

Research of phosphate accumulating microorganisms from WWTPs for the recovery of phosphorus from organic wastes (3BV.3.47)



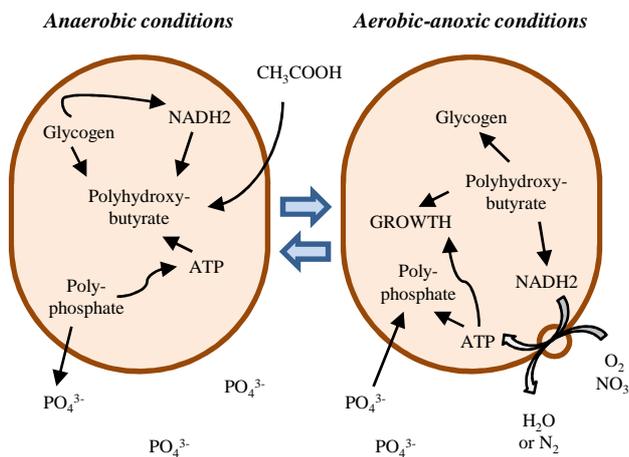
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Introduction

Many wastes containing reusable components, such as **nitrogen, phosphorus and potassium**, are not exploited through ideal processes. As an example, in Wallonia (Belgium), the main treatment applied to sewage sludge consists in incinerating the material. Such a process is chosen when the heavy metals are too concentrated in the sludge, preventing an agricultural use. However, sewage sludge, as well as manure, slurry and digestate, contain notable amounts of nutrients (nitrogen, phosphorus and potassium). Some Waste Water Treatment Plants (WWTPs) are actually designed in order to promote Phosphate Accumulating Organisms (PAOs), able to store or release phosphorus in accordance with the environmental conditions. The aim of this work is to isolate PAOs from WWTPs and evaluate their applicability to phosphorus recovery from organic wastes. Metagenomics and metabolic properties are also considered. This work is supported by the **BioRefine Project**, a European project in which various member states focus on recovery of inorganics from organic wastestreams.

The biological phosphate removal from wastewater is achieved by a specific microflora in WWTPs



What are the purposes of the analyses?

Metagenomics

Metagenomic analyses will provide data about the composition of the microflora

Consort. WWTP₁
Consort. WWTP₂

16S sequencing

Consort. WWTP₃
Negative control

BIOLOG Eco Microplates

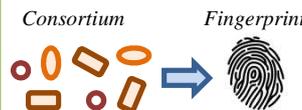
BIOLOG Eco Microplates will provide data about the metabolic properties

Principal Component Analysis

Calculation of similarity rates

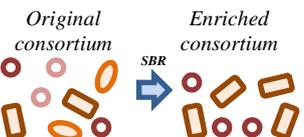
Flow cytometry

Flow cytometry can establish the profiles of consortia on the basis of fingerprints



Enrichment of consortia

Consortia can be enriched in PAOs through the use of the SBR system

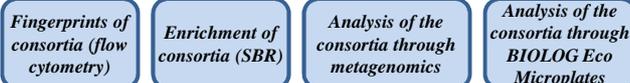


Sampling of activated sludge in 3 WWTPs achieving a 100% biological phosphate removal

In Wallonia (southern region of Belgium), there are only 3 WWTPs which achieve phosphate removal through a 100% biological pathway. Another WWTP achieving a chemical phosphate removal can be used as a negative control



Analyses



The partners of the BioRefine Project



Acknowledgements

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