

Investigation on Suitability of Banana Fiber as a Filler Material in Natural Rubber Latex-Based Household Gloves

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With increasing demand for polymer based household items, waste disposal has become an environmental issue. Thus, researchers are concerned on producing cost effective products, which are also biodegradable. The objective of this study is to investigate the possible use of banana fiber as a filler material in making natural rubber based household gloves with improved biodegradability and cost effectiveness while retaining the desired properties. In this study, long banana fibers were extracted mechanically and ground using a blender. Then, they were sieved and size less than 400 p.m particles were selected. These were chemically treated using 4% sodium hydroxide and 2% of sodium sulfite. Natural rubber latex compounds were prepared changing banana fiber content. The films were made using casting method. The physico-mechanical properties of films, including tensile, tear and accelerated aging properties were analyzed and compared with the control sample in which no banana fiber was added. Tensile and tear strength have decreased with increasing fiber percentage compared to the control sample. This may be due to the poor interaction between rubber matrix and banana fiber. Banana fiber added natural rubber latex films exhibited, in comparison, a higher Young's modulus at 100% elongation than the control sample. Results also showed that the elongation at break has decreased steadily with the increasing of the fiber loading. Increase in the modulus and the decrease in percentage elongation may be attributed to the restriction of molecular chain movements resulting from the presence of fiber in the rubber matrix. Significant increase in retention value can be seen when higher amounts of fiber was incorporated suggesting enhanced durability in the condition of heat, oxygen and ozone. Use of nano-sized fiber particles, better coupling agent and an alternative fiber dispersing method may improve the mechanical properties.

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