Phosphorus and metal recovery from sewage sludge ash by biohydrometallurgy

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Phosphorus, currently derived from phosphate rock, is an essential resource for the production of phosphate fertilizers, thus playing a vital role in the food industry. Both phosphate and phosphate rock are listed in the EU´s list of critical raw materials, the current supply of which is highly dependent on imports from non-EU regions. For this reason, efforts have been made for several years to recover phosphorus from sewage sludge. About 90% of the phosphorus in the influent of municipal wastewater treatment plants is retained in sewage sludge; for Austria this would be approximately 7,000 t/year and for the Czech Republic between 4,000 and 8,000 t/year.

Therefore, the aim of the Interreg ATCZ project PHOS4PLANT presented here is to dissolve phosphorus and metals from sewage sludge ash by biological leaching with an efficiency of >85% and to obtain a bioavailable phosphate fertilizer. A pretreatment of the sewage sludge ash is planned to accommodate bacterial adaptation to the ash matrix. The resulting phosphate fertilizer will subsequently be tested on model crops, and parameters of the plant root system and plant growth characteristics will be analyzed. Finally, a comprehensive ecological and economic analysis of the entire process will be conducted, to highlight advantages and limitations of the results drawn from this project. The novelty of linking bioleaching processes to the generation of phosphate fertilizer with subsequent testing of the produced fertilizer proposes an innovative solution.

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