Sweet cherries of second-quality: A sustainable source of high-added value products for the food industry

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Sweet cherries (*Prunus avium* L.) are stone fruits highly valued for their organoleptic attributes, such as sweet taste and bright red color. They are mainly consumed fresh during late spring to early summer (~60% of the global production) or they can be consumed throughout the year in the form of juices, jams, jellies as well as dried or canned products. Apart from their sensorial characteristics, the consumption of sweet cherries has been associated with various biological actions including the prevention of cardiovascular diseases and the Alzheimer's disease as well as lower blood pressure etc. These beneficial properties are mainly attributed to a variety of bioactive compounds such as anthocyanins (e.g. cyanidin 3-O-glucoside, cyanidin 3-O-rutinoside) and phenolic acids (e.g. cinammic acid, caffeic acid, ferulic acid) [1].

In general, fruit processing results in enormous amounts of wastes worldwide. In the case of sweet cherries, Greece is one of the main producing countries in Europe after Poland, Italy and Spain, resulting in high amounts of by-products. The main by-products derived from the processing of sweet cherries are stems, pits, pomace as well as second-quality cherry fruits. The latter ones, characterized by a lower appearance quality, they cannot be marketed for fresh consumption. In this view, such fruits could be exploited as a sustainable source of a variety of high-added value products for the food industry, including natural colorants and antioxidants [2].

In the frame of the present study, sweet cherry fruits of second-quality were collected from Pella (Greece) in July 2023. They were firstly washed with tap and ionized water and then they were dried with absorbent paper. After removal of the pits, cherries were freeze-dried. Extraction of bioactive compounds was carried out with the aid of a sonication probe using aqueous solutions of β-cyclodextrin as a green extraction solvent. Cyclodextrins are cyclic oligosaccharides that allow molecular inclusion and controlled release of hydrophobic molecules in their hydrophobic cavities. During the last decades, they find applications as extraction enhancers for phenolic compounds through formation of inclusion complexes [3]. In the frame of the present study, the extraction parameters for the recovery of bioactive compounds from freeze-dried sweet cherries, namely duration of sonication (min), concentration of β-cyclodextrin (mg/mL) and solvent:solid ratio (mL/g), using aqueous solutions of β-cyclodextrin, were optimized using Response Surface Methodology. The obtained extracts were characterized in terms of total phenol content, *in vitro* antioxidant activity, using a variety of assays, as well as total anthocyanins content.

Findings of the present study are promising towards the valorization of second-quality sweet cherry fruits as sustainable sources of valuable ingredients to produce novel foods and food supplements.

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