

VARIABILITY OF PHENOLIC SUBSTANCES CONTENT IN ITALIAN DURUM WHEAT

LADDOMADA B.*, DELVECCHIO L.N.***, DURANTE M.*, MANGINI G.***, MITA G.*, BLANCO A.***, PASQUALONE A.**

*) Institute of Sciences of Food Production, National Research Council (ISPA, CNR),
Via Monteroni, 73100 Lecce (Italy)

*) Department of Soil, Plant, and Food Sciences, Food Science Section, University of Bari “Aldo Moro”, Via Amendola, 165/a, 70124 Bari (Italy)

**) Department of Soil, Plant, and Food Sciences, Plant Breeding Section, University of Bari “Aldo Moro”, Via Amendola, 165/a, 70124 Bari (Italy)

phenolic compounds, durum wheat, nutritional quality, functional foods

Phenolic compounds are a widespread group of substances in the plant kingdom, but their dietary intake greatly varies depending on the type and quantity of vegetable foods consumed. Interest in plant polyphenols has focused on their favourable effects on human health, arising from their antioxidant activity and capacity to protect critical macromolecules (such as chromosomal DNA, structural proteins and enzymes, low-density lipoproteins, and membrane lipids) from damages induced by active species of oxygen. Phenolic substances are present also in wheat, with ferulic acid present in the highest amount. Various studies analysed the polyphenol content of soft, medium and hard wheat (*Triticum aestivum* L.). Marginal attention has been devoted to durum wheat (*Triticum turgidum* L. spp. *turgidum* var. *durum*), the essential raw material to produce high quality pasta, one of the basic foods in the Italian diet. The aim of this work has been to evaluate the variability of total phenolic content (TPC) in Italian durum wheat, in view of selecting the best materials to produce phenolic extracts for functional pasta enrichment. A set of 20 cultivars was considered, chosen among the most cultivated ones. The determination of TPC of the free phenolic fraction, spectrophotometrically assessed after Folin-Ciocalteu reaction, showed levels ranging from 1.28 to 1.94 mg ferulic acid equivalent (FAE)/g wholemeal. The TPC was significantly correlated to the polyphenol oxidase activity of the examined cultivars.

A subset of 5 cultivars was subjected to detailed survey of phenolic acids in whole flour. Three separate extractions were carried out to determine the composition and amount of soluble free, soluble conjugated, and bound phenolic acids. Two different mesh size (60 mesh or 0.251 mm; and 10 mesh or 2 mm) were used for milling whole grain samples to evaluate the extraction efficiency of phenolic acids depending on the particle size of whole flour samples. The evaluation of free, conjugated and bound extracts by the means of HPLC-DAD analysis lead to the characterisation of each fraction in terms of composition and amount of major phenolic acids. Sinapic acid resulted the most abundant compound present in the bound fraction, ranging from 335 and 438 ug/g dm, while *o*-coumaric acid resulted the major component of the conjugated fraction, ranging from 72 and 80 ug/g dm. Other phenolic acids were detected both in the bound and conjugated fractions, like ferulic, 2,4-dihydroxybenzoic, syringic and vanillic acids. The free fraction showed the smallest contribution to the total phenolic acid content (<0.5%), sinapic acid being the most abundant, followed by syringic, ferulic and *o*-coumaric acid respectively.