

Use of some agricultural wastes to modify the engineering properties of subgrade soils: A review

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Abstract-

The drive to diversify the economy in some developing countries have resulted in increased agricultural production and consequently increased agricultural waste. This study reviews some published research works on the reuse of some agricultural wastes for modifying soils with poor engineering properties. The review shows that some agricultural wastes, such as palm oil fuel ash, palm kernel shell ash, rice husk ash, sea-shell powder and sawdust ash, are effective modifiers of subgrade soil and become more effective when combined with traditional stabilizers. The use of stabilizers from agricultural wastes has the potential of reducing the amount of waste disposed of in landfills/dump sites, and at the same time reduce the carbon footprints caused by the use of traditional stabilizers like cement, and the cost of highway construction.

Key words: Sustainable environment; agricultural waste; engineering properties; poor subgrade soil

1. Introduction

To discourage improper waste management, while also searching for sustainable low-cost materials as alternatives to depleting natural resources [1], [2], researchers must find ways of reusing solid wastes in large quantities for engineering applications. Solid wastes can broadly be classified into industrial, agricultural and municipal wastes [3]. Rapid growth in population and industrialization has resulted in the generation of large quantities of solid wastes, the bulk of which are from industrial, commercial, agricultural, mining and domestic activities.

Owing to the drop in the gross domestic product (GDP) of Nigeria, the economy is being diversified from oil exploration and exportation, with specific emphasis on the agricultural sector. This has led to increased agricultural production and consequently, increased generation of agricultural wastes. However, most of the agricultural wastes generated get disposed of.

Although the estimate of agricultural wastes is rare to find in waste collection surveys, agricultural wastes significantly contribute to the total waste streams of some countries [4]. In a research conducted by Bakare [5] of bioenergy consult, Nigeria generates more than 32 million tons of solid waste annually, out of which only 20-30% is collected. Consequently, this large amount of waste generated constitutes environmental hazards and alteration of the ecosystem's balance if not properly disposed of. In tackling this menace, there arises a need to cater for the present without depriving future generations of their right to available natural resources. Worldwide, waste reduce, recycle and re-use (RRR) policy has been widely accepted in other to foster a sustainable environment. Through this policy, locally available agricultural waste can be effectively treated and adopted for modification of soil properties for infrastructural applications.

