A STUDY ON THE POTENTIAL OF USING SAVINASE IN MANUFACTURE OF DEPROTENIZED CREPE RUBBER

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By

THENA HANDI DILANI SHANIKA CHANDRAMALI

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Uva Wellassa University of Sri Lanka

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ABSTRACT

Deproteinized Crepe Rubber (DPCR), purified form of Natural Rubber (NR) with low Nitrogen Content (NC) has high demand in the global market due to its superior properties and quality consistency than conventional crepe rubber. Enzymatic hydrolysis of protein present in NR has commonly used technique in commercial-scale to manufacture DPCR. However, DPCR has not been produced, presently, due to the scarcity of suitable proteolytic enzymes and cost in the local market. Savinase is widely used and commercially available enzyme to remove protein especially in food and textiles industries. Therefore, this study was carried out to study the potential of Savinase in the manufacture of DPCR. DPCR samples were coagulated by varying Savinase dosage from 1 to 4 ml with 1 ml interval per 1 litre of the diluted field latex with 10% DRC and 1% formic was used to coagulate the control sample. After 3 days, enzymatic and acid coagulated samples were converted into pale crepe using standard pale crepe rubber manufacture procedure. Impact of the maturation time (1-3 days) on raw rubber properties were studied using the sample containing 4 ml Savinase in 1L of diluted latex. Raw rubber properties, curing characteristics and physico-mechanical properties of vulcanizates were also evaluated according to the ISO standards. Based on the NC, the amount of protein in the samples was used to interpret. All Savinase treated samples have shown lower NC (0.10-0.14 w/w %) than the control (0.31 w/w %). Further Increase of Savinase volume and the maturation period reduce the NC in the samples while increasing NC, COD and BOD in the serum. Other raw rubber properties of Savinase treated samples with 72 hour maturation period are compiled with the required specification for DPCR already established, excluding Plastic Retention Index (PRI). The Savinase treatment (4ml/litre) with 24 hours maturation period showed comparable PRI value (63.3%) with the control while other raw rubber properties are within the specification of DPNR. Moreover, reduction in NC, PRI and ash content while P_o value increment was observed with increasing maturation time. Due to the protein reinforcement effect and higher crosslink density, the control sample showed better tensile strength than the STC samples. Other physio- mechanical properties of Savinase treated samples were comparable with the control. Overall, it can be concluded that the Savinase enzyme has a potential to use for manufacturing DPCR.

Keywords: Deproteinized Crepe Rubber, Natural Rubber, Nitrogen Content, Raw rubber properties