

## **Physicochemical, structural and mechanical evaluation of bio-based epoxidized jatropha oil blended with amine-cured epoxy resin as new hybrid matrix**

### **ABSTRACT**

The utilization of bio-resources in the composite system, as an alternative to replace petroleum resources, increases tremendously due to the awareness of the society towards the environmental friendly composite material. The present work conveys the characteristics and performance of bio-epoxy resin blended with the existing polymer matrices, which was synthetic epoxy, as a new innovation to the bio-composite system. Initially, the bio-epoxy resin produced from in-situ epoxidation of Crude Jatropha Oil (CJO) in presence of ion exchange resins, Amberlite IR-120. Then, the hybrid matrix specimens were prepared by blending the Bio epoxy resin with the synthetic epoxy resin with a different mass percentage of 0%, 25%, 50%, 75%, and 100%. In addition, physicochemical, spectroscopic, tensile and flexural characterization of CJO and bio epoxy resin were also conducted. The formulation of synthetic resin with 25 wt% of bioepoxy shows the best mechanical properties of tensile and flexural. Thus, biobased epoxidized crude Jatropha oil is suggested as a potential green material to partially replaced the petrochemical-based resins as a polymeric matrix.

**Keyword:** Blends; Characterization; Jatropha oil; Performance; Renewable source; Resins