



Environmental effects of rehabilitated coalmine soils using organic wastes

J. Cruz, R.M. Poch, J. Porta

Department of Environment and Soil Sciences, University of Lleida, Av Rovira Roure 191, 25198 Lleida (Rosa.poch@macs.udl.cat)

The objective of this work is to evaluate the off-site effects of rehabilitated soils from coal mines under a semi-arid environment of the Ebro valley in Catalonia. The rehabilitation program started in 1997. Treatments used mine spoils with other materials easily available in the region such as pig slurry, straw and sewage sludge, as single applications at the end of the exploitation, and with different doses and application technologies on slopes with different aspect and slope degree. The rehabilitation has resulted in the revegetation of the plots and in a significant increase of SOM, which improves the quality of the soils as factor of biomass production and of potential pool of carbon storage. The amounts of C stored in these rehabilitated soils vary between 30 and 50 Mg/ha. In order to evaluate the soil erosion potential, as indicator of the quality of the rehabilitated soils, 14 plots were selected to perform a balance of sediments and organic matter exported through runoff water after rains, using Gerlach traps located at the bottom of the plots. Water was separated from sediment by vacuum filtration. The organic matter was analyzed in the sediments by the method of Walkley - Black and calcinations at 560°C, Total Carbon and Organic Carbon (after removal of carbonates by HCl fumigation) contents were determined by dry combustion using a LECO Truspec TM CN analyzer, both in the solid samples (sediments), as in the liquid (water and rain). These results allowed to measure the organic carbon and coal exported by erosion. The results of 6 months monitoring show that the OM exported ranges between 1.0 and 2899 kg OM/ha in sediments and 0,3 kg and 50,4 OM/ha in water. It was also determined that the plots exporting more OM are those which do not contain sewage sludge. Among the analytical methods used to determine

the OM, the method Walkley-Black tends to underestimate the values measured.

This programme of rehabilitation and continuing studies that have been conducted and that will be developed at a future are very important because we want to lay the foundation for subsequent work at sites of the same characteristics.