

Saco Sweet Cherry: Phenolic Profile and Biological Activity of Coloured and Non-Coloured Fractions

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Abstract : Increasing evidence suggests that a diet rich in fruits and vegetables plays important roles in the prevention of chronic diseases, such as heart disease, cancer, stroke, diabetes, Alzheimer's disease, among others. Fruits and vegetables gained prominence due their richness in bioactive compounds, being the focus of many studies due to their biological properties acting as health promoters. *Prunus avium* Linnaeus (L.), commonly known as sweet cherry has been the centre of attention due to its health benefits, and has been highly studied. In Portugal, most of the cherry production comes from the Fundão region. The Saco is one of the most important cultivar produced in this region, attributed with geographical protection. In this work, we prepared 3 extracts through solid-phase extraction (SPE): a whole extract, fraction I (non-coloured phenolics) and fraction II (coloured phenolics). The three extracts were used to determine the phenolic profile of Saco cultivar by liquid chromatography with diode array detection (LC-DAD) technique. This was followed by the evaluation of their biological potential, testing the extracts' capacity to scavenge free-radicals (DPPH•, nitric oxide (•NO) and superoxide radical (O₂•-)) and to inhibit α-glucosidase enzyme of all extracts. Additionally, we evaluated, for the first time, the protective effects against peroxy radical (ROO•)-induced hemoglobin oxidation and hemolysis in human erythrocytes. A total of 16 non-coloured phenolics were detected, 3-O-caffeoylquinic and p-coumaroylquinic acids were the main ones, and 6 anthocyanins were found, among which cyanidin-3-O-rutinoside represented the majority. In respect to antioxidant activity, Saco showed great antioxidant potential in a concentration-dependent manner, demonstrated through the DPPH•, •NO and O₂•-radicals, and greater ability to inhibit the α-glucosidase enzyme in comparison to the regular drug acarbose used to treat diabetes. Additionally, Saco proved to be effective to protect erythrocytes against oxidative damage in a concentration-dependent manner against hemoglobin oxidation and hemolysis. Our work demonstrated that Saco cultivar is an excellent source of phenolic compounds which are natural antioxidants that easily capture reactive species, such as ROO• before they can attack the erythrocytes' membrane. In a general way, the whole extract showed the best efficiency, most likely due to a synergetic interaction between the different compounds. Finally, comparing the two separate fractions, the coloured fraction showed the most activity in all the assays, proving to be the biggest contributor of Saco cherries' biological activity.

Keywords : biological potential, coloured phenolics, non-coloured phenolics, sweet cherry

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