

污泥干化芦苇床中积存污泥的氮磷变化规律

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Variation of Total Nitrogen and Total Phosphorus in Sludge Treated in Sludge Drying Reed Beds

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摘要 污泥干化芦苇床是近年发展起来的新型污泥处理技术,为探明污泥干化芦苇床中积存污泥的氮磷变化特征,进行为期3 a的试验研究。试验设3个单元: I单元作为对照(传统干化床),未种植植物; II和III单元种植芦苇(污泥干化芦苇床)。I和II单元底部设通气装置。前2 a为负荷期,植物生长期进泥,冰封期闲置;第3年为污泥自然稳定期。试验结果表明,II和III单元对污泥中TN和TP的去除效果优于I单元,对TN去除率分别为56.3%、53.2%和47.9%,TP去除率分别为18.8%、19.2%和10.3%。填料层设置通气结构有利于污泥中氮素的转化和去除,但对除磷无明显影响。至第3年末(11月),I、II和III单元积存污泥TN、TP平均含量分别为37.0、31.0、33.2和7.00、6.33、6.30 g·kg⁻¹。

关键词: 芦苇床 全氮 全磷 剩余污泥处理 污泥干化

Abstract: The technology of sludge drying reed bed is a new type of sludge treatment technique developed in recent years. To explore variation of total nitrogen and total phosphorus in the sludge treated in the sludge drying reed beds, a 3-year experiment was carried out. The experiment was designed to have 3 units. Unit I was set as control (conventional drying bed) with no plant cultivated thereupon; Units II and III had reeds planted (sludge drying reed bed); and Units I and II had an aeration apparatus installed underneath. The first two years were as loading period. Sludge was loaded in during the reed growing season, and loading stopped when the beds were frozen. The third year witnessed natural stabilization of the sludge in the beds. Results show that Units II and III were much better than Unit I at removing nitrogen and phosphorus from sludge, with total nitrogen removal rate being 56.3%, 53.2% and 47.9%, respectively, and total phosphorus removal rate being 18.8%, 19.2% and 10.3%, respectively. Aeration helped transformation of nitrogen in the sludge and hence increased removal of N, but it did not have any effect on P removal. At the end of the third year (in November), TN in Units I, II and III was 37.0, 31.0 and 33.2 g·kg⁻¹ and TP 7.00, 6.33 and 6.30 g·kg⁻¹, respectively.

Keywords: reed bed total nitrogen total phosphorus residual sludge treatment sludge drying

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