

## Effect of Residual Diammonium Hydrogen Phosphate Content on Properties of Natural Rubber Centrifuged Latex

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Natural rubber particle, a polyisoprene core is surrounded by a shell of non-rubber components, proteins and phospholipids. Natural  $\text{PO}_4^{3-}$  are added to ammonia preserved latex due to the hydrolysis of phospholipid layer around the rubber particle. Although this process contributes to the stability of the latex this could produce a waste sludge; a precipitate of magnesium with phosphate. In centrifuged latex (CL) manufacturing process  $\text{PO}_4^{3-}$  are added as diammonium hydrogen phosphate (DAHP) before centrifugation in order to remove residual  $\text{Mg}^{2+}$  present in field latex to the level of 80-100 ppm. In most cases, added DAHP will leave excess  $\text{PO}_4^{3-}$  in latex as most manufacturers added it without estimating the remaining  $\text{Mg}^{2+}$  present in latex. It results in a high amount of  $\text{PO}_4^{3-}$  in latex as a considerable amount of  $\text{PO}_4^{3-}$  are released from the natural process of hydrolysis with storage time. This study aimed to determine the variation of residual  $\text{PO}_4^{3-}$  content of CL with storage time and its ultimate effect on latex property development. A series of centrifuged latex samples were prepared by adding 0 g (control sample), 3 g, 6 g, 9 g, 12 g, and 15 g of 15% DAHP. Changes of the latex characteristics such as mechanical (MST) and chemical stability time (CST),  $\text{PO}_4^{3-}$  and  $\text{Mg}^{2+}$  concentration, viscosity were determined with time. All the testing were carried out according to ISO procedures. High ammonia preserved CL showed a considerable amount of natural  $\text{PO}_4^{3-}$  of about 300-200 ppm with storage time. The  $\text{PO}_4^{3-}$  content of latex is not a stable amount and showed several fluctuations with time due to several chemical reactions within the latex sample. The excess amount of  $\text{PO}_4^{3-}$  in the latex leads to a decrease in viscosity and stability of latex due to colloidal destabilization. The control sample showed the highest MST (315 seconds) and CST (97 seconds) with storage time than other samples revealing that there is no need for the addition of DAHP if the  $\text{Mg}^{2+}$  content of field latex is below 100 ppm in manufacturing CL.

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