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Influence of in vitro digestion process on polyphenolic profile of skin grape (cv. *Italia*) and on antioxidant activity in basal or stressed conditions of human intestinal cell line (HT-29)

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Abstract

White table grape cv. *Italia* is a typical component of the Mediterranean diet and a source of phenolic compounds, particularly abundant in the skin portion. The aim of this study was to characterize the phenolic profile of the table grape skin and to assess its stability after the *in vitro* digestion process. The main phenolic compounds identified by the HPLC-DAD analysis were: procyanidin B_1, caftaric acid, catechin, coutaric acid, quercetin 3-glucuronide and quercetin 3-glucoside. All compounds showed a good stability after *in vitro* digestion (from 43 to 80%). Moreover, the influence of grape skin polyphenols on the modulation of ROS and GSH levels was evaluated in basal and in stressed conditions on human intestinal cells (HT-29). In basal conditions, a higher polyphenol concentrations exerted pro-oxidant effect corresponding to high ROS level and low GSH content. This effect was probably due to the polyphenolic oxidation in cell culture condition with consequent production of hydrogen peroxide. Otherwise, in stressed conditions, grape skin polyphenols exerted antioxidant effects up to $1.3x10^{-6}$ µg/g and restored the stress-related GSH reduction. The *in vitro* digestion process attenuated the biological effect of grape skin polyphenols on intestinal cell line (HT-29). In conclusion, grape skin polyphenols showed different behaviour in relation to their concentrations and to the intracellular ROS levels .