

秸秆污泥堆肥产纤维素酶细菌的筛选及产酶条件优化

余婷婷, 葛骁, 李买军, 张盛华, 褚艳春, 郭海宁, 王小治, 封克

扬州大学环境科学与工程学院

Screening of Strains of Cellulase-producing Bacteria in Compost of Sewage Sludge and Straw and Optimization of Cellulase-Producing Conditions

SHE Ting-Ting, GE Xiao, LI Mai-Jun, ZHANG Sheng-Hua, CHU Yan-Chun, GUO Hai-Ning, WANG Xiao-Zhi, FENG Ke

College of Environmental Science and Engineering, Yangzhou University

摘要

参考文献

相关文章

Download: [PDF \(1057KB\)](#) [HTML 1KB](#) Export: [BibTeX](#) or [EndNote \(RIS\)](#) [Supporting Info](#)

摘要 从添加秸秆进行堆肥处理的污泥中采集样品, 通过富集培养和刚果红平板染色法筛选分离出具有纤维素降解能力的细菌, 再通过酶活力测定从中分离筛选出1株相对高活性的产纤维素酶细菌C1; 通过基于16S rRNA基因序列的系统发育分析, 初步确定该菌株为 *Devosia* sp.。利用单因素试验对目的菌株C1进行产纤维素酶发酵条件优化, 结果表明菌株C1产纤维素酶的最佳发酵时间、培养温度、摇床转速以及最适初始pH值分别为60 h、30 ℃、130 r·min⁻¹和pH 7.2~7.5, 且在该条件下其滤纸酶 (FPase) 和羧甲基纤维素酶 (CMCase) 活力分别达23.10和54.97 U·mL⁻¹。

关键词: 纤维素降解 筛选 酶活力 条件优化 鉴定

Abstract: Samples collected from compost of sludge and straw were incubated for enrichment culture, and then strains of bacteria capable of decomposing cellulose were screened out with the Congo red staining plate method. Enzyme activities of the stains of bacteria were measured and one strain, relatively higher in cellulose-producing activity, was isolated as C1. Phylogenetic analysis based on 16S rRNA gene sequences revealed that the isolated strain of bacteria, C1, was preliminarily identified as *Devosia* sp. Single factor experiments were adopted to optimize the fermentation conditions for C1. Results show that for C1, 60 hours of incubation at 30℃ with the culture medium being in the range of 7.2-7.5 in initial pH in the shaker rotating at a rate of 130 r·min⁻¹ was the optimal cellulase-producing condition. Under such conditions, the activities of filter paper enzyme (FPase) and carboxymethyl cellulase (CMCase) produced by Strain C1 reached 23.10 U·mL⁻¹ and 54.97 U·mL⁻¹ respectively.

Keywords: cellulose-decomposing screening activities of enzyme condition optimization identification

Received 2013-03-14; published 2013-11-25

Fund:

扬州市-扬州大学校地合作专项(YZ2011146); 江苏省普通高校研究生科研创新计划(CXLX13-910); 国家大学生创新创业训练计划(201311117025)

Corresponding Authors: 王小治 扬州大学环境科学与工程学院 Email: xzwang@yzu.edu.cn

About author: 余婷婷 (1988-), 女, 江苏南通人, 硕士生, 主要研究方向为固体废弃物处理处置及资源化利用。E-mail: tingtingshe.1988@yahoo.com.cn

引用本文:

余婷婷, 葛骁, 李买军, 张盛华, 褚艳春, 郭海宁, 王小治, 封克. 秸秆污泥堆肥产纤维素酶细菌的筛选及产酶条件优化[J] 生态与农村环境学报, 2013, V29(6): 768-772

SHE Ting-Ting, GE Xiao, LI Mai-Jun, ZHANG Sheng-Hua, CHU Yan-Chun, GUO Hai-Ning, WANG Xiao-Zhi, FENG Ke. Screening of Strains of Cellulase-producing Bacteria in Compost of Sewage Sludge and Straw and Optimization of Cellulase-Producing Conditions[J] Journal of Ecology and Rural Environment, 2013, V29(6): 768-772

Service

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ Email Alert
- ▶ RSS

作者相关文章

- ▶ 余婷婷
- ▶ 葛骁
- ▶ 李买军
- ▶ 张盛华
- ▶ 褚艳春
- ▶ 郭海宁
- ▶ 王小治
- ▶ 封克