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Subrata Chattopadhyay, Filip Du Prez

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Simple design of chemically crosslinked plant oil nanoparticles by triazolinedione-ene chemistry

Subrata Chattopadhyay and Filip Du Prez*

Department of Organic and Macromolecular Chemistry, Polymer Chemistry Research Group, Ghent University, Krijgslaan 281, s4-bis, 9000 Ghent, Belgium.

Email: filip.duprez@ugent.be

KEYWORDS: Plant oil nanoparticles, triazolinedione chemistry, lipid based nanoparticles, nanoprecipitation, Ouzo effect, nanoparticles with ester linkages, nanoparticles from renewables.

ABSTRACT: Plant oils, one of the most abundant source of fatty acids and derivatives thereof, have never been used as starting compounds to prepare chemically crosslinked nanoparticles. In this report, we demonstrate a simple approach for the preparation of chemically crosslinked nanoparticles (PONPs) in minutes, starting from a range of available plant oils (used as renewable starting materials) and, using triazolinedione (TAD)-ene reactions. The size of the PONPs can be controlled ($D_n = 140 - 260$ nm) by varying different reaction parameters. The thermal stability (25°C - 80°C) of these nanoparticles in solution was demonstrated. This study can contribute significantly to the future design of different chemically crosslinked nanoparticles using triazolinedione chemistry for various applications.

1. Introduction

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