

**OPTIMIZATION OF PROCESSING PARAMETER RANGES FOR  
REDUCTION OF DEFECTS IN SURGICAL GLOVE  
PRODUCTION**

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## ABSTRACT

Surgical gloves are one of the major dipped products processed from natural rubber latex (NR). The current research study was carried out to investigate the effect of temperature of former, concentration of calcium nitrate in coagulant medium and total solid content of natural rubber latex compound on defects in gloves. Those three parameters were monitored under current processing conditions. Temperature of formers before dipping into the compounded latex was in the range between 58 °C to 66 °C. Concentration of the calcium nitrate in coagulant medium was at three levels of 16.0%, 17.5% and 19.0%. Total solid content of latex compound was at three levels 26.5%, 28.5% and 30.5%. Major defects per batch were counted and converted it into a ratio, the defect ratio, to the total number of gloves produced in a batch. The defect ratio was taken as the response variable. It decreased with the increase of former temperatures within the range monitored and possible optimum temperature range can be narrowed down from 63 °C to 66 °C. The diluting concentration of calcium nitrate in coagulant medium at 19.0% to 17.5% is required to perform minimum defect ratios. Therefore, optimum concentration range could be narrowed down approximately by 10%. Total solid content had a negative relationship with defects. Total solid content of 28.5% to 30.5% range was performed as the optimum range. Temperature of formers should be maintained within a range without overlapping melting temperatures of chemicals and less energy consumption. Therefore, the narrowing down of the process parameters in to optimum ranges as identified in this study would enhance the productivity and the efficiency in the surgical glove production.

*Keywords:* Coagulant concentration, Defects ratio, Natural rubber, Surgical gloves, Total solid content