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USE OF SULPHURIC ACID AS COAGULANT FOR NATURAL RUBBER LATEX : LONG TERM EFFECTS ON RUBBER AND MACHINERY

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Detailed investigations were carried out on the ageing behaviour of air dried sheet rubber prepared using sulphuric acid as coagulant, in comparison with that of sheets prepared using formic acid. Long term thermo-oxidative ageing of vulcanizates prepared from the sheets was also studied. Observations have also been made on the extent of corrosion on coagulation pans and sheeting rollers for a period of two years. It was found that decrease in the strength of raw rubber sheets prepared with sulphuric acid was negligible over a period of one year. Ageing behaviour of vulcanizates from sheets prepared using sulphuric acid was comparable to those prepared using formic acid, if the recommended conditions of use are followed. Corrosion of aluminium pans and sheeting rollers was negligible, when sulphuric acid was used as coagulant and recommended practices were followed.

Key words : Natural rubber, Latex coagulation, Sulphuric acid, Formic acid, Ageing, Vulcanizates.

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INTRODUCTION

Several attempts were made by earlier workers on the use of sulphuric acid as a coagulant for natural rubber (NR) latex for preparing sheet rubber (Wiltshire, 1932; Martin and Davey, 1934; Baker and Philpott, 1950; Best and Morell, 1955). However, its use has been very limited for various reasons such as its corrosive and non-volatile nature, difficulties in dilution and handling and the narrow price advantage over the more popular coagulant, formic acid. There has been a revival of interest on the use of sulphuric acid in recent years as there had been occasional instances of shortage in the supply of formic acid and significant price difference. Recent studies by George *et al.* (1992) indicated that sulphuric acid can be used as an effective and cheaper alternative to formic acid if factors such as dilution, dosage and washing of sheets and machinery are taken care of.

However, there are reports that the ageing behaviour of sulphuric acid coagulated rubber, as measured by tensile properties, is poor (Neef, 1950). Therefore, a detailed study was undertaken to investigate the storage/ageing behaviour of sheet rubber prepared using sulphuric acid. Observations were also made on the extent of corrosion of the aluminium pans and the sheeting rollers as a result of continuous use of sulphuric acid over a period of two years.

EXPERIMENTAL

Commercial grades of formic acid (85%) and sulphuric acid (99%) were used for the study. Fresh latex for the study was collected from the Rubber Research Institute of India Experiment Station. Sheet