



Effect of irrigation and winery waste compost rates in nitrate leaching in vulnerable zones

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The winery industry is widespread in Spain (3,610,000 tonnes of wine in 2010 (FAO, 2010)), and generates wastes characterized by a high content of organic matter, a notable content in macronutrients and low heavy-metals. These organic wastes could be used for agricultural purposes after a correct stabilization process (e.g. composting). The addition of these organic wastes requires a correct management, especially on semiarid cropped areas of central Spain where environmental degradation of water supplies with high N loads is observed. An integrated optimization of both applied compost dose and amount of irrigation is important to ensure optimum yields and minimum nitrate leaching losses.

The purpose of this work was to study the effect of the application of winery waste compost as fertilizer in a melon crop cultivated with different drip irrigation rates. The field experiment was carried out in Ciudad Real, designated “vulnerable zone” by the “Nitrates Directive” 91/676/CEE. Melon crop has been traditionally cultivated in this area with high inputs of water and fertilizers, but no antecedents of application of winery wastes are known. Beside the control treatment (D0), three doses of compost were applied: 6.7 (D1), 13.3 (D2) and 20 T/ha(D3). Irrigation treatments consisted of applying a 100% ETc and an excess irrigation of 120% ETc. The soil was a shallow sandy-loam (Petrocalcic Paleixeralfs), with 0.6 m depth and a discontinuous petrocalcic horizon between 0.6 and 0.7 m. Drainage and nitrate concentration on the soil solution were measured weekly to determine N leached during the crop period. Crop yield was also followed by harvesting plots when a significant number of fruits were fully matured.

A comparison between nitrate leached and crop production among different treatments and irrigation rates are presented.

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