

生物化学工程与技术

利用甘蔗糖蜜半连续发酵生产琥珀酸

董晋军, 郑璞, 孙志浩, 倪晔, 刘宇鹏

工业生物技术教育部重点实验室, 江南大学生物工程学院; 河南大学生命科学学院生物工程研究所

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摘要 为获得较高的琥珀酸发酵产量和生产强度, 对Actinobacillus succinogenes CGMCC1593两级双流半连续发酵甘蔗糖蜜生产琥珀酸的工艺过程进行了研究。通过对一级罐初始总糖浓度、补加培养基体积分数和批次发酵时间等发酵条件的优化, 琥珀酸产量较分批发酵36 h提高12.9%, 与补料分批发酵结果接近; 生产强度较分批发酵和补料分批发酵分别提高111%和114%。

关键词

[琥珀酸](#) [甘蔗糖蜜](#) [半连续发酵](#) [Actinobacillus succinogenes](#)

分类号

Semi-continuous production of succinic acid from cane molasses by *Actinobacillus succinogenes*

DONG Jinjun,ZHENG Pu,SUN Zhihao,NI Ye,LIU Yupeng

Abstract

In this work, the semi-continuous succinic acid fermentation by Actinobacillus succinogenes CGMCC1593 from cane molasses with a novel two-stage and two-stream system was studied, in order to increase the succinic acid productivity. The fermentation conditions of the first stage, such as initial sugar concentration, medium addition volume, and time interval of each loading were optimized. Under the optimized condition the maximum succinic acid productivity ($2.38 \text{ g} \cdot \text{L}^{-1} \cdot \text{h}^{-1}$) was increased by 111% and 114% compared with those obtained in batch and fed batch fermentation, respectively. In addition, the maximum succinic acid concentration ($46.0 \text{ g} \cdot \text{L}^{-1}$) increased by 12.9% compared with that in batch fermentation, and reached a compatible level of that obtained in fed batch fermentation (36 h , $48.8 \text{ g} \cdot \text{L}^{-1}$). This process was operated stably for 39 circles without any decreases in both succinic acid concentration and productivity. During the 39 operation circles, the fermentation time of each batch (stage 1 and stage 2), the average succinic acid concentration, succinic acid productivity, succinic acid yield, and sugar conversion rate were 21—24 h, $43.5 \text{ g} \cdot \text{L}^{-1}$, $2.07 \text{ g} \cdot \text{L}^{-1} \cdot \text{h}^{-1}$, $0.79 \text{ g} \cdot \text{g}^{-1}$, and 96.4%, respectively.

Key words

[succinic acid](#) [cane molasses](#) [semi-continuous fermentation](#) [Actinobacillus succinogenes](#)

DOI:

通讯作者 孙志浩 sunw@public1.wx.js.cn; djj0612@yahoo.com.cn

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