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四种不同植物湿地对不同C/N比生活污水的净化效果与季节动态

The seasonal variation performance of vertical subsurface flow constructed wetlands with four plants under different influent C/N ratios

关键词: [垂直流湿地](#) [C/N比](#) [植物选择](#) [去除率](#) [季节动态](#)

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摘要: 进水浓度、C/N比、植物种类是影响垂直流型人工湿地对生活污水净化效果的重要因素.本文主要研究了菖蒲(*Acorus calamus*)、香蒲(*Typha orientalis*)、千屈菜(*Lythrum salicaria*)和水葱(*Scirpus Validus*)等4种植物湿地在不同碳添加及C/N比处理条件下对模拟生活污水的净化效果和季节动态.结果表明,4种湿地植物在不同C/N比(2.5:1、5:1和10:1)进水条件下均能正常生长.在一个生长季内4种湿地植物对主要污染物的平均去除效率为:COD 63.41%~78.02%,TN 33.19%~52.86%,TP 52.64%~73.16%.当C/N为5:1时,香蒲湿地的COD和TP去除效果最佳,而当C/N为2.5:1时,菖蒲湿地的TN去除率最高.夏末秋初(7-9月)人工湿地的净化效果较好,而冬季(11月-翌年1月)去除效果明显下降.总体而言,合理地调控进水浓度、C/N比,选择最佳的湿地植物,可显著提高垂直流型人工湿地对生活污水的净化效果.

Abstract: The influent water quality, C/N ratios and wetland plants could affect the treatment performance of vertical-subsurface flow constructed wetlands (VSWF). In this study, four kinds of wetland plants, named *Acorus calamus*, *Typha orientalis*, *Lythrum salicaria* and *Scirpus Validus*, were cultivated in the VSWF under different C/N ratios of influent to test the nutrient removal efficiencies and determine the seasonal variation. The results showed that all species grew well under the C/N ratios of 2.5:1, 5:1 and 10:1. The average removal rates of chemical oxygen demand(COD), total nitrogen(TN) and total phosphorous(TP) were 63.41%~78.02%, 33.19%~52.86% and 52.64%~73.16%, respectively. When the C/N ratio was 5:1, COD and TP were effectively removed in VSWF planted with *Typha orientalis* and *Scirpus Validus*. VSWF planted with *Acorus calamus* demonstrated higher N removal efficiency under the C/N ratio of 2.5:1. During the experimental period, the relatively higher nutrient removal efficiency (RE) was achieved from July to September. While RE decreased significantly from November to January. In general, the appropriate C/N ratio of influent water and wetland plant were beneficial to achieve the optimal effect of nutrients removal.

Key words: [vertical subsurface flow constructed wetlands](#) [C/N ratios](#) [plant selection](#) [treatment performance](#) [seasonal variation](#)

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