

PhosFarm: Sustainable Phosphorus Recovery from Agricultural and Food Residues

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Introduction

PhosFarm addresses the increasing need for an economically and environmentally sustainable phosphorus (P) recovery from agricultural and food residues. The aim of the project is to recover both soluble inorganic phosphate and also refractory P (e.g. insoluble P, organic P) compounds as a marketable P fertiliser salts.

P recovery from agricultural residues by acidification

The content of soluble phosphate in pig slurry and anaerobic digestate from central Europe (type A) and Mediterranean Europe (type B) ranged between 18% and 32% (Figure 1) if any treatment is carried out. Thus, the P recovery potential from the liquid fraction is limited.

By acidification, the soluble P fraction was successfully increased to more than 80%.

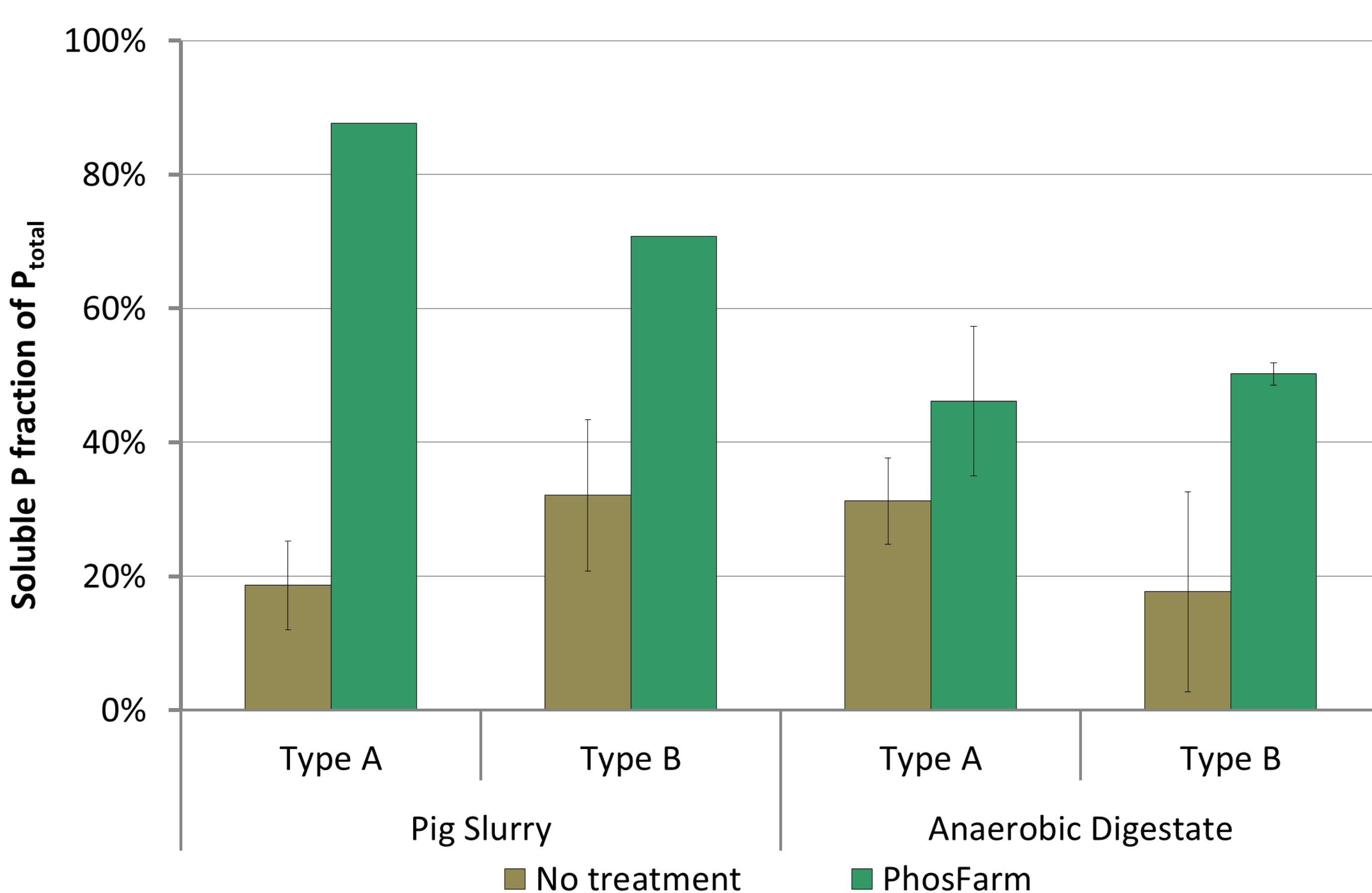


Figure 1. Soluble P fraction in pig slurry and anaerobic digestate before and after acidification

P recovery from food residues by enzymatic process

Spent grains from the beer production and wine grape seeds from the winery industry were treated with enzymes to convert their high organic phosphorus content into soluble phosphate.

The soluble P concentration successfully increased from less than 10% to more than 70% (Figure 2).



Figure 2. Increase in the soluble P concentration in food residue samples by enzymatic treatment

PhosFarm products: P salts and organic soil amendment

Phosphorus was recovered from the liquid fraction as phosphate salts by precipitation. The organic solid fraction was dried and pelletised to be used as soil amendment (Figure 3).



Figure 3. PhosFarm products from anaerobic digestate. Left: Precipitated phosphate salts. Right: Pellets from organic solid fraction

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