ABS-00319

Phytoremediation potential of various woody plants used in urban ornamental horticulture

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Keywords: Dendroremediation, bioaugmentation, multiple pollutants, biomass accumulation

In the development of national botanical gardens, multifaceted functions of resource plants have become a crucial aspect of urban sustainable development. In urban areas of China, various woody plants are commonly used for ornamental purposes. Many of these plants have shown a strong ability to withstand multiple stresses in urban environments. An investigation of whether these plants can thrive in polluted areas and exhibit potential for phytoremediation would be pertinent. Eighty-five ornamental woody plant species were selected to test their tolerance to inorganic contaminants and their capacity to absorb and concentrate trace elements in their roots and aerial parts. The results show that the concentration of trace elements, Cu (22.9–371.0 $mg \cdot kg^{-1}$), Pb (0.2–27.0 $mg \cdot kg^{-1}$), and Zn (25.0–539.0 $mg \cdot kg^{-1}$), based on biomass accumulation and dry matter content in the roots of woody plants were significantly higher than in the aboveground parts. Fast-growing trees, such as *Fraxinus chinensis* (Oleaceae), *Paulownia fortunei* (Paulowniaceae) and *Salix alba* (Salicaceae), are species for phytoremediation of urban polluted sites. The phytoextraction of trace elements and their concentration in aboveground parts was enhanced through amendments with organic materials and EDTA, which improved the physical soil characteristics and the metal's bioavailability. The biomass production of willow and ash was enhanced by adding these two amendments, regardless of whether the plants were grown individually or together. The addition of EDTA-enhanced phytoextraction in willow (between 2.0–2.8 times for Cu) and in ash (between 1.2–2.3 times for Zn) is based on the cultivars used. The addition of EDTA increased phytoextraction rates of Cu in willow by 2.0 to 2.8 times and Zn in ash by 1.2 to 2.3 times, with variations dependent on the cultivar. Therefore, appropriate woody plants with specious bioaugmentation measures play a crucial role in the phytoremediation of contaminated soil and in ornamental horticulture.