



## **Application of calcium carbonate slows down organic amendments mineralization in reclaimed soils**

Raúl Zornoza, Ángel Faz, José A. Acosta, Silvia Martínez-Martínez, and M. Ángeles Muñoz

Sustainable Use, Management, and Reclamation of Soil and Water Research Group. Department of Agrarian Science and Technology. Technical University of Cartagena. Paseo Alfonso XIII, 48, 30203 Cartagena, Murcia, Spain

A field experiment was set up in Cartagena-La Unión Mining District, SE Spain, aimed at evaluating the short-term effects of pig slurry (PS) amendment alone and together with marble waste (MW) on organic matter mineralization, microbial activity and stabilization of heavy metals in two tailing ponds. These structures pose environmental risk owing to high metals contents, low organic matter and nutrients, and null vegetation. Carbon mineralization, exchangeable metals and microbiological properties were monitored during 67 days. The application of amendments led to a rapid decrease of exchangeable metals concentrations, except for Cu, with decreases up to 98%, 75% and 97% for Cd, Pb and Zn, respectively. The combined addition of MW+PS was the treatment with greater reduction in metals concentrations. The addition of PS caused a significant increase in respiration rates, although in MW+PS plots respiration was lower than in PS plots. The mineralised C from the pig slurry was low, approximately 25-30% and 4-12% for PS and MW+PS treatments, respectively. Soluble carbon (C<sub>sol</sub>), microbial biomass carbon (MBC) and  $\beta$ -galactosidase and  $\beta$ -glucosidase activities increased after the application of the organic amendment. However, after 3 days these parameters started a decreasing trend reaching similar values than control from approximately day 25 for C<sub>sol</sub> and MBC. The PS treatment promoted highest values in enzyme activities, which remained high upon time. Arylesterase activity increased in the MW+PS treatment. Thus, the remediation techniques used improved soil microbiological status and reduced metal availability. The combined application of PS+MW reduced the degradability of the organic compounds.

Keywords: organic wastes, mine soils stabilization, carbon mineralization, microbial activity.