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Production of fermentable sugars and nanolignins via liquid hot water and sulfonated pretreatment combinations aiming at the optimal enzymatic conversion of sugarcane bagasse.

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- In the context of energy transition and the fight against climate change, the production of 2nd generation bioethanol is recognized as a promising way to reduce our dependence on fossil fuels. On the other hand, lignocellulosic biomass as sugar cane bagasse constitutes an enormous reservoir of reduced carbon that can serve as a feedstock to produce renewable fuels, chemicals, and polymeric materials.(1) Indeed lignocellulose biomass, considered as "waste," can potentially be converted into various value-added products, including biofuels, chemicals, cheap energy sources for fermentation. Generally, lignocellulosic biomass consists of 35–50% cellulose, 20–35% hemicellulose, and 10–25% lignin. Cellulose is a major structural component of plant cell walls, while hemicellulose macromolecules are often repeated polymers of pentoses and hexoses. In addition, lignin is the largest natural source of aromatic molecules and represents a promising renewable chemical raw material.(2) While cellulose is essential for the biomass-to-bioethanol conversion process, lignin is undesirable in this context. Therefore, pretreatment is necessary to break down the lignocellulose structure and separate lignin from carbohydrates (cellulose and hemicellulose). However, the isolation and purification of lignin on an industrial scale are still under development. Therefore, adequate pretreatment methods are necessary for increasing concentrations of fermentable sugars after enzymatic saccharification and extracting lignin efficiently.(3) The work aims at nano lignins and fermentable sugar production from respectively lignin and carbohydrates via enzymatic conversion after combined liquid hot water and sulfonated pretreatments sugar cane bagasse.

Palavras-chave: Sugar cane bagasse. Liquid hot pretreatment. Sulfonated pretreatment. Nanolignin. Enzymatic hydrolysis.

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