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Production of a Bio-based Concrete Water Reducer from Crude Cellulose obtained from fractionated Mixed-Saw Dust

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Concrete water reducers are essential components of building materials applied widely in the construction industry today. They decrease the amount of water required during concrete preparation to improve its workability, durability, and strength. Presently, majority of concrete water reducers in the market are produced from petroleum derived synthetic materials which pose both health and environmental challenges. The few available bio-based concrete water reducers are produced from lignin, a complex bioresource which requires multi-stage processing to obtain the final product. Also, there has been limited study on the production of concrete water reducer from cellulose which is considered the most abundant lignocellulosic biomaterial. My research focused on the production of a bio-based concrete water reducer by dual chemical functionalization and modification of crude cellulose obtained from solvent fractionated mixed saw dust. It investigated and optimized the product synthesis conditions and measured its performance relative to a commercial concrete water reducer.