



Marble waste and pig manure amendments decrease metal availability, increase soil quality and facilitate vegetation development in bare mine soils

Raúl Zornoza, Ángel Faz, Silvia Martínez-Martínez, José A. Acosta, M. Dolores Gómez, and M. Ángeles Muñoz
Universidad Politécnica de Cartagena, Spain (raul.zornoza@upct.es)

In order to bring out a functional and sustainable land use in a highly contaminated mine tailing, firstly environmental risks have to be reduced or eliminated by suitable reclamation activities. Tailing ponds pose environmental hazards, such as acidity and toxic metals reaching to waters through wind and water erosions and leaching. As a consequence, soils have no vegetation and low soil organic matter and nutrients. Various physicochemical and biochemical properties, together with exchangeable metals were measured before, 6 months and 12 months after the application of marble waste and pigs manure as reclamation strategy in a tailing pond from SE Spain to reduce hazards for environment and human health. Three months after the last addition of amendments, eight different native shrub species were planted for phytostabilization. Results showed the pH increased up to neutrality. Aggregates stability, organic carbon, total nitrogen, cation exchange capacity, bioavailable phosphorus and potassium, microbial biomass and microbial activity increased with the application of the amendments, while exchangeable metals drastically decreased (~90%). After one year of plantation, only 20% planted species died, with a high growth of survivals reaching flowering and fructification. This study confirms the high effectiveness of initial applications of marble wastes together with pig manure and plantation of shrub species to initialize the recovery of the ecosystem in bare mine soils under Mediterranean semiarid conditions.

Key Words: pig manure, marble waste, heavy metals, mine soil.

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