

Influence of germination on the profile of free and matrix-bound phytochemicals of Brazilian wheat cultivars

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Wheat is a cereal produced and consumed around the world. Several cultivars are produced in Brazil, with emphasis on those that are suitable to produce bread and pasta, such as BRS Marcante, and others that are recommended to produce cakes and cookies, such as BRS Guaraim. Brazilian wheat production in the South region is often affected by large volumes of rain that result in pre-harvest sprouting (PHS), which impairs the baking properties of wheat flour. On the other hand, the germination process has been shown to improve the health benefits of some grains by changing the levels and type of nutrients and phytochemicals. However, information on the alterations due to the germination of wheat cultivars is scarce, specially regarding changes in phenolic compounds, amino acids, and benzoxazinoids. In this sense, this study aimed to evaluate the germination effects in the profile and content of phytochemicals of Brazilian wheat cultivars. Wheat cultivars BRS Marcante and BRS Guaraim were germinated for 24, 48, and 72 h. Compounds were identified by HPLC-PDA-MS/MS and quantified by HPLC-PDA after extraction of solvent soluble phytochemicals (SSP), or hydrolysis of matrix-bound phytochemicals (MBP) using alkaline (K) or acid (C) hydrolysis. SSP extract contained amino acids such as phenylalanine and tryptophan, benzoxazinoids such as DIBOA-hex-hex, and DIMBOA-hex-hex that belong to the group of hydroxamic acids, and phenolic compounds such as apigenin-hex-pent I and II, which are isomers and belong to the group of flavones. Alkaline and acid MBP extracts contained *p*-coumaric acid, *cis*, and *trans*-ferulic acid, which are phenolic acids derived from hydroxycinnamate. The two cultivars showed the same compound profile, but different concentrations, and this difference became even greater with the advance of germination. Before germination the major compound in SSP was tryptophan, but germination caused an increase in benzoxazinoids concentration so that DIBOA-hex-hex became the major SSP in germinated BRS Guaraim. In MBP-K the major compound was *trans*-ferulic acid, which increased within 24 h of germination and then remained stable. BRS Marcante had higher SSP content than BRS Guaraim (26.24 ± 2.29 vs. 16.55 ± 2.51 mg 100 g⁻¹ dw). Germination did not change the qualitative phytochemical profile of wheat but increased the content of benzoxazinoids, mainly in the cultivar BRS Guaraim. In this context, the increase of DIBOA-hex-hex levels is particularly interesting as this compound has been recently demonstrated to exert a range of health-promoting effects, including antimicrobial and antitumoral properties.

Keywords: Bioactive compounds for health promotion; *Triticum aestivum* L., sprouting, bioactive compounds, compounds identification.

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