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颤蚓生物扰动对沉积物氮释放的影响

Effects of the bioturbation activity of Tubifex tubifex on nitrogen release from sediments

关键词: [颤蚓](#) [生物扰动](#) [沉积物](#) [总氮释放](#)

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摘要: 通过实验室模拟沉积物中颤蚓生物扰动过程,研究了生物扰动对沉积物TN释放的影响,并探讨了温度、pH和DO对颤蚓生物扰动作用下TN释放过程的影响.结果表明,颤蚓生物扰动能促进沉积物TN释放,且促进效果随颤蚓密度的增加而提高.适当地提高温度有助于颤蚓快速生长,提高生物扰动对TN释放的促进效果,温度由15℃提高到25℃,上覆水TN平均增量可从1.66mg·L⁻¹增至2.55mg·L⁻¹;酸性或碱性环境会对颤蚓产生逆境胁迫,颤蚓的应激行为可以强化生物扰动效应,pH为5、7、9和11时,上覆水TN平均增量依次为3.06、2.02、3.05和3.20mg·L⁻¹;颤蚓对厌氧环境表现出较强的适应性,且生物扰动效应更为明显,上覆水TN平均增量为2.06mg·L⁻¹,而好氧环境中则为1.59mg·L⁻¹.

Abstract: By simulating the bioturbation activity of *T. tubifex* in laboratory, the effects of bioturbation on TN release from sediments were studied. The influence of temperature, pH and dissolved oxygen (DO) on TN release during bioturbation of the sediments by *T. tubifex* was investigated. The results indicated that bioturbation of *T. tubifex* promoted TN release of sediments and the effect increased with increased density of *T. tubifex*. Higher temperatures increased the growth rate of *T. tubifex*, which promoted bioturbation and TN release. The mean value of TN increase in overlying water increased from 1.66 mg·L⁻¹ to 2.55 mg·L⁻¹ when the temperature increased from 15 °C to 25 °C. Since acidic and alkali environments would induce stress on *T. tubifex*, the stress behavior under such conditions enhanced the bioturbation effect of *T. tubifex*. The mean TN increases in overlying water of pH5, pH7, pH9 and pH11 were 3.06 mg·L⁻¹, 2.02 mg·L⁻¹, 3.05 mg·L⁻¹ and 3.20 mg·L⁻¹ respectively. *T. tubifex* showed good adaptability to an anaerobic environment, in which more remarkable bioturbation was observed than in an aerobic environment. The mean TN increases of the overlying water in anaerobic and aerobic environments were 2.06 mg·L⁻¹ and 1.59 mg·L⁻¹ respectively.

Key words: [T. tubifex](#) [bioturbation](#) [sediment](#) [TN release](#)

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