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## Branched plasticizers derived from eugenol via green polymerization for low/non-migration and externally/internally plasticized polyvinyl chloride materials

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摘要	The synthesis of nontoxic plasticizers derived from the waste residues of the? rosin?-processing industry can reduce pollution and promote the high-value utilization of the waste resi-dues of?rosin. In this study, four kinds of sustainable branched plasticizers derived from a biomass resource, eugenol (derived from the waste residues of the?rosin?processing industry), were synthe-sized via one-pot solvent free polymerization and used to plasticize polyvinyl chloride (PVC). Internally plasticized PVC was fabricated using thiolated DPE (branched plasticizers based on eugenol). The thermal stability, tensile properties, microstructure, volatility behavior, and solvent extraction resistance of plasticized PVC were investigated. Compared with the behavior of the commercial plasticizer dioctyl phthalate, the thermal stability, plasticizing efficiency, and migration resistance of the branched plasticizers are superior. The acute oral toxicity dose of each branched plasticizer was extremely high at 5000 mg/kg of body weight, with no deaths among test animals. Compared with externally plasticized PVC, the internally plasticized PVC showed zero weight loss in volatility and leaching tests despite its less effective plasticization. All the branched plasticizers have potential application in plastic products.
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