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Short Communication
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Ebisilc® Organosilicate Particles for Innovative Galenic Formulation

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Clays, mineral clays and more interestingly organoclays [1] have been extensively described as complexation agents for drugs and bioorganic compounds.

Laboratory EBInnov® has developed a collection of novelorganosilicate particles synthesized by sol-gel procedure with a controlled ratio of hydrophobic/hydrophilic side chains [2]. Further investigations were carried out on the ability of these particles to stabilize Pickering emulsions [3]. From these customizable organ silicates with particular characteristics such as size distribution and Wettability, new organic-inorganic hybrid materials can be designed and synthesized.

Some studies described the complexation of UV-filters with various clay minerals of smectite group such as montmorillonites [4-6]. Therefore, in the first phase of a new project, a proof of concept study was carried out to combinelipophilic organ silicate particles with a UV filter and then to propose interesting innovation in the formulation of sunscreen emulsions. Then we started the complexation according to the works previously described by Ambrogi et al. [7] and Li *et al.* [8], using oxybenzone (BZ-3) as UV filter. We performed a large number of experiments involving the lipophilic organosilicateparticles SC002, Laponite® XLG (laponite) and natural white-pinkish montmorillonites Cos WHITE™ (MMT).Every complexation experiment with wet procedure required a clever choice of the solvent. In our case, the optimal solvent must dissolve the BZ-3 and easily disperse each of the three adsorbents (SC002, laponite, MMT) involved in the loading studies. Based on the Hansen solubility parameters, we performed a solubility card for a panel of solvents and UV filters using HSPiP 3.1 software as Benazzouz *et al.* [9] have reported for avobenzone. Then Hansen solubility parameters would predict the solubilization of solutes in solvents based on semi-empirical description. Other parameters such as temperature and pH were also studied to rationalize our complexation [10]. A design-of-experiment approach to optimize actual data is performed and we will be able to propose new SC002-BZ-3 hybrids for sunscreen formulation, with expectation of a synergistic action toward photo stabilization.

In the second phase of our project, we are planning to involve other molecules in future complexation experiments, making SC002 particles as promising carriers of bioactive molecules. Then our studies should also include desorption experimentation to prove the reversible release of active pharmaceutical ingredients and their corresponding applications. Laboratory EA 4446 B2MC and his researchers have developed diverse small-molecule probes and drugs [11-18] and we will draw on their skills to design new bioactive molecules dedicated to be complexed with customizable organ silicates.

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