The impact of biological control agents on soil microbial communities in oil palm plantation soils

Abstract

Soil microbial community plays an important role in the soil ecosystem and the diversity of microbial community may act in check and balance to various plant pathogens. However, soils microbes are very sensitive to changes in soil condition. The use of Biological Control Agents (BCAs) is regarded as a promising measure to control Basal Stem Rot (BSR) of oil palm disease. However, its potential effect on other soil microbes is not clear. This paper reports the impact application of two BCAs-based products in the soil microbial population and diversity on oil palm plantation soil. Isolation of microbes from the soil was carried out using plate counts techniques on various media such as Potato Dextrose Agar (PDA), Malt Extract Agar (MEA) and Nutrient Agar (NA). The presence of viable microbes on cultured media was observed and counted using Colony Forming Unit (CFU) method and later identified using Biolog and molecular techniques. The CFU for bacteria and yeast after application of these microbial treatments were remains unchanged, which varied between 103 to 106 cfu/g and 102 to 106 cfu/g of soil respectively. However, CFU for fungi has increased to 104 cfu/g of soil. Identification based on Biolog and molecular technique shows that new species arose and overcome the predominated species after application of these microbial products. The new identified species were Enterobacter spp., Microbacterium spp., Burkholderia spp., Yarrowia spp., Streptomyces spp., Trichoderma spp., etc. Application of BCAs to soil could possibly enhance the richness and evenness of microbial distribution in soil.