

Extended Abstract

Properties of Free and Embedded Extracts from Different Grape Pomace into Mesoporous Inorganic Matrices [†]

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[†] Presented at the 16th International Symposium “Priorities of Chemistry for a Sustainable Development” PRIOCHEM, Bucharest, Romania, 28–30 October 2020.

Published: 15 November 2020

Keywords: inorganic matrices; polyphenolic extracts; grape pomace; antioxidant activity; NCTC fibroblasts

1. Introduction

Grape pomace, a by-product of the winemaking process, is a source of valuable natural compounds like polyphenols, flavonoids, and anthocyanin pigments, which can be valorized in cosmetics, nutraceuticals, or in the food industry [1,2].

2. Materials and Methods

Herein, we report the preparation of ethanolic and hydroalcoholic polyphenolic extracts from red grape pomace of two cultivars, Fetească Neagra (FN) and Pinot Noir (PN), from Murfatlar (Black Sea region, Romania) and their characterization through different spectrophotometric methods: total polyphenols, flavonoids, and anthocyanin pigments content and radical scavenging activity (RSA) by both DPPH and ABTS assays. The chemical profile of polyphenolic extracts was determined by HPLC-PDA analysis. To improve the stability of polyphenols, the extracts were further embedded in two inorganic mesoporous matrices, SBA-15 silica with ordered hexagonal pore array and titania with anatase structure. Both inorganic matrices were obtained by sol-gel method, in the presence of triblock copolymer, Pluronic P123 and Pluronic F127 for SBA-15 and titania, respectively. The in vitro cytocompatibility of free and embedded hydroalcoholic extracts was assessed in the concentration range of 100–1000 µg/mL on NCTC fibroblast mouse cell line using MTT assay.

3. Results

The hydroalcoholic extracts exhibited better radical scavenger activity than alcoholic ones, which can be correlated with their higher total polyphenols content. HPLC-PDA analysis evidenced high amounts of polyphenolic acids and flavonoids, especially for the hydroalcoholic extract from Feteasca Neagra cultivar. The embedded extracts preserved the RSA of free ones after several months of storage at 4 °C.

4. Conclusions

The embedding of chosen polyphenols extract into inorganic matrices led to a preservation of radical scavenger activity and showed a good biocompatibility either free (up to 300 µg/mL) or embedded into mesoporous titania (20 wt% extract) or mesoporous SBA-15 silica (39 wt% extract) on NCTC fibroblasts cell line (up to 1000 µg/mL and 300 µg/mL, respectively).

Acknowledgments: This work was funded by the UEFISCDI (Romania) project PCCDI No. 85/2018.

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