peanut fields (Central Taiwan), followed by the DNA extraction, PCR amplification of 16S rRNA gene fragments and PCR products purification. Analysis on DGGE patterns of 16S rRNA gene fragments suggests that two separated groups can be identified, soil bacteria from paclobutrazol contaminated orchard of southern Taiwan and soil bacteria from paclobutrazol applied peanut field of central Taiwan. Further purification and sequence analysis of DGGE bands followed by phylogenetic tree assay showed similar results. Mung bean plants were treated with paclobutrazol for three consecutive seasons and each time the soil samples were collected and analyzed. With paclobutrazol treatment, bacteria Proteobacteria would account for the majority. After paclobutrazol treatment, the soil bacterial diversity reduced 33%.

Keywords : Paclobutrazol、Denaturing gradient gel electrophoresis (DGGE)、bacterial diversity、agricultural soil

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