



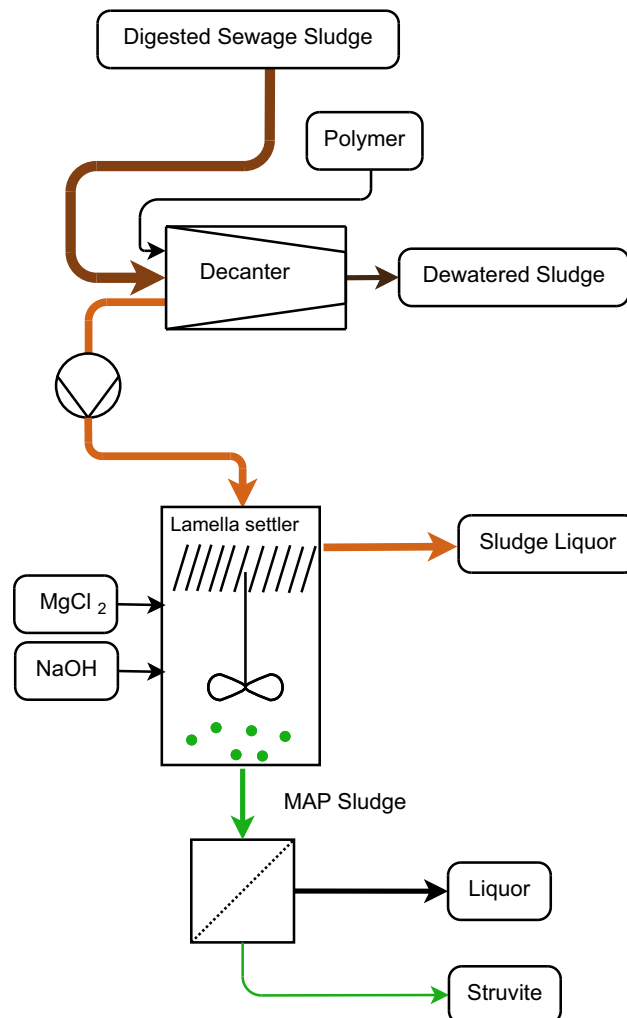
Struvia™ *Struvite crystallisation in sludge liquor*

Short description

The STRUVIA™ process is a modification of the phosphorus recovery technology Phostrip, originally developed by the Japanese company Showo Kankyo Systems K.K. (SKS). Since 2011, SKS is owned by Veolia Water which has developed the process into the current state and renamed the process to STRUVIA™.

For recovering struvite from sludge liquor, a continuous stirred tank reactor (CSTR) combined with a lamella settler on top are installed after the dewatering unit of a WWTP with enhanced biological P removal. Rapid mixing in the CSTR is enabled by a special mixing technology (Turbomix®). After dosing of $MgCl_2$ and $NaOH$ for pH adjustment to 8-9, struvite is precipitated and can be harvested as a clean powder at the bottom of the reactor. Struvite can be dried at low temp (40-50°C) before storage.

Process scheme



© p-rex.eu

General Data

Type of Process	crystallisation
Type of Plant	crystallization reactor
Input Material	sludge liquor
Product	struvite
P-concentration	29 % P ₂ O ₅ of DM
P recovery performance ¹	11 % of P in sludge input

Supply

Average total electricity demand ¹	1.3 [kWh/kg P _{recovered}]
Average total heat demand (optional)	0.9 [kWh/kg P _{recovered}]
Average chemical demand ¹ (as 100% concentrate)	3.2 [kg MgCl ₂ /kg P _{recovered}] 1.0 [molar ratio MG:P _{recovered}] 0.8 [molar ratio Mg:P _{dissolved}] 0.2 [kg NaOH/kg P _{recovered}]

Advantages

- WWTP retrofit possible by implementation after centrifuge
- Prevention of struvite incrustations after centrifuge
- High purity of struvite product
- Proportional reduction of phosphorus and nitrogen return load from sludge liquor

Remarks

- Process is limited to WWTP with enhanced biological P removal and more than 50 mg/L PO₄-P in sludge liquor
- Two process configurations: separated reactor and struvite settler (Turbomix® configuration) and integrated reactor and settler (Turboflo™ configuration)
- On demand the process is also capable of recovering P as calcium phosphate

Patents and Licenses

Patent held by	Veolia Environment
Contact	Hervé Paillard
Phone	+33 1 71 33 32 40
Mail	herve.paillard@veolia.com
Website	www.veolia.com

References

Pilot plant on WWTP Brussels North (2013-2014)

Veolia subsidiary SKS

is successfully operating three reference WWTPs with hydroxylapatite or struvite production in Japan

- Urabandai plant: hydroxylapatite
- Hakusyu distillery: struvite
- Kyoto distillery: struvite

¹Process data related to reference sludge line defined in P-REX (digested sludge of wastewater treatment plant for 1 Mio inhabitant equivalents, dry matter (DM) content: 3%, P content: 4.2% of DM, PO₄-P in liquor: 200 mg/L (EBPR) or 10 mg/L (ChemP), Fe content: 2% (EBPR) or 6.6% (ChemP)). More information on modelling can be found in P-REX LCA report.