Formulation and polymerization of Pickering emulsions stabilized by stimuli-responsive dextran-based nanoparticles

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Pickering emulsions offer outstanding kinetic stability, appreciable for storage. It is of great interest to confer them stimuli-responsiveness [1] [2] for applications that often require release of the content.

The aim of our work is to formulate Pickering emulsions stabilized by dextran-based stimuli-sensitive nanoparticles. To do so, we modified dextran: a bio-sourced, biocompatible and biodegradable hydrophilic polysaccharide in three different ways. Then, nanoparticles made of modified dextran exhibiting narrow size distribution (PDI<0.2) and average hydrodynamic diameter around 200 nm were produced using nanoprecipitation. The initial modification step provides wettability and ensures stimuli-responsiveness to pH, enzyme or light of these nanoprecipitated particles for their use in Pickering emulsion stabilization. Oil-in-water Pickering emulsions were successfully formulated using these three different types of nanoparticles and limited coalescence phenomenon was studied. Degradation of the nanoparticles and destabilization of the related Pickering emulsions under stimuli (pH [3], enzyme, or light [4] (Figure 1)) were achieved, promoting new bio-friendly vectors for lipophilic substances. The next step is to polymerize the inner phase of simple Pickering emulsions.

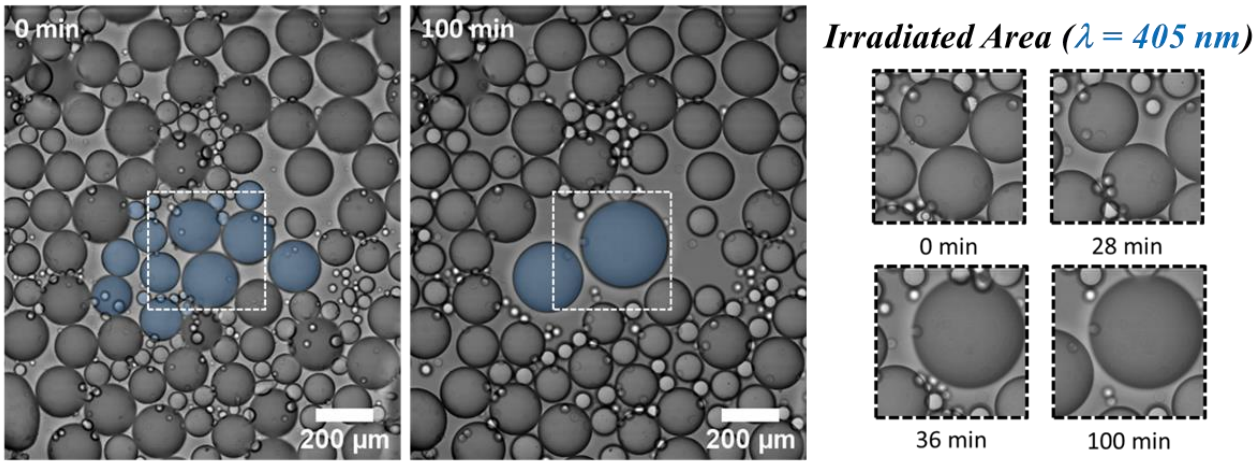

Figure 1. *Spatio-temporal control over coalescence of a light-sensitive Pickering emulsion*

Key Words: Stimuli-responsiveness, Pickering emulsions, bio sourcing, sustained release

References

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