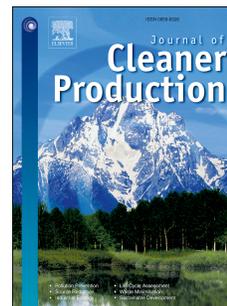


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Green concrete partially comprised of farming waste residues: A review

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Abstract

The growing demand of construction around the world has led to the increased usage of concrete. However, conventional concrete-making materials are not entirely environmental-friendly and this has enthused research on seeking greener alternative for concrete production. In the past, extensive research works had been carried out to utilize farming waste materials such as those from palm oil, coconut, sugarcane as well as the paddy industry and these findings indicate potential of utilizing such materials in concrete. The re-use of the farming waste materials in concrete could reduce the dependency on conventional concrete-making material as well as minimizing the negative impact on the environment besides ensuring waste conservation and reduction in waste disposal from these sectors. In this paper, a review on the utilization of emerging alternative farming waste materials in concrete such as from the farming of bamboo, corn, wheat, olive, sisal, seashells and more is carried out with the aim of examining the benefits and shortcomings of using these materials. This review shows the possible usage of farming waste materials in different form in concrete, such as partial cement and aggregate replacement, as well as fibre reinforcement. The main finding from the paper is that although usage of farming waste materials resulted in lowering of some concrete properties, appropriate treatment methods and selection of the waste materials would enable the production of concrete with improved performance. The summary and discussion provided in this paper should provide new information and knowledge on a greater variety of farming waste materials which are suitable to be used for the production of a greener and sustainable concrete.

Abbreviations

BMBLF	Bamboo leaf ash
BNNLA	Banana leaf ash
CCA	Corn cob ash
DPF	Date palm fibre
EGA	Elephant grass ash
GGBS	Ground granulated blast furnace slag
LOI	Loss on ignition
MOE	Modulus of elasticity
MS	Mussel shell
OS	Oyster shell
OWA	Olive waste ash
PS	Periwinkle shell
PSA	Periwinkle shell ash
SCM	Supplementary cementitious material
WSA	Wheat straw ash

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