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**Oxidative pretreatment of sugarcane bagasse assisted by hydrodynamic cavitation aiming to produce fermentable sugars for biorefineries**

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The production of biofuels and biomolecules from lignocellulosic materials are among the most targeted and important research topics. The most important step in the biomass transformation process is the pretreatment, which is necessary to increase the enzymatic digestibility of the material in the subsequent hydrolysis step. A new alternative for pretreatment is the use of advanced oxidative processes assisted by HC (hydrodynamic cavitation). In this context, the pre-treatment of sugarcane bagasse by HC- assisted technology was evaluated, considering the use of peroxide along with ozone variation in the medium. The composition of material pretreated under different conditions was compared (Table 1), showing that the use of ozone in the presence of HC-assisted peroxide was effective in reducing lignin content in biomass. Moreover, this alternative was shown as attractive, considering the glucan enzymatic hydrolysis yield reached until 71.32% (and 79.87 for 5 carbon sugars) in 24 h in a subsequent enzymatic hydrolysis of pretreated sugarcane bagasse, showing the potential of the technique in which presented lignin reduction of 40.85%, this can be interesting for lignocellulosic biorefineries.

**Keyword:** *sugarcane; hydrodynamic cavitation, ozone.*

**Table 1**. Composition of sugarcane bagasse pretreated by HC-assisted technology

|  |  |  |
| --- | --- | --- |
| Pretreatment condition | Pretreated material composition, % |  Removal of Lignin, % |
| Glucan | Hemicellulose | Lignin |  |
| Aeration rate, m³/mim | Concentration of O3, mg/L | Concentration of H2O2, % |  |  |  |  |
| 1.10 | 1 | 0 | 40.08 ± 1.54 | 63.45 ± 1.10 | 20.85 ± 1.10 | 13.17 ± 1.09 |
| 0.2 | 1 | 0 | 41.01± 1.54 | 29.03 ± 1.64 | 16.05 ± 1.54 | 37.13 ± 2.56 |
| 1.10 | 8 | 1 | 64.82± 1.34 | 69.21 ± 2.54 | 22.72 ± 1.74 | 27.44 ± 3.54 |
| 0.2 | 8 | 1 | 71.32± 2.24 | 79.87 ± 1.54 | 19.76 ± 2.54 | 40.85 ± 4.54 |
| 1.10 | 1 | 1 | 42.76± 3.54 | 43.32 ± 1.74 | 22.61± 1.54 | 30.97± 1.74 |
| 0.2 | 1 | 1 | 58.06 ± 1.31 | 22.67 ± 1.11 | 21.22 ± 0.73 | 34.03 ± 2.76 |
| 1.10 | 8 | 0 | 52.7 ± 1.60 | 25.38 ± 1.20 | 23.88 ± 2.48 | 28.08 ± 1.07  |
| 0.2 | 8 | 0 |  61.40± 1.5 | 41.75 ± 1.0 | 20.81 ± 1.25 |  28.73 ± 0.89 |