

Sewage sludge ashes

Origine:	Sewage sludge incineration plants
Recycling pathways:	<ul style="list-style-type: none"> • Inorganic fertiliser • Organo-mineral fertiliser • Fertilising product blend



COMPOUND MATERIAL DESCRIPTION

ORIGIN & AVAILABILITY

Sewage sludge ashes (ssa) are produced at sewage sludge incineration plants (SSIP) implementing fluidized bed furnace (circulating/rotating/stationary) or rotary kilns (e.g in the EuPhoRe® process).

Resources of ssa range from 1000 to 50 000 tons/year/plant. SSIP are widely distributed throughout all European area, with e.g. 2 plants in The Netherlands, 12 in Switzerland, 20 in Germany and many more under planning.

A low seasonal variability in quantity and quality can be expected.

QUALITY CONSIDERATIONS

Key criteria such as Phosphorus (P) content, P-bioavailability, heavy metals load are to be checked.

P-content of ssa ranges from approx. 2 to 13% depending of the ratio municipal/industrial sludge treated. Influencing further processing, further main element such as Si-content (3% to 23%), or Fe-Content (2% to 20%) need to be considered. The P-bioavailability of ssa varies a lot: this is directly linked

with the incineration techniques applied. The *end-of-waste* status of ssa is available in some countries and included in legislations.

INTEREST & VALUE

Ssa are a valuable source of P, and this P can possibly be found in available form. In addition, ssa are free of carbon, free of organics, free of pharmaceuticals and pathogens. They can also contain further interesting nutrients or trace element (Ca, Mg, Zn...).

TIPS/BE AWARE

The production technology is decisive on the quality of the ssa achieved. Select ssa with good bioavailability of P can enable an easy subsequent processing.

The applied method to determine the P-bioavailability is crucial: for solubility assessment, NAC or citric acid mime better real behavior at the plants roots level than the sole water solubility; in case of pot trials, the choice of a P-poor substrate with good soil mimic properties (water retention...) is essential to get reliable results.

RECYCLING PATHWAYS

As this material can be recycled in fertilisers, the formulations proposed refer to a possible Product Function Category (PFC) according to the numbering set up in the EU Fertilising Products Regulation ((EU) 2019/1009). The recognition of *thermal oxidation materials and derivatives* as compound material category (CMC) is in process. If the CE marking is not applied for, the existing national legislations (and possibly Regulation (EU) 2019/515 on mutual recognition) apply.

INORGANIC MACRONUTRIENT FERTILISER – PFC 1(C)(I)

After chemical elution, the P contained in the ssa can be incorporated with P extracted from P-Rock into water-soluble solid/liquid straight inorganic P fertilisers or compounds fertilisers (PK, NPK, NP).

The targeted users are the existing fertiliser producers with international market outreach.

Limiting factors can be a constant and homogenous supply of a minimum quantity (approx. 10 000 tons ssa/year). Also this use requires an extensive chemical processing of the ssa, and rest of the ssa needs to be disposed of or further processed.

The reliability of a continuous SSIP operation can encourage companies to adopt ssa as input material.

SOLID INORGANIC MACRONUTRIENT FERTILISER – PFC 1(C)(I)(A)

After mechanical processing (grinding, dust binding), the ssa gets granulated into straight or compound fertiliser (P or PK fertiliser, incl. S, Ca, Mg).

Innovative fertiliser producer with regional market outreach are here targeted.

Only ssa presenting a good P bioavailability and low contaminants content can be used for this formula.

Many factors are supporting this use. The manufacturing plant of the fertiliser can be located directly near to the SSIP producing P-rich ssa with good bioavailability (creating synergies for energy and carriage). The distribution of the fertilisers can occur through the regional stakeholders and avoid long transport of usual fertilisers. With this mechanical processing, nearly 100% of the ssa is recycled and nearly 100% of P-Rock import for this fertiliser amount is avoided.

FERTILISING PRODUCT BLEND – PFC 7

As straight fertiliser in powder form, the ssa can be mixed with products of other PFC (e.g. liming material) to offer a customized balance by adjusting fertilising inputs to crop requirements.

The targeted users are the fertilisers blenders.

This application is reserved for ashes having good P bioavailability and acceptable contaminants content.

The increase of the demand of customized fertilising products is a factor in support of this route. Also, nearly 100% of the ssa is recycled.

STAKEHOLDERS MAPPING

The figure shows the main stakeholders that might be implicated in the recycling pathways of sewage sludge ashes.

