

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



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Project Report
Main Library, Eastern University, Sri Lanka

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2024

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

DECLARATION	ii
DEDICATION	v
ACKNOWLEDGMENTS	vi
ABSTRACT	vii
TABLE OF CONTENT	viii
LIST OF FIGURES	x
LIST OF TABLES	xi
LIST OF ABBREVIATIONS	xii
CHAPTER 01	1
1.INTRODUCTION	1
1.1 Carbon Black Varieties	2
1.1.1 N-series carbon black	2
1.1.2 S series carbon black	3
1.1.3 P series carbon black.....	3
1.1.4 F series carbon black	3
1.2 Natural Rubber	4
1.3 Rice Husk Ash	5
1.4 Objectives	6
CHAPTER 02	7
2. LITERATURE REVIEW	7
CHAPTER 03	14
3. MATERIAL & METHODOLOGY	14
3.1. Material.....	14
3.2 Methods	14
3.2.1 Preparation of Rice Husk Ash.....	14
3.2.2 Preparation of Without Ball Milling (Sieving) RHS	16
3.2.3 Preparation of Ball milling RHA	16
3.2.4 Preparation of Rubber Compounds.....	17
3.3 Characterization of Rice Husk Ash.....	18
3.3.1 FTIR - Fourier-Transform Infrared Spectroscopy	18
3.4 Testing.....	18
3.4.1 Determination of curing characteristics	18
3.4.2 Testing of Tensile Strength Sample	19

3.4.3 Testing Hardness of Compounds	20
3.4.4 Density of Cured Rubber Compounds.....	20
3.4.5 Evaluation of Abrasion Resistance Cured Rubber Compounds	20
3.4.6 Rebound Resilience of Cured Rubber Compounds	21
CHAPTER 04	22
4. RESULT AND DISCUSSION.....	22
4.1 Characterization of Rice Husk Ash.....	22
4.1.1 Fourier-Transform Infrared Spectroscopy Analysis (FTIR) Of Rice Husk Ash	22
4.2 Curing Characteristics of Natural Rubber and Rice Husk Ash.....	24
4.3 The physical properties of Natural Rubber with Rice Husk Ash Compound	25
4.3.1 Tensile Strength Test Results	25
4.3.2 Elongation Results	28
4.3.3 Tear Strength Results	29
4.3.4 Density Test Result	31
4.3.5 Hardness Test Result.....	32
CHAPTER 05	34
5. CONCLUSIONS AND RECOMMENDATIONS.....	34
5.1 Conclusions	34
5.2 Recommendations for Future Research.....	35
REFERENCES	36