

Acid leaching of phosphorus from partially/fully dried sewage sludge: PULSE process

- Piloted by: Université de Liège (ULiège)
- P-source: Partially/fully dried sewage sludge
- P-product: CA/K/Mg phosphate salts



The process

The PULSE process starts with a chemical acid leaching of phosphorus from partially to fully dried sewage sludge. It is followed by a reactive-extraction step and fractionated precipitation to remove contaminants. The last step is the precipitation of a fertilizer grade calcium and/or magnesium phosphate.

In comparison to simple precipitation from the wet sludge, this process enables to access more P, not only that which is already dissolved. It also permits to remove detrimental components like Fe, Al and heavy metals.

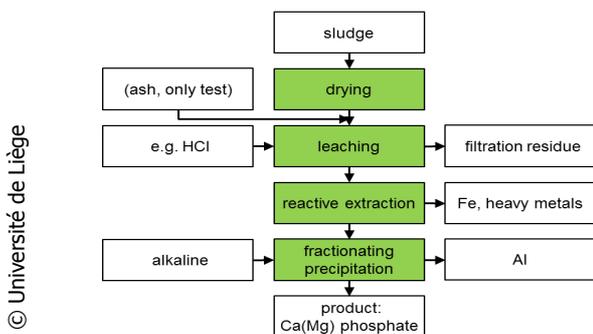
The technology includes a sludge dryer, a leaching vessel, solid-liquid separation, a mixer-settler cascade for reactive extraction to separate dissolved P from heavy metals and other impurities, various storage, precipitation and supply vessels, pumps, piping and required sensors. Due to contact with strong acids, highly corrosion resistant elements are required.

The product

Phosphorous obtained with in PULSE process can be precipitated either as calcium or as magnesium phosphate depending upon what is more desirable for the fertilizer industry and the plant availability of P in the two products. The product that will be produced from the PULSE process will comply with the legal requirements of the fertilizer industry in terms of impurities and heavy metal content. Due to the process flexibility, the purities can be achieved independent from the quality of the original sludge. The PULSE process is aimed at recovering more than 70% of the total P contained in the sludge so that it also satisfies the recently introduced German sludge disposal legislation according to which at least 50% of P must be recovered from sewage sludge.



The demonstrator



Location: The mobile demonstration plant is used in by-pass at different WWTP: Belgium/Tenneville, Ireland/Carrigrennan, Scotland/Bo'ness, Germany/Dorsten
 Commissioning: 2020

Input material: partially/fully dried sewage sludge

Input mass: 100kg of wet matter / day

Output: Ca/Mg/K phosphate

Output mass: 1 kg/day of product

Contact: Prof. Dr.-Ing. Andreas Pfennig, Université de Liège, andreas.pfennig@uliege.be
 Prof. Dr. Ir. Angélique Léonard, Université de Liège, a.leonard@uliege.be