

EIP-AGRI practice abstract

Short title:

Technology for P recovery as biomass ashes from low plant available phosphorus compounds with "AshDec®" thermochemical process

AshDec® is a thermochemical process designed to convert the low plant available phosphorus compound from sewage sludge ash ($\text{Ca}_3(\text{PO}_4)_2$) to the highly plant available compound Rhenania-P (CaNaPO_4) while reducing the heavy metal content. The core process encompasses feeding ash to a rotary kiln where it is mixed with sodium compounds (e.g. Na_2CO_3) and a reducing agent, preferably sewage sludge. The material is treated at around 900 °C for 15-20 min. Sodium ions replace calcium ions in the phosphates and form citrate-soluble CaNaPO_4 compounds. Simultaneously, sodium reacts with silicon dioxide present in the ash and forms sodium silicates. The reducing agent is added to reduce the oxidized heavy metals. A noticeable high amount of heavy metals evaporates in their elemental form under the prevalent process conditions and temperatures.

The AshDec process is a robust technology to convert low plant available phosphorus compounds in biomass ashes (e.g. sewage sludge ash) to highly plant available phosphorus compounds. The output material is a calcined ash with 15-25 % P_2O_5 . A plant should exceed a capacity of 15.000 t per year (1 t input ash \approx 1 t of product output). No hazardous input or output materials are used. The P-Recovery rate of the process is > 95 % and there are no to very little amounts of residues and no by-products are produced. The product has a low content of contaminants, e.g. heavy metals (Cd, U, As, Pb). It has no organic compounds and is free of pathogens.

For more information, https://nutriman.net/farmer-platform/technology/id_398