

Enhancement of the Physical Properties of Natural Rubber Latex Gloves by Using Nano-Cellulose Fibrils Filler

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The growing demand for greener and biodegradable materials that brings satisfaction to society requires a convincing movement towards the advancement of nano materials science. Natural fibers are considered to have potential use as reinforcing agents in polymer composite materials due to their principle benefits: good strength and stiffness, low cost, environmental friendliness and biodegradability. Fillers are additive agents and are also functioning to improve the strength of natural rubber. This study was conducted to evaluate physical properties of natural glove made using nano natural filler of Arecanut husk (*Areca catechu*) and Bagasse (*Saccharum officinarum*) fibers, which are otherwise, throw as waste daily. In this study, we focus to determine the effectiveness of the nano cellulose fibrils as a filler for glove industry. In this work initially nano cellulose fibrils of Arecanut husk and Bagasse were prepared separately by chemically and physically. Structural analysis of Nano cellulose fibrils was done by X-Ray Diffractometer (XRD) and Fourier Transform Infrared Microscopy (FTIR). Morphological characteristics of the cellulose fibrils were observed by Scanning Electron Microscopy (SEM). Finally Nano cellulose fibrils were introduced to the natural glove compound in different amounts and natural gloves were prepared according to the specific quality standards. Then physical properties were measured according to the EN 388:2016 reference standard. The experimental and quality control results suggested that by addition of the natural filler, the abrasion, tensile strength and tear resistance properties were enhanced with compared to the synthetic filler added gloves. Overall results suggested that there is an effectiveness of nano cellulose fibrils as filler for glove industry at 0.05 level of significance.

Keywords: Nano filler, Nano cellulose, Arecanut, Bagasse, Natural Filler