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Risk of wine-distillery waste compost application in vulnerable zones: nitrogen balance

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Nitrogen (N) is the nutrient with the greatest impact on yield of horticultural crops. It is extremely dynamic in soil and undergoes changes that include processes of gains, losses and transformations. The melon crop area at Ciudad Real adds the 29% of the national production in Spain. The common agronomic management is representative of semiarid cropped zones of Spain where environmental degradation of water supplies with high N loads is observed. The site of this work is located near of Mancha Occidental aquifer (U.H.04.04, 6.953 km2) and Campo de Montiel aquifer (U.H. 04.06, 3.192 km2) with high contamination problems. The efficient use of fertilizers and irrigation is especially important in these areas designated vulnerables to nitrate pollution from agricultural sources.

The aim of this study was to assess N losses when applying exhausted grape marc compost to a melon crop as source of nutrients in a vulnerable area. The doses are often excessive because are normally based on the input of organic matter rather than on the potentially mineralizable nitrogen. This N is not only released during the growing season but also in the intercropping period. In this experiment a nitrogen balance was carried out with three different doses of compost: 0 (D0), 6.7 (D1), 13.3 (D2) and 20 T compost ha-1 (D3). The soil was a shallow sandy-loam (Alfisol Xeralf Petrocalcic Palexeralfs), with a depth of 0.6 m and a discontinuous petrocalcic horizon between 0.6 and 0.7 m. Nitrogen plant absorption and nitrate losses were measured weekly, controlling at the same time N mineralized in soil. Simultaneously, a mineralization experiment was carried out without crop (either in laboratory and field conditions) to compare it with the results obtained with melon crop.

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