

From Waste to Worth: Peanut Shell-Based Anti-Termite Paper

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ABSTRACT

Waste to Worth is aimed to transform discarded materials into valuable products. Instead of seeing waste as a worldwide problem, it's better to view them as a chance for innovations. After working on this concept, we can mitigate the pollution and assist in creating a green economy by reusing and recycling the garbage materials. *Arachis Hypogaea* commonly known as peanuts (legumes), cultivated across various agricultural regions of Pakistan and due to their widespread use and large-scale production throughout the country, a significant accumulation of shell waste presenting considerable environmental challenges. Since, peanut shells possess large amount of lignocellulose which can be easily converted into valuable products.

Keywords: Peanut Shell, Anti-Termite Paper, Waste Management, Lemon Grass.

INTRODUCTION

Arachis hypogaea (Peanuts) is a plant of the Fabaceae family (legumes), primarily recognized as oil crops and grown globally for their edible purposes as seeds and oil as well as due to its high percentage of fat, peanuts are also used for industrialized products such as flours, inks, creams, lipsticks, etc., Notably, peanut shells contribute approximately one-third of the peanut pod by weight, and the peanut industry is one of the main generators of agro industrial waste (shells) which are abundant and inexpensive byproducts of peanut cultivation. However, agricultural by-products, like peanut shell have been utilized as animal feed and fuel or left unused resulting in a significant waste of natural resources [1-2].

Termites (*Coptotermes curvignathus* H.), which are produced by plant woods, are a widespread pest on papers and plants. To stop termites, even the majority of synthetic pesticides are sprayed. To manage termite infestations, synthetic termiticides are widely employed; however, these chemicals pose serious ecological risks such as groundwater contamination, threats to wildlife, and endocrine disruption [3-4].

As an alternative, Plant-derived pesticides are generally biodegradable and offer environmentally friendly options for termite management. Many studies have confirmed the efficacy of plant-based compounds against termites. It has been explored that lemongrass (*Cymbopogon nardus* L.) extract, which contains geraniol and citronellal, is a recommended herbal insecticide [5-6]. The goal of this research is to convert waste materials into sustainable goods while protecting the environment from greenhouse gases produced by exposure to fire and air. Because termite-resistant paper has been made for a long time using compounds that are highly toxic and have negative effects on human health, anti-termite papers are one of the sustainable products in this regard.

OBJECTIVE

The main objective of this study is to transform waste materials into valuable products in order to improve environmental conditions. This work will also explore the effectiveness of natural additives like lemongrass extract for their insecticidal resistance.

METHODOLOGY

Peanut shells were cleaned, dried, and grinded into fine powder form for easy incorporation. Together with, lemongrass extract and 20% starch solution were prepared. After the preparation of the required materials a tub containing waste paper immerses in water were taken and ingredients including peanut shell powder, lemon grass extract and starch solution were mixed in order to make pulp which is then spread over mould then dried. At the end several termite resistance tests were conducted.

KEY FINDINGS

The study effectively showed that the treated samples showed less termite damage than regular paper, suggesting good defensive qualities. During testing, the created paper demonstrated good durability, texture, and termite resistance. It has also been explored that peanut shells might be used to make environmentally friendly anti-termite papers. Additionally, the procedure turned out to be sustainable and economical, demonstrating the potential of agricultural waste as a useful raw resource for creating environmentally beneficial products.

CONCLUSION

This study specifically develop useful products from waste materials with enhanced strength and a high degree of resistance to termites by effectively utilizing recycling methods, thus offering a sustainable solution for waste management and resource utilization.

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