

ITACONIC ACID AS RENEWABLE BUILDING BLOCK FOR UV-CURING POLYMER RESINS

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Over the last years itaconic acid has drawn considerable attention as novel and renewable building block for bio-based polymers. It has been used as (co-)monomer in radical polymerization reactions to obtain polyitaconates with different fields of application.¹ However, itaconic acid can also be used as monomer for unsaturated polyesters (Figure 1).² Due to the higher reactivity compared to polyesters derived from maleic acid, these materials can also be used in UV-curing applications and have the potential to be a renewable alternative to polyester acrylates. In addition, by using other bio-based building blocks it is possible to obtain polymers of this type that are completely derived from renewable resources.

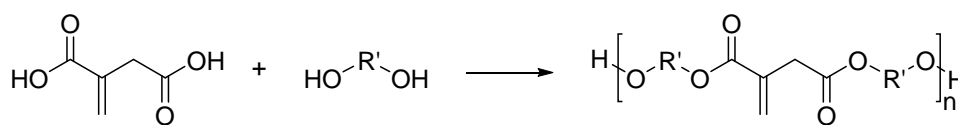


Figure 1 – Bio-based polyester itaconate

Herein, the synthesis and properties of novel polyesters and poly(ester amide)s derived from itaconic acid will be reported. Furthermore, the application of these polymer resins as binders for different UV-curing applications, such as printing inks,³ wood coatings, and materials for additive manufacturing will be presented. In addition, novel small molecules derived from itaconic acid that might have potential to be used as reactive diluents will be discussed. The results suggest that these bio-based resins and monomers can be an alternative to conventional materials derived from acrylic acid. These findings are very intriguing, as itaconic acid usually suffers from lower reactivity towards UV-induced crosslinking in comparison to acrylic acid. In addition, characterization of the properties of the UV-cured materials derived from itaconic acid show that they can compete or even surpass the properties of commercial materials.

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