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Encapsulation of grape marc extract into novel phospholipid vesicles to protect skin against oxidative stress

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Grape marc is the main solid waste product of the wine making process, and it represents around 25% of the total harvested grape weight [1]. Like the grape, its pomace is rich in bioactives, especially antioxidant compounds [1].

In the present study, aiming at valorizing this byproduct, the phytocomplex from skins of grape pomaces was extracted, characterized, then loaded into phospholipid vesicles tailored for topical delivery; the physicochemical, technological and physiological properties of vesicles were evaluated.

The extraction was performed by maceration in hydroethanolic solution. The resulted extracts were lyophilized and stored under vacuum at dark. The extract was analyzed by HPLC coupled to TOF mass spectrometry and incorporated in liposomes, glycosomes, montanov-liposomes and montanov-glycosomes, the last were modified by adding Montanov 82, a commercial mixture of alkyl glucosides and alkyl alcohols. The biocompatibility and protective effect against oxidative damages were tested in vitro in 3T3 cells.

Catechin, quercetin, fisetin and gallic acid were the main compounds detected. The obtained vesicles were small in size (~183 nm), slightly polydispersed ($PI \geq 0.28$), and highly negatively charged (~-50 mV). The extract was incorporated in high amounts in all the vesicles (~100%). The antioxidant activity of the extract, measured by the DPPH (2,2-Diphenyl-1-picrylhydrazyl) test, was ~84%, and increased when loaded into the vesicles (~90%). All tested vesicles were highly biocompatible and able to protect the fibroblasts (3T3) from the oxidative stress induced by hydrogen peroxide.

The vesicles, especially montanov-glycosomes appeared to be a promising formulation for the development of topical products.

References: [1] K. Dwyer, F. Hosseinian, M. Rod, The Market Potential of Grape Waste Alternatives, J. Food Res. 3 (2014) 91. doi:10.5539/jfr.v3n2p91.

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