



Land management effects on soil carbon in olive groves of Mediterranean areas

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The study analysed soil organic carbon (SOC) and hot-water extractable carbon (HWC) in an agricultural Mediterranean area of Southern Spain under different land management: Conventional tillage (CT); Conventional tillage with the addition of oil mill waste, also known as *alperujo* (A); Conventional tillage with the addition of oil mill waste olive leaves (L); No tillage with chipped pruned branches (NT₁); and No tillage with chipped pruned branches and weeds (NT₂).

SOC values in CT, A, NT₁ and NT₂ decreased with depth. In L, SOC also decreased with depth, although there was an increase of 89% from the first (0–10 cm) to the second horizon (10–16 cm). Total SOC stock (considering the entire soil profile) was very similar under A (101.9 Mg ha⁻¹), CT (101.7 Mg ha⁻¹), NT₁ (105.8 Mg ha⁻¹) and NT₂ (111.3 Mg ha⁻¹). However, SOC under L was significantly higher ($p < 0.05$), at 250.2 Mg ha⁻¹. HWC decreased with depth in A, CT and NT₁. NT₂ and L followed the same pattern as the other management types but with a higher value in the surface horizon. The results showed a clear relationship between SOC and HWC values. Both increased SOC and HWC under L indicate the possibility of improved soil quality. Therefore, our results show that the application of oil mill waste olive leaves under conventional tillage (L) is a good management practice to improve SOC and reduce waste, suggesting that the negative effects of conventional tillage can be mitigated using sustainable practices.