

后生物生产层

利用能源牧草柳枝稷生产燃料乙醇的研究进展

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摘要:

能源作物柳枝稷(Panicum virgatum)因其种植成本低、管理简便、生长周期短、收益高并对环境有积极的影响作用而成为能源研究的热点。本研究从柳枝稷的能源开发特性、栽培与管理方式、生物技术改良方法以及生物燃料的转换工艺等方面综述了能源作物柳枝稷的研究进展。并以生物技术为出发点, 针对柳枝稷的生物学特性讨论了如何引种驯化、克服抗性、使纤维素得到有效降解、提高生物质含量以及乙醇的产率等问题。在生物燃料的转换工艺中, 对酶的优化方法、不同微生物的发酵效率进行了分析, 认为在同步糖化发酵中不仅微生物的特性要作为重要指标考虑, 间歇式培养, 细胞回收的连续式培养以及原位乙醇的移除等发酵过程的选择也尤为重要。

关键词: 柳枝稷; 燃料乙醇; 生物技术; 发酵

Advances in biofuel ethanol from bioenergy crop switchgrass

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Abstract:

Switchgrass(Panicum virgatum) has become hot point in the bioenergy crop research because its low cost of plant, convenient management, short life cycle, high yield, and positive effects to environment. This paper reviewed the characteristic of energy, the way of plant and management, the method of biotechnology modification, and the translating process of biofuel of switchgrass. Also, the key issues include overcoming recalcitrance, efficient breakdown of cellulose, and increasing biomass and lipid production for ethanol and biodiesel were analyzed. The optimization method of enzyme and the fermentation efficient of different microorganism, the vital indexes of microorganism feature should not only be considered in the process of simultaneous saccharification and fermentation, fermentation strategies such as batch culture, continuous culture with cell recycling and in situ ethanol removal are also important.

Keywords: Panicum virgatum fuel ethanol biotechnology fermentation

收稿日期 修回日期 网络版发布日期

DOI:

基金项目:

通讯作者:

作者简介:

作者Email:

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