Title of Article: Role of fruits and vegetables as sources of health beneficial polyphenols: Biochemical, enzymatic and molecular perspectives.

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Abstract

Edible parts of plants (vegetables) are good source of nutrients and health beneficial biomolecules. These biomolecules like vitamin C, vitamin E, carotenes, phenolic acids, bioflavonoids, phytate and phytoestrogens have been recognized as having the potential to reduce disease risk. Most of which are largely polyphenolic in nature. Several types of polyphenols (phenolic acids, hydrolysable tannins, and flavonoids) show anticarcinogenic and antimutagenic effects. Polyphenols might interfere in several of the steps that lead to the development of malignant tumors, inactivating carcinogens, inhibiting the expression of mutant genes and the activity of enzymes involved in the activation of procarcinogens, and activating enzymatic systems involved in the detoxification of xenobiotics. However, some polyphenols have been reported to be mutagenic and co-carcinogens or promoters in inducing skin carcinogenesis in the presence of other carcinogens. This latter possibility warrants further research. Polyphenols particularly flavonoids, possesses antioxidant protective effect on DNA and gene expression, as well as ability to inhibit the initiation, promotion and progression of tumors. Methylation in one or more phenolic hydroxyls is another possibility in polyphenol metabolism. This reaction is apparently mediated by catechol-O-methyl transferase, an enzyme present in liver and kidney. The biosynthesis pathway is largely limited by polyphenol oxidase and phenylalanine ammonia lyase. These two enzymes had been implicated in plant defences system. Modern approaches like molecular biology is now been employed to further enhance the understanding of these health beneficial biomolecules. However, more efforts are required at molecular level to facilitate a better understanding of their mechanism of action, and for their easy manipulation to better mankind.