

Integrated mechanical-economic–environmental quality of performance for natural fibers for polymeric-based composite materials

ABSTRACT

In this work, a proposed evaluation tool for the performance of the available natural fibers based on integrated technical, economic, and environmental stand points is demonstrated. A novel Cost Per Waste-Volume Ratio (CPWVR) eco-friendly indicator for natural fibers is introduced here for the first time. Various natural fiber types were evaluated regarding the suggested integrated evaluation criteria simultaneously to capture the quality of fiber performance for producing biomaterials. Better evaluations of natural fibers regarding wide range of criteria will lead to better decisions regarding fibers' qualities as well as their selections for industrial applications and enhance achieving better performance. Such evaluations should consider economic, physical, mechanical, and environmental characteristics as well as technical ones. New potential fiber types can be discovered and utilized in future cleaner production through keen evaluation criteria.

Keyword: Date palm fibers; Eco-friendly; Evaluation criteria; Natural fibers; Quality of performance; Sustainable materials