Optimization of Sulfur: Zinc Oxide: Accelerator Ratio for Natural Rubber Latex Unsupported Gloves

N.C.Y. Kithmini A.G.A.W. Alakolanga', P. Ariyananda[2]

'Department of Export Agriculture, Faculty ofAnimal Science and Export Agriculture, Uva Wellassa University, Badulla, Sri Lanka

'Research and Development Division, Industrial Clothing (Pvt) Ltd (Prime Polymer Division), Avissawella , Sri Lanka

Glove is one of most important export product which holds a significant place in rubber latex dipping industry in Sri Lanka. Different chemical ingredients are incorporated with centrifuge latex in compounding for glove production. Among them, the ratio of S, ZnO and accelerator plays an important role on vulcanization rate and the properties of the end product. The existing ratio which used in the glove industry is identified as having some wastage of above ingredients. Therefore, an investigation was carried out to optimize the S, ZnO and accelerator ratio while maintaining same physical properties in natural rubber latex unsupported gloves. The dispersions of 50 % Zinc Oxide, 50 % Sulfur and 50 % Accelerator were prepared successfully. Nine compounds including the control were prepared by changing the ZnO, Sulfur and accelerator ratio within the selected minimum and maximum limits while all the other ingredients are constant. The existing compound was used as the control and the physical properties of finished gloves; tensile strength, elongation, force at peak were measured. The results indicated a significant effect of different amount of dispersions on the physical properties. The treatment 4 (ZnO 0.1: Sulfur 0.3: Accelerator 1.0) was identified as the best treatment which resulted the best tensile strength (>17 $Nmni^2$), elongation (>700 %) and force at peak (>7 N) compared to the specifications of the properties of natural rubber latex disposable gloves. The cost of glove production was successfully reduced by eliminating the excess amount of ingredients in the selected compound while maintaining the properties as well.

Keywords: Vulcanization rate, Unsupported gloves, Tensile strength, Elongation, Force at peak