

Non-invasive online detection of microbial lysine formation in stirred tank bioreactors by using calorespirometry.

Regestein L, Maskow T, Tack A, Knabben I, Wunderlich M, Lerchner J, Büchs J (2013) Non-invasive online detection of microbial lysine formation in stirred tank bioreactors by using calorespirometry. *Biotechnol Bioeng* 110(5), 1386-1395.

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Abstract

Non-invasive methods for online monitoring of biotechnological processes without compromising the integrity of the reactor system are very important to generate continuous data. Even though calorimetry has been used in conventional biochemical analysis for decades, it has not yet been specifically applied for online detection of product formation at technical scale. Thus, this article demonstrates a calorespirometric method for online detection of microbial lysine formation in stirred tank bioreactors. The respective heat generation of two bacterial strains, *Corynebacterium glutamicum* ATCC 13032 (wild-type) and *C. glutamicum* DM1730 (lysine producer), was compared with the O₂ -consumption in order to determine whether lysine was formed. As validation of the proposed calorespirometric method, the online results agreed well with the offline measured data. This study has proven that calorespirometry is a viable non-invasive technique to detect product formation at any time point.

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Identifier

doi: 10.1002/bit.24815

PMID: 23280310