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DIETARY PHENOLICS AND ITS EFFECTS ON HUMAN NUTRITION

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Phenolics are secondary metabolites synthesized by plants, both during normal development and in response to stress conditions such as disease infection, insect attack and wounding, UV radiation, and adverse environmental conditions. Plants may contain simple phenolics, phenolic acids, coumarins, flavonoids, stilbenes, hydrolysable and condensed tannins, lignans and lignins. Most of all vascular plants contain phenolic compounds and generally they exist as conjugates with sugars (glycosides) in vacuoles. In leafy vegetables and many fruits, phenolics are almost completely present as glycosides. Phenolics may play many roles in plants such as phytoalexins, antifeedants, attractants for pollinators, contributors to plant color development, antioxidants and protective agents against adverse conditions. Phenolic compounds contribute many positive effects and tastes to the plants. Different foods in human diet have their characteristics such as the bitterness, astringency, color, flavour, odor, and oxidative stability from these phenolics. In recent years, the health-protecting capacity and anti-nutritional properties of these plant metabolites are of great importance to researchers, consumers and food producers. Epidemiological studies show that the consumption of fruits and vegetables including phenolics is associated with reduced risk of many chronic diseases. Since phenolics have antioxidant properties, they operate by inhibiting oxidant formation, intercepting oxidants once they have formed, and repairing oxidant-induced injury. Among these compounds, the flavonoids are a group of low molecular weight natural substances, and more than 4000 flavonoids have been isolated from bryophytes, pteridophytes, gymnosperms and angiosperms. There are three flavonols such as quercetin, myricetin and kaempferol and two flavones such as epigenin and luteolin. Anthocyanins, the most significant group of the phenolic pigments, are common in nature and play an important role in human nutrition and health. They take part in many of the orange, red and blue colors of fruits, vegetables, flowers, leaves, roots and other storage organs of plants. Compounds of interest in phenolics as dietary supplement and daily nutrition include:

- _ Ellagic acid found commonly in various fruits, nuts and vegetables,
- _ Curcumin forms yellow pigment in turmeric (*Curcuma longa*),
- _ Resveratrol found in a narrow range of plants including grapes (*Vitis vitifera*),
- _ Silybin, a flavonoid derived from milk thistle (*Silybum maritimum*),
- _ Theaflavins, gallates and catechins, major antioxidants in black and green tea flavonoids,
- _ Quercetin, a flavonoid from red wine and other sources,

_ Genistein, a flavonoid from soy (*Glycine max.*), clover (*Trifolium subterraneum*) and other leguminous plants.

In addition to the mentioned compounds above, many other phytonutrients will also be examined in the paper. The purpose of this review is to search the chemistry in relation to their antioxidant activity, the biological activity in different food and non-food sources, the bioavailability and metabolism of phenolic compounds and also utilization of these compounds as food antioxidants in human nutrition and health protection.

Key words: Antioxidants, phenolic compounds, nutrition, phytonutrients