Title Phytochemical profiles of milled fractions of wheat varieties

Author K.K. Adom, R.H. Liu and M.E. Sorrells

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Abstract

The unique photochemicals of whole grains may account for the reduced risk of developing chronic diseases associated with their consumption. Wheat phytochemicals are distributed between the endosperm, bran, and germ fractions. Variability in the phytochemical content contained in wheat varieties has been reported by our research group recently. However, little is known about the variation of these phytochemicals in milled fractions of different wheat varieties. The objective of this study was to investigate variations in phytochemical content of milled fractions of five different wheat varieties. Five wheat varieties (Caledonia02627, Cayuga02652, Caledonia02628, Roane02626, Roane02629) were each milled into endosperm fraction (refined flour) and bran/germ fraction. Each fraction was analyzed for content of total phenolics, flavonoids, and ferulic acids using methods routinely used in our lab. For the wheat varieties tested, phenolic content of bran/germ fraction (2867.2 – 3119.9 micromole gallic acid equivalents/ 100 g flour) was 15-18-fold higher ($p<0.01$) than that of endosperm fraction (175.8 – 194.9 micromole gallic acid equivalents / 100g flour). Total flavonoid content of wheat endosperm fraction range from 59.6 to 80.4 micromole catechin equivalents/100 g flour, while that of the bran/germ fraction ranged from 739.5 to 939.6 micromole catechin equivalents/100g flour. The bran/germ fraction had 10-15-fold higher ($p<0.01$) flavonoid content than the endosperm. Ferulic acid content of bran/germ fraction from different wheat varieties (1004.6 – 1130.1 micromole / 100 g flour) was 52-70-fold higher ($p<0.01$) than that of endosperm fractions (15.5 – 20.6 micromole /100 g flour). On average, 77% of total phenolics, 72% of flavonoids, and 93% of ferulic acid in whole wheat grains are from the bran/germ fraction, even though the bran/germ fraction is only ∼17% of total weight. These results show that significant differences in phytochemical content exist among milled fractions of wheat varieties, and phytochemicals of whole wheat grains are mainly present in the bran/germ fraction.