

LIST of ABBREVIATIONS

APA	Acrylopicmaric acid
MPA	Maleopicmaric acid
MA	Maleic anhydride
MEKP	Methyl Ethyl Ketone Peroxide
EG	Ethylene Glycol
PG	Propylene Glycol
PA	Phthalic anhydride
AdA	Adipic acid
DSC	Differential Scanning Calorimetric
UP	Unsaturated polyester
VE	Vinyl ester
MPE	Maleopicmaric Ester
EMPE	Epoxy of maleopicmaric ester
AVEMPR	Acrylate vinyl ester of Maleopicmaric resin
MAVEMPR	Methacrylate vinyl ester of Maleopicmaric resin
PTSA	p- Toluene sulphonic acid monohydrate
RMIDA	Rosin maleimidodicarboxylic acid

AIM OF THE WORK

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In recent years, there have been several attempts to use the sophisticated costing techniques as anti-corrosive system for steel. Hence, rather than seeking economies in the cost of the paint, and possibly using a less effective coating, ways should be found of reducing the costs of preparation and application. Rosin has been developed as a feedstock for synthesis of various chemicals and intermediates for polymers. It is often used in the formulation of adhesives, paints, varnishes and printing inks. It is also incorporated in some formulations of unsaturated polyester, but in small quantities. Unsaturated polyester resins, UP, have firmly established themselves as important matrix materials in the field of reinforced plastics and coatings. The unsaturated polyesters (UP's) are one of the most important matrix resins for composite applications. They possess a wide range of properties and used in marine, automobile. They are becoming increasingly popular because of their low cost, ease of use, and versatility, they find applications in laminates, industrial construction, insulation, molding compound, coatings, and adhesive, other advantage of polyesters are their high impact resistance, good weathering resistance, transparency, and good surface effects. Disadvantages include poor adhesion, high cure shrinkage and inhibition of cure by air and some fillers.

Vinyl ester resins are one of the most widely used thermoset resins in polymeric composite due to their excellent resistance to a wide range of chemicals and to their outstanding combination of thermal and mechanical properties. These very positive properties are the result of

their molecular structure. The secondary hydroxyl groups present on the backbone of the resin are responsible for producing composites with very good mechanical performance. In this respect, we have designed both UP resins and hardeners based on aliphatic and cycloaliphatic systems to produce cured UP resins have good durability with excellent mechanical properties. Developments and application of vinyl ester resins include the synthesis of new vinyl ester resins with new structural properties in an effort to improve toughness, to reduce viscosity, to decrease shrinkage, and so on.

The aim of this work was to use the rosin as potential raw materials for the production of UP and vinyl ester resins as coatings. In order to fulfill these goals, three steps were distinguished. In this work, rosin can be converted into useful products by the following chemical reactions:

- i) The rosin converted into dibasic acid via Diels Alder reaction of rosin with maleic anhydride or acrylic acid to form rosin adducts. These adducts can be used to react with ethylene and propylene glycols to increase the flexibility of the UP resins.
- ii) These adducts are utilizing in synthesis of unsaturated polyester and epoxy and vinyl ester resins.
- iii) Vinyl esters are produced from the addition products of an epoxy resin with unsaturated carboxylic acid.
- iv) The curing behavior of UP resins and vinyl ester resins used for the production for ambient temperature coatings was investigated by manipulating the amounts of the initiators used.
- v) The cured resins were evaluated as organic coatings for steel.