
Bread fortified with betacyanin-rich extract from red dragon fruit peel as nutraceutical sources: Its baking performance, antioxidant activity, and in vitro digestibility

XU X. (1), WONG S. (1), DJOHARI . (1), ZHOU W. (1)

¹ National University of Singapore, Singapore, Singapore

Betacyanins are a class of water-soluble and red-violet pigments that have attracted increasing attention due to their promising bioactivities. Red dragon fruit peel (RDFP) is a rich source of betacyanins, which is commonly discarded as a waste during processing and consumption. Herein, betacyanins were extracted from RDFP and purified by solid phase extraction to obtain a betacyanin-rich extract (BRE). BRE was subsequently incorporated into bread and its effects on bread baking performance, antioxidant activity, and in vitro digestibility were studied. The baking quality of the bread fortified with 0.25, 0.5, and 0.75% BRE was not significantly ($p > 0.05$) different from the control bread, in terms of specific volume, texture, and crumb cellular structure. However, the antioxidant activity of the BRE-fortified bread was enhanced in a dose-dependent manner. Compared to the control bread, the 0.75% BRE-fortified bread exhibited a 2.7-, 1.7- and 4.1-fold stronger antioxidant activity measured by the total phenolic content (TPC), 2,2'-azino-bis (3-ethylbenzothiazoline-6-sulphonic acid) (ABTS), and oxygen radical absorbance capacity (ORAC) assays, respectively. Furthermore, results from in vitro digestion demonstrated that the glucose release rate of 0.75% BRE-fortified bread was significantly reduced in comparison to the control bread. Overall, the present study outcome suggests the potential of BRE from RDFP as a promising functional food ingredient in bread, providing consumers with a higher intake of antioxidants and a slower increase in postprandial blood glucose, without a compromise of sensory quality.