EFFECT OF *Artocarpus heterophyllus* LATEX AS A COUPLING AGENT ON CALCIUM CARBONATE-FILLED NATURAL RUBBER/LOW-DENSITY POLYETHYLENE/WASTE POLYETHYLENE COMPOSITE

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Value addition for Polymeric industrial wastes such as Low-density polyethylene waste (wLDPE) is a way to reduce environmental pollution and also a cost reduction strategy in polymer industry. Many studies have considered the possibility of blending wLDPE with natural rubber in fabricated rubber industry. The mixing incompatibilities between natural rubber and wLDPE will badly influence the mechanical properties of the final rubber-polymer composites. This can be minimized by adding various coupling agents such as organic-titanium compounds. We hypothesized that mixing incompatibility of natural rubber (NR) with LDPE could be minimized by adding cost effective *Artocarpus heterophyllus* latex (AHL), while enhancing physical, chemical and mechanical performances of NR/LDPE polymer blend filed with $CaCO_3$. In this study, we attempted to replace conventional titanate coupling agent with AHL, while partial substitution of LDPE by wLDPE, in NR/LDPE composite. Test composites NR:LDPE:wLDPE (30:60:10) were prepared with varying amounts of AHL (0 to 2.5 pphp at 0.5 pphp intervals) incorporating 20 pphp $CaCO_3$. The composite of NR:LDPE:wLDPE (30:60:10) with $CaCO_3$ (20 pphp) and titanate coupling agent (0.5 pphp) was used as the control. The physico-mechanical and chemical properties of the composite were evaluated according to the ISO standards. Morphology and structural features were examined by Scanning Electron Microscopy (SEM) and Fourier transform infrared (FTIR) analysis. The gel content and the degree of swelling in p-xylene, hardness, tear strength, elongation at break, aging and water absorption were also studied. Our findings revealed that the composite prepared with 1.5 pphp of AHL with 20 pphp of $CaCO_3$, showed the better performance in terms of chemical and physico-mechanical properties and fine morphology compared to the control. Overall our study reveals the possible use of AHL as a low cost, and environmental friendly compatibilizer for manufacturing NR /LDPE/wLDPE polymer blends.

Keywords: *Artocarpus heterophyllus latex, Waste polyethylene, Natural rubber compatibilizer*