

N₂ fixation, plant growth enhancement and root-surface colonization by rhizobacteria in association with oil palm plantlets under in vitro conditions

ABSTRACT

Association of the N₂ fixing plant growth promoting rhizobacteria (PGPR) with various non-leguminous crops has reinforced the importance of biological nitrogen fixation (BNF) and plant growth stimulation effects. This concept was demonstrated through a laboratory experiment using tissue cultured oil palm plantlets. Under in vitro conditions, sterilized tissue cultured oil palm plantlets were grown in test tubes. Tests were conducted to observe the ability of selected rhizobacteria to fix N₂, promote plant growth, enhance essential nutrient uptake and colonize roots of the associated host plants. Results from the experiment show that *Azospirillum* spp. (Sp 7) could contribute up to 66% of the host plant N requirement (%Ndfa), while locally isolated *Bacillus* spp. (UPMB 13) recorded up to 55% Ndfa at D56. The inoculation (especially Sp 7 and UPMB 13) also caused a significant increase in total N and higher leaf chlorophyll content of the host plants. The rhizobacteria tested especially CCM 3863 had enhanced primary root numbers and length compared to the control (+Ni). All of the inocula tested successfully colonized the root-surface and benefit the host plants.

Keyword: *Elaeis guineensis*; Rhizobacteria; N₂ fixation; Growth enhancer; Root colonization; Oil palm plantlets