

Evaluation of four plant species for phytoremediation of copper contaminated soil

ABSTRACT

Copper (Cu) is known as the most dangerous pollutant, particularly at higher concentrations. Four forest species, namely, *Jatropha curcas*, *Acacia mangium*, *Dyera costulata* and *Hopea odorata* were used. Randomized complete block design (RCBD) with four replications was used in a factorial arrangement. The aim of this study was to assess the phytoremediation potential of the tested species for Cu-contaminated soil. Copper sulphate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$) was used as a source of Cu. The different levels of Cu were (Cu0 = control, Cu1 = 50, Cu2 = 100, Cu3 = 200, Cu4 = 300 and Cu5 = 400 mg kg⁻¹). The pots were filled with growth media, and the seedlings were transplanted. The parameters monitored and analyzed were soil physio-chemical properties, growth variables, plant dry biomass and heavy metal concentrations. Higher Cu levels significantly decreased ($p \leq 0.05$) the growth performance and the production of dry biomass. Total Cu concentration in tested species increased significantly ($p \leq 0.05$) with an increase in the Cu level. *J. curcas* attained the highest Cu removals within each level of Cu. The BCFs of Cu were > 1 within each level of Cu and in control media. Plant species grown in the media treated with various levels of Cu exhibited very small TFs (< 1). The highest total Cu concentration and the maximum Cu removal efficiency among plant species were observed in *J. curcas*. In addition, most parts of Cu accumulated in the roots of the four tested species. As a conclusion, *J. curcas* was the most effective species for phytoremediation of Cu-contaminated soils through phytostabilization.

Keywords: Phytoremediation; Copper; Translocation factor; Bioaccumulation factor