

Enzymatic ProEnduction of Bioxylitol from Sawdust Hydrolysate: Screening of Process Parameters

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ABSTRACT

Xylose-rich sawdust hydrolysate can be an economic substrate for the enzymatic production of xylitol, a specialty product. It is important to identify the process factors influencing xylitol production. This research aimed to screen the parameters significantly affecting bioxylitol synthesis from wood sawdust by xylose reductase (XR). Enzymatic bioxylitol production was conducted to estimate the effect of different variables reaction time (2–18 h), temperature (20–70 °C), pH (4.0–9.0), NADPH (1.17–5.32 g/L), and enzyme concentration (2–6 %) on the yield of xylitol. Fractional factorial design was followed to identify the key process factors. The screening design identified that time, temperature, and pH are the most significant factors influencing bioxylitol production among the variables with the values of 12 h, 35 °C, and 7.0, respectively. These conditions led to a xylitol yield of 71 % (w/w). This is the first report on the statistical screening of process variables influencing enzyme-based bioxylitol production from lignocellulosic biomass.

KEYWORDS: Bioconversion; Hemicellulosic hydrolysate; Screening design; Bioxylitol; Xylose; Xylose reductase

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