

# **POLYFUNCTIONAL MACROMONOMERS OBTAINED FROM OF 2,2-BIS(HYDROXYMETHYL)PROPANOIC ACID AND TALL OIL FATTY ACID.**

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## **ABSTRACT**

During the last years, the researching have been focused toward the synthesis of friendly environmentally materials obtained from renewable resources to reduce the dependence of petrochemistry industries and to obtain friendly environmentally materials [1-4].

Different macromonomers of 2,2-Bis(hydroxymethyl)propanoic acid (DMPA) modified with tall oil fatty acids (TOFA), which is obtained from renewable resources, were prepared with oil length (LO) 50 (LO50), 60 (LO60), 70 (LO70) and 80 (LO80) by a esterification reaction. The structural, thermal, rheological and films properties of the macromonomers (LO50, LO60, LO70 and LO80) obtained were studied by acid value, hydroxyl value, infrared analysis (IR), nuclear magnetic resonance (RMN), mass spectrometry (MS) ultraviolet absorption (UV), dynamic light scattering (DLS), differential scanning calorimetric (DSC), thermogravimetric analysis (TGA), rheological analysis, drying time, gloss, flexibility, adhesion and chemical resistance against to solvent.

The acid value obtained of the macromonomers was around to 80 mg KOH/g of sample (this value was obtained so, to guarantee the presence of -COOH groups into macromonomers). The macromonomers exhibited a reduction in the hydroxyl value with the content of TOFA employed in the synthesis. Though IR and RMN analyses were evidenced the formations of the macromonomers and the presence of double bond carbon-carbon, acid groups and OH groups, in their structure. The mass spectrometry analysis showed different molecular ions of repetitive units of DMPA and DMPA units grafted with fatty acids. UV analysis allowed determinate that the absorption due to double bond carbon-carbon (-C=C-) increased with the content of TOFA (LO80>LO70>LO60>LO50). The macromonomer hydrodynamic dimensions were mainly nanometrics. The glass transition temperature decreased with the content of TOFA. The thermal stability of the macromonomers was higher than 200 °C. The rheological behavior presented by the macromonomers was Newtonian and the viscosity values ( $\eta$ ) were lower than 2.7 Pa.s. The properties of drying time, gloss, flexibility, adhesion and chemical resistance were goods.

Since the macromonomers exhibited low viscosity, double bonds, OH groups and COOH groups, good thermal stability and good film properties, they can be employed as plasticizer, reactive diluents to alkyd resins, crosslinking agent and functionalizing agent. Furthermore this macromonomers can be used to obtain environmentally alkyd resins (waterborne or with high solid content).

## **References**

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