



Effects of municipal waste compost and sewage sludge on proton binding behavior of humic acids from Portuguese sandy and clay loam soils

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Abstract

The effects of amendment with municipal solid waste compost (MSWC) and sewage sludge (SS) on acid–base properties of soil humic acids (HAs) were investigated. For this purpose, HAs were isolated from MSWC and SS and two different Portuguese soils, one sandy and the other clay loam, either unamended or amended with MSWC or SS at a rate of 60 t ha⁻¹, and analysed by potentiometric titrations at various ionic strengths (0.01, 0.05, 0.1 and 0.3 M) over the pH range from 3.5 to 10.5. All titration data were fitted with the NICA–Donnan model and the variations of model parameters between the various HA samples were discussed. The HAs from MSWC and SS had lower acidic functional group contents and higher proton binding affinities than the control soil HAs. Amending soils with MSWC and SS determined a decrease of acidic functional group contents and an increase on proton binding affinities of soil HAs. These effects were more evident in SS-amended soil HAs than in MSWC-amended soil HAs, and in clay loam soil HA than in sandy soil HA. © 2007 Elsevier Ltd. All rights reserved.

Keywords: Sewage sludge; Municipal solid waste compost; Humic acids; Proton binding; NICA–Donnan model

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