

TRAINING MATERIAL

Title:

Technology for P recovery as calcium-phosphate starting from sewage sludge ashes with “Ash2Phos” process (ID:448)

Training:

What is the product/technology?

EasyMining is focused on creating circular material flows from waste. Via the food cycle, phosphorus ends up in sewage sludge. Incineration of this sludge is today mainly used as a method to reduce the amount of waste to land fill, or destruction if the sludge quality is too low for other uses. The phosphorus content of ash from incinerated sewage sludge is high. EasyMining’s Ash2Phos technology extracts phosphorus and other resources from the incinerated sewage sludge.

Who is the vendor of the product/technology?

EasyMining is an innovation company dedicated to closing nutrient cycles. EasyMining is passionate about inventing new technology that uses intelligent chemical solutions to close nutrient cycles. Our objective is to create new circular material flows in an efficient commercial way. EasyMining Sweden was founded in 2007. They are owned by the Swedish environmental company Ragn-Sells.

Which other product/technology are provided by the vendor?

- CleanMAP: this technology extracts ammonium phosphate from mining waste or other sources
- Ash2Salt: this technology extracts commercial salts from high chloride containing fly ashes
- Nitrogen Removal Process: this process enables efficient removal and recovery of ammonium from aqueous flows

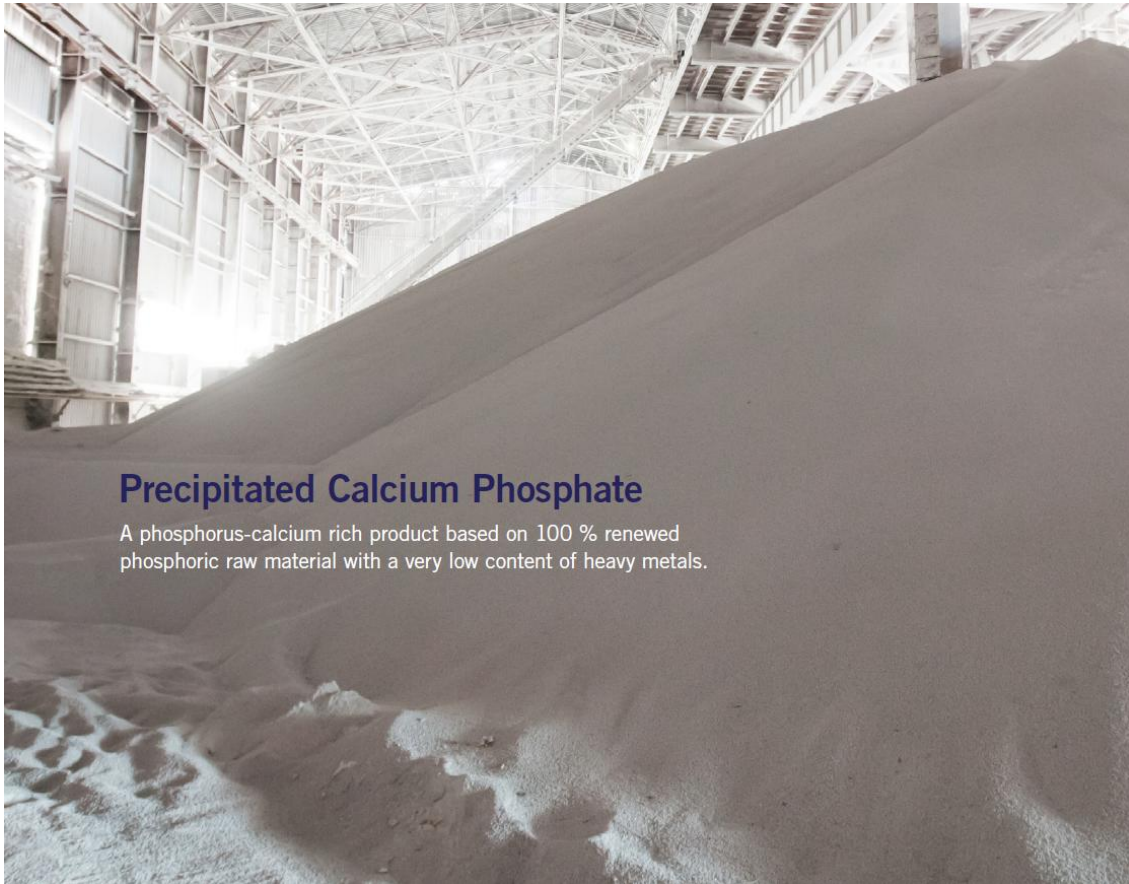
Features of the product

The Ash2Phos process can transform the sludge ash into raw material for phosphorus extraction and thereby be a part of a circular solution for phosphorus management. More than 90% of the P in the ash is recovered by the process, which consists of 3 sequential steps: acidic step, a second alkaline step (where intermediate products are produced), and finally a conversion step where the intermediates are processed into final products.

The main output product is calcium phosphate, a white powder or granule phosphorus-calcium rich product ($\text{Ca}_5(\text{PO}_4)_3\text{OH}$, 17% P, 35% Ca) with a very low content of heavy metals ($\text{Cd} < 0.1 \text{ mg/kg}$). The water solubility is low, but P is highly available as demonstrated by the high solubility in neutral ammonium citrate. It is already proven that phosphate is slowly released, the fertilizing efficiency is therefore high. It can be applied as such on the field (as root placed fertilizer or spread as granules with common equipment), or transformed to other phosphate fertilizers (MCP, DCP, MAP, DAP, etc). In addition, the precipitated calcium phosphate can also be used for animal feed, compound feed and mineral feed.

Which are the advantages of the product and the problems addressed?

With the Ash2Phos technology, a clean precipitated calcium phosphate (PCP) can be recovered from sewage sludge. Heavy metal and Fluor concentrations are lower than in conventional P fertilizers (Cd < 0.1 mg/kg). Therefore, it can be used for field application and in feed products. The P recovery process is independent from ash quality fluctuations (so no limitations regarding precipitation metals like Fe) and comes with highly efficient heavy metal separation to guarantee high P product quality.

**Which are the authority permits and in which EU countries? How much does it cost?**

In 2023, 13,000 t/a PCP (from 30,000 t ash) will be produced. The price is matter of market and negotiation. Pilots are running in Sweden (Helsingborg and Uppsala, 600 and 50 kg ash per day). Permit application is ongoing for the full scale plant in Sweden (30000 ton ash per year) and Germany (ChemPark Bitterfeld-Wolfen, 60000-90000 ton ash per year).

For more information: https://nutriman.net/farmer-platform/product/id_448