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锯末+乙醇作为混合碳源去除地下水中硝酸盐的影响因素研究 

**Effect of sawdust and ethanol as mixed carbon sources on nitrate removal from groundwater**

关键词: [锯末](#) [乙醇](#) [混合碳源](#) [反硝化](#) [地下水](#) [硝酸盐](#)

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**摘要:** 本试验采用室内试验装置,研究了pH、温度、硝酸盐浓度对锯末+乙醇作为混合碳源去除地下水中硝酸盐的影响.结果表明,pH值在5~10内变化时对锯末+乙醇混合碳源体系的硝酸盐去除率影响较大,pH>7时的硝酸盐去除率明显高于pH<7时的去除率;并且随着pH值的增加,亚硝酸盐的积累量越多,锯末+乙醇混合碳源体系最佳的pH值范围是7~8.锯末+乙醇混合碳源体系受温度的影响较大,温度为8.5、15℃时的反硝化速率显著低于25℃时的速率,25℃时的反硝化速率分别是8.5、15℃时的3倍和1.5倍,锯末+乙醇混合碳源体系适宜的温度范围为25~35℃.进水硝酸盐浓度也会影响锯末+乙醇混合碳源体系的反硝化效果,硝酸盐氮浓度在67.8~113 mg·L<sup>-1</sup>范围内变化时,反应体系的硝酸盐去除效果较好.反应初期,硝酸盐浓度越大混合碳源体系的反硝化速率就越低,可能较大的硝酸盐负荷对反硝化细菌产生毒害作用而不利于硝酸盐的去除.

**Abstract:** In this study, mixture of sawdust and ethanol were investigated as carbon sources to remove nitrate from groundwater. The influences of pH, temperature as well as nitrate concentration on nitrate removal efficiency were observed. The results indicated that pH ranging between 5~10 had great effect on the nitrate removal rate by sawdust and ethanol mixture. The nitrate removal rate with pH greater than 7 was obviously higher than that with pH less than 7. The amount of accumulated nitrite increased along with the increasing pH. The optional pH of the mixture for removing nitrate was 7~8. The mixture dependent denitrification was markedly affected by the changes in temperature. The denitrification rate at 25℃ was 3 times and 1.5 times that at 8.5℃ and 15℃ respectively. The optional temperature of the mixture for removing nitrate was 25~35℃. The nitrate concentration also influenced the effect of denitrification in which the mixture was used as carbon sources. When the concentration of nitrate-nitrogen ranged between 67.8~113 mg·L<sup>-1</sup>, the reactor had good nitrate removal efficiency. The larger concentration of nitrate at the first stage of reaction was, the lower of denitrification rate. It was because that large nitrate concentration was deleterious to denitrifying bacteria which was not favored for nitrate removal.

**Key words:** [sawdust](#) [ethanol](#) [mixed carbon sources](#) [denitrification](#) [groundwater](#) [nitrate](#)

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