Bioactive Compounds from Brassicaceae: a Beneficial Contribution in our Everyday Diet

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Dietary intake of Brassicaceae (Crucifers) provides not only nutrients, but also a highly interesting class of secondary metabolites beneficial to health, known as glucosinolates (GLs). These compounds possess a β-D-glucopyranosyl unit connected to a O-sulfated anomeric Z-thiohydroximate function, and a side chain R which is the only variable part of the chemical structure. Up to now, more than 120 naturally-occurring GLs have been characterized. GLs constitute a class of pseudo-thioglucosides which, through injury of plant cells, undergo hydrolysis catalyzed by the endogenous myrosinase (EC 3.2.1.147) to release isothiocyanates (ITCs) or nitriles depending on physico-chemical parameters and/or the presence of enzyme cofactors.

The combination of epidemiological and experimental studies brings the presumption that a great consumption of vegetables from the Brassica genus, and in particular broccoli, has a protective effect against some cancers. Such an effect seems to strictly correlate with the GLs content in these vegetables (IARC, 2004). R-(-)-Glucoraphanin (GRA) the major GL contained in broccoli sprouts, is enzymatically hydrolysed to its corresponding ITC R-sulforaphane, a biologically active compound responsible for many reported health benefits (Fahey et al., 1997). We have recently set up a suitable method to obtain a large amount of GLs, in particular GRA and glucoerucin (GER). More recently, the up-regulation of cytochrome P450 and phase II enzymatic systems by intact GRA and GER has been described in precision-cut slices of rat lung (Razis et al., 2011). This study establish for the first time that intact naturally occurring GLs are able to modulate pivotal enzymes in carcinogen metabolism, and may contribute to the chemopreventive activity associated with intake of Brassicaceae vegetables. The potential cancer preventive effects of a diet rich in broccoli, radish, cauliflower, etc., are well recognized and the food industry should develop and market new high-potency products containing GLs.

REFERENCES