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M. Valentina Aristizábal, Carlos A. Cardona A., P. Álvaro Gómez

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Biorefineries based on coffee cut-stems and sugarcane bagasse: furan-based compounds and alkanes as interesting products

Valentina Aristizábal M., Carlos A. Cardona A.[*], Álvaro Gómez P.

[a] Instituto de Biotecnología y Agroindustria, Departamento de Ingeniería Química. Universidad Nacional de Colombia at Manizales. Manizales - Colombia.

* Corresponding author Tel.: +57 6 8879400 ext. 55354 e-mail: ccardonaal@unal.edu.co (Carlos A. Cardona).

Abstract

This work presents a techno-economic and environmental assessment for a biorefinery based on sugarcane bagasse (SCB), and coffee cut-stems (CCS). Five scenarios were evaluated at different levels, conversion pathways, feedstock distribution, and technologies to produce ethanol, octane, nonane, furfural, and hydroxymethylfurfural (HMF). These scenarios were compared between each other according to raw material, economic, and environmental characteristics. A single objective function combining the Net Present Value and the Potential Environmental impact was used through the Analytic Hierarchy Process approach to understand and select the best configurations for SCB and CCS cases. The results showed that the configuration with the best economic and environmental performance for SCB and CCS is the one that considers ethanol, furfural, and octane production (scenario 1). The global economic margin was 62.3% and 61.6% for SCB and CCS respectively. The results have shown the potential of these types of biomass to produce fuels and platform products.

Keywords biorefinery, techno-economic assessment, environmental assessment, furan-based compounds, alkanes.