05-16

MECHANICAL PROPERTIES OF CHICKEN FEATHER FIBRE REINFORCED NATURAL RUBBER BIOCOMPOSITES

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Background: Chicken feather fibre (CF) is commonly described as a waste by-product and they are contributing to environmental pollution due to the disposal problems. The composite reinforcement application of the CF offers much more effective way to solve the environmental concerns compared to the traditional disposal methods (burning and burying).The CF as a composite reinforcement has certain desirable properties that includes; lightweight, high thermal insulation, non-abrasive behaviour and excellent hydrophobic properties. The present study is the development of a new class of composites with the CF waste as filler in natural rubber (NR) to solve the environmental problem and to develop cheaper filler for NR composites.

Method: Biocomposites of NR reinforced with CF were prepared using dicumyl peroxide (DCP) as vulcanizing agent. Composites with two series of CF were studied. i.e., raw (RCF) and alkali treated (ACF) fibres. Surface modification of the fibre was done by alkali treatment to improve the interfacial adhesion. The influence of fibre loading and chemical modification on the mechanical properties of composites was analysed. The composites were characterised by using FTIR and scanning electron microscopy (SEM).

Results: The mechanical properties such as tensile strength, tear strength and tensile modulus were found to be improved by the incorporation of CF in all forms. A fibre loading of 25phr has been found to be optimum for the best balance of properties. Better properties are shown by the composites with ACF. SEM studies support the results of mechanical properties. FTIR analysis confirms the interfacial adhesion of CF in the NR matrix.

Conclusion: Blends of natural rubber with acrylonitrile butadiene rubber (NBR) are used for many product applications like oil seals, hoses and automobile bushes etc. Hence a method of utilization of waste chicken feathers as reinforcing agents in NR offers a good ecofriendly modification. There are many other areas where the applications of these materials are to be tested and utilized.

Keywords: Chicken feather fibre, Natural rubber, Dicumyl peroxide, Mechanical properties

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ROBUST HAND POSTURE RECOGNITION USING SVM CLASSIFIER WITH GABOR AND DWT FEATURES

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Background: Hand gesture recognition has got key attention of researchers due to its popularity in varied fields such as human machine interaction, robotics, medical therapy, sign language communication etc. This paper presents a static hand gesture recognition method using image features and multiclass support vector machine (SVM) classifier by addressing its application for the communication of people with speaking and hearing difficulty. The method works by extracting the visual features of the handsfrom the images of gestures.

Method: The method includes the hand segmentation, feature extraction and recognition phases. Hand segmentation extracts the hand palm region from the input image by eliminating the irrelevant pixels and body parts from the background. Then, the combination of the feature values obtained through Gabor and DWT (Discrete Wavelet Transform) descriptors are used to form the feature vector. Further reduction with PCA (Principal Component Analysis), selects the most discriminative feature values. The classification of the hand postures are done with multiclass SVM.

Results: The proposed method has been tested on the publicly available Jochen Triesh hand posture dataset. The sample images of the ten different static hand gesture classes with uniform background are used for the experiment. The dataset has been divided into two equal sets as training and validation sets. The obtained result has been compared with a previous work on the same dataset. The analysis shows that the proposed method is very effectual for static hand gesture recognition.

Conclusion: This work utilises the support vector classifier with image features extracted through Gabor and wave-