Process Alternatives for Second Generation Ethanol Production from Sugarcane Bagasse

In ethanol production from sugarcane juice, sugarcane bagasse is used as fuel for the boiler, to meet the steam and electric energy demand of the process. However, a surplus of bagasse is common, which can be used either to increase electric energy or ethanol production. While the first option uses already established processes, there are still many uncertainties about the techno-economic feasibility of the second option. In this study, some key parameters of the second generation ethanol production process were analyzed and their influence in the process feasibility assessed. The simulated process includes the enzymatic hydrolysis of sugarcane bagasse pretreated with liquid hot water, and the analyzed parameters were the solid consistency in the hydrolysis and pretreatment reactors and the hydrolysis reaction time. The solid consistency in the hydrolysis reactor had the highest influence on the economic feasibility of the process. For the economic scenario considered in this study, using bagasse to increase ethanol production yielded higher ethanol production costs compared to using bagasse for electric energy production, showing that further improvements in the process are still necessary.