# FILM PROPERTIES OF PREVULCANIZED NATURAL RUBBER LATEX FILMS PRODUCED OUT OF CREAMED LATEX

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# ABSTRACT

Pre-vulcanization of latex yields latex with intra cross-linked rubber molecules in rubber agglomerated dispersed in the aqueous medium. This nature of latex offers many advantages such as improved stability, simplicity in use, long shelf life, low toxicity in the industrial applications. Despite numerous works has been reported on pre-vulcanization of centrifuged natural rubber latex, no much work has been reported on the pre-vulcanization of creamed natural rubber latex. In this research study, pre-vulcanization of natural rubber creamed latex using fast, ultrafast and delayed-action accelerator systems was investigated. Accelerators used were Tetramethylthiuram disulfide, Zinc diethyldithiocarbamate and N-Tert-Butyl-2-benzothiazolesulfenamide, respectively. Corresponding counterparts were also prepared using centrifuged latex for the purpose of comparison. Pre-vulcanized latex films were prepared and their film properties were compared. Results showed that latex films made out of pre-vulcanized creamed latex exhibit higher crosslink density as evidenced by the lower swelling index, higher tensile strength (unaged and aged) and tear strength values than the corresponding films prepared using pre-vulcanized centrifuged latex. These results were justified by the low level of curing agent residuals available in the pre-vulcanized creamed latex than the centrifuged latex counterpart as evidenced by the acetone extraction results. Further pre-vulcanized creamed latex possesses low leachable protein content before leaching than that of in centrifuged latex. However, after leaching the opposite trend was observed, with significantly low levels of leachable protein content. Among the accelerators, Zinc diethyldithiocarbamate accelerator showed overall best performance while the lowest performance was shown by N-Tert-Butyl-2-benzothiazolesulfenamide. Therefore, it could be inferred that pre-vulcanized creamed latex with ultra-fast accelerator system can be a new achievement for the small scale rubber product manufacturers assuring energy efficient and less chemical consuming process promoting greener rubber products.

**Keywords:** *Accelerator, Centrifuged, Creamed, Pre-vulcanized*