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Production of cellulosic ethanol from sugarcane bagasse by steam explosion: effect of extractives content, acid catalysis and different fermentation technologies

P.V. Neves, A.P. Pitarelo, L.P. Ramos

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4 Neves, P. V.<sup>1</sup>; Pitarelo, A. P.<sup>1,2</sup>; Ramos, L. P.<sup>1</sup>

5 <sup>1</sup> Research Center in Applied Chemistry (CEPESQ), Department of Chemistry, Federal  
6 University of Paraná, Curitiba, PR, Brazil.

7 <sup>2</sup> Sugarcane Technology Center (CTC), Piracicaba, SP Brazil.

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9 \*Corresponding author

10 Email: luiz.ramos@ufpr.br; Phone: 55 41 33613175

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12 **Abstract**

13 The production of cellulosic ethanol was carried out using samples of native (NCB) and  
14 ethanol-extracted (EECB) sugarcane bagasse. Autohydrolysis (AH) exhibited the best  
15 glucose recovery from both samples, compared to the use of both H<sub>3</sub>PO<sub>4</sub> and H<sub>2</sub>SO<sub>4</sub>  
16 catalysis at the same pretreatment time and temperature. All water-insoluble steam-  
17 exploded materials (SEB-WI) resulted in high glucose yields by enzymatic hydrolysis. SHF  
18 (separate hydrolysis and fermentation) gave ethanol yields higher than those obtained by  
19 SSF (simultaneous hydrolysis and fermentation) and pSSF (pre-hydrolysis followed by  
20 SSF). For instance, AH gave 25, 18 and 16 g L<sup>-1</sup> of ethanol by SHF, SSF and pSSF,  
21 respectively. However, when the total processing time was taken into account, pSSF  
22 provided the best overall ethanol volumetric productivity of 0.58 g L<sup>-1</sup> h<sup>-1</sup>. Also, the removal  
23 of ethanol-extractable materials from cane bagasse had no influence on the cellulosic  
24 ethanol production of SEB-WI, regardless of the fermentation strategy used for  
25 conversion.

26

27 **Keywords:** sugarcane, ethanol extractives, steam explosion, acid catalysis, enzymatic  
28 hydrolysis, fermentation, cellulosic ethanol

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