



## Treated pig slurries reduce denitrification losses under irrigation conditions

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Pig slurry applications supply easily degradable C compounds and a suitable nitrifiable N source which make conditions more favourable for nitrification and denitrification. Different treatments, such as anaerobic digestion and composting pig slurries, are used to mitigate their environmental impact, decreasing the number of pathogens in manures and controlling the emissions of odour compounds. However, these kind of treatments also decrease soluble organic carbon (SOC), affecting denitrification. Our aim is to study how SOC in different treatments of pig slurries could reduce denitrification losses under Mediterranean conditions. The field experiment was carried out at 'El Encín' field station (40° 32' N; 3° 17' W) on a potato crop (*Solanum tuberosum*) in 2004. The soil was a Haploxeralf and has a clay-loam texture (28% clay). Anaerobically digested pig slurry (AnPS), composted pig manure (CP) and untreated pig slurry (IPS) were compared with urea and a Control treatment without any N fertilization. The treatments were applied at a rate of 175 kg available N ha<sup>-1</sup>. Denitrification was estimated in the field by a core incubation method in the presence of acetylene (C<sub>2</sub>H<sub>2</sub>). The cumulative denitrification losses were significantly and positively related to the soluble carbohydrates, dissolved organic C (DOC) and total C added with fertilizers. Added DOC and NH<sub>4</sub><sup>+</sup> affected the N<sub>2</sub>O/N<sub>2</sub> ratio. A lower ratio was observed for organic fertilizers than from urea or unfertilised controls. The proportion of N<sub>2</sub>O produced from nitrification was higher for mineral than for organic fertilizers. Digested pig slurry and CP decreased the total denitrification rate by 24%, in relation to the IPS. In conclusion, under irrigated conditions, additions of treated pig slurries can mitigate denitrification losses from soils compared with mineral fertilizers.