

Effects of mixing types by air diffuser on the performance of phosphorus recovery process using swine manure

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Phosphorus regarded as non-renewable material and is an essential element. Because it is expected to be exhausted with-in 90 years. Therefore, it is important to recover phosphorus. Struvite crystallization as one of phosphorus recovery methods has been widely studied. This study was performed to evaluate mixing regime varied by 2 types of air diffuser (A, doughnut; B, ball) in a cylindrical reactor. Mixing the fluid for chemical reaction was controlled by both circulation nozzle for liquid and air diffuser for air supply. The ranges of circulation rate (CR) was set from 20 to 40 Q and aeration rate was fixed with $0.5 \text{ m}^3/\text{m}^3 \cdot \text{min}$. Swine wastewater was used as the influent and the reactor operation was set by the optimal condition. Both types showed O-P removal efficiency of over 90%, but the T-P removal efficiency of 87.6% from A-type were significantly higher than B-type ($P < 0.05$), which was probably caused by the combination with circulation nozzle to form fluid flow and A-type diffuser may facilitate struvite to settle down in a reactor when compared to B-type. Consequently, A-type was found to be profitable in managing and improving struvite recovery.