

Vegetable Oils as Green Alternatives for Monomer and Polymer Synthesis

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The use of renewable raw materials can significantly contribute to a sustainable development, usually interpreted as “acting responsible to meet the needs of the present without compromising the ability of future generations to meet their own needs”. In ages of depleting fossil oil reserves and increasing emission of green house gases it is obvious that the utilization of renewable raw materials wherever and whenever possible is one necessary step towards a sustainable development of our future. In particular, this can perennially provide a raw material basis for daily life products and avoid a further contribution to green house effects due to CO₂ emission minimization. Furthermore, the utilization of renewable raw materials can (in some cases) meet other principles of green chemistry, such as a built in design for degradation or an expected lower toxicity of the resulting products.

Within this contribution, the utilization of plant oil renewable resources as raw materials for monomers and polymers will be discussed and reviewed. It will be shown that the synthesis of monomers as well as polymers from plant fats and oils already has some industrial application and recent developments in this field offer promising new opportunities. Moreover, new approaches of monomer as well as polymer synthesis using plant oils as starting materials will be discussed in detail. Especially cross-metathesis and other efficient catalytic reactions, the synthesis of oxazoline, acrylate or methacrylate derivatives and their subsequent controlled and living polymerization, as well as post polymerization functionalization procedures of the obtained macromolecules will have an important impact on the field in the future. Interesting examples and results of these new approaches towards defined and functional polymeric materials will be discussed in detail.