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Flavanol and Flavonol Contents of Cocoa Powder Products: Influence of the Manufacturing Process.

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Major brands of cocoa powder products present in the Spanish market were analyzed for monomeric flavanols [(+)-catechin and (-)-epicatechin] and flavonols [quercetin-3-glucuronide, quercetin-3-glucoside (isoquercitrin), quercetin-3-arabinoside, and quercetin]. In addition, the influence of the manufacturing process of cocoa powder products, in particular, the alkalization treatment (Dutching), on the original content of these flavonoids has been studied; (-)-Epicatechin was in the range of 116.02-730.26 microg/g, whereas (+)-catechin was in the range of 81.40-447.62 microg/g in the commercial cocoa products studied. Among flavonols, quercetin-3-arabinoside and isoquercitrin were the major flavonols in the cocoa powder products studied, ranging from 2.10 to 40.33 microg/g and from 3.97 to 42.74 microg/g, respectively, followed by quercetin-3-glucuronide (0.13-9.88 microg/g) and quercetin aglycone (0.28-3.25 microg/g). To our knowledge, these results are the first quantitative data in relation to the content of individualized flavonol derivatives in commercial cocoa powder products. The alkalization treatment resulted in 60% loss of the mean total flavonoid content. Among flavanols, (-)-epicatechin presented a larger decline (67%, as a mean percentage difference) than (+)-catechin (38%), probably because of its epimerization into (-)-catechin, a less bioavailable form of catechin. A decline was also confirmed for di-, tri-, and tetrameric procyanidins. In the case of flavonols, quercetin presented the highest loss (86%), whereas quercetin-3-glucuronide, quercetin-3-arabinoside, and isoquercitrin showed a similar decrease (58, 62, and 61%, respectively). It is concluded that the large decrease found in the flavonoid content of natural cocoa powder, together with the observed change in the monomeric flavanol profile that results from the alkalization treatment, could affect the antioxidant properties and the polyphenol bioavailability of cocoa powder products.

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