

# E-Waste: Integrating Phytoremediation in the Management of E-Waste †

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**Abstract:** In a growing technology era, the increasing use of electric and electronic appliances leads to a higher load of electronic waste. E-waste is discarded as a complete electronic product or in component form. Technological advancements in the availability of electronics have made it much easier, which has originated the issue of e-waste. Toxic heavy metals (HMs) emerge from e-waste, which can be hazardous to people's health and the environment. Those heavy metals accumulate in plants and affect the normal functioning of the natural ecosystem. Most developed countries mainly export their e-waste to developing countries; in these developing countries, the e-waste ends up in landfills and dumping sites. Chemical and physical methods are also used, but they are a bit expensive and simultaneously hazardous; there is a need for safe alternative methods for the treatment of e-waste, such as phytoremediation, which is a natural method for removal of (HMs) from the soil. This process is done in a few stages, such as Phyto stabilization, rhizofiltration, phytoextraction, and phytovolatilization. It is a new technology that is mostly used and regarded as economical, efficient, unique, and environmentally friendly. Therefore, this review discusses different strategies and natural approaches for the removal of various heavy metal contaminants from the environment, with the implication of phytoremediation. Moreover, the effects of heavy metals and steps of phytoremediation that are used in the removal of HMs, have also been discussed.

**Keywords:** phytoremediation; e-waste; bioremediation; heavy metals; phytoextraction.

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## Conflicts of Interest

The authors declare no conflict of interest.