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Partial characterization of a new kind of Chilean Murtilla-like berries

Patricia Arancibia-Avila^{a,*}, Fernando Toledo^a, Enrique Werner^a, Milan Suhaj^b, Hanna Leontowicz^c, Maria Leontowicz^c, Alma Leticia Martinez-Ayala^d, Paweł Paśko^e, Shela Gorinstein^f

^a Department of Basic Sciences, Universidad del Bio-Bio, Chillan, Chile

^b Food Research Institute, 824 75 Bratislava, Slovakia

^c Department of Physiological Sciences, Faculty of Veterinary Medicine, Warsaw University of Life Sciences (SGGW), Warsaw, Poland

^d Instituto Politecnico Nacional, Centro de Investigación en Biotecnología Aplicada, C.P. 90700, Tlaxcala, Mexico

^e Department of Food Chemistry and Nutrition, Medical College, The Jagiellonian University, Kraków, Poland

^f The Institute for Drug Research, School of Pharmacy, The Hebrew University, Hadassah Medical School, Jerusalem 91120, Israel

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ABSTRACT

The aim of this research was to characterize a new kind of Chilean Murtilla-like berries (*Myrteola nummularia* (Poiret) Berg. Myrtaceae, called by locals as Daudapo) vs. well known Murtilla, blueberries, raspberries and black chokeberries. Polyphenols, flavonoids, flavanols and tannins and the level of antioxidant activity by ABTS, FRAP and CUPRAC radical scavenging assays of methanol extract of studied berry samples were determined and compared. It was found that the contents of the polyphenol compounds and the level of antioxidant activity in extracts of berries differ significantly ($P < 0.05$). The significantly highest contents of polyphenol compounds were in methanol extract of non-ripe Murtilla (121.31 ± 5.9 mg GAE/g for polyphenols; 14.43 ± 0.7 , 31.79 ± 1.5 , and 9.93 ± 0.3 mg CE/g for flavonoids, tannins and flavanols, respectively). Also the antioxidant activity according to ABTS, FRAP and CUPRAC was significantly highest in methanol extract for non-ripe Murtilla (878.18 ± 41.2 , 486.92 ± 23.3 and 1012.42 ± 43.2 $\mu\text{M TE/g}$, respectively). The amount of polyphenol compounds and their antioxidant activities of Murtilla berries are significantly higher than in other studied berries and are comparable with blueberries and raspberries, however, these indices in the Murtilla-like non-ripe berries were the following: 31.55 ± 1.4 mg GAE/g for polyphenols; 5.22 ± 0.3 , 12.16 ± 0.6 and 2.24 ± 0.1 mg CE/g for flavonoids, tannins and flavanols; ABTS, FRAP and CUPRAC: 244.22 ± 12.1 , 81.32 ± 3.9 and 203.83 ± 9.3 $\mu\text{M TE/g}$, respectively. The correlation between the polyphenol compounds and the antioxidant activities were relatively high. DPPH kinetic measurements were used to compare, distinguish and discriminate the antiradical activity among berry methanolic extracts by multivariate analysis. 3-D fluorescence was used as an additional tool for the characterization of the polyphenol extracts during various stages of ripening and different berries cultivars. The interaction between methanol polyphenol extracts of Murtilla-like and bovine serum albumin (BSA) showed that the new kind of berries has a strong ability, as other studied berries, to quench the intrinsic fluorescence of BSA by forming complexes.

In conclusion, for the first time these berries were analyzed and compared with widely consumed cultivars, using their polyphenols' composition, antioxidant activities and fluorescence properties. The ability of Murtilla-like berries to quench the intrinsic fluorescence of BSA and relatively high content of polyphenol compounds can be used as a new source of antioxidants.

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1. Introduction

Health-beneficial effects of fruits such as grapes have been linked to the presence of various polyphenols, including anthocyanins in these products (Jacob, Hakimuddin, Paliyath, & Fisher, 2008). Tannins in persimmon showed high antioxidant ability as well (Gu et al., 2008). Nowadays berries are intensively studied (Schreckinger, Lotton, Lila, & Gonzalez de Mejia, 2010) and it was shown that among them the strawberries possess very high bioactivity (Pineli et al., 2010; Proteggente

et al., 2002; Simirgiotis, Theoduloz, Caligari, & Schmeda-Hirschmann, 2009; Sun, Chu, Wu, & Liu, 2002). The consumption of berries increased during the last years and berries of different kinds are widely consumed in many countries (Delporte et al., 2007; Heinonen, 2007; Szajdek & Borowska, 2008), based on high contents of their bioactive compounds. And indeed, it was shown that berries contain polyphenols, including anthocyanins, phenolic acids, and tannins, as well as nutritive compounds such as carotenoids and vitamin C (Kähkönen, Hopia, & Heinonen, 2001; Pineli et al., 2010). The extractable and unextractable proanthocyanidins were determined in plant material using normal phase HPLC (Borges, Degeneve, Mullen, & Crozier, 2010; Hellström & Mattila, 2008). The amount of these substances depends on extraction procedure (Khanal, Howard, & Prior, 2009). The comparison of the extracted phenolics and

* Corresponding author. Tel.: +56 94508616; fax: +56 42 253046.
E-mail address: parancib@ubiobio.cl (P. Arancibia-Avila).