Characteristics of Flavonoids and the Plants that are Rich in Flavonoids

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Commentary

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ABOUT THE STUDY

Flavonoids are a type of polyphenolic secondary metabolite present in plants and often used in human diets. Anthoxanthins are ketone containing flavonoids, similar to the three flavonoid groups mentioned (flavones and flavonols). The term bioflavonoids were initially applied to this group. Non ketone polyhydroxy polyphenol chemicals, which are more properly referred to as flavanoids, have also been referred to as flavonoid and bioflavonoid. Albert szent gyorgyi and other scientists determined in the 1930s that vitamin C alone was not as beneficial as the crude yellow extract from oranges, lemons or paprika in preventing scurvy. They attributed the extract's heightened action to the other ingredients in the mix, which they referred to as citrin or vitamin P. However, it was eventually discovered that the chemicals in issue did not meet the criteria for a vitamin, rendering the title obsolete. Flavonoids are secondary metabolites that are primarily generated by plants. Flavonoids have a 15-carbon skeleton with two benzene rings joined by a 3-carbon connecting chain in general. As a result, they're shown as C6-C3-C6 compounds. Flavonoids are categorised into distinct groups based on their chemical structure, degree of oxidation, and unsaturation of the connecting chain (C3), such as anthocyanidins, chalcones, flavonols, flavanones, flavan-3-ols, flavanonols, flavones, and isoflavonoids.

Flavonoids can be found in both glycoside bound and free aglycone forms in plants. The glycoside bound form of flavone and flavonol is the most common in the diet. Plants are rich in flavonoids, which serve a variety of purposes. They're the most significant plant pigments for floral color, creating yellow or red/blue pigmentation in pollinator friendly petals. UV filtration, symbiotic nitrogen fixation and floral coloring are among processes that they play a part in in higher plants. Chemical messengers, physiological regulators and cell cycle inhibitors are all possible functions of these molecules. Rhizobia is helped in the infection stage of their symbiotic association with legumes such as peas, beans, clover and soy by flavonoids released by the root of their host plant. Rhizobia in soil may detect flavonoids, which causes the release of nod factors, which are recognized by the host plant and can cause root hair deformation and a variety of cellular responses, including root hair deformation. The USDA database on flavonoids provides data on food composition for flavonoids. Adults average flavonoid consumption was 190 mg/d in the NHANES study in the United States, with flavan-3-ols being the largest contributor. According to EFSA data, the average flavonoid intake in the European Union was 140 mg/d, while there were significant variances between nations. Flavan-3-ols were the most often eaten flavonoids in the EU and the US (80% for adults in the US), mostly from tea or cocoa in chocolate, whereas other flavonoids were ingested in much smaller amounts. Flavonoids are poorly absorbed in the human body (less than 5%), converted swiftly into smaller fragments with uncertain characteristics, and eliminated quickly. Flavonoids have low antioxidant action in the body and the rise in blood antioxidant capacity seen after eating flavonoid rich meals is due to the generation of uric acid generated by flavonoid depolymerization and excretion, not flavonoids. The overall metabolism of dietary flavonoids is heavily influenced by microbial metabolism. The impact of flavonoid consumption on the microbiome of the human gut is unknown. Light color spectrums at both high and low energy radiations stimulate flavonoid production in plants. Phytochrome accepts low energy radiations, while carotenoids, flavins and cryptochromes, in addition to phytochromes, accept high-energy radiations. In Amaranthus, barley, maize, sorghum and turnip, the photomorphogenic process of phytochrome mediated flavonoid production has been documented. Flavonoid synthesis is aided by red light. Several recent studies have shown that genetically modified microbes can produce flavonoid compounds efficiently. SynBio4Flav is a project that aims to provide a cost-effective alternative to current flavonoid production by breaking down complex biosynthetic pathways into standardized specific parts that can then be transferred to engineered microorganisms within synthetic microbial consortia to promote flavonoid assembly through distributed catalysis.