REDUCTION OF MATURATION TIME OF NATURAL RUBBER COMPOUNDS USED IN DISPOSABLE GLOVE MANUFACTURING INDUSTRY

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ABSTRACT

Latex compound maturation is one of the most important aspects in manufacturing of natural rubber gloves, because compound properties change over time and temperature of maturation. The maturation time is generally considered as 24 hours in natural rubber compounds for glove manufacturing. Higher the maturation duration will cause over maturation of compound resulting increase of microbial activity and waste of energy in the process. In this research, compound properties such as pH, Total Solid Content, chloroform number and glove-properties like tensile strength, modulus, force at break, swelling index were assessed by changing accelerators and sulfur ratios at different maturity durations (Started from 8 hours up to 72 hours at four hour intervals). Main objectives of this study are to reduce the maturation time of natural rubber compound without affecting above properties of gloves and to find physical properties of natural rubber formulation with different maturity durations and to optimize the natural rubber compound formulation.

Seven new formulations were developed by changing accelerators and sulfur ratios using ZDBC (Zinc dibutyldithiocarbamate), ZDEC (Zinc diethyldithiocarbamate), ZMBT (Zinc-2-mercaptobenzothiazole), Setsit (Liquid Zinc dibutyldithiocarbamate), and mixture of liquid Zinc dibutyldithiocarbamate and Zinc dibutylamine as accelerators. Sample gloves were manufactured and mentioned compound and gloves properties were measured with different maturity durations. Finally the effects of maturation time with different accelerator: sulfur ratio were identified.

Results revealed that compound maturation time could be reduced from 24 hours to 16 hours using 0.6 phr of ZDBC (Zinc dibutyldithiocarbamate) without changing the mentioned properties.