Geophysical Research Abstracts
Vol. 13, EGU2011-13637-3, 2011
EGU General Assembly 2011
© Author(s) 2011

Short-term effects of the application of mineral fertilizer and municipal organic wastes on non-humified and humified soil organic matter content

Víctor G. Franco-Otero, Pedro Soler-Rovira, Diana Hernández, Esther G. López-de-Sá, Alfredo Polo, and César Plaza

Instituto de Ciencias Agrarias, Centro de Ciencias Medioambientales, Consejo Superior de Investigaciones Científicas, Spain (c.plaza@ccma.csic.es)

The objective of this work was to investigate the effects of a one-time application of municipal solid waste (MSW) compost, sewage sludge (SS) compost, and thermally-dried SS, compared to those of mineral fertilization and no amendment, on the amount of soil organic C and some humified and non-humified soil organic fractions, namely humic acid C (HAC), fulvic acid C (FAC), and water-soluble organic C (WEC), carbohydrates (WCH), and proteins (WPR). For this purpose, a field experiment was set up as a randomized complete block design with four replicates at the experimental farm "La Poveda" in Arganda del Rey (Madrid, Spain). The site is characterized by a Mediterranean climate and the soil is a clay loam Xerofluvent poor in organic matter. The organic amendments were hand broadcast prior to winter wheat planting at a rate of 30 t ha-1. Soil samples were collected soon after wheat harvest, approximatelly eight months after the amendments were applied.

The TOC content and the amount of the humified and non-humified organic fractions examined in the mineral-fertilized soil did not differ significantly from those in the unamended soil. In contrast, the soil treated with MSW compost featured similar WEC content but more TOC, HAC, FAC, WEC, and WPR. With respect to the control, the soils amended with composted and thermally-dried SS had higher WEC and WPR content. The soil amended with SS compost also exhibited more HAC.

Thermally-dried SS, despite being much richer in organic matter than SS compost and containing as much as organic C as MSW compost, caused the smallest changes in non-humified and humified soil organic matter content. These results are consistent with those of previous studies and indicate the occurrence of more intense mineralization processes in the soil amended with thermally-dried SS than in the compost-amended soils.