# INVESTIGATION OF MECHANICAL BEHAVIOR OF INDUSTRIAL AND AGRICULTURAL WASTE BASED EPOXY COMPOSITES

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Submitted

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# ABSTRACT

In this work presents an investigation of mechanical behavior of industrial and agricultural waste-based epoxy composites. Specifically, rice husk ash (agriculture waste) and fly ash (industrial waste) are used as filler materials in the epoxy (matrix). This study aims to optimize mechanical properties of the composite material through the implementation of Design of Experiments (DOE) and Artificial Neural Network (ANN) techniques. The composites were prepared by varying weight percentages i.e., 7%,10%& 13% of the filler content. Here we also check the improvement of mechanical properties with the aid of increases the homogeneity of mixture via mixing criteria i.e., hand stirred, 900rpm & 2400 rpm, after that behavior of the composites, were evaluated. The results show that the filler group, filler loading and mixing criteria have a significant effect on the mechanical properties of the composites. The optimum combination of these parameters was determined using the DOE method. Furthermore, an ANN model was developed to predict mechanical properties of the composites based on the input variables. The ANN model was trained and tested using a dataset of experimental results. The results show that the ANN model is capable of accurately predicting the mechanical of the composites with high precision. Overall, the study demonstrates that the use of waste-based filler materials can significantly enhance the mechanical properties of the epoxy composites. Moreover, the DOE and ANN techniques can be effectively used to optimize the process parameters and predict the properties of the composites. The findings of this study have implications for the development of sustainable composite materials and can contribute to ucing the environmental impact of industrial and agricultural waste.

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