PGI products of Campania region: chemical and biological investigation of edible parts and by-products as potential sources of functional ingredients for herbal, nutraceutical and cosmetic formulations.

Abstract

This project is addressed to the definition of the chemical profile of selected PGI products of Campania region and related byproducts to highlight the presence of phytochemicals with health benefits. The species studied were *Corylus avellana* cultivar "Nocciola di Giffoni" and *Castanea sativa* cultivar "Marrone di Roccadaspide" PGI products of Campania region.

The phytochemical investigation on *C.avellana* cultivar 'Tonda di Giffoni' byproducts allowed us to isolate and characterize, by 1D and 2D NMR experiments, 22 new cyclized diarylheptanoids and diaryletherheptanoids, some of which highly hydroxylated, named giffonins A-V. Cyclized diarylheptanoids were characterized by a C-C bond among the C-1 and C-2 positions of the two aromatic rings, while cyclized diaryletherheptanoids were characterized by an ether linkage among the C-1 and C-17 of the two aromatic moieties. Some of isolated giffonins and the MeOH extracts displayed the ability to prevent oxidative damages of human plasma lipids, induced by H_2O_2 and H_2O_2/Fe^{2+}. Moreover, a metabolomic study of "green" extracts of *C.avellana* leaves was carried out. ^{1}H NMR experiments of "green" extracts were performed and the metabolite variation among different extracts was further evaluated multivariate data analysis.

Food and Drug Administration has recognized hazelnut as "heart-healthy" food, in onder to highlight the compounds responsible of this property, a detailed characterization of the lipids occurring in fresh and roasted "Tonda di Giffoni" hazelnut was performed by LC-ESI/LTQOrbitrap/MS/MSn. LC-MS analysis has showed a wide range of compounds from oxylipins and long chain bases to phospholipids, sphingolipids, and glycolipids. Thereby, at the best of our knowledge, this is the first report of many of these metabolites in hazelnut kernels.

With the aim to achieve deeper insight into the chemical composition of *Castanea sativa* Mill., source of the Italian PGI product "Marrone di Roccadaspide", the phytochemical investigation of the leaves has been carried out; the phenolic compounds isolated were quantified by LC-ESI(QqQ)MS. Moreover, the ability of isolated compounds to protect HaCaT human keratinocytes from UVB-induced damage has been investigated.

during the PhD stage at the University of Veterinary and Pharmaceutical Sciences, preliminarity tests to evaluate the ability of *C.sativa* and *C.avellana* extracts to inhibit in vitro reactive oxygen species formation and NF-κB activation. To explain the strong antioxidant activity of MeOH extract of *C.sativa* shells, his metabolic profile LC-ESI/LTQOrbitrap/MS/MSn was carried out. LC-MS led

the identification a wide range of compounds belonging to the different chemical classes such as tannins, in particular hydrolysable tannins, ellagitannins derivatives and condensed tannins; moreover the HPLC analysis was carried out; the structure of isolated compounds were elucidated by NMR and their quantitative determination was carried out by LC-ESI(QqQ)MS.