Inoculation of zinc-solubilizing bacteria with different zinc sources and rates for improved growth and zinc uptake in rice

ABSTRACT

An experiment was conducted in growth chamber using sand culture technique to determine the effect of zinc-solubilizing bacteria (ZSB) inoculation with different zinc sources and zinc rates on growth and zinc uptake of rice. The treatments were consisted of non-inoculated control, two bacterial isolates (Acinetobacter sp. and Serratia sp.), two zinc sources (zinc sulfate and zinc oxide) with three rates (0, 0.2 and 0.4 mg L-1). The experiment was arranged in a factorial complete randomized (CRD) with three replications. Results revealed significant difference ($p<0.05$) among treatments on plant height, plant biomass, and leaf area index (LAI). The treatments also affected zinc concentration and its uptake. Plants inoculated with Acinetobacter sp. showed higher plant growth, zinc concentration and zinc uptake compared to non-inoculation and Serratia sp. Zinc sulfate at 0.2 mg L-1 was also recorded for high plant growth and zinc concentration. It can be concluded that Acinetobacter sp. and zinc sulfate at 0.2 mg L-1 have good potential in alleviating zinc deficiency in rice and important in solubilizing the insoluble zinc in soil for improved growth of rice.

Keyword: Zinc-solubilizing bacteria; Rice; Growth; Zinc; Uptake