

Long-term stable emulsions prepared from electrostatically chitosan-modified silica nanoparticles

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The stabilization of emulsions by particles allows for the production of long-term stable surfactant-free emulsions desirable in the food industry.

In this work, a novel method is described to produce edible oil-in-water emulsions with a droplet size of a few microns that are stable for a few months. The droplets in the emulsion are stabilized by food-grade silica nanoparticles that are modified by non-covalently bound chitosan. This *in-situ* surface modification increases the particle hydrophobicity, favoring their adsorption at the oil-water interface. The adsorption behavior of chitosan to silica nanoparticles strongly depends on the pH of the solution. In this work, we demonstrate how the modification of the particle surface influences the stability of the emulsions. The mechanisms of emulsion stabilization vary with the pH of the suspensions and will be discussed on the basis of interfacial rheology, light scattering and optical microscopy data.

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