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## AN NOVEL UCSB-ANR INTEGRATED SYSTEM FOR EFFICIENT REMOVAL OF ORGANIC MATTER AND AMMONIA NITROGEN FROM SWINE WASTEWATER

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### Abstract

A combined system of up-flow cyclic sludge bed (UCSB) and aerobic nitrification reactor (ANR) was designed for organic matter and ammonia nitrogen (NH<sub>4</sub>-N) removals of swine wastewater. The UCSB had one acidogenic zone for hydrolytic acidification to solve the problem of poor carbon source in swine wastewater, and the other zone for denitrification. Results showed that average removals of the chemical oxygen demand (COD) and NH<sub>4</sub>-N were 92% and 95%, respectively, under the following conditions: influent COD of about 5,670 mg/L, hydraulic retention time (HRT) of 48 h and reflux ratio of 8. After acidogenic zone of the UCSB, the average 5-day biochemical oxygen demand (BOD<sub>5</sub>) to COD ratio increased from 0.51 in the influent to 0.71, implying that biodegradability of the swine wastewater was improved. Short chain fatty acids (SCFAs) contents of the influent were lower than that in the acidogenic zone, and higher than that in the denitrification zone of the UCSB, indicating that SCFAs was produced in the acidogenic zone, and consumed as the preferred carbon source for denitrification in the latter zone.

*Key words:* ammonia nitrogen removal, biological treatment, novel integrated process, organic matter degradation, swine wastewater

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