

### Thermophilic fermentation hydrogen production from xylose by *Thermotoga neapolitana* DSM 4359 using a 3L-CSABR system

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Biohydrogen production from xylose by *Thermotoga neapolitana* was investigated in continuously stirred anaerobic bioreactor (CSABR). The highest hydrogen production of  $32.1 \pm 1.6$  mmol-H<sub>2</sub>/L and maximum biomass concentration of  $959.63 \pm 47.9$  g/L were obtained at initial xylose concentration of 5.0 g/L. To develop a large scale biohydrogen production system as well as overcome the problems in small batch culture, an CSABR was tested on *T. neapolitana* in both pH-uncontrolled batch culture and pH-controlled batch culture. The results showed that the production level of H<sub>2</sub> in a pH-controlled batch culture was much higher than those from a pH-uncontrolled batch culture for H<sub>2</sub> production. In order to study the precise effect of a stable pH on hydrogen production, and metabolite pathway involved, cultures was conducted with pH-controlled at different levels ranging from 6.5 to 7.5. The maximum H<sub>2</sub> yield of  $2.8 \pm 0.14$  mol-H<sub>2</sub>mol<sup>-1</sup> xylose<sub>consumed</sub> was measured while the pH was maintained at 7.0. The acetic acid and lactic acid production were  $2.98 \pm 0.15$  g/L and  $0.36 \pm 0.02$  g/L, respectively.