Ethanol production from glucose and xylose by immobilized Thermoanaerobacter pentosaceus at 70 °C in an up-flow anaerobic sludge blanket (UASB) reactor

The newly isolated extreme thermophilic ethanologen Thermoanaerobacter pentosaceus was immobilized in different support materials in order to improve its ethanol production ability. In batch fermentation, a maximum ethanol yield of 1.36 mol mol\(^{-1}\) consumed sugars was obtained by T. pentosaceus immobilized on rapeseed straw. Additionally, immobilized T. pentosaceus’ ethanol production was improved by 11 % in comparison to free cells. In continuous mode, it was shown that hydraulic retention time (HRT) affected ethanol yield, and a dramatic shift from ethanol to acetate and lactate production occurred at an HRT of 6 h. The maximum ethanol yield and concentration, 1.50 mol mol\(^{-1}\) consumed sugars and 12.4 g l\(^{-1}\), were obtained with an HRT of 12 h. The latter represented an improvement of 60 % in relation to previously obtained results. This indicates that immobilization of T. pentosaceus is an effective strategy to improve its ethanol production ability.
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