

BIO-BASED FACADE COMPOSITES FROM AGRO-INDUSTRIAL AND TEXTILE FIBRE WASTE: A SCOPING REVIEW

MWV-017

<https://dx.doi.org/10.4314/just.v44i2.3s>

Margaret Baamah Patterson¹, Alexander Boakye Marful¹, Moritz Dörstelmann², Isaac Egyir Kwofie¹

¹College of Art and Built Environment, Department of Architecture, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

²Digital Design and Fabrication, Karlsruhe Institute of Technology, Karlsruhe, Germany

Abstract

The construction industry faces increasing pressure to adopt sustainable materials that reduce carbon footprints and utilize waste streams. This scoping review synthesizes global literature on the development of bio-based facade composites derived from agro-industrial and textile fibre waste, with a focus on material performance, processing methods, and environmental benefits. Agro-industrial residues such as coir, jute, sisal, bagasse, and rice husks, combined with recycled textile fibres, have been demonstrated as viable reinforcements in polymer and cement-based matrices for facade applications. Key performance parameters reviewed include tensile and flexural strength, thermal insulation, moisture resistance, fire retardancy, and durability under UV exposure. The review identifies research gaps in the standardization of bio-composite testing protocols for tropical climates and recommends pathways for the industrialization of these materials in the West African construction sector.

Keywords: Mineral waste valorisation, bio-based composites, facade cladding, agro industrial waste, hot humid climate.

This book of abstracts published © 2026 by the Journal of Science and Technology is licensed under CC BY 4.0

