

UTILIZATION OF COIR DUST AS A COST EFFECTIVE REINFORCEMENT FILLER MATERIAL IN POLYMER COMPOSITES

A dissertation submitted to the
Faculty of Animal Science and Export Agriculture of
Uva Wellassa University
in partial fulfillment of the requirements for the award of the degree of
Bachelor of Science in Palm & Latex Technology and Value Addition

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2014

ABSTRACT

In this research utilization of coir dust as a cost effective reinforcement filler material in polymer composite was investigated.

Usage of natural rubber only to produce rubber products become disadvantages in economic and environmental aspect. It will be more efficient if rubber is reinforced with filler as its additive without affecting its properties. Moreover, the increase interest in using natural fillers as reinforcement in natural rubber to substitute the conventional fillers has become one of the main concerns in nowadays.

For this study low cost coir dust was used as the natural filler to reinforce the skim rubber composite. Different amount of coir dust (10-100 phr) was loaded into polymer composite according to compounding recipe. The cured rubber composite was vulcanized using hot press.

The physico-mechanical properties of the coir dust reinforced rubber composite were evaluated as a function of filler loading. The coir dust showed good processing safety in terms of torques and scorch.

For coir dust reinforced rubber composite, optimum tensile strength of 4.90 MPa at 60 phr was recorded. It was found that composite with 60 phr coir dust showed maximum tensile properties. Elongation at break was significantly decreased when increasing filler loading. Hardness of the composite was significantly ($P < 0.05$) increased with increasing of coir dust filler loading. 60 phr of coir dust showed optimum hardness of 84 IRHD according to ultimate product requirement. Specific gravity of composite was significantly ($P < 0.05$) increased with increasing filler loading. Required specific gravity of composite was recorded in 60 phr of coir dust filler loading. Abrasion resistance of the composite did not show a linear relationship with coir dust filler loading.

As a conclusion, this study indicates the potential of coir dust to be exploited further by controlling particle size, particle distribution, improving filler dispersion and also its surface functionality as a low cost filler material in natural rubber composites.

Key words: Polymer composite, torque, scorch, reinforcement, elongation at break, hardness, filler, physico-mechanical properties.