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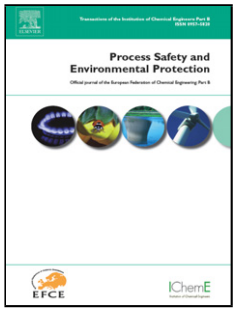

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Phosphorus Recovery from Aquaculture Wastewater using Thermally Treated Gastropod Shell

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Abstract

In tandem with the quest for the development of sustainable strategies for the recovery of P from P-rich aqua waste streams, thermally treated Gastropod shell (GS) was investigated as a reactive material for P-recovery from aquaculture wastewater (AQW). The enhanced defects in the surficial physiognomies, imparted by the thermal treatment process, accounted for the higher P-recovery efficiency. This contradicted the claim that the conversion of the carbonate form of calcium to the oxide form was the reason for the higher P-recovery efficiency of thermally treated calcium rich materials. The fittings of the time-concentration profiles of the P-recovery process to different kinetic models and the determinations of the thermodynamic parameters of the precipitation reaction showed that both adsorption and precipitation were the underlying mechanism of the P-recovery process, using the thermally treated GS. In addition to the removal of P, substantial amount of the total nitrogen in the AQW was also removed. The evaluation of the effects of the P-recovery process on the quality characteristics of the AQW showed that there was significant improvement in the overall physicochemical characteristics.

Keyword: Phosphorus recovery; aquaculture wastewater; nutrients and eutrophication

1.0: Introduction