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Review

New perspectives for the design of sustainable bioprocesses for phosphorus recovery from waste

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1 New perspectives for the design of sustainable bioprocesses for
2 phosphorus recovery from waste

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14 **Abstract**

15 Phosphate rock has long been used for the production of phosphorus based chemicals.
16 However, considering the depletion of the reservoirs and the decrease of the quality of
17 phosphate rocks, a potential market is now emerging for the recovery of phosphate
18 from waste and its reuse for different applications. Notably, phosphate recovery from
19 wastewater could be included in a circular economy approach. This review focuses on
20 the use of microbial systems for phosphorus accumulation and recovery, by
21 considering the actual range of analytical techniques available for the monitoring of
22 phosphorus accumulating organisms, as well as the actual biochemical and metabolic
23 engineering toolbox available for the optimization of bioprocesses. In this context,
24 knowledge gathered from process, system and synthetic biology could potentially lead
25 to innovative process design.

26 *Keywords: Phosphorus recovery, PAOs, wastewater, biological processes*

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