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IMPACT OF OUTDOOR PIG PRODUCTION ON SOIL PROPERTIES: P SORPTION AND RISK OF EUTROPHICATION OF WATERBODIES

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The increase of soil available phosphorus (P) could be due to (i) the use of P fertilisers at higher rates than those required by crops in agricultural soils, and to (ii) the inputs of livestock production provided by the addition of feed and animals excreta to soils. In this latter case, there is also an increase of the soil organic matter (SOM). Several researchers reported the effect of the OM in preventing P sorption in agricultural soils and consequently the increase of P losses from soils to waterbodies by drainage and runoff waters.

This work aimed at evaluating the effect of outdoor pig production on P sorption in soils enriched with OM. The experiment was done for two years, at an experimental area of 2.8 ha, at the Polytechnic Institute of Castelo Branco. Soil samples were taken at 0.20 m depth and a P sorption experiment was carried out using the method of Fox and Kamprath (1970). The sorption data were fitted to the Langmuir isotherm.

The results showed that from the beginning of the experiment till the end the level of soil organic matter increased from 1.8 (\pm 0.21) to 4.1 % (\pm 0.15) and the maximum soil P sorption capacity decreased from $Q_{max}=147 (\pm 14)$ to $Q_{max}=128 (\pm 3)$ mg kg⁻¹. The linear model $Q_{max}= -37.168SOM+282.19$ $R^2=0.73$ ($p<0.05$) highlight the effect of SOM on the decrease of P sorption and the need of good management practices to prevent the eutrophication of waterbodies from livestock production.

Keywords: Eutrophication; Phosphorus sorption; Soil Olsen P; Soil organic matter