

Enhancement of hydrogen production by thermophilic bacterium, *Caldicellosiruptor saccharolyticus*

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Abstract

The high yield hydrogen producing bacterium, *Caldicellosiruptor saccharolyticus*, can produce hydrogen from various carbon sources including cellulose. In this work, the effects of tryptone and nitrogen purging on hydrogen production were investigated. By introducing these conditions, hydrogen production in fed-batch operation was improved greatly.

When the concentration of tryptone increased from 0 g/l to 2 g/l, the production of hydrogen was decreased even though the cell growth was increased. This result indicates that tryptone should be omitted from the medium to improve hydrogen production. The maximum hydrogen production and specific hydrogen production were estimated as 2448.7 ml/l and 551.9 ml/g DW/h, respectively.

Hydrogen in gas phase should be removed because of inhibition of hydrogen production. With intermittent nitrogen purging, cells were grown exponentially and hydrogen production was improved 1.3 times than control. Finally, productivity was improved more than three times in fed-batch operation with nitrogen purging.

Reference

1. Osamu Mizuno et al., Enhancement of hydrogen production from glucose by nitrogen gas sparging (2000), *Bioresource Technology*, 73, 59-65.