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The influence of wine-distillery waste compost on nitrogen and phosphorus dynamics and uptake by a melon crop in a shallow calcareous soil

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In Mediterranean countries, the large quantity of organic wastes generated by the winery industry constitutes a serious environmental concern, due to its low pH and high content of phenolic compounds. This is accompanied by a seasonal production that makes their management difficult. Winery wastes are characterized by high organic matter contents, low electrical conductivity values and notable contents in macronutrients, so their use as organic amendments is a good management option for improving soil fertility. However, a composting treatment is necessary to convert these organic wastes into more stable, hygienic and humic-rich materials.

The aim of this work was to evaluate the effects of the application of exhausted grape marc compost (composed of dealcoholized pulp, skins and stems) as fertilizer in soil nitrogen and phosphorus availability and uptake by a melon crop (Cucumis melo L.). This experiment was carried out from May to September 2011 in Ciudad Real (Spain). This area was designated “vulnerable zone” by the “Nitrates Directive” 91/676/CEE. The soil was a shallow sandy-loam (Alfisol Xeralf Petrocalcic Palexeralfs) with a depth of 0.60 m and a discontinuous petrocalcic horizon between 0.60 and 0.70 m, slightly basic (pH 7.9), poor in organic matter (0.20%), rich in potassium (407 ppm) and with a medium level of phosphorus (19.4 ppm). The experiment had a randomised complete block design, with four treatments consisted of four compost doses: 0 (D0), 6.7 (D1), 13.3 (D2) and 20 T compost ha-1 (D3), in order to determine the optimum dose to ensure nutrient demand, maximizing yield and minimizing nutrient losses.

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