



Carbon and nitrogen mineralization in vineyard acid soils amended with a bentonitic winery waste

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Carbon mineralization and nitrogen ammonification processes were determined in different vineyard soils. The measurements were performed in samples non-amended and amended with different bentonitic winery waste concentrations. Carbon mineralization was measured as CO₂ released by the soil under laboratory conditions, whereas NH₄⁺ was determined after its extraction with KCl 2M. The time evolution of both, carbon mineralization and nitrogen ammonification, was followed during 42 days.

The released CO₂ was low in the analyzed vineyard soils, and hence the metabolic activity in these soils was low. The addition of the bentonitic winery waste to the studied soils increased highly the carbon mineralization (2-5 fold), showing that the organic matter added together the bentonitic waste to the soil have low stability. In both cases, amended and non-amended samples, the maximum carbon mineralization was measured during the first days (2-4 days), decreasing as the incubation time increased.

The NH₄⁺ results showed an important effect of bentonitic winery waste on the ammonification behavior in the studied soils. In the non-amended samples the ammonification was no detected in none of the soils, whereas in the amended soils important NH₄⁺ concentrations were detected. In these cases, the ammonification was fast, reaching the maximum values of NH₄ between 7 and 14 days after the bentonitic waste additions. Also, the percentages of ammonification respect to the total nitrogen in the soil were high, showing that the nitrogen provided by the bentonitic waste to the soil is non-stable.

The fast carbon mineralization found in the soils amended with bentonitic winery wastes shows low possibilities of the use of this waste for the increasing the organic carbon pools in the soil. On the other hand, the use of this waste as N-fertilizer can be possible. However, due its fast ammonification, the waste should be added to the soils during active plant growth periods.