

Bioaccessible Phenolics, Phenolic Bioaccessibilities and Antioxidant Activities of Cookies Supplemented with Pumpkin Flour

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Abstract : In this study, pumpkin flours (PFs) were used to replace wheat flour in cookie formulation at three different levels (10%, 20% and 30% w/w). For this purpose PFs produced by two different applications (with or without metabisulfite pre-treatment) and then dried in freeze dryer. Control sample included no PFs. The total phenolic contents of the cookies supplemented with PFs were higher than that of control and gradually increased in total phenolic contents of cookies with increasing PF supplementation levels. Phenolic content makes also significant contribution on nutritional excellence of the developed cookies. Pre-treatment with metabisulfite (MS) had a positive effect on free, bound and total phenolics of cookies which are supplemented with various levels of MS-PF. This is due to a protective effect of metabisulfite pretreatment for phenolic compounds in the pumpkin flour. Phenolic antioxidants may act and absorb in a different way in humans and thus their antioxidant and health effects will be changed accordingly. In the present study phenolics' bioavailability of cookies was investigated in order to assess PF as sources of accessible phenolics. The content of bioaccessible phenolics and phenolic bioaccessibility of cookies supplemented with PFs had higher than those of control sample. Cookies enriched with 30% MS-PF had the highest bioaccessible phenolics (597.86 mg GAE 100g⁻¹) and phenolic bioaccessibility (41.71%). MS application in PF production caused a significant increase in phenolic bioaccessibility of cookies. According to all assay (ABTS, CUPRAC, FRAP and DPPH), antioxidant activities of cookies with PFs higher than that of control cookie. It was also observed that the cookies supplemented with MS-PF had significantly higher antioxidant activities than those of cookies including PF. In presented study, antioxidative bioaccessibilities of cookies were also determined. The cookies with PFs had significantly ($p \leq 0.05$) higher antioxidative bioaccessibilities than control ones. Increasing PFs levels enhanced antioxidative bioaccessibilities of cookies. As a result, PFs addition improved the nutritional and functional properties of cookie by causing increase in antioxidant activity, total phenolic content, bioaccessible phenolics and phenolic bioaccessibilities.

Keywords : phenolic compounds, antioxidant activity, dietary fiber, pumpkin, freeze drying, cookie

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