

Abstract

Bioavailability and health effects of cocoa polyphenols

G. Williamson

Chair of Functional Food, Procter Department of Food Science, University of Leeds, Leeds, LS2 9JT, UK, Fax: +44 113 343 2982,
e-mail: g.williamson@leeds.ac.uk

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Key words: Absorption – Metabolism – Flavonoid – Endothelial function – Nitric oxide – Epicatechin – Cardiovascular disease – Nutrition

Cocoa contains very high levels of polyphenols, in particular flavanols (also called catechins, procyanidins or flavan-3-ols). The content of epicatechin, the main monomeric flavanol in cocoa, in a broad range of milk and dark chocolates varied from 0.071–1.942 mg/g (Cooper et al., 2007), and dark chocolate is one of the most polyphenol-rich foods.

In the Zutphen Elderly Study using a cohort of elderly men, cocoa intake was inversely associated with blood pressure, and 15-year cardiovascular and all-cause mortality (Buijsse et al., 2006). In addition to the epidemiological evidence, there is now considerable evidence from clinical trials on cocoa-containing foods that polyphenols exert a beneficial effect on biomarkers related to cardiovascular disease, and these studies have been reviewed recently (Cooper et al., 2008). Based on current evidence, this protective effect is mainly, or though not totally, due to the content of epicatechin in the cocoa (Schroeter et al., 2006). This flavanol is relatively well absorbed, with a maximum plasma concentration at around 2h, and approximately 20% of consumed epicatechin is excreted in the urine (Manach et al., 2005). Typically drugs are designed to have one target of action when given in acute doses. However, biologically active compounds in food act often act at low levels by multiple mechanisms, which have an effect chronically over a longer period of time. Although it is also likely that there are multiple modes of action of epicatechin, an important mechanism involved in modulating

endothelial function, a biomarker for cardiovascular risk, is the modulation of nitric oxide (Fisher et al., 2003) which affect expression of inflammatory mediators (Sies et al., 2005). Low molecular weight phenolics are produced by microbial fermentation of another cocoa polyphenolic component, the procyanidins, in the colon. These compounds are well absorbed and are excreted in the urine (Rios et al., 2003). The effects of these are largely unknown and need to be evaluated. Taken together, the evidence from epidemiological, human intervention and mechanistic studies, points to an effect of cocoa polyphenols, especially epicatechin, on reducing the risk of cardiovascular diseases.

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* Corresponding author