E-13 **SYNTHESIS OF ANTIOXIDANTS FOR NATURAL RUBBER FROM HINDERED PHENOLS AND AMINES**

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Natural rubber being an unsaturated polymer is susceptible to degradation by oxidation even at room temperature, which results in the deterioration of the physical properties of the polymer. To prevent or retard this process of degradation, antioxidants are incorporated into natural rubber.

In the present study antioxidants were synthesised by condensation of hindered phenols and amines in the presence of formaldehyde using the Mannich reaction. The corresponding dithiocarbamates of these Mannich bases were also prepared. The compounds synthesised include : (1) N (3, 5 di-tert-butyl–4 hydroxy benzyl) di methyl amine ; (2) N (3, 5 di-tert-butyl–4 hydroxy benzyl) morpholine ; (3) N (3,5 di-tert-butyl–4 hydroxy benzyl) piperidine and their corresponding dithiocarbamates.

Antioxidants were also prepared using cardanol which is obtained by the vacuum distillation of locally available cashew nut shell liquid.

The characterisation of these compounds was carried out using physical techniques namely infrared, nuclear magnetic resonance and mass spectroscopy.

The antioxidant activities of the compounds have been studied, by carrying out the determination of physical properties before and after accelerated ageing, by stress relaxation and by oxygen absorption technique.

The volatility of the antioxidants was also determined. The results indicate that the compounds have antioxidant activities comparable to some of the commercial antioxidants.