

Thermochemical solution to recover phosphorus from sewage sludge: EuPhoRe®

- Piloted by: Emschergenossenschaft and EuPhoRe GmbH
- P-source: Sewage Sludge (dewatered or pre-dried)
- P-product: Phosphate fertiliser (12-20 % P₂O₅)



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The process

The EuPhoRe® process enables the recovery of phosphate simultaneously with the double thermal treatment of the sewage sludge. The generated ashes have a high plant-availability of the phosphorus and low heavy metal content. This end-product can be directly used as a phosphorus fertilizer and/or raw material for a multicomponent fertilizer.

The EuPhoRe® process consists of two-steps (anoxic, oxic) occurring in a rotary kiln: first pyrolysis/dry carbonisation, directly followed by incineration. With a flue gas cleaning, heavy metals are eliminated into the gas phase. Organic pollutants are eliminated in the thermal processes.

For the process the sewage sludge is loaded into a rotary kiln via an airlock system. Here it is pre-dried by using hot flue gas and pyrolysis gas from the two EuPhoRe® steps in a counter-current manner. The ash finally exits the kiln via a cooling unit into Big-Bags, awaiting transport.

The product

The products coming out of the EuPhoRe® process is a phosphate ash directly ready for use as a fertilizer.

Due to the immediate transfer from reductive conditions to oxidative conditions in the process, coinciding with high temperatures, the phosphate compounds in the ashes are changed to such an extent that a high plant P-availability is the result.

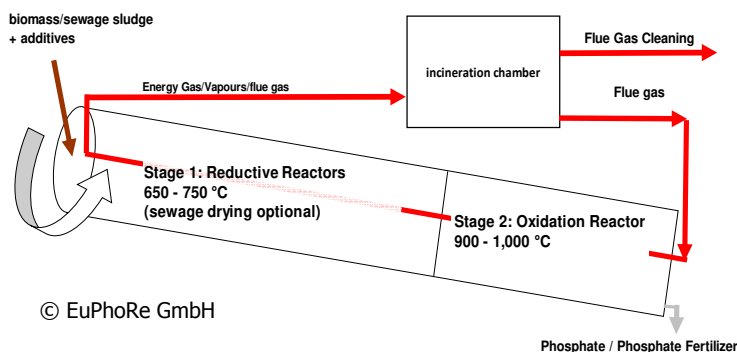
The pyrolysis gas of the reductive step and the process gas of the oxidation step are used thermodynamically. Due to input of additives like alkali- and/or earth-alkali chlorides (e.g. KCl, MgCl₂) before the treatment, an effective heavy metal reduction is reached.

As the entire Sewage sludge ashes (SSA) are converted in a fertilizer, additional disposal of SSA is avoided.



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The demonstrator



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Location: Germany, Dinslaken, outdoor

Commissioning: September 2019

Input material: Sewage Sludge, 25 – 30 % Dry Matter (DM)

Input mass: approx. 100 kg/h

Output: Phosphate slag (12-20 % P₂O₅)

Output mass: approx. 10 – 15 kg/h

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