

From food industry by-products to smart nano-fertilizers: towards a circular economy of phosphorus

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Prompted by the large-scale use of phosphates for farming purposes, the extensive mining of phosphate rocks for the fertilizers production have depleted many of phosphorous natural supplies. The use of food residues as low-cost raw material represents an alternative source of phosphorous for the production of valuable agricultural compounds. In this respect, the recovery of calcium-phosphate (CaP) based agrochemicals from industrial waste could be an option and a valid alternative to the conventional production of fertilizers, which involves chemical reactions with negative impacts on the environment. Here, I will show you that smart fertilizers based on CaP nanoparticles can be recovered from fishery industry by-products by a simple, green, sustainable and scalable thermal process. The residual biomass from fishery industry makes up to the 50 wt% of the total fish and consists of non-edible parts whose disposal is costly both economically and environmentally. Therefore, the concept of circular economy, a restorative, zero-waste model in which resources are used to maximum capacity and natural systems are regenerated, is applied.