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ÁREA: Catálise aplicada na produção de combustíveis, biocombustíveis, produtos químicos e energia

Biocarvões, a partir de resíduos amazônicos, na esterificação do destilado de óleo de palma em biodiesel

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Resumo-Abstract

The valorization of solid waste is fundamental for the development of new sustainable products in the area of biofuels and bioenergy (Rahul et al., 2024; Yogin Soodesh et al., 2024). In this work, Amazonian biochars were developed from murumuru husks and the alcoholic extraction residue of açaí seeds for biodiesel production, according to Laohapornchaiphan, Smith, and Smith (2017) method. The biomass was subjected to hydrothermal carbonization at 240°C for 10 hours and functionalized with ρ-toluenesulfonic acid (PTSA) in a 1:2 ratio of residual biomass to PTSA for the synthesis of biocatalysts. Biodiesel was obtained by esterification of the deodorized palm oil distillate (DDOP) under conditions of 65°C ± 5°C for 2 and 4 hours. TGA and FT-IR analyses confirmed that PTSA functionalization was effective at 240°C, highlighting aromatic C=C (~1573 and 1603 cm^{-1}) or NH_2 (1590–1550 cm^{-1}) functional groups, characteristic of lignocellulosic biomass, and esters C–O (1300–1020 cm^{-1}) and S=O (1350–1040 cm^{-1}) indicative of PTSA, as described by Laohapornchaiphan et al. (2017) and Queiroz et al. (2020). The best biodiesel conversions with biocatalysts were 87.29% and 89.15%, with murumuru husk biochar at 2 hours and açaí seed residue biochar at 4 hours, respectively, while the control sample showed a conversion of 10.52%. Thus, the bioproducts show potential in esterification reactions and in promoting biorefinery by utilizing three residual raw materials derived from murumuru (*Astrocaryum murumuru*), açaí (*Euterpe oleracea*), and palm (*Elaeis guineensis*) for biofuel production.

Keywords: Biochar, murumuru bark, açaí seed residue, DDOP, esterification, biodiesel

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