

DEPOLYMERIZATION OF LIGNIN EXTRACTED FROM LOW-RANGE CARBON BY THE UV/TIO₂ RADIATION METHOD AND ITS USE IN THE ELABORATION OF SYNTHETIC WOOD BOARDS

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ABSTRACT

On this research, lignin depolymerization by ultraviolet radiation and catalyzed by titanium dioxide was studied and later it was used as a copolymer in making boards with rice husks. Lignin was extracted from a low-rank coal sample coming from Paipa-Boyacá using Sosa Method. Depolymerizations on samples of 100 ml 50 mg/L lignin for 0, 2, 6, 10 hours and catalyst amounts in ratios 1:1; 1: 3.3; 1: 6.6; 1:10 lignin and TiO₂ respectively were standardized by irradiation with 45W UV light. Results allowed selecting optimal values of 6 hours of irradiation and the catalyst in the proportion of 1 lignin by 3.3 of TiO₂ for depolymerization. It produced 22% degradation on lignin. Later, depolymerized lignin was activated by the hydroxymethylation reaction with formaldehyde. For boards, preparation components were mixed in proportions of 60% rice husk, 7.4% lignin, 14.9% melamine and 17.7% formaldehyde. The mixture was heated to 100 ° C for one hour in molds. Three boards were produced with the above-mentioned proportions and with following characteristics: board 1 was made with unmilled rice husk and Kraft lignin (Sigma-Aldrich); board 2 was made with milled rice husk and Kraft lignin and board 3 was made with milled rice husk and activated lignin. All boards were subjected to mechanical tests of bending, compression, and traction and water absorption. Board 2 showed the most suitable results according to ASTM D 143 norms.

KEYWORDS: *Aglomerated, Depolymerization, Lignin, Low-Rank Coal, Rice Husks*

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