

A Novel Process to Manufacture Low Protein Contained Centrifuged Latex

P.M.G.S. Hansani¹, Y.C.Y. Sudusinghe^{2*}, A.M.W.K. Senevirathna¹, E.A.L. Lochana¹
and P.K.N.N. Sandamali²

¹*Department of Export Agriculture, Uva Wellassa University, Badulla, Sri Lanka*

^{2*}*Department of Raw Rubber Processing Development & Chemical Engineering, Rubber Research Institute, Ratmalana, Sri Lanka*

Removal of protein in Natural Rubber (NR) latex has been a focus of great importance as some users face serious allergy issues when they exposure to NR latex-based products. Therefore, in this study, an attempt was taken to develop a commercially viable and environmentally friendly hybrid route by combining fractionation and creaming processes, to manufacture quality centrifuged latex with reduced protein level. Firstly, preserved NR field latex was fractionated at four different Dry Rubber Content (DRC) levels: 15%, 18%, 21%, and 24%. Subsequently, all fractionated and diluted field latex samples at 10% DRC were creamed up to 30% DRC using sodium alginate at 20 phr concentration. Creamed latex obtained were then subjected to the centrifugation process. Fractionated Creamed Centrifuged Latex (FCCL) samples were compounded according to the basic formula and cured in a drying oven at 120 °C for 20 minutes. Latex properties and their film properties were studied according to the standard test procedures and compared with Single Centrifuged Latex (SCL) and Double Centrifuged Latex (DCL). The FCCL sample fractionated at 15% DRC (15% FCCL) showed the lowest nitrogen content than other centrifuged samples while other samples follow the order of 18% FCCL < 21% FCCL < 24% FCCL < DCL < SCL. Also, 15% of FCCL has the lowest VFA development than the other samples including SCL and DCL due to the lower amount of NRC. Moreover, it showed similar MST development with all other samples. However, films prepared using FCCL and DCL have higher swelling indices (lower crosslink density) and lower tensile strength and water adsorption as most of the protein removed during the process. In conclusion, the process of manufacturing centrifuged latex using creamed and fractionated at 15% DRC is more suitable to manufacture low protein centrifuged latex for sensitive advanced applications than currently available methods such as double centrifugation.

Keywords: Fractionation, Creaming, Low protein latex, Centrifuged latex, Natural rubber latex