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Looking for more biocompatible sunscreen ingredients in pharmaceutical and cosmetic formulations

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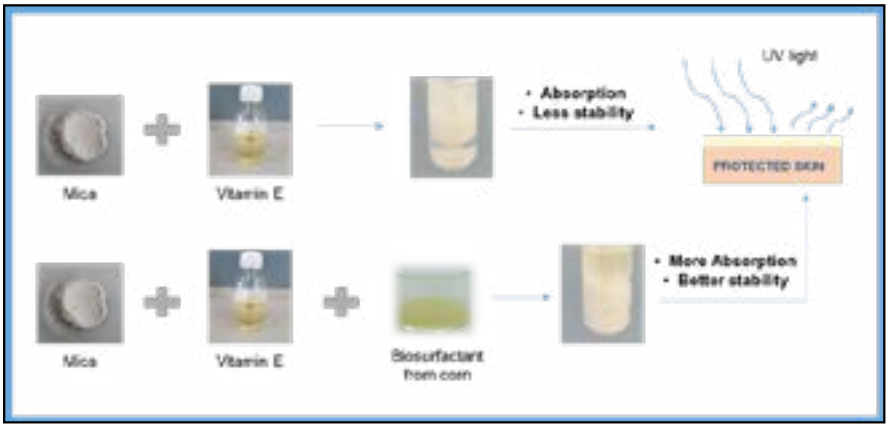
Statement of the Problem: Nowadays, cosmetic and pharmaceutical industries are looking for more natural ingredients to prevent the effects of sun damaging radiation (UV light) on skin. Usually, sunscreen formulations contain synthetic organic compounds, which can produce irritant effects on skin. Therefore, there is a need for the use of more natural and biocompatible ingredients. The utilization of a biosurfactant extract obtained from corn in combination with mica, could be an interesting alternative to replace chemical sunscreen ingredients. Additionally, vitamin E could be included as well in these formulations because of its antioxidant capacity. In this work, it is elucidated that the sun protection factor (SPF) and emulsion formation (EV) of different formulations were formed by a biosurfactant aqueous extract (obtained from corn), a mining silicate mineral (mica) and a non-aqueous soluble antioxidant (Vitamin E).

Methodology: Different formulations were prepared in presence and absence of biosurfactant, in order to see the effect of it as sunscreen and emulsifier. The SPF of each substance and of the different formulations was measured following the methodology of Mansur et al. using ethanol as solvent. On the other hand, the percentage of emulsion formation (EV) was measured as in previous studies, during one month.

Findings: It was shown that all substances tested exerted sun protection capacity. Particularly, the biosurfactant showed a better SPF than tocopherol, at the same concentration. As a consequence, the presence of the biosurfactant increased the SPF of the different formulations. Moreover, this biosurfactant was observed to exert emulsifier capacity during the experiment.

Conclusion & Significance: The preparation of formulations in presence of biosurfactant, mica and tocopherol can be a good alternative to obtain more biocompatible sunscreen formulations for the cosmetic and pharmaceutical industry, observing a synergistic effect of mica and biosurfactant on the stabilization of the emulsions.



Recent Publications

1. Rincón-Fontán M, Rodríguez-López L, Vecino X, Cruz J M and Moldes A B (2018) Design and characterization of greener sunscreen formulations based on mica powder and a biosurfactant extract. Powder Technology 327:442-228.
2. Chen L, Hu J Y and Wang S Q (2012) The role of antioxidants in photoprotection: a critical review. Journal of American Academy of Dermatology 67(5):1013-1024.

3. Lin J Y, Selim M A, Shea C R, Grichnik J M, Omar M M, Monteiro-Riviere N A and Pinnell SR (2003) UV photoprotection by combination topical antioxidants vitamin C and vitamin E. Journal of American Academy of Dermatology 48(6):866-874.

4. Vecino X, Barbosa-Pereira L, Devesa-Rey R, Cruz J M and Moldes A B (2015) Optimization of extraction conditions and fatty acid characterization of *Lactobacillus pentosus* cell-bound biosurfactant/bioemulsifier. Journal of Science of Food and Agriculture 95(2):313-320.

Biography

Myriam Rincón Fontán is a PhD student at the University of Vigo. She has completed her Chemical Engineering Degree at University of Santiago de Compostela in 2014. During the last year of the degree, she has carried out her Master Thesis at the Royal Institute of Technology (KTH) in Stockholm, Sweden in the Department of Biochemistry. In 2015, she has completed her Master degree in Chemical Industry and Research at the University of Vigo in the Physical Chemistry Department.

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