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1 **Hydrodynamic cavitation as an efficient pretreatment method for**
2 **lignocellulosic biomass: a parametric study**

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11 **Abstract**

12 Hydrodynamic cavitation (HC), which is a highly destructive force, was employed for
13 pretreatment of sugarcane bagasse (SCB). The efficacy of HC was studied using
14 response surface methodology (RSM) with determining parameters varied: inlet
15 pressure of 1-3 bar, temperature of 40-70 °C, and alkaline concentration of 0.1-0.3M. At
16 the best condition (3 bar, 70 °C and 0.3M NaOH), 93.05% and 94.45% of hydrolysis
17 yield of cellulose and hemicellulose, respectively, were obtained within 30 min of
18 pretreatment time. Also, pretreatment time higher than 10 min had little to do regarding
19 to SCB composition changes using different orifice plates (16 and 27 holes, with
20 corresponding cavitation number of 0.017 and 0.048, respectively), with higher
21 hydrolysis yield observed at 20 min of process. Therefore, HC-based approach could
22 lead to a high yield of hydrolysis, as long as a treatment condition was right; it could be
23 so at mild conditions and at short running time.

24 **Keywords:** Hydrodynamic cavitation; Lignocellulosic biomass; Sugarcane bagasse;
25 Pretreatment; Enzymatic digestibility

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