

## **ABSTRACT**

Vegetable oil based hyperbranched epoxy thermoset is one of the most in demand materials in modern engineering applications. In the present experiment, vegetable oil based hyperbranched epoxy resins were synthesized from epichlorohydrin, bisphenol-A, triethanol amine with or without monoglyceride of Mesua ferrea L. seed oil ( nahar oil), by a single step polycondensation reaction using  $A_2+B_3$  approach. The physical properties like epoxy equivalent, curing time, viscosity etc. of the synthesized hyperbranched epoxy resins were determined by different analytical techniques. The structure of the resins was characterized by different spectroscopic techniques (NMR and FTIR). The degrees of branching of the resins were found to be 0.49, 0.62, 0.68, and 0.72 for the resins without monoglyceride, using 5, 10, and 15% monoglyceride respectively. The cured epoxy resins with poly (amidoamine) hardener exhibited high thermostability (upto 285, 282, 278, 272<sup>o</sup>c). The rheological properties of the resins were studied by using rheometer and the dynamic viscosities of the resins at 25<sup>o</sup>c and at 100 Pa were found to be 403, 243, 171, and 52 Pas. The performance characteristics as coating materials were studied by gloss, impact resistance, scratch resistance, tensile strength; elongation at break, adhesive strength etc. and the results indicated suitability and sustainability of the synthesized resin as coating materials. The results showed an interesting role of monoglyceride ( $B_2$ ) in the performances of the resins.