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378/39. PRODUCTION, DIGESTIBILITY AND ANTIOXIDANT PEPTIDES OF BREAD PRODUCED BY USE OF SELECTED FUNCTIONAL GRAINS

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Introduction

In the last decade, colored wheat varieties have raised increasing interest for their functional properties. These grains are high in carotenoids, anthocyanins and polyphenols with antioxidant activity. Thus, the introduction of colored wheat as ingredients for human diet may have beneficial effects on health.

Objective

In this study, we investigated the composition and structural properties of selected grains with high content of functional components, including anthocyanins (*T. vulgare* cv Skorpion), carotenoids (*T. vulgare* cv Bonavita), β -glucans (*H. vulgare* cv Rondo) and fiber (emmer *T. dicoccum* cv Giovanni Paolo).

Methodology

Composition of macro and micronutrients was assessed by omic techniques, which confirmed that active metabolites are enriched in the bran; gluten protein alleles were determined by proteomic analysis including 2D-electrophoresis and LC-MS/MS (Orbitrap technology).

Main findings

Mapping of glutenin subunits showed that all grains presented specific alleles related to good bread-making performance. Furthermore, a procedure for quantitative determination of the single protein components was set up, based on automated gel image analysis.

All-bran flour from the selected cereals was then used to produce sourdough bread. Compositional analyses, as well as characterization of bioactive components (anthocyanins and carotenoids) were performed by omic methodologies in order to evaluate their survival, modification and bioavailability in the final products. In vitro protein digestibility of bread baked with colored grains was determined using a static model of gastrointestinal digestion (GID), according to Minekus et al. 2014. Peptides which survived digestion were characterized by MS-based peptidomics. These peptides derived from all wheat protein subfractions and they were specific of the wheat biotypes and antioxidant composition of cereals. Several sequences corresponding to antioxidant peptides or their precursors survived digestion.

Conclusion

Combined with the natural presence of health-promoting compounds, bioactive peptides released upon GID support the use of colored grains as ingredients for producing functional bread and baked products.

Key words

Colored grain; protein digestibility; functional bread

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