

Online determination of viable biomass up to very high cell densities in *Arxula adeninivorans* fermentations using an impedance signal.

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Abstract

Up to now biomass has been measured online by impedance analysis only at low cell densities in yeast fermentations. As industrial fermentation processes focus, for example, on producing high target concentrations of biocatalysts or pharmaceutical proteins, it is important to investigate cell growth under high cell-density conditions. Therefore, for the first time, biomass has been measured online using impedance analysis in a 50L high-pressure stirred tank reactor. As model organism the yeast *Arxula adeninivorans* was cultivated in two chemically defined mineral media at a constant growth rate in fed-batch mode. To ensure aerobic culture conditions over the entire fermentation time, the fermentations were conducted at an elevated headspace overpressure of up to 9.5bar. The highest oxygen transfer rate value of $0.56\text{molL}^{-1}\text{h}^{-1}$ ever reported for yeast fermentations was measured in these investigations. Unlike previous findings, in this study a linear correlation was found between capacitance and biomass up to concentrations of 174gL^{-1} dry cell weight.

Leibniz-HKI-Authors



Lars Regestein

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