

Changes in soil hydrological and chemical properties of vineyard soils after composted cattle manure application

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The aim of this study was to evaluate the changes soil chemical and physical properties (organic matter content, nitrogen and phosphorus, water retention capacity and infiltration) when composted organic waste were applied in vineyard soils. The effect on soil properties after two repeated applications at a rate of 10t/ha compared with the control (without treatment) were evaluated. The analysis was carried out in vineyard soils, located in the Penedès area (NE Spain). In this area, vines are the main agricultural land use and during the last decades, important land levelling operations have been carried out to facilitate the mechanizations of the labours. After levelling, the application of organic matter is a common practice in order to increase the organic matter levels. According to SSS (1998), the soils are classified as Typic Calcixerepts, with slopes between 5 and 15%. Organic matter, nitrogen and phosphorus content were evaluated in one control plot and in another plot in which successive applications of compost were done, separated between them 2 years. The changes in infiltration were evaluated using simulated rainfall, applied at 60 mm/h. The simulated rainfall consisted of 2.5 mm diameter drops of deionised water freely falling from droppers positioned 2.5 m above the soil surface. Each simulation lasted for 40 min. Runoff generated was collected at 5 minute intervals. Differences between treatments were analysed using the Duncan test. The results confirmed the beneficial effect of compost application to improve organic matter and nutrients in the treated soils. The organic matter content increased from 1 to 2.9%; Nitrogen increased from < 1% to 0.25% and P (Olsen) increased from 45 to 164 mg/kg. The infiltration also improved, respectively 13 and 20% after the successive compost application. The effect on water retention capacity was significantly different after the second application.

Keywords: compost, infiltration, nutrients, organic matter, water retention capacity