PREPARATION OF BIOCHAR FROM RICE HUSK AS A SUSTAINABLE AND ALTERNATIVE FILLER FOR CARBON BLACK IN THE TYER INDUSTRY

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ABSTRACT

This research Investigates the potential of rice husk ash (RHA) as a sustainable alternative to traditional carbon black fillers in the tire industry, aiming to reduce reliance on non-renewable resources. Although interest in agricultural-waste products is gaining ground, very little has been reported on their influence on the mechanical properties of rubber compounds. More so, when products are processed using techniques like ball milling, their effect remains almost unreported. In this regard, the present study has been attempted to explore the possibility of using RHA in natural rubber compounds with regard to tensile strength, tear resistance, and elongation. Rice husks were obtained, cleaned, dried, and the controlled burning in a furnace at 650°C was done in order to obtain RHA. RHA was then further processed by both sieving and ball milling. In this regard, rubber compounds were prepared in a two-roll mill by incorporating ball-milled and non-ball-milled RHA into the natural rubber matrix, and their mechanical properties were analyzed. The results show that RHA-enhanced rubber compounds have improved mechanical properties, and among these, ball milled composites generally outperform their non-ball-milled counterparts. However, ball milling has also introduced microstructural defects that somewhat reduced the tensile strength. Although RHA does give some promise for use as a friendly Eco filler in tire production, it turned out that the technique used in its processing had a significant effect on its performance. It, therefore, requires further optimization to be able to offer a viable alternative as a filler.

Key words: Rice Husk Ash (RHA), Sustainable Filler, Ball Milling, Tensile Strength, Tear Resistance, Elongation

TABLE OF CONTENT

Table of Contents