ABSTRACT SUBMISSION

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Formulation of a multiscale fluid gel based on nanostructured lipid carriers (NLCs) for wound-healing applications

R. Calderon-Jacinto[1], D. Lopez[1], M. Gentili[2], S. Abraham[2], S. Sandhu[1], F. Schoenstein[3], V. Gueguen[4], G. Pavon-Djavid[4], P. Matricardi[2], E. Pauthe[1], V. Rodriguez-Ruiz[1]

1. ERRMECe Laboratory, Biomaterials for Health group, Maison Internationale de la Recherche I MAT, 1 rue Descartes, 95031 Neuville sur Oise, France
2. Department of Drug Chemistry and Technologies, "Sapienza" University of Rome, Piazzale Aldo Moro 5, 00185 Rome, Italy
3. Laboratoire des Sciences des Procédés et des Matériaux–LSPM–CNRS UPR3407, Université Paris 13, Sorbonne Paris Cité 99, Ave J.B. Clément, 93 430 Villetaneuse, France.
4. INSERM U1148, Laboratoire de Recherche Vasculaire Traslationnelle, Université Paris 13, Sorbonne Paris Cité 99, Ave J.B. Clément, 93 430 Villetaneuse, France.

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ABSTRACT

Skin's regeneration emerges as a main challenge for both medicine and cosmetics. Cosmeceutics can be defined as cosmetics in which the active ingredient has a proven therapeutic effect. In this context, the aim of this work is to formulate a fluid gel being able to mediate interesting tissue responses, promote the delivery of an active ingredient and be easily applied on the skin. (Fig. 1). Natural active ingredients presenting antioxidant, anti-inflammatory and/or antibacterial properties such as curcumin or astaxanthin can be included in such formulation by firstly being entrapped in a special type of nanoparticles: nanostructured lipid carriers (NLCs)[1]. This innovative multiscale formulation will be able to protect the active ingredient, and thus, foster it's wound healing effects.

In this study we focused on the preparation and characterization of the major components of the formulation. First, the synthesis and characterization of the unloaded and active ingredient-loaded NLCs. Then, the incorporation of the NLCs into a carbomer gel and the study of the mechanical properties of the whole system.

Negatively charged nanoparticles of an average size of about 250 nm and a polydispersity value of 0.3 were obtained by a reproducible process. Their physicochemical properties were characterized by means of dynamic light scattering (DLS), atomic force microscopy (AFM), X-ray diffraction (XRD) among others. Mechanical properties of the gel itself and the gel containing NLCs were studied by rheology. Our results show that NLCs remained stable for at least 2 months and that their introduction into the fluid gel matrix did not affect the mechanical properties of the gel.

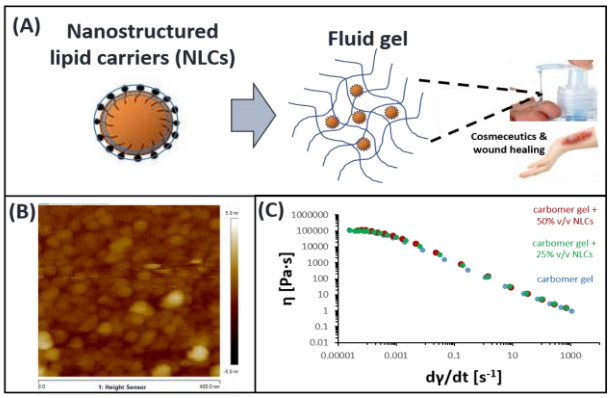

Figure 1: (A) Scheme of the multiscale fluid gel; (B)AFM image of NLCs; (C) overlapping viscosity flow curves for the gel and gel + NLCs

References: [1] V. Rodriguez-Ruiz *et al*., Molecules (2018) 104 : 10-18, doi: 10.3390/molecules23102601