

## **5 - 05** Effect of slurry acidification on phosphorus distribution along the soil profile

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Slurry acidification and/or its mechanical separation for direct use of the liquid fraction (LF) are techniques used to minimize NH<sub>3</sub> emission during and after application to soil. However, these treatments can modify the content or solubility of some nutrients, particularly phosphorus (P) compounds.

Consequently, we hypothesized here that the P availability to crops and its mobility in soil profile, following application of treated slurry, might differ from application of untreated slurry, with agricultural and environmental consequences.

To test out hypothesis, an in-situ incubation was performed using open reactors with no plants, during a 24 months period. For this, we used a distric cambisol (pHH<sub>2</sub>O – 5.9, organic matter – 15.3 g kg<sup>-1</sup> and clay content – 86.0 g kg<sup>-1</sup> in fine earth fraction), dried and sieved (<4 mm diameter) before packing. Three surface applications was performed in equivalents quantities of 40 kg P ha<sup>-1</sup> by no treated slurry (pH 8.2) (T1) and acidified slurry (pH 5.5) (T2), and 36 kg P ha<sup>-1</sup> by slurry liquid fraction (LF) (pH 8.2) (T3) and acidified LF (pH 5.5) (T4). A control treatment (T0), with no fertilizer addition, was also tested. After 24 incubation months, the soil was collected and sliced in layers of 0-2, 2-5 and 5-15 cm depth. The vertical P distribution was evaluated based on extracting solutions, namely 0.01M CaCl<sub>2</sub>, Olsen and Egner-Riehm.

Except for T0, where the values of the first two layers are similar, the results exhibit a significant increase of P availability with depth, sharper for both acidified materials. In all layers, the P values show a significant increase between T0 and the others treatments and between no treated slurry (T1) and both LF treatments. Regarding slurry acidification, the effect was more evident for LF at the 5-15 cm layer.

Comparing the methods used in this study, the results obtained by CaCl<sub>2</sub> (0.01M) and Olsen show to be more effective to discriminate treatments effects than Egner-Riehm method.

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