

ABSTRACT
GROWTH RESPONSES OF CORN (*Zea mays* L.)
TO ELECTROPLATING EFFLUENTS

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The growth responses of corn to treated electroplating effluents were studied using germination rates, morphological and eco-physiological parameters, and rates of heavy metal uptake. Corn seeds were soaked for 12 hours in 0, 5, 10, 30, 75 and 100% concentrations of effluents. Statistical analysis showed that pre-treatment of corn seeds with 10, 30, 75 and 100% concentrations did not significantly affect germination. At least, a germination rate of 80% was noted after 10 days. To assess the growth responses of corn to treated electroplating effluents, corn seeds were sown in pots and grown for 45 days. Plants were irrigated with treated electroplating effluents at concentrations of 0, 5, 10, 30, 75 and 100%. Statistical analysis revealed that high concentration levels (100% and 75%) significantly increased leaf formation, plant height and stem breadth. Root and shoot weights (fresh and dry) were also significantly enhanced at these levels. Root/shoot ratios, however, were not significantly affected by the effluent irrigation. Results of chromium (Cr), copper (Cu), nickel (Ni) and zinc (Zn) analyses by Atomic Absorption Spectrophotometry (AAS) indicated the preferential accumulation of these elements in the root tissues rather than the shoot tissues. Concentration of Cr, Ni and Zn in the root tissues increased with increasing levels of these elements in the effluents. There was no apparent accumulation of Cu in the root tissues. Shoot tissues showed a high accumulation level of Ni at 100% effluent concentration, but the presence of Zn, Cr and Cu was in limited amounts. The concentrations of these elements in corn shoots were below the reported critical levels in plants. In this study, the enhancement of vegetative growth could be attributed to the additional supply of nitrogen (N) and phosphorus (P) from the effluents. Equally important was the non-toxic levels of Cr, Cu, Ni and Zn in the effluents based from the results of the study, which suggested the potential use of treated electroplating effluents in irrigating corn plants. The concentrations levels of heavy metals in treated electroplating effluents were indeed non-toxic to corn plants.