

Inhibition and Breaking of Advanced Glycation End Products with Nuts and Polyphenols

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Abstract : Long-term hyperglycemic conditions associated with diabetes lead to the formation of advanced glycation end-products (AGEs). Highly reactive glucose metabolites, methylglyoxal (MGO) and glyoxal (GO), induced carbonyl stress and it may induce cellular damage, cross-linking of proteins, and glycation, playing an important role in the impairment of kidney function. Small molecules that have the ability to inhibit AGE formation, and even break preformed AGEs have a beneficial impact on metabolic syndrome, diabetes, and cancer. We quantified contents of polyphenols in nuts and investigated the protective effect of nuts and polyphenols on MGO-induced cytotoxicity in porcine kidney epithelial cells (LLC-PK1). Moreover, we evaluated the inhibitory effect of AGEs formation in the presence of MGO or GO and possess the ability to break preformed AGEs. In this study, we confirmed twenty polyphenols in diverse nuts using LC-MS/MS system. Nuts and polyphenols play a protective role in LLC-PK1 cells by reducing MGO-induced cytotoxicity. They could also prevent the formation of MGO or GO-mediated AGEs and Break AGEs crosslink. It can be surmised that increased consumption of nuts would be an effective means of preventing diabetic diseases.

Keywords : advanced glycation end products, LLC-PK1, methylglyoxal, nut, polyphenol

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