

快速检索

检索

高级检索

首页

稿约信息

编者论坛

编委会

关于本刊

订购本刊

下载中心

陈庆丽,景澄茗,付韵馨,王晓洋,李明堂.寒区水体中溶藻铜绿假单胞菌的分离和性质研究[J].环境科学学报,2015,35(3):692-698

寒区水体中溶藻铜绿假单胞菌的分离和性质研究

**Isolation and characteristics of algicidal *Pseudomonas aeruginosa* from water body in cold region**关键词: [溶藻菌](#) [铜绿假单胞菌](#) [铜绿微囊藻](#) [水华](#) [富营养化](#)基金项目: [国家自然科学基金\(No.51109089\)](#); [吉林省科技发展计划项目\(No.20100141.20130206031NY\)](#)

作者 单位

陈庆丽 吉林农业大学资源与环境学院, 长春 130118

景澄茗 吉林农业大学资源与环境学院, 长春 130118

付韵馨 吉林农业大学资源与环境学院, 长春 130118

王晓洋 吉林农业大学资源与环境学院, 长春 130118

李明堂 吉林农业大学资源与环境学院, 长春 130118

摘要: 我国北方,尤其是东北地区的一些水体由于富营养化导致的水华现象呈增加趋势,成为急需解决的水环境问题.溶藻菌可从生态调控的角度来控制水华的爆发,因此在富营养化水体治理方面逐渐得到重视.本文从寒区水华爆发水体中分离获得了一株溶藻细菌JM1,系统发育分析表明,菌株JM1与铜绿假单胞菌的同源性最高.VITEK系统鉴定表明,菌株JM1与铜绿假单胞菌的相似度为98%.菌株JM1在不同的碳源和氮源培养基中可产生不同颜色和pH值的代谢产物,而以葡萄糖和蛋白胨分别为碳源和氮源时发酵液的溶藻效果明显好于其它培养基.菌株JM1的溶藻效果随藻细胞初始密度的降低而增强,随发酵液添加量的增加而增加;当菌体细胞的密度达到 $10^{11}$  CFU·mL<sup>-1</sup>时,可单一抑制藻细胞的生长;当菌体细胞的密度大于 $10^5$  CFU·mL<sup>-1</sup>时,菌体细胞可促进发酵液的溶藻作用.发酵液作用于藻细胞6 h时可明显影响其恢复能力,当暴露时间达18 h时,藻细胞彻底丧失了恢复能力.菌株JM1发酵液在中性和偏碱性的藻液中的溶藻效果最强,并且经过酸化、碱化和高温处理后,仍然保持较高的溶藻活性.本研究可为基于微生物作用过程的水华控制提供优势的土著菌种及其应用上的技术支持.

**Abstract:** As a result of eutrophication of water body, the algal bloom shows an increasing trend in North China, especially in Northeast China, therefore becoming a pressing water environmental issue. More attention has been paid to algicidal bacteria in eutrophic water body treatment because they can control algal bloom from ecological regulation point of view. This paper screened a strain of bacterium JM1 which showed strong algicidal effect. According to phylogenetic analysis and VITEK identification system, strain JM1 was identified as *Pseudomonas aeruginosa*. Strain JM1 produced metabolites with different colors and pH values in different culture media containing different carbon and nitrogen sources. The fermentation fluid produced by strain JM1 grown on glucose and peptone showed better algicidal effect, compared with those on other culture media. The algicidal effect increased with decreasing initial algal cell density and increasing additive amount of fermentation fluid. The bacterial cells with the density of  $10^{11}$  CFU·mL<sup>-1</sup> could inhibit algal cells growth themselves. The bacterial cells could promote the algicidal effect of fermentation fluid when their densities were more than  $10^5$  CFU·mL<sup>-1</sup>. After 6 h of exposure to fermentation fluid, the recovery capacity of algal cells was significantly affected and algal cells were completely deprived of recovery capacity after 18 h of exposure. The fermentation fluid of strain JM1 showed strong algicidal effect under neutral and weakly-alkaline conditions. The fermentation fluid still showed strong algicidal effect even after treatment of acidification, alkalification and high temperature treatment. This study could provide dominant bacterium and technical support in the algal bloom control based on microbial processes.

**Key words:** [algicidal bacteria](#) [Pseudomonas aeruginosa](#) [Microcystis aeruginosa](#) [algal bloom](#) [eutrophication](#)

摘要点击次数: 1165 全文下载次数: 1892

关闭

下载PDF阅读器

您是第27535360位访问者

主办单位: 中国科学院生态环境研究中心

单位地址: 北京市海淀区双清路18号 邮编: 100085

