

Phytochemicals Uses and its Functions

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Opinion Article

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Description

Phytochemicals are chemical compounds produced by plants to aid in their resistance to fungi, bacteria and plant viruses, as well as for consumption by insects and other animals. Phytochemicals are plant-derived chemicals. Phytochemicals are chemicals produced by plants *via* primary or secondary metabolism. They usually have biological activity in the plant host and help the plant grow or defend itself against competitors, pathogens or predators. Phytochemicals are generally regarded as research compounds rather than essential nutrients even though evidence of their health impacts has yet to be established. Carotenoids and polyphenols, which include phenolic acids, flavonoids, stilbenes and lignans are two major categories of phytochemicals under investigation.

Flavonoids are further classified into groups based on their chemical structure, including anthocyanins, flavones, flavanones, isoflavones and flavanols. Flavanols are divided into three types they are catechins, epicatechins and proanthocyanidins. Phytochemists investigate phytochemicals by first extracting and isolating compounds from the

source plant then defining their structure or testing them in laboratory model systems such as *in vitro* studies with cell lines or *in vivo* studies with laboratory animals.

Isolating specific compounds and determining their structures, which are often complex are challenges in that field, as that is determining which specific phytochemical is primarily responsible for any given biological activity. Phytochemicals were being used as poison and in traditional medicine without specific knowledge of their cellular actions or mechanisms. Salicin which has anti-inflammatory and pain-relieving properties was originally extracted from the bark of the white willow tree and later sequenced to become the common, over-the-counter drug aspirin. *Atropa belladonna's*, tropane alkaloids were used as poisons and the plant is being used to consider making poisonous arrows besides early humans. The phytochemical category includes compounds recognized as essential nutrients that are naturally found in plants and are required for normal physiological functions in humans, so must be obtained through diet. Some phytochemicals have been identified as phytotoxins that are toxic to humans. Some phytochemicals are antinutrients that inhibit nutrient absorption. Others, such as some polyphenols and flavonoids, may be pro-oxidants when consumed in large quantities. Non-digestible dietary fibres from plant foods which are frequently referred to as phytochemicals are now widely recognized as a nutrient group with approved health claims for lowering the risk of certain types of cancer and coronary heart disease.

A diet high in fruits, vegetables, grains, legumes and plant-based beverages has long-term health benefits but there is no evidence that taking dietary supplements of non-nutrient phytochemicals extracted from plants benefits health in the same way. Phytochemical supplements are not recommended by health authorities for health improvement nor are they approved by regulatory agencies for health claims on product labels. The US Food and Drug Administration found insufficient evidence for the effects of carotenoids such as the tomato phytochemical lycopene on any of several cancer types, due to the limited language for how products containing lycopene can be described on brands. Processing techniques, such as cooking, can degrade phytochemicals in freshly harvested plant foods. Thermal decomposition is the primary cause of phytochemical loss during cooking. Carotenoids, such as lycopene found in tomatoes may remain stable or increase in content after cooking due to liberation from cellular membranes in the cooked food. Mechanical processing of food can also liberate carotenoids and other phytochemicals from the food matrix, increasing dietary intake. In some cases, food processing is required to remove phytotoxins or antinutrients which are required to avoid becoming ill from cyanogenic glycosides found in unprocessed cassava.