

研究报告

不同浓度铵态氮对镉胁迫轮叶黑藻生长及抗氧化酶系统的影响

许秋瑾, 金相灿, 王兴民, 扈学文, 陈书琴, 颜昌宙

中国环境科学研究院湖泊生态环境创新基地, 国家环境保护湖泊污染控制重点实验室, 北京 100012

收稿日期 2006-1-6 修回日期 2006-11-30 网络版发布日期 2007-3-21 接受日期

摘要 用含有不同浓度 $\text{NH}_4^+\text{-N}$ (0、0.5、2.0和4.0 $\text{mg}\cdot\text{L}^{-1}$)和10 $\text{mg}\cdot\text{L}^{-1}$ Cd的1/10 Hoagland营养液培养沉水植物轮叶黑藻, 研究了铵态氮对Cd胁迫下轮叶黑藻的生长及抗氧化酶系统的影响, 探讨富营养化污染水体沉水植物退化机理. 结果表明, 10 $\text{mg}\cdot\text{L}^{-1}$ Cd对轮叶黑藻能产生明显的胁迫作用, 叶绿素合成量明显降低; 超氧化物歧化酶(SOD)与过氧化物酶(POD)活性呈先升高后下降的趋势. $\text{NH}_4^+\text{-N}$ 能加速Cd对植物的胁迫作用, 单因子Cd作用3 h时SOD明显升高, 而Cd和 $\text{NH}_4^+\text{-N}$ 共同作用0.5 h SOD就明显升高. Cd与 $\text{NH}_4^+\text{-N}$ 共同作用时, 相对于叶绿素和蛋白质, 抗氧化酶是早期敏感指标, 并且SOD比POD更敏感. 本试验条件下, $\text{NH}_4^+\text{-N}$ 与Cd共同作用2 d后, 对轮叶黑藻的胁迫作用主要取决于Cd, $\text{NH}_4^+\text{-N}$ 的作用几乎可以忽略.

关键词 [NH₄⁺-N](#) [Cd](#) [黑藻](#) [抗氧化酶](#)

分类号

Effects of different concentration ammonium-N on *Hydrilla verticillata* antioxidant enzymes under Cd stress

XU Qiu-jin, JIN Xiang-can, WANG Xing-min, HU Xue-wen, CHEN Shu-qin, YAN Chang-zhou

State Environmental Protection Key Laboratory for Lake Pollution Control, Research Center of Lake Eco-environment, Chinese Research Academy of Environmental Sciences, Beijing 100012, China

Abstract

In this paper, submersed plant *Hydrilla verticillata* was cultivated in a 1/10 Hoagland culture medium added with different concentration $\text{NH}_4^+\text{-N}$ (0, 0.5, 2.0, 4.0 $\text{mg}\cdot\text{L}^{-1}$) and 10 $\text{mg}\cdot\text{L}^{-1}$ cadmium to study the effects of $\text{NH}_4^+\text{-N}$ on *H. verticillata* growth and its antioxidant enzyme system under Cd stress, and approach the degradation mechanism of submersed macrophyte in eutrophic and polluted water bodies. The results showed that under 10 $\text{mg}\cdot\text{L}^{-1}$ Cd stress, the chlorophyll content of *H. verticillata* decreased obviously, and SOD and POD activities increased first but declined then. $\text{NH}_4^+\text{-N}$ accelerated the stress effect of Cd. Under 0.5 h joint stress of Cd and $\text{NH}_4^+\text{-N}$, SOD activity increased significantly, while such an increase needed 3 hours under single Cd stress. Relative to chlorophyll and protein, antioxidant enzyme system was an early sensitive index, and SOD was more sensitive than POD. After two days exposure to Cd plus $\text{NH}_4^+\text{-N}$, *H. verticillata* was mainly stressed by Cd, and $\text{NH}_4^+\text{-N}$ stress could be neglected.

Key words [ammonium-N](#) [cadmium](#) [Hydrilla verticillata](#) [antioxidant enzyme](#)

DOI:

通讯作者

扩展功能

本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(864KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [参考文献](#)

服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

相关信息

- ▶ 本刊中 包含 [“NH₄⁺-N”](#)的 [相关文章](#)
- ▶ 本文作者相关文章

- [许秋瑾](#)
- [金相灿](#)
- [王兴民](#)
- [扈学文](#)
- [陈书琴](#)
- [颜昌宙](#)