

GROWTH ENHANCEMENT OF SWEETPOTATO THROUGH APPLICATION OF *AZOSPIRILLUM* AND IAA-PRODUCING RHIZOBACTERIA

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Introduction

Sweetpotato (*Ipomoea batatas* L) is grown in Malaysia on marginal soils such as peats and sandy soils. Several soil factors including allelopathy (Radziah and Rohaya, 1998) limit the high production of sweetpotato. Application of beneficial micro-organisms such as growth-promoting rhizobacteria (PGPR) has been shown to have positive influence on growth and yield of several field crops. *Azospirillum* sp. influence growth through N₂ fixation through its association with plant roots (Okon and Carlos, 1994). Several species of PGPR are capable of producing phytohormones, including indole-3 acetic acid (IAA) which influence physiological processes of plants at very low concentration (Kloepper, 1993). The objectives of the study were to determine the effect of *Azospirillum* spp. and IAA-producing rhizobacterial isolates on growth and yield of sweetpotato on sandy tailings.

Materials and Methods

Cuttings of sweetpotato (Gendut) were grown in sandy tailings in two separate pot studies. I) Soils were inoculated with different strains of *Azospirillum* spp. and II) soil inoculated with IAA-producing rhizobacteria isolated from sweetpotato roots (Lusi Maira and Radziah, 1998). Nitrogen fertiliser was applied full (70kg N/ha) for control and 1/3 N for soil treated with *Azospirillum*. Plants in study (I) were harvested at 90 days and (II) 45 days after planting. Dry matter production and soil chemical and microbiological properties were determined. Field experiments were also conducted to study the effect of *Azospirillum* Sp7 and 1/3 N application in continu-

ous cropping of sweetpotato. Chicken dung (30 tonnes/ha) was applied to improve the fertility of the sandy tailings.

Results and Discussion

Pot studies showed that *Azospirillum* Sp7 and three of the IAA-producing rhizobacterial isolates significantly improved plant growth. *Azospirillum* with addition of 1/3 N and the IAA-producing isolates increased total dry matter and uptake of nutrients in roots and leaves. IAA-producing rhizobacterial isolates were also able to produce tubers two weeks earlier. Field studies showed that *Azospirillum* Sp7 inoculation with addition of 1/3 N resulted in higher dry matter production and tuber yield compared to that without inoculant and fertiliser N. The increase in plant growth in all studies could most probably be due to the N₂ fixation of *Azospirillum* and IAA production of the rhizobacterial isolates. The bacteria could also be involved in the biological control, which suppress soil borne root diseases and hence, increase plant growth.

Conclusions

Inoculation of sandy tailings with *Azospirillum* and IAA-producing isolates increased sweetpotato growth and tuber yield. There is a potential of field application of these bacteria for increased production of sweetpotato and other field crops.

References

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