VEOLIA

STRUVIA™
Sustainable Struvite Removal

WATER TECHNOLOGIES

The Struvia™ solution

Struvia™ has been developed by Veolia Water Technologies to facilitate the recovery and reuse of phosphorus. Struvia™ allows facility owners to reduce maintenance costs associated with cleaning nuisance struvite from piping, pumps and other equipment, while also producing a valuable end product.

Struvia™ is ideal for treatment plants that handle municipal wastewater and are equipped with biological phosphorus removal followed by anaerobic sludge digestion.

Samoens WWTP, France

Wastewater facilities that remove phosphorus have dewatered centrates that contain high concentrations of phosphate that may uncontrollably precipitate as struvite crystals. The Struvia solution ensures controlled struvite precipitation in a specialized reactor. In addition to reducing struvite-related maintenance, the final struvite-rich product can be used to enhance the plant's dewatered biosolids, or separated and packaged separately for distribution.

APPLICATIONS

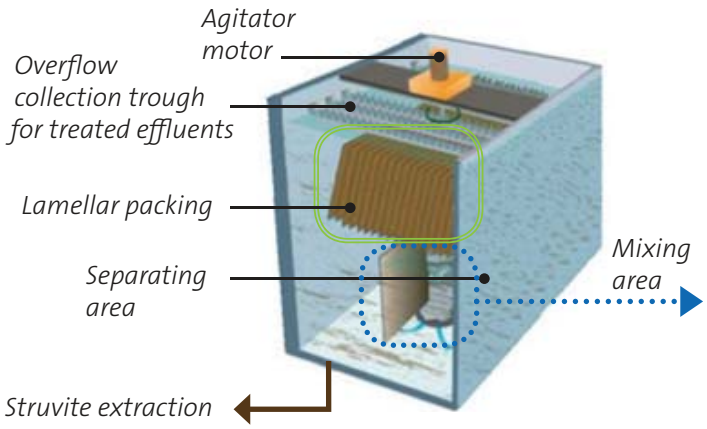
- Wastewater treatment plants equipped with digesters
- Wastewater treatment plants equipped with biological phosphorus removal wishing to install sludge digestion
- Wastewater treatment plants equipped with anaerobic digestion wishing to install biological phosphorus treatment

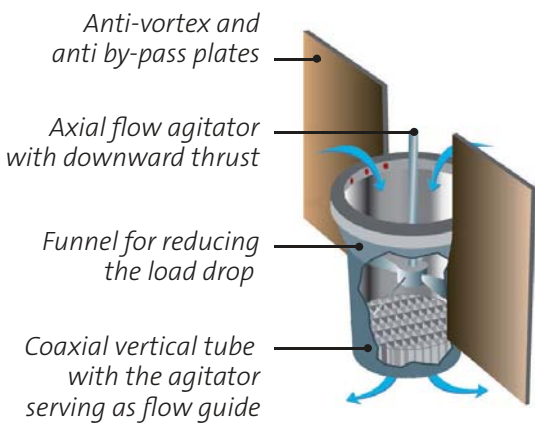
Operating Principle

Effluent containing high concentrations of phosphorus, like centrate generated from digested sludge dewatering, is fed to a continuous stirred tank reactor where rapid mixing is achieved using a special mixing system: Turbomix™. Struvite precipitation is initiated by increasing the pH and by addition of a magnesium salt.

An integrated lamella settler ensures the separation of the produced struvite and the treated effluent. In most municipal applications the treated effluent is returned to the head of the treatment plant.

The struvite is then pumped and directed to a drying and storage facility before it is available for use as a fertilizer, a biosolids amendment, or a product for other applications.





Turbomix™ is patented by Veolia Water Technologies. It encourages crystallization and growth of struvite pellets and it allows for optimum use of reactive products with a short reaction time, thereby reducing system footprint.

The Struvia™ advantage

Struvia™ installation at Helsingør, Denmark

Struvite pellets produced in a Struvia™ reactor

Reduced operating costs for existing facilities

- Struvia™ minimizes operational problems, maintenance costs, and unplanned down- time caused by uncontrolled struvite precipitation that clogs pipes and other equipment
- Struvite production reduces the need for coagulants like iron or aluminum salts for phosphorus precipitation in the wastewater treatment process
- Reduces phosphorus return load to the head of the secondary process, making treatment simpler, more efficient and more stable
- Reduces overall sludge production by eliminating the continual recirculation and treatment of phosphorus

An ideal solution for treating high phosphorus sidestreams

- Compact footprint
  - a single reactor with integrated lamella settler
  - no loop or recirculation pump
- Reduced maintenance
- Low investment and operating costs
- Phosphorus-rich product can be sold for added revenue

Draining then drying the struvite produced using a filter bag during tests at the Braunschweig WWTP in Germany, with phosphorus elimination efficiency levels higher than 85%

THE FUTURE USES OF THE PRODUCT

> The client may wish to create a circular economy for phosphorus, whereby the plant can sell the recovered end product as a fertilizer. Veolia can provide assistance for this distribution if desired.

> In concert with their own sustainability initiatives, the municipal authorities may choose to make the recovered struvite freely available as a struvite enriched material.

Example of struvite incorporated in an organo-mineral fertilizer used in agriculture

South Durham, NC WRF - Conclusive Testing

Struvia™ pilot testing was successfully conducted on the plant dewatering concentrate in 2016. The City of Durham was interested because the plant has had issues with struvite buildup on their belt presses and in the piping of the downstream process. This pilot illustrated the treatment effectiveness of the Struvia process for phosphorus recovery, showing a removal of phosphates in the concentrated liquid of greater than 90%.

Resourcing the world

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