

Optimization of Phosphorus Recovery Process from Swine Wastewater in Struvite

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Phosphorus, an essential element for living creature, has been regarded as non-renewable resources. Struvite formation as one of phosphorus recovery technologies is relatively straightforward compared to other reaction. This study was conducted to optimize struvite producing reactor which was newly designed with 20L of effective volume. Using swine wastewater as the influent, the reactor optimization was carried out followed by response surface methodology. The experimental design was set up with the central composite design as one of fractional factorial design. In order to determine the optimal operational condition, the responses of particle size(μm) and ortho-P removal were set and the variables of pH (9, 9.5, 10), circulation rate (CR) (0.5, 1.0, 1.5L/min), and hydraulic retention time (HRT) (1, 3, 5h) were selected in three levels, respectively. Total 18 Runs were constructed and showed average 90.8% of ortho-P removal efficiency from all the Runs. As result of statistical analyses via analysis of variance, particle size was mainly governed by the changes of CR. The optimal operational condition of pH, CR and HRT was selected with [pH 9.0; CR 1.5L/min; HRT 2.1h]