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INFLUENCE of FLUID DYNAMIC CONDITIONS on ENZYMATIC HYDROLYSIS of LIGNOCELLULOSIC BIOMASS: EFFECT of MASS TRANSFER RATE

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ABSTRACT

The effect of fluid dynamic conditions on enzymatic hydrolysis of acid pretreated corn stover (PCS) has been assessed. Runs were performed in stirred tanks at several stirrer speed values, under typical conditions of temperature (50 ºC), pH (4.8) and solid charge (20% w/w). A complex mixture of cellulases, xylanases and mannanases was employed for PCS saccharification. At low stirring speeds (<150 rpm), estimated mass transfer coefficients and rates, when compared to chemical hydrolysis rates, lead to results that clearly show low mass transfer rates, being this phenomenon the controlling step of the overall process rate. However, for stirrer speed from 300 rpm upwards, the overall process rate is controlled by hydrolysis reactions. The ratio between mass transfer and overall chemical reaction rates changes with time depending on the conditions of each run.

KEYWORDS

Enzymatic hydrolysis, Lignocellulosic biomass, Mass transfer, Stirrer speed, Fluid dynamic

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