The effect of rhizobacterial inoculation on growth and nutrient accumulation of tissue-cultured banana plantlets under low N-fertilizer regime

ABSTRACT

Banana, an important fruit crop, requires high amounts of N-fertilizers for commercial cultivation. This, however, is costly and can be hazardous to the soil environment when used excessively. Biofertilizer is globally accepted as an alternative source of N-fertilizer and can substantially supplement the N requirement while enhancing the uptake of water and mineral nutrients of crop plants. An experiment was conducted to observe the effect of plant growth promoting rhizobacterial inoculation on growth, nutrient uptake of bananas grown under hydroponics condition. The design of the experiment was randomized complete block with five replicates. The following six treatments were imposed: T1 (control; N0-PGPR), T2: (N0+Sp7), T3: (N0+ UPMB10), T4: (N33%+ Sp7), T5: (N33% + UPMB10), and T6: (N100%-PGPR). The results showed that inoculation by UPMB10 with minimal fertilizer-N supply increased (P < 0.05) the primary root elongation and secondary root initiation and subsequently increased (P < 0.05) the root biomass. The same treatment also increased (P < 0.05) N concentration in pseudostem and leaves and Ca concentration in roots. The total accumulation of N, P, K, Ca and Mg were increased due to inoculation; a consequence of increased plant growth. Plants with this treatment produced an equivalent total dry matter as those supplied with 100% N.

Keyword: Banana; Rhizobacteria; Root stimulation; Growth; Nutrient uptake