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Review

Chrononutrition and Polyphenols: Roles and Diseases

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Received: date; Accepted: date; Published: date

Supplementary Materials: The following are available online at www.mdpi.com/xxx/s1, Figure S1: Basic chemical structures of the main classes of phenolic compounds. According to their structure, phenolic compounds can be classified into two major families: flavonoids and nonflavonoids, and they can be further divided into several subclasses, Table S1: Total phenolic contents of relevant plant products, their most important bioactive phenols and their health benefits.

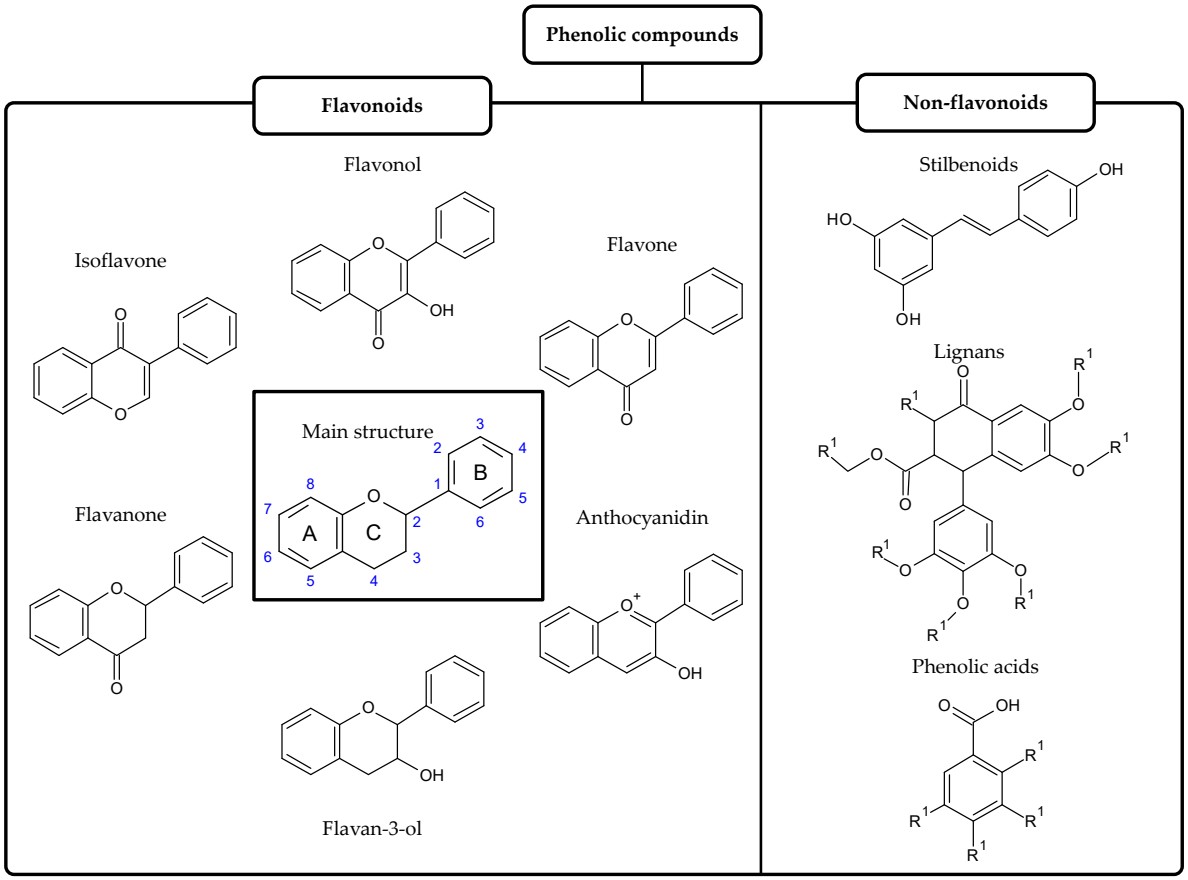

Figure S1. Basic chemical structures of the main classes of phenolic compounds. According to their structure, phenolic compounds can be classified into two major families: flavonoids and nonflavonoids, and they can be further divided into several subclasses.

Table S1. Total phenolic contents of relevant plant products, their most important bioactive phenols and their health benefits.

Plant product	Scientific name	Total content of phenolic compounds (mg/100 g FW)*	Most important bioactive phenols	Benefits to human health	References
Apple (whole, raw)	*Malus domestica*	200.96	(+)-Catechin (-)-Epicatechin Quercetin Kaempferol	Anti-ulcer, Anti-allergy, Antioxidant, Antihypertensive, Anticancer, Antidiabetic, Anti-inflammatory, Cardioprotective	[1–8]
Apricot (raw)	*Prunus armeniaca L.*	133.00	Quercetin Kaempferol	Antioxidant, Anticancer, Antidiabetic, Anti-inflammatory	[4–8]
Broccoli (raw)	*Brassica oleracea var. italica*	198.55	Quercetin Myricetin	Anticancer	[9]
Cocoa, powder	*Theobroma cacao*	5624.23	(+)-Catechin (-)-Epicatechin	Antioxidant, Antihypertensive, Antidiabetic, Anti-inflammatory	[3,4]
Coffee (beverage, filtered)	*Coffea arabica L.*	266.70 mg/100 mL	Chlorogenic acid Caffeic acid *p*-Coumaric acid	Antioxidant, Anti-inflammatory, Cardioprotective	[10–14]
Common beans (whole)	*Phaseolus vulgaris L.*	1234.38	(+)-Catechin Quercetin Vanillin acid Ellagic acid Caffeic acid Ferulic acid Gallic acid Chlorogenic acid Sinapic acid	Antidiabetic, Anti-obesity, Antioxidant, Anti-inflammatory, Chemoprotective	[15]
Grape (black)	*Vitis vinifera L*	184.97	(+)-Catechin (-)-Epicatechin Quercetin Kaempferol Chlorogenic acid Caffeic acid *p*-Coumaric acid Resveratrol Proanthocyanidins	Anti-ulcer, Anti-allergy, Antiproliferative, Antioxidant, Antihypertensive, Antidiabetic, Anti-inflammatory, Anticancer, Anti-obesity, Cardioprotective	[1,2,12–14,16–18,3–8,10,11]

Lemon	*Citrus limon*	59.80	Hesperidin Naringenin	Antioxidant, Anti-inflammatory, Anticancer, Cardioprotective	[4,8,19–21]
Mango	*Mangifera indica L.*	144.77	Mangiferin	Antioxidant, Anticancer, Antidiabetic, Anti-allergic, Anti-obesity	[22,23]
Nectarine (whole)	*Prunus persica var. nucipersica*	55.44	Chlorogenic acid Caffeic acid *p*-Coumaric acid	Antioxidant, Anti-inflammatory, Cardioprotective	[10–14]
Olive (green, raw)	*Olea europaea L.*	161.24	Tyrosol Hydroxytyrosol	Anticancer, Anti-inflammatory, Antioxidant, Cardioprotective	[24–28]
Onion (red, raw)	*Allium cepa L. var. cepa*	102.83	Quercetin Kaempferol	Anti-ulcer, Anti-allergy, Antiproliferative, Antioxidant, Anticancer, Antidiabetic, Anti-inflammatory, Cardioprotective	[2,4–8,24]
Orange (blond)	*Citrus sinensis L.*	278.59	Hesperidin Naringenin	Antioxidant, Anti-inflammatory, Anticancer, Cardioprotective	[4,8,19–21]
Parsley (fresh)	*Petroselinum crispum Mill.*	89.27	Apigenin	Antioxidant, Anticancer, Anti-inflammatory, Cardioprotective	[4,29,30]
Peach (whole)	*Prunus persica L.*	279.08	Chlorogenic acid Caffeic acid *p*-Coumaric acid	Antioxidant, Anti-inflammatory, Cardioprotective	[10–14]
Pear (whole)	*Pyrus communis*	107.91	(+)-Catechin Chlorogenic acids	Antioxidant	[2]
Pomegranate (peel, juice, seed)	*Punica granatum L.*	410.03[a]	Anthocyanidins	Antioxidant, Cardioprotective	[31,32]
Plum (fresh)	*Prunus domestica L.*	409.79	Chlorogenic acids Caffeic acid *p*-Coumaric acid	Antioxidant Anti-inflammatory Cardioprotective	[10–14]
Raspberry (red, raw)	*Rubus idaeus L.*	154.65	Cyanidin Malvidin Gallic acid	Antioxidant, Anti-obesity, Anti-inflammatory, Anticancer, Antidiabetic, Cardioprotective	[1,4,33–41]
Soybean (seed)	*Glycine Max L. Merr.*	354.00[b]	Genistein Daidzin	Antioxidant, Anticancer, Antihyperlipidemic	[4,42–44]

Spinach (raw)	*Spinacia oleracea L.*	248.14	Chlorogenic acid Caffeic acid *p*-Coumaric acid	Antioxidant, Anti-inflammatory, Cardioprotective	[10–14]
Strawberry (raw)	*Fragaria L.*	289.20	Cyanidin Malvidin Gallic acid	Proapoptotic effects, Antiproliferative, Antioxidant, Anti-obesity, Anti-inflammatory, Anticancer, Antidiabetic, Cardioprotective	[4,24,41,45,33–40]
Sweet cherry (raw)	*Prunus avium L.*	174.90	(+)-Catechin Quercetin Cyanidin Malvidin Chlorogenic acid Caffeic acid *p*-Coumaric acid	Antioxidant, Anti-obesity, Anti-inflammatory, Cardioprotective	[2,4,10–14,34–36]
Tangerine	*Citrus tangerina*	192.00	Hesperetin Naringenin	Antioxidant, Anti-inflammatory, Anticancer, Cardioprotective	[4,8,19–21]
Tea (infusion)	*Camellia sinensis L. Kuntze*	104.48 (black) 61.86 (green) mg/100 mL	Gallic acid (+)-Catechin (-)-Epicatechin	Antioxidant, Anticancer, Antidiabetic, Antihypertensive, Anti-inflammatory, Cardioprotective	[3,4,33,37–41]
Walnut	*Juglans regia L.*	1574.82	Ellagic acid Gallic acid	Antidiabetic, Antioxidant	[46,47]

*Data from the Phenol-Explorer database [48–50]. [a][51]. [b][52]

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