Pickering emulsions stabilized by solid vegetal particles

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Emulsions are metastable systems normally obtained in the presence of amphiphilic species like surfactant molecules, polymers or proteins. It is now well established that solid particles of colloidal size may also be employed to kinetically stabilize emulsions. These so-called Pickering emulsions [1] or, more generally, solid-stabilized emulsions, can be obtained with a wide variety of solid organic or mineral powders [2]. Materials with outstanding properties compared to their protein or surfactant stabilized counterparts have been elaborated [1].

In order to meet consumers’ demand and to address the food industry, naturally occurring amphiphilic particles are highly sought after. Here, we explore the potential use of solid particles deriving from vegetable powders as emulsion stabilizers. Our approach aims at valorizing vegetable particles deriving from either defatted cocoa powder or vegetal co-products of the oil industry, namely press cakes (the waste of oleaginous seeds after oil extraction). We compare several techniques to optimize the extraction of residual lipids and proteins and to fractionate the particles into diverse sizes. The efficiency of different emulsification techniques is assessed and compared: sonication, propeller type agitation and high-pressure homogenization. We explore the evolution of the droplet average size as a function of the mass fraction of particles. The interfacial adsorption of particles is directly visualized by fluorescent microscopy.

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