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**This form will include the following details:**

1. **Report Title and Type:** Phytoremediation of Cadmium in Contaminated soil
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7. **Expert Comments on the Work and Facility for the Feedback from the Users:** -
8. **Abstract of the Work:**

Cadmium contamination of soil causes major environmental and human health problems. A need, therefore, exists for cost-effective remediation procedures. Phytoremediation, the use of plants to extract contaminants from soils, has revealed great potential. The overall objective of this research was to screen, investigate and quantify the capability of *Andrographis paniculata* (Bum.f) Nees and *Nicotiana tabacum* L. for Cd uptake and removal in pot culture experiment with and without compost added. Two micronutrients, zinc(Zn) and iron(Fe) were applied to a cadmium-contaminated soil (50 ppm Cd), and the uptake of cadmium into the two plant species was indicated that Zn and Fe led to a decrease of Cd uptake and the occurring of plant symptoms possibly caused by zinc and iron toxicity in all two species. In the other pot culture experiment study conducted with 10 to 200 mg Cd. kg<sup>-1</sup> of soil indicated that *N. tabacum* was more effective in removing Cd from soil than *A. paniculata* as indicated by the value of bioconcentration factor (BCF). The highest accumulated concentration of Cd by *N. tabacum* was at round up 474, 387 and 326 µg.g<sup>-1</sup> DW in roots, stems, and leaves, respectively at the highest Cd added.

The results showed that about 83-90% and 27-43%, of the total amount of Cd uptake were localized in plant roots of *A. paniculata* and *N. tabacum*, respectively and 10-17% and 59-68% were translocated to the aboveground plant parts of *A. paniculata* and *N. tabacum* after the 8 growing weeks under different Cd concentration applied. Correlation (r) between soil Cd concentration and plant Cd accumulation was significantly in *A. paniculata* (at 1<sup>st</sup>, 4<sup>th</sup>, and 8<sup>th</sup> week) and *N. tabacum* (1<sup>st</sup>, 2<sup>nd</sup>, and 4<sup>th</sup> week) ( $p < 0.05$ ). A significant accumulation of zinc was correlated with soil Cd concentrations after 2<sup>nd</sup> and 4<sup>th</sup> week for *A. paniculata* and 1<sup>st</sup> and 8<sup>th</sup> week for *N. tabacum* ( $p < 0.05$ ). *N. tabacum* grown on the two different soils, The

Cd contents were localized in the descending order: leaf>stem>root and stem>leaf>root of the growing on two different type soils without compost and that with compost added, respectively.

In our study, it was demonstrated that addition of compost led to a decrease of BCF value in Cd-contaminated soil and an increase in uncontaminated soil (reference soil). This could be explained that compost would form complexes with Cd in soil, thus reducing Cd bioavailability. As a result Cd uptake by the plants was reduced. A possible estimation for clean up, dry leaf biomass of *N. tabacum* at about 0.25-0.33 t.ha<sup>-1</sup> which had grown on different spiked Cd concentration soils (10, 20, 50, and 100 mg Cd. kg<sup>-1</sup>) could remove Cd 31-41, 22-29, 56-74 and 103 -136 g Cd. ha<sup>-1</sup> in two months.

**9. Keywords (*minimum 5; maximum 10*):**

phytoremediation, bioconcentration factor, compost, Cd uptake, micronutrient, plant symptoms

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