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Introduction of NaDES in cosmetic formulation: phycocyanin-enriched extracts as case study

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PURPOSE OF THE ABSTRACT

Spirulina (Arthrospira platensis), as a renewable source of bioactive compounds, is focusing attention from many fields ranging from food to cosmetics. In particular, phycocyanin, a phycobiliprotein, is the subject of many studies due to its significant antioxidant potential. It could also be interesting as a blue dye as it is responsible for the blue color of these microalgae.

Recently, our laboratory described the strong potential of Natural Deep Eutectic Solvent (NaDES) to extract and stabilize phycocyanin in a liquid medium. Thus, five glycerol-based NaDES showed superior extractive performances to water. In particular, NaDES based on glycerol and glucose proved to be very good stabilizers for this protein [1]. Thus, these specific extracts were used in order to assess the impact of incorporating NaDES-based extracts in a cosmetic formulation. A cosmetic gel-based on a semi-synthetic cellulose derivative was selected. The extracts were introduced at a concentration of 1% m/m and several operating conditions were screened. The physicochemical, colorimetric and antioxidant characteristics of the gels enriched with spirulina extracts were observed before and after 30 days under accelerated aging conditions (40°C, 75°C humidity, obscurity). The results obtained showed that if the incorporation of Glycerol:Glucose NaDES-based extracts in the gels does not significantly modify the pH of the formulations, it has a variable impact on viscosity, colorimetry, and antioxidant activity depending on whether the extract is added before or after gelation. These results highlight the importance of understanding the interactions of NaDES-based extracts with the ingredients of the cosmetic formulation for an effective identification of the best preparation approach for cosmetic formulations.

FIGURES

FIGURE 1

FIGURE 2

KEYWORDS

Natural deep Eutectic Solvents | Topical gels | Phycocyanin content | Antioxidant activity

BIBLIOGRAPHY

[1] Hilali, S., Wils, L., Chevalley, A. et al. Glycerol-based NaDES as green solvents for ultrasound-assisted extraction of phycocyanin from Arthrospira platensis—RSM optimization and ANN modelling. Biomass Conv. Bioref. (2022). https://doi.org/10.1007/s13399-021-02263-6