Optimization of Glove Mixing Process of Gammex Powder Free (GPF) Product to Overcome Scum Formation

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Hevea brasiliensis latex is used to manufacture surgical gloves. GPF gloves are low in residual proteins and powder. Hence they are less susceptible to allergies. Scum formation is a major drawback in compounding process which contains of two major phases, phase 1 (heat prevulcanization) and phase 2 (ambient prevulcanization). The major issue of the current process is scum formation during prevulcanization stage. The main reason for scum formation is the lack of stability at elevated temperature, high dosage of ZnO which forms excessive zinc amine complexes and due to less Brownian motion of curing agents. The trials were done by changing 3 main factors such as Potassium laurate (PL) level, ZnO% and mode of cure pack. As per the trials, changed PL dosage as 50% in each phases, interchanged ZnO dosage in phase 1 (lower dosage) & phase 2 (higher dosage), individual dispersions of curing agents were introduced. Anyhow, ZnO trial was failed due to lack of ZnO for the activation of prevulcanization process. According to the statistical analysis using Minitab 16 software, the P value (<0.05) at 0.05 level of significance proved that there was an interaction between PL level and curing method. With the PL 50% in both phases and adding individual dispersions, the scum level was reduced from 8% to 0.5%. Gloves were prepared to test whether the chemical adjustment was affected for final glove quality. The P value (>0.05) at 0.05 level of significance proved that there was no significance difference in tensile strength. The modulus was more than required and it is cost effective. In conclusion, the scum formation can overcome by changing PL level and by adding individual dispersions. Furthermore, it is beneficial to overcome glove defects like scum, dirt hole and it allows opportunity for the process optimization of GPF product.

Keywords: Scum, Potassium laurate, ZnO, Individual dispersions