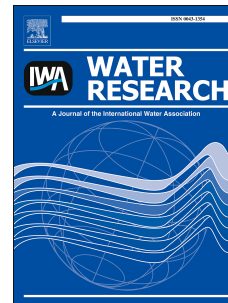


# Accepted Manuscript

Acidification and recovery of phosphorus from digested and non-digested sludge

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## 1            **Acidification and recovery of phosphorus from digested and non-digested sludge**

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### 9 10 **Abstract**

11 Acidification was used to dissolve phosphorus from digested and non-digested sludge from five wastewater  
12 treatment plants in order to make phosphorus accessible for subsequent recovery. More phosphorus was  
13 dissolved from digested sludge (up to 80%), with respect to non-digested sludge (~25%) and the highest  
14 recovery was observed at pH 2. The acid consumption for digested sludge was higher than for non-digested  
15 sludge due to the presence of the bicarbonate buffer system, thus CO<sub>2</sub> stripping increased the acid  
16 consumption. In all the experiments, the sludge was exposed to acid for 1h. For the five tested sludge types,  
17 60-100 mmol o-P was released per added mol H<sub>2</sub>SO<sub>4</sub>. It was mainly iron and calcium compounds that  
18 accounts for the phosphorus release at low pH. The release of heavy metals was in general low (<30%) for  
19 all the wastewater treatment plant, as Zn, Cd and Ni showed the most critical release after acidification of  
20 non-digested sludge.

21  
22 **Keywords:** *Phosphorus, acidification, sludge, heavy metals*

### 23 **Introduction**

24 The human population will grow to 9.3 billion by 2050, meaning that food production needs to increase  
25 accordingly. A high production of agricultural products can only be achieved by the use of fertilizers of

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