



Evaluation of Phytotoxic Effect of Compost Mixtures Derived from Water Hyacinth (*Eichhornia crassipes* L.) Using Relative Seed Germination Percentage

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ABSTRACT

The presence of toxic metals or salts in the compost prepared by water hyacinth (WH) and their possible toxic effect on the plants must be tested before the soil amendment. In the present study, a seed germination test was carried out to evaluate the possible phytotoxic effect of four compost mixtures generated by mixing different ratios of water hyacinth collected from *Gamachchiwewa*, Weeraketiya. The compost mixtures were, WH only (T0), WH with cattle manure-Albesia sawdust mixture in 1:1 ratio (T1), 2:1 ratio (T2), and 3:1 ratio (T3). The control experiment was conducted using deionized water. Four aqueous compost extracts (ACE) were prepared as 25%, 50%, 75%, and 100% using each mature compost mixture by adding deionized water, and ACE was used for the germination test. The radish seeds were used to evaluate the effect of WH compost on the relative seed germination percentage (RSG%). The formula used to calculate RSG% was: (number of germinated seeds in the treatment/number of germinated seeds in the control) ×100%. Thirty seeds of radish in three replicates were germinated in each ACE for 72 h. According to the results, the germination of radish was not inhibited at any ACE. The value of RSG% of T0 was significantly higher than the control ($\alpha=0.05$). All ACE recorded pH values in the range of 6–9. There was a positive correlation between WH compost and pH ($\alpha=0.05$, $p=0.000$). The EC varied in a range of 1190.25-2233 μScm^{-1} while the water-extractable NH_4^+ concentration was significantly higher ($\alpha=0.05$) in the ACE of T2 (15.64 ± 6.34 mg/L) and T3 (12.24 ± 5.92 mg/L). The values of RSG% were significantly correlated with pH ($r=0.487$, $p=0.05$) and EC ($r=0.531$, $p=0.05$). The values of pH were significantly correlated with EC ($r=0.694$, $p=0.01$), RSG% ($r=0.487$, $p=0.05$) and NH_4^+ ($r=0.479$, $p=0.05$). Moreover, the EC was significantly correlated with NH_4^+ ($r=0.833$, $p=0.01$) and Fe^{3+} ($r=0.535$, $p=0.05$) while NH_4^+ was significantly and positively correlated with the Fe^{3+} ($r=0.845$, $p=0.01$). It was revealed that WH collected from the particular location can be integrated into compost without a toxic effect on the seed germination.

Keywords: Compost, physicochemical properties, relative seed germination, water hyacinth