

A strategy for controlling production-scale industrial fermentations

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Abstract: In fed-batch fermentation processes, microbial growth can be controlled by setting the feed rate of the process. A problem in industrial fermentation control is the lack of fast and reliable on-line measurements which can be used in processes utilizing a complex medium, but modern dissolved oxygen probes fulfil these criteria. In this study, a strategy for feed rate control in fed-batch fermentations based on frequency analysis of the dissolved oxygen signal was developed. The strategy has been developed and tested in industrial pilot plant scale, where it gave higher growth and better process robustness compared to a reference strategy currently used in this type of process. Studies in production scale indicate that the core principles of the strategy hold there as well.

Keywords: Process control; Frequency response; Fermentation processes; Industrial production systems
