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溶解氧对Biolak型A^{2}O工艺脱氮除磷性能的影响

Effect of dissolved oxygen on removal of nitrogen and phosphorus in Biolak/A^{2}O process

关键词：溶解氧 Biolak型A^{2}O工艺 脱氮除磷 同步硝化反硝化

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摘要：通过对Biolak型A^{2}O工艺处理生活污水工程应用的研究,考察了好氧段溶解氧(DO)浓度对该工艺脱氮除磷的影响.试验结果表明,DO浓度变化对系统COD、NH_4^+-N处理效果的影响不大,而对系统总氮及总磷的去除效果影响显著.当DO浓度控制在0.80~1.50 mg·L^{-1}之间时,系统总氮去除效果最佳,可以达到69.5%,系统好氧段可实现同步硝化反硝化除氮.通过对系统氮进行物料衡算发现,23.7%的总氮通过好氧段多级A/O反硝化脱氮去除.当DO浓度为1.00~3.00 mg·L^{-1}时,总磷(TP)去除率较高,可以达到74.0%.DO浓度控制在1.00~1.50 mg·L^{-1}之间时,系统脱氮除磷效果最佳,此时TN、TP的去除率分别为68.9%、73.7%,二级生化处理段出水TN、TP分别为12.02、0.95 mg·L^{-1}.

Abstract: A full-scale Biolak/A^{2}O process was studied to treat domestic wastewater. The effect of dissolved oxygen(DO) in oxic zone on removal of nitrogen and phosphorus in the system was investigated. The results indicated that the variation of DO concentration has no significant effect on the removal of COD and NH_4^+-N. However the nitrogen and phosphorus removal efficiency in the system is significantly affected by the DO concentration. By controlling DO at 0.80~1.50 mg·L^{-1}, the treatment efficiency of system is near optimal with the total nitrogen efficiency of 69.5%. The simultaneous nitrification and denitrification can be achieved under this condition. Based on the calculation equations and transformation pathways of nutrients, about 23.7% of total nitrogen (TN) was removed by multistage A/O system in the oxic tank. When DO is 1.00~3.00 mg·L^{-1}, the total phosphorus (TP) removal efficiency reaches the maximum at 74.0%. DO in the range of 1.00~1.50 mg·L^{-1} is optimal for removal of nutrient in Biolak/A^{2}O process, with removal efficiency of TN and TP of 68.9% and 73.7%, respectively. TN and TP of the effluent are 12.02 mg·L^{-1} and 0.95 mg·L^{-1}, respectively.

Key words: dissolved oxygen Biolak/A^{2}O process nitrogen and phosphorus removal simultaneous nitrification and denitrification

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