

Extraction of beetroot peels using Natural Deep Eutectic Solvents and incorporation of the extract in cosmetic formulation

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Nowadays, herbal cosmetics containing plant extracts are gaining popularity since they are characterized by important properties like antioxidant, anti-inflammatory, antiseptic and antibacterial etc. Beetroot contains high amounts of bioactive compounds such as ascorbic acid, carotenoids, phenolic acids, flavonoids etc (Chen et al., 2021) and is regularly consumed as part of the normal diet. Recent studies, have focused on the valorisation of red beetroot waste (Rosa M. E et al. 2023).

Natural Deep Eutectic Solvents (NADES) are mixtures of two or more naturally occurring components, a hydrogen bond acceptor and a hydrogen bond donor, with a low-temperature eutectic point. NADES display a broad range of advantages, including among others low or negligible volatility, non-flammability, tunability of their physicochemical properties, ability to dissolve a wide variety of compounds while they can be prepared in high purity through straightforward and low-cost procedures without producing waste. Owing to these characteristics, NADES have been extensively used as solvents for the extraction of valuable bioactive compounds from a wide range of natural sources and biomass (Tzani A. et al. 2023; Tzani A. et al. 2022, Koutsoukos S. et al. 2019, Hernández-Aguirre, O. A et al. 2021) .

In the present work, a series of NADES, comprised of components which are applied in cosmetic formulations, were screened as potential ingredients for the preparation of a lip balm formulation using the homogenous mixing method. The NADES that was successfully incorporated in the cosmetic formulation was then used as a solvent for the extraction of beetroot peels. The “as obtained” extract, containing both the NADES and the extracted phytochemicals, was incorporated in the lip balm.

The most important organoleptic characteristics such as pH and spreadability of the cosmetic formulation as well as stability studies (freeze-thaw cycles) were performed. The results showed that the prepared lip balm was uniform in nature and was perfectly applied without any deformation at room temperature and refrigeration.

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