

**EVALUATION OF SUITABILITY OF PALMYRA
FIBRE AS A REPLACEMENT FOR COCONUT
FIBRE IN CARBON BLACK FILLED NATURAL
RUBBER COMPOSITES**

A dissertation submitted to the

Faculty of Animal Science and Export Agriculture

Uva Wellassa University

In partial fulfilment of the requirement for the award of the
Degree of Bachelor of Science in Palm and Latex Technology and Value
Addition

By

**GANIHACHCHI PATHIRANNALAGE DON LAHIRU
SURESH THILANGA**

Faculty of Animal Science and Export Agriculture

Uva Wellassa University

2013

ABSTRACT

The main objective of this study was to replace coconut fibre with palmyra fibre in carbon black filled natural rubber composites. The effect of different amounts of palmyra fibre on physico-mechanical properties of natural rubber compounds was investigated and the properties were compared with those of coconut fibre filled natural rubber compounds. Test pieces were prepared with the rubber compounds to carry out physico-mechanical testing. The cure characteristics and physico-mechanical properties of the rubber composites prepared with different loadings of palmyra fibre were investigated. For comparison purposes, a series of rubber compounds was prepared using coconut fibre, similar in quantity to palmyra fibre. Palmyra fibre containing composites exhibited lower minimum torque, higher maximum torque, higher scorch time and shorter cure time. Further, incorporation of palmyra fibre into rubber compounds significantly improved hardness, tensile modulus, elongation at break and tear strength, but significantly decreased tensile strength and abrasion resistance. In overall, results indicated that palmyra fibre containing, carbon black filled natural rubber composites exhibit improved cure and physico-mechanical properties in comparison to coconut fibre containing carbon black filled natural rubber composites. There was a significant difference ($P < 0.05$) between palmyra fibre filled and coconut fibre filled rubber composites. Palmyra fibre composite is suitable as a direct replacement for coconut fibre composite in most applications because of the pattern of reinforcement produced. Further, palmyra fibre composite fulfils the requirements of a middle layer solid tyre compound.

Key words: Palmyra fibre, cure characteristics, physico-mechanical properties, reinforcing filler, carbon black