

Optimizing the properties of TiO_2 nanomaterials used as UV-blockers in sunscreen to maximise the efficiency and safety of the final product.

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Among nanotechnology-based products, sunscreens are of emerging concern. Nanometric titanium dioxide (TiO_2) UV-blockers are advantageous in terms of sun protection and aesthetics. However from a regulatory perspective, their fate and impact are still under consideration, due to their potential influence on both consumers and the environment. At present, many gaps remain in the scientific knowledge regarding the efficacy and safety of nanomaterials used in sunscreen [2-4]. Nanometric TiO_2 minerals are largely used in sunscreen since they are efficient and transparent UV-blockers with both light scattering and absorption properties. From an optical aspect, little is known regarding the size and structural characteristics of the nanoparticle that optimize the resulting sunscreen. We studied this aspect by varying TiO2 primary particle size, structure, coating and concentration, using both nanomaterials currently on the market and those synthesized in-house. Our work aimed to optimize the properties of the UV blockers prior to their integration into a cosmetic formulation. Both the absorbing and scattering properties of the UV-blocker were optimised in order to get the highest sun protection factor (SPF) and transparency on the cream prepared on purpose. The resulting sunscreens were characterised in terms of structure (nanomaterial dispersion in the emulsion) and this was related to the (SPF). The consequences of these characteristics on the overall risk of the product were also studied considereing the entire lifecycle. Release and fate of the nanomaterial upon sunscreen aging were characterised and quantified.

Biography

Dr Jérôme Labille has completed his Ph.D. in Environmental geosciences in 2003. He is a research senior scientist at French National Scientific Research Center CNRS in CEREGE lab (Aix-Marseille University, France). He is expert in the physical chemistry of aggregation, dispersion and deposition of nanoparticles in liquid systems and porous media. He coordinates the national research program Eco-SUN focused on the elaboration of safe by design sunscreen. He has published more than 40 papers in reputed journals.

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