

## AGEING CHARACTERISTICS OF NATURAL RUBBER CONTAINING PHOSPHORYLATED CASHEW NUT SHELL LIQUID

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The effect of phosphorylated cashew nut shell liquid prepolymer, (PCNSL) on the ageing characteristics of natural rubber vulcanizates was studied in comparison with styrenated phenol. It was found that at low concentrations PCNSL improved ageing characteristics of natural rubber and the improvement was more than that by styrenated phenol. PCNSL showed antiozonant property also.

**Key words:** Natural rubber, Cashew nut shell liquid, Phosphorylation, Flame retardancy, Ageing resistance.

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### INTRODUCTION

There are a variety of unsaturated hydrocarbon phenols present in certain plant species (Tyman, 1979). *Anacardium occidentale* is one such species which gives a viscous, reddish brown, vesicant and corrosive liquid known as cashew nut shell liquid (CNSL). It is obtained from the mesocarp of the true fruit of the plant. The main constituent of the liquid, as it exists in the shell, is phenolic. Approximately 10 per cent is cardol, a mixture of substituted resorcinols. The remaining 90 per cent consists of anacardic acid, a mixture of salicylic acid derivatives. The industrial applications of CNSL are based on the fact that it can be polymerised by various means. There are many patents on the use of CNSL and its derivatives in the rubber industry. Menon and Pillai (1989) reported

that fire retardant characteristics could be imparted to natural rubber vulcanizates by the addition of phosphorylated cashew nut shell liquid (PCNSL).

Natural rubber (NR) is prone to oxidation and other degradation reactions and a number of antioxidants and other stabilisers are used to decelerate these reactions. As CNSL and its derivatives are possessing functional groups having antioxidant qualities, it is likely that PCNSL may improve the ageing behaviour of NR while imparting flame retardancy. The present study was conducted to assess mainly the antioxidant and flame retardant qualities of PCNSL prepolymer (ANORIN 38) in NR.

### EXPERIMENTAL

Natural rubber in the form of ribbed

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