

Title:

Preparation and Characterization of Black Seed/Cassava Bagasse Fiber-Reinforced Cornstarch-Based Hybrid Composites

Journal:

Sustainability (Switzerland), Volume 14, Issue 19

Document Type: Article

Authors:

Walid Abotbina,
S. M. Sapuan,
R. A. Ilyas,
M. T. H. Sultan
Munir Fajar Almagrouk Alkbir, munir@unikl.edu.my

Full text link:

Publisher : <https://www.mdpi.com/2071-1050/14/19/12042>

Scopus preview:

<https://www.scopus.com/inward/record.uri?eid=2-s2.0-85139963086&doi=10.3390%2fsu141912042&partnerID=40&md5=e19b12c2bd75f5cafa08f5b6962e450d>

Abstract:

Great advances have been made in the preparation of bioplastics and crude oil replacements to create a better and more sustainable and eco-friendly future for all. Here, we used cassava bagasse fibers at different ratios as reinforcement material to enhance the properties of black seed w-cornstarch films using the facile solution casting technique. The reinforced films showed compact and relatively smoother structures without porosity. The crystallinity values increased from $34.6 \pm 1.6\%$ of the control to $38.8 \pm 2.1\%$ in sample CS-BS/CB 9%, which reflects the mechanical properties of the composite. A gradual increase in tensile strength and elastic modulus was observed, with an increase in loading amounts of 14.07 to 18.22 MPa and 83.65 to 118.32 MPa for the tensile strength and elastic modulus, respectively. The composite film also exhibited faster biodegradation in the soil burial test, in addition to lower water absorption capacity. Using bio-based reinforcement material could significantly enhance the properties of bio-based packaging materials. The prepared hybrid composite could have a promising potential in food packaging applications as a safe alternative for conventional packaging.