Preparation and Characterization of Bioplastic from Sorghum Husks

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Abstract : The increase in the global population and advances in technology have made plastic materials to have wide applications in every aspect of life. However, the non-biodegradability of these petrochemical-based materials and their increasing accumulation in the environment has been a threat to the planet and has been a source of environmental concerns and hence, the driving force in the search for 'green' alternatives for which agricultural waste remains the front liner. Sorghum husk, an agricultural waste with potentials as a raw material in the production of bioplastic, was used in this research to prepare bioplastic using sulphuric acid-catalyzed acetylation process. The prepared bioplastic was characterized by X-ray diffraction and Fourier transform infrared spectroscopy (FTIR), and the structure of the prepared bioplastic was confirmed. The Fourier transform infrared spectroscopy (FTIR) spectra of the product displayed the presence of OH, C-H, C=O, and C-O absorption peaks. The bioplastic obtained is biodegradable and is affected by acid, salt, and alkali to a lesser extent. Other tests like solubility and swelling studies were carried out to ensure the commercial properties of these bioplastic materials. Therefore, this revealed that new bioplastics with better environmental and sustainable properties could be produced from agricultural waste, which may have applications in many industries.

Keywords : agricultural waste, bioplastic, characterization, Sorghum Husk
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