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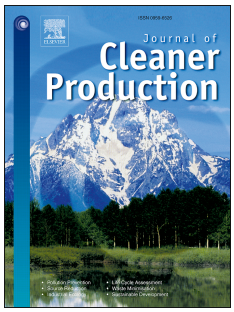

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Occurrence and ecological risks of veterinary antibiotics in struvite recovered from swine wastewater

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Abstract

Struvite recovered from swine wastewater has been proved as an efficient fertilizer to a range of crops in pot or field studies, but the residue of antibiotics in the recovered struvite products would bring about potential ecological risks in the subsequent farming applications. In this study, the occurrence and ecological risks of antibiotics were investigated in the struvite products harvested from two common crystallization reactors, i.e., stirred reactor (SR) and fluidized-bed reactors (FBR), and compared with that in original swine manure. Results showed that veterinary antibiotics (VAs) contents and the levels of hazard quotient (HQ) were significantly lower in the struvite products on the comparison of the swine manure, where better safety was observed in FBR products. Further decrease of VAs contents in struvite recovered from FBR can be achieved through increasing upflow velocity, recycle ratio or harvesting products with larger size. Regarding the transfer mechanism, the antibiotic adsorptions during the struvite crystallization were probably owing to the ternary complexation among organic matter (OM), Ca and VAs, implying that the elimination of the concentrations of OM or Ca could be a simple and efficient approach to lower the antibiotics risks in the struvite products.