



Long-term Effect of Pig Slurry Application on Soil Carbon Storage, Quality and Yield Sustainability in Murcia Region, Spain

Asuman Büyükkılıç Yanardağ (1), Ángel Faz Cano (1), Ahmet Mermut (2,3), İbrahim Halil Yanardağ (1), and Melisa Gomez Garrido (1)

(1) Sustainable Use, Management and Reclamation of Soil and Water Research Group, Technical University of Cartagena, Cartagena, Spain, (2) Harran University, Agriculture Faculty, Soil Science Department, Şanlıurfa, Turkey, (3) Department of Soil Science, University of Saskatchewan, Saskatoon SK Canada.

Sustainability of agriculture is now a major global concern, especially since the 1980s. Soil organic matter is very important in the proper functions of the soil, which is also a good indicator of soil quality. This is due to its influence on many of the chemical, physical, and biological processes that control the capacity of a soil to perform properly. Understanding of nutrient supply through organic matter mineralization in agricultural systems is essential for maintaining long-term quality and productivity.

The composition of pig manure will have a profound impact on soil properties, quality and crop yield when used in agriculture. We studied the effects of pig slurry (PS) application as an organic fertilizer, trying to determine the optimum amount that can be added to the soil, and the effect on soil properties, quality, and productivity. We applied 3 different doses on silty loam soils: Single (D1), Double (D2), Triple (D3) and unfertilized plots (C) served as controls. Samples were collected at two different levels, surface (0-30 cm) and subsurface (30-60 cm). D1 application dose, which is the agronomic rate of N-requirement (170 kg N/ha/yr) (European Directive 91/676/CEE), is very appropriate in term of sustainable agriculture and also can improve physical, chemical and biological soil properties. Therefore that the long-term use of PS with low dose may necessarily enhance soil quality in the long term. There are many factors to be considered when attempting to assess the overall net impact of a management practice on productivity. Additions of pig manure to soils at agronomic rates (170 kg N ha⁻¹ yr⁻¹) to match crop nutrient requirements are expected to have a positive impact on soil productivity. Therefore, the benefits from the use of application depend on the management of PS, carbon and environmental quality. However, PS have high micronutrient contents, and for this reason the application of high doses can pollute soils and damage human, animal and plant health, which is not suitable in term of sustainable agriculture.

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