PHORWATER

Technology for P recovery as struvite starting from wastewater sewage with "PHORWater" controlled biological processes and struvite scaling process.

Keywords: *Struvite •WWTP • Raw material • Nutrients recovery • Fertilizers*

Key facts:

- → **Category of the technology**: Greentech
- → **Input:** Wastewater sewage
- → **Output product(s):** Struvite
- → **Available capacity:** Pilot plant has a capacity of 20m3/d (recovery of 10 kg/d), but it is easy to scale up a full scale reactor
- → **Focusing geographical areas**: Europe
- → **Technology status:** TRL 7
  - → **EC/MS Authority permits:** National utility model: 201630525 (8) in Spain

Several technologies are available for P-recovery at WWTPs, but none before the anaerobic digestion, thinking about the WWTP as a whole, with biological processes and scaling problems. By controlling biological processes and struvite scaling we increase the phosphorus recovery rate and we avoid operational problems.
The innovation of PHORWater is that faces the problem from less to more. Moving from the optimization of the integral management to increase phosphorus availability and decrease uncontrolled precipitation of phosphorus, to a new simple-operational P-recovery reactor.
The obtained struvite ($NH_4MgPO_4 \cdot 6H_2O$; 29% P_2O_5, 15% MgO, 5% N) is a potentially marketable product for the P fertilizer industry. Its genuine slow release property avoids burning of plant roots, even when applied in excess quantities. Insoluble nature of struvite in neutral water prevents eutrophication and restricts leaching into groundwater. Regarding to impurities, the phosphorus obtained as struvite from recycling processes in WWTPs has less metal content than that of the phosphate rock, very low organic matter and less micropollutants content than an anaerobic sludge.

Competitive position and advantages:

- → The whole process increases the P availability and therefore the amount of P recovered from WWTP as struvite. Struvite also contains N so it also increases the amount of N recovered. Side effects are reduction in energy consumption and reduction in WWTP management problems.
- → PHORWater process allows the recovery of high quality struvite with no detected Cd and very low organic matter and reduces P (nutrients) discharges into water bodies.

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