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Polyphenols and its Classification

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Description

Polyphenols are substances found in fruits, vegetables, herbs, spices, tea, dark chocolate, and wine that are found naturally in plant foods. A phenolic substance is also defined as an antioxidant when it delays, retards, inhibits autoxidation or free radical-mediated oxidation, when present in low concentration compared to the substrate to be oxidized, with the radical generated after scavenging being stable. Polyphenols, which are chemical substances found in abundance in plants, have become an emerging field of interest in nutrition in recent decades. Polyphenol consumption appears to play an important role in health through regulating metabolism, weight, chronic disease, and cell proliferation. According to a growing body of research they have the ability to act as antioxidants, which means they can neutralize dangerous free radicals that would otherwise damage human cells and increase risk of cancer, diabetes, and heart disease. Polyphenols have also been linked to a reduction in inflammation, which is identified to be the root cause of many chronic diseases. Polyphenols helps to improve digestion and brain function, as well as protect against heart disease, type 2 diabetes, and even certain cancers when consumed on a regular basis. Dark chocolate, red wine, berries, and tea are some of the best-known sources. Yet, many other foods also offer significant amounts of these polyphenols compounds. Health effects are determined by the amount taken as well as their bioavailability. Polyphenol consumption has been reported to have several negative side effects. Polyphenolic botanical extracts in beverages have been linked to negative results, particularly in people with a degenerative illness, high blood pressure, thyroid disease, epilepsy or heart disease.

Classification

Polyphenols are divided into groups based on the number of phenol rings they contain and the structural components that connect these rings. Phenolic acids, flavonoids, stilbenes and lignans are the four main categories.

Phenolic acids: Phenolic acids are aromatic secondary plant metabolites that can be found all over the plant kingdom. Recent interest in phenolic acids arises from their ability to protect against oxidative damage diseases by intake of fruits and vegetables (coronary heart disease, stroke, and cancers). They may benefit health, because they function as antioxidants, preventing cellular damage caused by free-radical oxidation processes. Eg: Vanillic acid and Caffeic acid.

Flavonoids: Flavonoids are a group of plant metabolites as it provides health benefits through antioxidant effects and cell signalling pathways. A wide range of fruits and vegetables contain these compounds. Chalcones, flavones, isoflavonoids, flavanones, anthoxanthins, and anthocyanins are among the six primary subtypes of flavonoids. It has 15 carbon atoms and can be dissolved in water. Onions, parsley, blueberries, bananas, dark chocolate and red wine are examples of foods high in flavonoids. It provides beneficial health effects like Anti-viral, Anti-cancer, Anti-inflammatory, and Anti-allergic. Eg: Apigenin, Luteolin, Baicalein, Chrysin.

Stilbenes: Stilbene or trans-stilbene is an organic compound generally found in red wine or dark red fruits such as grapes, blueberries, and cranberries. It's a type of polyphenol that comes in two forms such as resveratrol and pterostilbene. It is very helpful for the prevention and treatment of different diseases like cancer, due to their antioxidant, cell death activation, and anti-inflammatory properties which associate with low toxicity under in vivo conditions.

Lignans: Plant-based foods such as fruits, whole grains, seeds, vegetables, red wine, nuts, and coffee contain lignans molecules that have anti-inflammatory effects and antioxidants. Lignans Protect against cancer by blocking enzymes that are involved in interfering with the growth and spread of tumour cells and hormone metabolism. Some other components in flaxseed also have antioxidant properties, which act as protection against heart disease and cancer.

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