

ALKYD RESIN FROM RUBBER SEED OIL

Oil modified alkyd resins proved to be quite indispensable in the protective coating industry. In Nigeria there seems to be great demand for vegetable oils in the nutritional, pharmaceutical and paint industries. Rubber seed is reported to be abundant in Nigeria, and is found to contain 42% oil and may be classified as a semi-drying oil (Aigbodion, 1991). Vegetable oils, especially the drying oils, have been used as an important vehicle in the production of alkyd resins. Preliminary studies (Aigbodion, 1991; Sthapitanonda *et al.*, 1981) have shown that crude rubber seed oil could be successfully utilized in the production of short, medium and long chain alkyds. This study complements earlier research on the industrial utilization of rubber seed oil in the production of surface coatings.

Laboratory grade glycerol, phthalic anhydride, calcium carbonate and sodium thiosulphate were employed in the polycondensation reaction. Rubber seed oil was extracted from fresh seeds using petroleum ether (40 - 60°C). For the production of gloss paints analytical grade chemicals were used. Refining of the oil was done using the method adopted by Protein Oil Starch Pilot Plant Corporation, Canada. British Standard, AOCS and IUPAC methods were used for the analysis of oils, fats and soaps. ASTM methods were followed for the characterisation of the surface coatings.

Two samples of modified alkyds (Table 1) were prepared using the alcoholysis method. Refined rubber seed oil, glycerol

Table 1. Ingredients and conditions for preparation of modified alkyd resins

Ingredients	Sample I Medium chain (%)	Sample II Long chain(%)
Oil content	50.0	66.7
Phthalic anhydride	30.0	20.2
Polyol	19.6	12.7
Sodium thiosulphate modified	00.2	00.2
Calcium carbonate catalyst	00.2	00.2

Time : 120 min., Acid value : 8.0, Temperature : 240 to 260°C

and phthalic anhydride were the reactants while calcium carbonate and sodium thiosulphate the catalyst and the modifier respectively. The preparation was carried out in a two litre flask fitted with a motorized stirrer and condenser at a temperature of 230 to 250°C with xylene as solvent (Kienle *et al.*, 1939). Sampling was done at 30 minute intervals to determine the acid value of the reaction mixture. White gloss paint was prepared from the modified rubber seed oil using the method reported by Sthapitanonda *et al.* (1981). The modified oil was converted into gloss paint according to the formulation shown in Table 2.

Results of the analysis of the refined rubber seed oil are given in Table 3. The characteristics of the refined rubber seed oil used in the preparation of the alkyd resins show that the process of refining improved the quality of the oil. The acid and saponi-