

生物化学工程与技术

不同溶氧控制方式下的谷胱甘肽分批发酵过程分析

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摘要

分析了产朊假丝酵母生产谷胱甘肽(GSH)的摇瓶发酵过程,发现溶氧浓度的大小成为影响细胞生长和GSH产量的重要因素。在此基础上,研究了恒溶氧和恒转速条件下的GSH分批发酵过程,与恒转速发酵相比,恒溶氧控制发酵可以明显提高细胞干重和GSH产量,当恒溶氧浓度为35%时,二者的提高幅度最多可分别达到22%和30%。最后分别采用发酵动力学模型和代谢网络中各代谢物通量的分布情况对该结果产生的原因进行了定量解释。

关键词

[谷胱甘肽](#) [分批发酵](#) [溶解氧](#) [动力学](#) [代谢通量分析](#)

分类号

Analysis of batch fermentation process of glutathione under different control modes of dissolved oxygen

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Abstract

The fermentation process of glutathione production in flasks by *Candida utilis* WSH 02-08 under different agitation rates and diverse media volumes were studied. It was concluded that dissolved oxygen (DO) was one of the most important factors in the cultivation of the strain by influencing cell growth and glutathione production. Based on this result, batch fermentation of glutathione under constant agitation rate of 300 r·min⁻¹ and constant DO concentrations of 20%, 35%, 50%, 65% and 80% were investigated. Dry cell weight (DCW) and glutathione production both increased evidently under constant DO concentrations rather than those obtained under constant agitation rate of 300 r·min⁻¹. As a result, DCW and glutathione production increased under constant DO concentration of 35% by 22% and 30%, respectively. Then the reason for the increase of DCW and glutathione production was quantitatively described in detail by the comparison of parameters obtained from fermentation kinetic models, together with the distribution of flux for metabolites in metabolic network of glutathione production by *Candida utilis* WSH 02-08.

Key words

[glutathione](#) [batch fermentation](#) [dissolved oxygen](#) [kinetics](#) [metabolic flux analysis](#)

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