EFFECT OF ETHEPHON STIMULATION ON PHYSICO-MECHANICAL PROPERTIES OF CARBON BLACK FILLED NATURAL RUBBER VULCANIZATES

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ABSTRACT

Low intensity harvesting systems (LIH) with ethephon stimulation were introduced to rubber plantations due to the shortage of skilled latex harvesters. The objective of this research study was to identify the effect of ethephon stimulation on physico-mechanical properties of the carbon black filled natural rubber vulcanizates. The study was conducted with the RRIC 121 clone using half spiral, once in three-day harvesting system. Experiments were laid out in Randomized Complete Block Design using three blocks with six ethephon treatments (0, 1, 2, 3, 4, 5 %). Each block was composed of 150 trees and each treatment was applied in 25 trees while the non-stimulated (0%) trees were considered as the control. Latex was separately collected from each treatment and processed into unfractioned unbleached crepe rubber (UFUBCR) and carbon black filled natural rubber vulcanizates were produced according to the general compounding formulation. Vulcanization was carried out at 150°C for 10 minutes. Initial Plasticity and Mooney Viscosity of UFUBCR reduced with the increase of ethephon concentration while Plasticity Retention Index showed marked reduction at 4% and 5% ethephon concentrations. Rebound resilience, tensile strength and elongation at break have reduced with high ethephon concentrations. However, hardness, compression set and tear strength has increased with high concentrations of ethephon. Results revealed that elastic properties have reduced and filler reinforcement has increased with high ethephon concentrations. LIH systems with ethephon stimulation do not have any adverse effect on physico-mechanical properties up to 3% ethephon concentrations. However, such properties were negatively affected with the application of higher ethephon concentrations beyond 3%; therefore application of ethephon up to 3% could be recommended.

Keywords: Ethephon stimulation, Physico-mechanical properties, Natural rubber carbon black filled vulcanizate.