



The influence of different time durations of thermal processing on berries quality[☆]

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ABSTRACT

Bioactive compounds (polyphenols, flavonoids, flavanols, tannins, anthocyanins and ascorbic acid) and the level of antioxidant activity by ABTS, DPPH, FRAP and CUPRAC of water, acetone and hexane extracts of Chilean 'Murtilla' (*Ugni molinae* Turcz.) and 'Myrteola' berries (Myrtaceae, *Myrteola nummularia* (Poir.) Berg.), Chilean and Polish blueberries (*Vaccinium corymbosum*), Chilean raspberries (*Rubus idaeus*), and Polish black chokeberry (*Aronia melanocarpa*) were determined and compared. It was found that the contents of the bioactive compounds and the levels of antioxidant activities in used extracts differ significantly ($P < 0.05$). The correlation between the total polyphenols, flavanols and the antioxidant activities was significantly the highest in water, average in acetone and the lowest in hexane extracts. Fourier transform infrared (FTIR) spectroscopy was applied as an additional tool for the characterization of the water polyphenol extracts. Aqueous extracts of investigated berries were subjected to different times of thermal processing. Bioactive compounds and the levels of antioxidant activities by 2,2-Azino-bis (3-ethyl-benzothiazoline-6-sulfonic acid) diammonium salt (ABTS⁺); 1,1-Diphenyl-2-picrylhydrazyl method (DPPH); Ferric-reducing/antioxidant power (FRAP) and Cupric reducing antioxidant capacity (CUPRAC) after 10, 20, 40 and 60 min of thermal processing were determined and compared with non processed samples. It was found that the antioxidant activity only of berries subjected to thermal processing for 10 and 20 min did not differ from the non thermally processed studied berries, showing high correlation between the total polyphenols, flavanols and the antioxidant activities. In conclusion, thermal treatment of studied berries influences their quality: only berries after 10 and 20 min of thermal processing preserved their bioactivity.

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1. Introduction

Polyphenolic compounds, which present in berries, fruits and vegetables important not only in terms of quality, as they influence the visual appearance and taste, but also from a therapeutical point of view, as they appear to be associated with the prevention of different diseases (Arancibia-Avila et al., 2011; Borowska & Mazur, 2008; Fredes, 2009; Gorinstein et al., 2009; Piasek et al., 2011).

The bioactive nutrients and antioxidants present in fruits and berries are responsible for their perception as healthy foods (Dean, Leavens, & Boyd, 2010). Lugasi, Hovari, Kadar, and Denes (2011) determined phenolics in raspberry, blackberry and currant cultivars. Two cultivars of conventionally and organically grown red raspberries and blueberries were analyzed for total anthocyanins, total and specific phenolic compounds and total antioxidant activity (Sablani et al., 2010). From a big number of cited references above it can be concluded that the subject of different berries was investigated intensively. Chilean berries were also studied (Fredes, 2009). We were interested to investigate a new kind of Chilean berry known by the name of 'Myrteola' and to compare its composition with the wide consumed berries, which was described in our recent report (Arancibia-Avila et al., 2011).

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