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Techno-economic impacts of varied compositional profiles of sugarcane experimental hybrids on a biorefinery producing sugar, ethanol and electricity

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Highlights

- Sugarcane hybrids with varied characteristics affect 1G-ethanol production. High field productivity results in the best economic indicators. High sugar, fiber contents and field productivity are desirable for 1G2G-biorefinery.

Abstract

Evaluation of processes parameters along with the economic return are crucial aspects for selection of sugarcane characteristics for different biorefinery configurations. In this context, six sugarcane hybrids with varied compositional characteristics and field productivity were assessed through process simulation for potential use in first generation ethanol production. A computational platform, the Virtual Sugarcane Biorefinery, which includes Aspen Plus simulations and spreadsheets, was used as tool to estimate production of electricity, sugar and ethanol in first generation biorefineries. The same platform also provided sugarcane costs and economic performance, mostly based on -internal rate of return (IRR) calculations. Results show that sugarcane characteristics including components composition, mainly lignin, sucrose and fiber contents, as well as field productivity, must be evaluated simultaneously in the biorefinery context. The three hybrids with the highest field

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