

SOLUTION BEHAVIOUR OF RUBBER SEED OIL-MODIFIED ALKYD RESINS

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Solution behaviour of rubber seed oil (RSO) alkyds having oil content of 40, 50 and 60 per cent was investigated. Viscosity measurements of the finished alkyds were carried out in toluene and dimethyl formamide (DMF) while those of samples withdrawn periodically during preparation of the alkyds were determined in toluene solution at $30 \pm 5^\circ\text{C}$. The parameters investigated include intrinsic viscosity $[\eta]$, Huggins (KH), Kraemer's (KK) and Mark-Houwink-Sakurada (MHS) constants (k , k' and α). $[\eta]$ values for the alkyds are found to be influenced by their capability to form hydrogen bond with solvent molecules. Hence $[\eta]$ values for samples I and III with capability to form hydrogen bonds are larger in DMF (a relatively basic solvent); while $[\eta]$ value for sample II with less tendency to associate with solvent molecule is larger in toluene. Values of KH and KK show no regularity in their variation with respect to the type of alkyd and solvent. MHS relationship was found to be applicable to RSO alkyds. Correlation of $[\eta]$ with degree of polymerization (DP) and average molecular weight from end group analysis (M_{av}) showed a linear relationship. Variation in molecular weight distribution (MWD) of the alkyds as deduced from the MHS constants, k and k' is of the same order as that found from polydispersity indices obtained from GPC analysis of the alkyds.

Key words : Alkyds, Intrinsic viscosity, Mark-Houwink-Sakurada equation, Rubber seed oil, Solution behaviour.

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INTRODUCTION

Many practical and theoretical applications of alkyd solutions manifest themselves daily in the surface coatings industry as well as academia. Knowledge of solution behaviour of alkyds is important for adjusting properties of finished alkyds for optimum performance as their practical usefulness can be realised only in solution

in suitable solvent systems. For instance, solution viscosity of surface coatings determines their mode of application either by brushing or spraying and is equally important in the design of processing equipment (OCCAA, 1981). Similarly, polymer fractionation is performed in the solution state (Bajjal, 1982; Tosh and Saikia, 1997). The solvents are selected in such a