**《Journal of Environmental Management》杂志刊登“垂直固定床反应器间歇曝气方式对合成废水中的氮、碳的去除效果”**

作者：Rafael B. Moura, Márcia H.R.Z. Damianovic, Eugenio Foresti

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关键词：碳氮去除；间歇曝气；固定床反应器；聚氨酯泡沫

摘要：用单一反应器去除氮和有机物，以及在间歇曝气条件下，反应器在批处理模式下的运行一直是研究关注的焦点。本研究的目的是评估一个新的反应器的应用情况，该反应器包括一个在连续进料和间歇曝气条件下运行的固定床反应器。该反应器的材料是丙烯酸纤维，工作容积为6.1升。用于承载生物质的固定床是垂直放置于反应区域内的聚氨酯泡沫圆筒。反应器在间歇曝气（曝气2小时，停曝1小时）和循环比为5（Qr/Q = 5）的条件下运行。研究分别对三种不同的运行条件（一期，二期，三期）相应的水力停留时间（12小时，8小时，10小时）进行测试。在第一期中，系统对总氮和化学需氧量的去除率分别达到了82%和89%。在水力停留时间为8小时和10小时的情况下，反应器对于总氮的去除率不稳定，得到的平均去除率为49%和45%。但是，化学需氧量的去除率仍然维持在很高水平，二期和三期分别是85%和88%。因此，这种新型反应器可以有效地去除废水中的氮和有机物。

**Nitrogen and carbon removal from synthetic wastewater in a vertical structured-bed reactor under intermittent aeration**

Authors: Rafael B. Moura, Márcia H.R.Z. Damianovic, Eugenio Foresti

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Abstract: The removal of nitrogen and organic matter using a single reactor has been a common focus of investigation, and reactors operated in batch mode and under intermittent aeration have attracted special attention. This study aimed to evaluate the application of a new reactor configuration consisting of a fixed-bed reactor that was operated under conditions of continuous feeding and intermittent aeration. The reactor was built using acrylic, with a working volume of 6.1 L. The fixed bed used for biomass support was composed of polyurethane foam cylinders vertically oriented inside the reaction zone. The reactor was operated under intermittent aeration (2 h aerated and 1 h non-aerated) and a recirculation ratio Qr/Q = 5. Three different operating conditions (Phase I, Phase II, and Phase III) corresponding to hydraulic retention times (HRT) of 12 h, 8 h, and 10 h, respectively, were tested. In Phase I, the system achieved total nitrogen (TN) and chemical oxygen demand (COD) removal efficiencies of 82% and 89%, respectively. At HRTs of 8 h and 10 h, the reactor was unstable with respect to TN removal, and the average resultant removal efficiencies were 49% and 45%, respectively. However, COD removal efficiencies remained high with mean values of 85% and 88% for Phases II and III, respectively. Based on these results, it can be concluded that this new reactor configuration constitutes an alternative method for effective removal of organic matter and nitrogen from wastewater.

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**翻译：**胡鹏 ；**审核：翟家齐**