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Phytochemicals and Health

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Abstract—*Majority of foods, such as whole grains, beans, fruits, vegetables and herbs contain phytochemicals of utmost importance. These phytochemicals, either alone and/or in combination, have tremendous therapeutic potential in curing various ailments. They have specific pharmacological effects in human health as anti-inflammatory, anti-allergic, antioxidants, chemopreventive and prevents cancer. The aim of this article is to review the role of phytochemicals in health.*

Keywords*: Diseases, Foods, Phytochemicals.*

1. INTRODUCTION

Phytochemicals are bioactive compounds present in vegetables, fruits, cereal grains, and plantbased beverages like tea and wine[1]. They are non-nutritive in nature and are known to prevent various diseases. They are nonessential nutrients particularly produced by plants and offer them protection. Regular intake of phytochemicals may promote health benefits, protecting against chronic degenerative disorders, such as cancer, cardiovascular and neurodegenerative diseases. Foods including whole grains, beans, fruits, vegetables and herbs contain phytonutrients/ phytochemicals. These phytochemicals, either alone and/or in combination, have tremendous therapeutic potential in curing various ailments[2].

2. POLYPHENOLS

The primary source of dietary polyphenols are cereals, legumes (barley, corn, nuts, oats, rice, sorghum, wheat, beans, and pulses), oilseeds (rapeseed, canola, flaxseed and olive seeds), fruits, vegetables and beverages (fruit juices, tea, coffee, cocoa, beer and wine) [2, 3, 4] . Fruits including apple, grape, pear, cherry and various berries are abundant sources of polyphenols. Red wine or a cup of coffee or tea incorporates about 100 mg polyphenols. The main constituent of tea polyphenols are flavonols (catechin, epicatechin, catechingallate and epigallo-catechingallate), flavanols (quercetin, kaempferol and their glycosides), flavones (vitexin, isovintexin) and phenolic acids (gallic acid, chlorogenic acid). Caffeic acid in the form of caffeoyl esters and coumaric acids is found in apples, pears, and grapes. Citrus fruits are rich in flavonones and orange juice is an abundant source of hesperidin (120-250 mg/lit). They have also been studied as potent antioxidant protectants for human beings and play a major role in lowering the risk of coronary heart disease, diabetes, hypertension and some types of cancer [3, 5, 6] A prospective study involving 9959 men and women (age 15–99 y) in Finland showed an inverse association between the intake of flavonoids and the incidence of all sites of cancer[7]. Consumption of quercetin in onions and apples was found to be inversely associated with lung cancer risk in Hawaii[8].

3. ISOFLAVONOIDS

Isofavonoids belong to the subclass of phenolic phytonutrients. Soybeans are concentrated sources of isoflavones, including genistein and daidzein. Genistein prevents the growth of most hormone-dependent and independent cancer cells in vitro, together with the colonic cancer cells. Isoflavones have received considerable attention as potentially preventing and treating cancer and osteoporosis [5, 9]. In mice, dietary soybean inhibited the growth of experimental prostate cancer and altered tumor biomarkers associated with angiogenesis.

4. CAROTENOIDS

They are highly pigmented, yellow, orange and red, are present in fruits and vegetables, and when consumed by birds are incorporated into the yolk of eggs. Carotenes are tissue specific in their biological activity and beta-carotene has vitamin A activity. Betacarotene, lycopene and lutein are known to protect uterine, prostate, breast, colorectal and lung cancers. They may also offer protection against risk of digestive tract cancer. The xanthophyll types of carotenoids offer safety to other antioxidants, and may exhibit tissue specific protection. Zeaxanthin, cryoptoxanthin and astaxanthin are members of the xanthophyll group [9,10, 11] .

5. TERPENOIDS

The terpenes, also known as isoprenoids, are the largest class of phytonutrients in green foods, and grains. Terpenes have a unique antioxidant activity in their interaction with free radicals. They react with free radicals by partitioning themselves into fatty membranes by means of virtue of their long carbon side chain. The maximum studied terpene

antioxidants are the tocotrienols and tocopherols. They are found abundantly in whole grains and have effects on cancer cells. The tocotrienols are powerful apoptotic inducers for human breast cancer cells. The effect of fruits, vegetables and grains on reduction of cancer risk explained by the actions of terpenes in vivo have been reported by several authors [12, 13].

6. CONCLUSION

Increasing the consumption of fruit and vegetables, whole grains, and soy is a practical strategy for consumers to maintain their health and to reduce the chance of chronic diseases. Beneficial health effects determined from phytochemicals are associated with the synergistic mixture of phytochemicals and other nutrients found in whole foods and its components, consumption of variety of plant-based foods is thus highly encouraged. Use of dietary supplements, functional foods, and nutraceuticals is increasing as industry is responding to consumers' demands. However, there is a need for more information about the health benefits and possible risks to ensure the efficacy and safety of dietary supplements.

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