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高通量培养技术在生物过程中的发展和应用

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摘　要

本综述着重于高通量培养技术的最新进展，及其在质量源于设计驱动下的生物过程发展中的日益广泛应用。批判性地分析了几种实用的高通量培养策略，包括商业化高通量培养平台，例如深孔细胞培养板，微型生物反应器，以及平行发酵系统等，这些策略旨在缩短从DNA到大规模生产过程的研发时间。重点探讨了每一个平台相对的优缺点和局限性，同时也批判性的评价了近年来报道的诸如毫升规模的搅拌式生物反应器、集成微流体的微型生物反应器等新兴微型生物反应器原型，及其在质量源于设计驱动下的高通量过程研发中的潜在应用。由于这些技术的总体目标是快速获得过程参数，并且高通量系统中的分析技术对于这一目标的实现至关重要，本文也对这一快速发展领域进行了探讨。最后，本文批判性地分析了这项技术未来发展的趋势。

Abstract

This review focuses on recent progress in the technology of high throughput (HTP) cultivation and its increasing application in quality by design (QbD)—driven bioprocess development. Several practical HTP strategies aimed at shortening process development (PD) timelines from DNA to large scale processes involving commercially available HTP technology platforms, including microtiter plate (MTP) culture, micro-scale bioreactors, and in parallel fermentation systems, etc., are critically reviewed in detail. This discussion focuses upon the relative strengths and weaknesses or limitations of each of these platforms in this context. Emerging prototypes of micro-bioreactors reported recently, such as milliliter (mL) scale stirred tank bioreactors, and microfludics integrated micro-scale bioreactors, and their potential for practical application in QbD-driven HTP process development are also critically appraised. The overall aim of such technology is to rapidly gain process insights, and since the analytical technology deployed in HTP systems is critically important to the achievement of this aim, this rapidly developing area is discussed. Finally, general future trends are critically reviewed.

其他相关研究

Oxidative stress in fungal fermentation processes: the roles of alternative respiration

《Biotechnology Letters》2011 年 33 期

Introduction to bioreactors of shake-flask inocula leads to development of oxidative stress inAspergillus niger

《Biotechnology Letters》2007 年 29 期

Physiological responses of chemostat cultures of *Aspergillus niger* (B1-D) to simulated and actual oxidative stress

《Biotechnology and Bioengineering》2003 年 82 期

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