

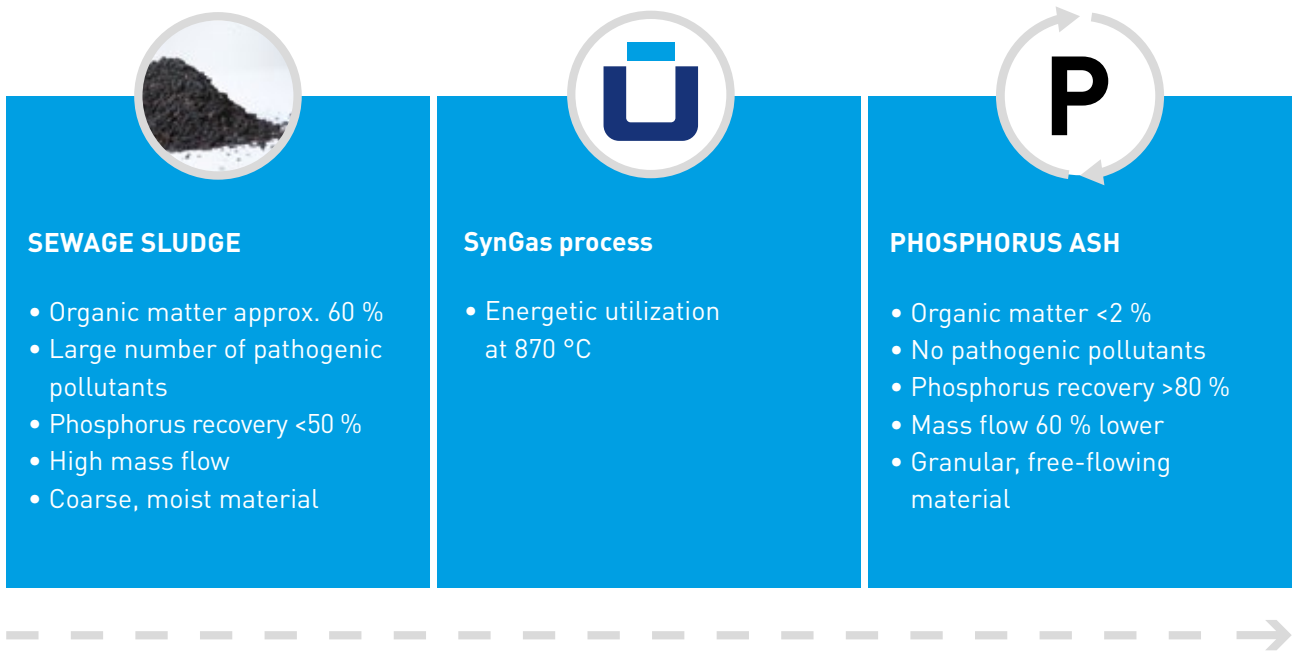
SEWAGE SLUDGE RECYCLING

Phosphorus recovery with the SynGas ash



FROM SEWAGE SLUDGE TO A SUSTAINABLE PHOSPHORUS RESOURCE

The SynGas process produces a mineral product that can be used as a phosphate fertilizer or resource for the phosphoric acid production.



For the analyzed ashes the requirements of the of the German Fertilizer Ordinance (DüMV) are fulfilled:

- Phosphorus content of more than 10% P₂O₅ in the ash. This corresponds to the minimum nutrient requirement of the DüMV.
- Heavy metal concentrations are below the limit values of the DüMV.
- Organic pollutants are completely destroyed during thermal treatment. The concentration of organic matter is max. 2 %.

NUTRIENT CONTENT (%TS)

P ₂ O ₅	>10 %
K ₂ O	0,3 %
CaO	28 %
MgO	1,1 %

POLLUTANT CONTENT (mg/kg TS)

	Ash	Limits DüMV
Cd	<0,2	1,5
Cr (VI)	<0,5	2
Hg	<0,05	1
Ni	<40	80
TL	<0,01	1
Pb	37	150
As	18	40
AOX	<0,05	-
PAK 16	<0,4	-
PFT	<0,01	-

PHOSPHORUS COMPOUNDS IN THE ASH

The crystalline Phosphorus compounds in the ash are mainly calcium and magnesium phosphates. Depending on the iron content in the sludge, iron phosphate, hematite (Fe_2O_3) or magnetite (Fe_3O_4) may also be present.



The prerequisite for obtaining a phosphorus-rich, detoxified ash is mono-recycling of the sludge. With our patented process we set new standards in this field.



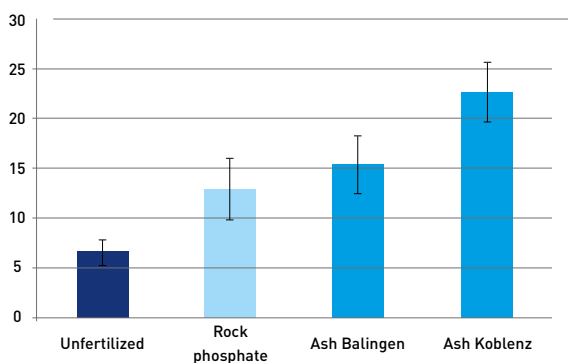
PHOSPHORUS PLANT AVAILABILITY

- Plant experiments were carried out with untreated ashes from two different SynGas-plants on corn plants.
- An unfertilized sample and a sample with ground rock phosphate were used for the control comparison. Rock phosphate is used as fertilizer in organic farming.
- The fertilizing effect of the ash was clearly above the unfertilized control and even above that of the rock phosphate.
- Further trials are currently being conducted.

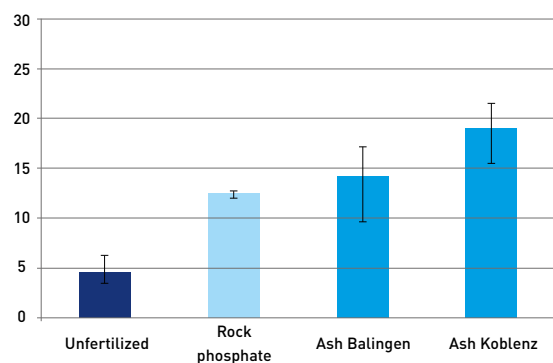


Unfertilized Rock phosphate Ash Balingen Ash Koblenz

PLANT MASS (g/VESSEL)



P WITHDRAWAL (mg P /VESSEL)



STEEL
ENERGY
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