

Antioxidant and antiradical properties of extracts derived from cocoa bean

Dorota Żyzelewicz and Małgorzata Bojczuk

Faculty of Biotechnology and Food Sciences/Institute of Food Technology and Analysis, Lodz University of Technology, Lodz, Poland, dorota.zyzelewicz@p.lodz.pl

Plant phenolic compounds are important low molecular mass antioxidants coming from the diet. They are widely found in fruits, vegetables, cereals, tea, wine, chocolate and chocolate products and over the last few years have been the focus of a number of studies concerning their potential to reduce the morbidity due to some cancers or heart diseases as a result of their antioxidant activity (Cailliet et al., 2011). Cocoa polyphenols, mainly flavanols and procyanidins, have been reported in many studies as bioactive compounds with antioxidant, antiradical and anticarcinogenic properties (Record et al., 2003; Oloyede and Abimbade, 2014). They have been shown to protect against diseases like coronary heart disease, cancer, neurodegenerative disorders, mostly as a result of their antioxidant and antiradical properties (Bruna et al., 2009). Additionally, cocoa polyphenols have been suggested to have a positive influence on cardiovascular health through lowering the rate of low-density lipoprotein (LDL) oxidation and inhibition of platelet activation (Radojčić Redovniković et al., 2009).

The aim of the study was to evaluate the total polyphenol content determined with the Folin-Ciocalteu spectrophotometric method. Furthermore, antiradical properties were expressed as the reduction of the stable free-radical DPPH, ABTS radical cation (ABTS^{•+}) and hydroxyl radical ([•]HO) in freeze-dried water extracts of cocoa beans of *Forastero* variety. These properties were analyzed and compared for raw cocoa beans of different origins (Togo, Sao Tome, Ivory Coast and Peru). Additionally, the reduction potential was measured for all samples. The extraction was performed using solvent (water) extraction at elevated temperature (60 °C). Obtained extracts before analysis were subjected to freeze-drying.

The highest results for the total polyphenol content were obtained for beans coming from Sao Tome. The lowest values, on the other hand, were reported for beans from Peru and Ivory Coast. The measurement of DPPH radical scavenging activity indicated that the highest IC₅₀ value was obtained for extracts of beans coming from Ivory Coast, whereas the lowest was reported for Sao Tome beans. The results obtained for the measurements with ABTS radical cation as well as with hydroxyl radical revealed the highest values for Sao Tome beans and the lowest for beans originating from Togo.

Obtained results confirm that both the total polyphenol content as well as antiradical properties of cocoa beans are greatly influenced by the place of their origin.

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