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Remediation and reclamation of contaminated tailings from the collapsed Fundão dam by using woody native species of the Brazilian Atlantic Forest

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Abstract

The failure of the Fundão dam in Brazil spilled contaminated sediments to the Doce river basin with high levels of pH, ether-amine and sodium (Santos et al, 2019). In the present study, it was established a riparian forest over contaminated sediment using two main remediation strategies: phytoremediation with species native to the Brazilian Atlantic Forest, previously selected for tolerance to the sediment toxicity, and physicochemical remediation by management of the sediment with incorporation of organic matter (OM). In the experimental site (ES), tolerant native species were cultivated under two treatments: T1- scrapping of the sediments with incorporation of OM and T2- nonmanaged sediment + superficial deposition of OM. The results were compared with a degraded site (DS) reached by the contaminated sediments and a preserved site (PS) composed of a fragment of preserved Atlantic Forest. After 12 months of transplanting, plants from T1 showed a better height growth performance (~ 4m) and survival index in relation to T2, as well as a significant decline of pH, ether- amine and sodium contents, which were attributed not only to the phytoremediation but especially to the chemical remediation . There was an improvement of soil fertility, highlighting cation exchange capacity, total soil microbial biomass and soil aggregation in both treatments, especially in T1. Therefore, the phyto and physico-chemical remediation procedures adopted are recommended to reclaim Na and ether-amine toxicity, allowing the restoration of reached zone by contaminated tailings.

Biography

Maria Rita Scotti is an Assistant professor in Federal University of Minas Gerais Belo Horizonte, Brazil

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