Der Chemica Sinica ISSN 0976-8505

2021 Vol.12 No.12:59

Polyphenols: An Overview Hidasy C*

Received: December 09, 2021; Accepted: December 23, 2021; Published: December 30, 2021

Perspective

Polyphenols are secondary plant metabolites that are engaged in defence against UV radiation or pathogen aggression. There has been a lot of attention in the possible health advantages of dietary plant polyphenols as antioxidants during the last decade. Epidemiological research and accompanying meta-analyses clearly imply that long-term intake of plant polyphenol-rich diets provide protection against cancer, cardiovascular disease, diabetes, osteoporosis, and neurological illnesses. Polyphenols are naturally occurring substances present in a variety of foods, including fruits, vegetables, cereals, and beverages. Grapes, apple, pear, cherries, and berries have up to 200–300 mg polyphenols per 100 grammes fresh weight.

Polyphenols are found in substantial concentrations in the products made from these fruits. Their biological effects are primarily attributed to their ability to sequester or inhibit reactive oxygen and nitrogen species, transfer electrons to free radicals, activate antioxidant enzymes, improve oxidative stress and inflammation, and demonstrate promising effects in the prevention of diseases such as diabetes, obesity, cancer, cardiovascular disease, osteoporosis, and neurodegenerative diseases. In various plant species, over 8,000 polyphenolic chemicals have been found. All plant phenolic chemicals are derived from phenylalanine, a common intermediate, or a close precursor, shikimic acid. They are most commonly found conjugated, with one or more sugar residues attached to hydroxyl groups, however direct connections of the sugar (polysaccharide or monosaccharide) to an aromatic carbon also exist.

Polyphenols are categorised into several groups based on the number of phenol rings they contain and the structural components that tie these rings together. The most important classes include phenolic acids, flavonoids, stilbenes, and lignans. Polyphenols are a diverse category of secondary metabolites that are produced via the pentose phosphate, shikimate, and phenylpropanoid pathways. They are found across the plant kingdom, primarily in fruits and vegetables, and it is estimated that over 8000 structures have already been recognised. Phenolic acids are common in foods and are classified into two types: benzoic acid derivatives and cinnamic acid derivatives. With the exception of certain red fruits, black radish, and onions, which can have concentrations of many tens of milligrammes per kilogramme fresh weight, the hydroxybenzoic acid content in food plants is generally modest. They are classified into two types: those formed from hydroxybenzoic and those derived

R&D Wing, Fine Treatment, Oxford, United Kingdom

*Corresponding author: Hidasy C

c.hidasy@gmail.com

R&D Wing, Fine Treatment, Oxford, United Kingdom.

Citation: Hidasy C (2021) Polyphenols: An Overview. Der Chem Sin Vol. 12 Iss No.12:59

from hydroxycinnamic acids.

The most common derivatives of hydroxybenzoic acid are -hydroxybenzoic, gallic, protocatechuic, and vanillic acids, which all have one carboxylic group (COOH). Because phenolic acids can serve as a depressive and an antihypertensive, their biological potential is as diverse as their structural diversity. The most researched group of polyphenols is flavonoids. This group shares a fundamental structure that consists of two aromatic rings linked by three carbon atoms to form an oxygenated heterocycle. Their concentration in the plant matrix, however, is determined by a number of parameters, including genetic diversity of species, edaphoclimatic conditions, plant part, growth conditions, and degree of maturation. Flavonoids have a phenyl benzopyran skeleton, which consists of two aromatic rings connected to a tetrahydropyran ring.

Anthocyanins are flavonoid-family natural plant pigments that give fruits, vegetables, and other foods their vibrant colours (red, blue, and purple). They are most commonly found in nature as glycosylated anthocyanidins and less frequently as acyl glycosides of anthocyanidins, which are flavylium structures composed of two aromatic rings connected by a three carbon heterocyclic ring containing oxygen once that conjugated double bonds of the anthocyanidin moiety constitute the chromophore. Tannins are phenolic chemicals that can form complexes with a variety of different macromolecules. They are classified as condensed or hydrolysable tannins based on their structural and chemical features. Condensed tannins are formed by the polymerization of several monomeric flavon-3-ols, which occur naturally in the bark, trunks, leaves, and fruits of various plant species.

Hydrolysable tannins have carbohydrates as a central core and hydroxyls esterified with phenolic groups, whereas hydrolysable tannins occur naturally in the bark, trunks, leaves, and fruits of various plant species. The distribution of phenolics in plants is not consistent at the tissue, cellular, and subcellular levels. Cell walls contain insoluble phenolics, but plant cell vacuoles contain soluble phenolics. Certain polyphenols, such as quercetin, are found in all plant products, such as fruit, vegetables, cereals, fruit juices, tea, wine, infusions, and so on, whereas flavanones and isoflavones are found only in certain foods. In most cases, meals contain complex polyphenol combinations. Plants have larger levels of phenolics in their outer layers than in their inner layers. Numerous factors influence plant polyphenol concentration, including ripeness during harvest, environmental factors, processing, and storage.

Der Chemica Sinica

ISSN 0976-8505