Geophysical Research Abstracts
Vol. 14, EGU2012-1110-1, 2012
EGU General Assembly 2012

Evaluation of the physical properties, bulk density and aggregate stability of potential substrates in quarry restoration.

M. Jordan, F. Garcia-Orenes, J. Mataix-Solera, and E. Garcia-Sanchez

University Miguel Hernández, Agrochemistry and Environment, Elche-Alicante, Spain (fuensanta.garcia@umh.es, +34966658532)

Quarrying activity entails significant environmental impact affecting the soil, water, plants, landscape, etc. One of the most important impacts is the loss of the productive layer of the soil and its vegetation cover. However, mining activities are absolutely necessary for human development; keeping them sustainable implicates looking for viable solutions for the restoration of these areas to prevent degradation during and after the exploitation period. The aim of this study was to evaluate different substrates obtained from different mixes of sewage sludge and different mine spoils, to check how they are effective in quarry restoration, and to establish good practises in mining restoration. Also, the study tried to approach two refuses, one deriving from mining activity, as are the mine spoils that need to be reused for their valorisation, and the other, sewage sludge, obtained in the water depuration process to acquire a cheap substrate for soil rehabilitation. This preliminary work, which is included in a larger study, shows the results obtained from two physical properties studied, bulk density and aggregate stability, as key properties in the substrate structure for use in mining area restoration. Two doses of composted sewage sludge (30 and 90 Tm/Ha), both very rich in calcium carbonate, were applied to two different mine spoils under lab conditions. The first material, of poor quality, originated from the acquisition of arid particles in crushed limestone (Z). It is characterized by stable "coarse elements" predominance (up to 75% of its weight), and by the presence of elevated percentages of sand. The other waste material tested comes from limestone extraction (basically formed by the levels of interspersed non-limestone materials and the remains of stripped soils (D)). The results show that the high dose of sewage sludge applied to a mix of the two mine spoils significantly increased the percentage of stable aggregates by more than 50% than the control (the same mix without sewage sludge) and also produced an important decrease in the bulk density with respect to the control. This substrate could be a good material for use in quarry restoration.