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反硝化聚磷SBR与微动力曝气组合技术处理猪场废水的研究

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中文关键词 [反硝化聚磷](#) [SBR](#) [微动力](#) [同步脱氮除磷](#)

英文关键词 [DNPAO](#) [SBR](#) [low-intensity](#) [simultaneous nitrogen and phosphorus removal](#)

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中文摘要

在实验室模拟条件下,以猪场废水(粪尿及冲洗水等混合废水)为例,研究传统SBR(A/O模式)与反硝化聚磷(DNPAO)SBR在脱氮除磷及有机质降解方面的可行性及其功效。结果发现,采用传统SBR工艺直接处理猪场废水,其处理系统效率较低,处理效果不稳定,出水水质不佳,废水处理后出水TN、TP和BOD₅的去除率分别为89.08%、86.04%和93.88%。而改用反硝化聚磷SBR,同时配以微动力曝气法,采用废水输入两步法与双循环“厌氧-缺氧/微氧”运行模式,可实现猪场废水TN、TP和BOD₅去除率分别高达93.95%、99.26%和99.93%。由于其独特的工艺设计可使处理水NO₃⁻浓度和输出负荷“双低”。同时ORP、pH与DO 3项关键参数的动态变化可以间接地揭示微动力曝气SBR技术运行状态及出水水质,但在实际条件下的中试运行成效有待于进一步研究。

英文摘要

The wastewater from animal farms in China is threatening the quality and security of local water environment. In the laboratory scale, a traditional SBR(A/O) and a denitrifying phosphorus-accumulating organisms(DNPAO) sequencing batch reactor(SBR) in biologically removing nutrients and organic matters from swine manure were investigated in this study. When piggery wastewater was directly treated with a traditional SBR, the efficiency was low with unstable working state, the reduction of TN,TP and BOD₅ reached 89.08%,86.04% and 93.88%, respectively. While it performs a good effect in treating high density of piggery wastewater using DNPAO SBR technology, with the help of low-density aeration, two-step of influent feeding and two circulations of anaerobic-anoxic-anaerobic-anoxic(An/Ax\2), the reduction of TN,TP and BOD₅ reached the maximums of 93.95%,99.26% and 99.93%, respectively. The specific operation of (An/Ax\2) SBR contributed both low concentrations and limited export loads of NO₃⁻. The temporal curves of ORP,pH and DO over time could be indicators for simultaneous removals of nitrogen and phosphorus along with biodegradation of organic matter during this specific SBR running. A pilot-scale investigation was recommended to further testify the feasibility and efficiency of this kind of SBR under the real-world condition.

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