*12th International AIIA Conference: September 19-22, 2022 Palermo - Italy*

*"Biosystems Engineering towards the Green Deal"*
*Improving the resilience of agriculture, forestry and food systems in the post-Covid era*

# Impact of compost addition on physical quality of a loam soil estimated from hysteretic water retention curve

**Cristina Bondì[1], Mirko Castellini[2*] and Massimo Iovino[1]**

[1] Department of Agricultural, Food and Forest Sciences, University of Palermo, Italy, Viale delle Scienze, Buiding 4, 90128, Palermo, Italy

[2] Council for Agricultural Research and Economics–Research Center for Agriculture and Environment (CREA–AA) Via C. Ulpiani 5, 70125 Bari, Italy

*Correspondence: mirko.castellini@crea.gov.it

**Keywords.** soil water retention, compost, hysteresis, soil physical quality

***Abstract.*** Application of compost to agricultural soils is a viable option for disposal of organic wastes but the effects on different soil physical attributes need to be evaluated. Capacitive soil physical quality (SPQ) indicators derived from the soil water retention curve allow assessment of potential effects of compost addiction on the soil's ability to store air and water. However, estimation of SPQ indicators has been generally conducted from water retention data obtained from desorption experiments and assuming simplified assumptions, and little information is available on the hysteresis effects on soil physical quality estimation.

This study evaluates how hysteresis of the water retention curve affects the soil pore volume distribution functions and the capacitive SPQ indicators of a loam soil amended with compost. The van Genuchten model was fitted to experimental sorption (WWRC) and desorption (DWRC) water retention data determined for different compost to soil ratios. The pore volume distribution functions highlighted that sorption process involves larger and more heterogeneous pores than the desorption one. Consequently, different information is provided from the two processes with air capacity SPQ indicators higher in WWRC than SWRC and the opposite for the water storage SPQ indicators. Compost amendment was effective in modifying the soil pore distribution system as the water entry potential increased and the air entry potential decreased at increasing the percentage of compost. Whereas the SPQ indicators estimated from DWRC were sensitive to compost amendment, the same result was not obtained for SPQ indicators estimated from WWRC. It was concluded that compost addiction could trigger positive effects on soil hydrological processes and agronomic service as both water infiltration during wetting and water storage during drying are favoured.