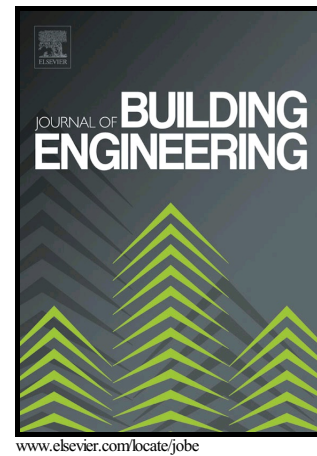


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Influence of spent shea waste addition on the technological properties of fired clay bricks

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Abstract

This paper examines the feasibility of replacing clay materials with spent shea waste as an economic and sustainable construction material via assessing the technological properties of their fired brick bars. In this regard, we admix different proportions of spent shea waste to the raw clay materials. Rectangular brick bars were prepared through the replacement of 5, 10, 15 and 20 wt.% of the clay materials with spent shea waste. Preliminarily, the waste and clay materials were characterized by their chemical composition, X-ray powder diffraction, particle morphologies and thermal behavior. The prepared brick bars were sintered at temperatures ranging from 900°C to 1200°C and their technological properties (e.g. linear dry shrinkage, green density, linear fired shrinkage, fired density, apparent porosity, cold compressive strength and water absorption) were ascertained. It was found that spent shea waste is an excellent calorific value material, which contained minor concentrations of SiO₂ (0.35 wt.%), Al₂O₃ (0.37 wt.%), K₂O (2.11 wt.%), CaO (2.11 wt.%) and a rich diversity of inorganic fluxes in trace amounts. The test results show that spent shea waste could synergistically be used as energy-contributing raw materials in construction brick; thus, creating new pathways of possibilities for their widespread economic and sustainable reuse in the construction industry.

Keywords: *Spent shea waste, Economic construction material, Reusing, Fired clay bricks, Statistical analysis.*

1.0 Introduction

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