

Editorial

Effects of Polyphenol-Rich Foods on Human Health

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Received: 10 August 2018; Accepted: 13 August 2018; Published: 14 August 2018



Abstract: Recent evidence has suggested that polyphenol-rich foods intake may be associated with decreased risk of chronic diseases. The Special Issue “Effects of Polyphenol-Rich Foods on Human Health” comprised 64 peer-reviewed papers on the most recent evidence regarding the dietary intake of polyphenols and polyphenol-rich foods, as well as their effect toward the prevention and treatment of non-communicable diseases. Original contributions and literature reviews demonstrated the potential protective effects of polyphenol-rich foods and their extracts toward cardiovascular diseases, certain cancers, and neurodegenerative diseases, mostly through anti-oxidant and chemo-preventive properties.

Keywords: polyphenol-rich foods; polyphenol; flavonoids; human health; evidence-based

Over the last years, polyphenol-rich foods and polyphenols have received great attention due to their potential beneficial effects toward human health. Contained not only in fruits and vegetables, but also in whole-grains, nuts, olive oil and beverages such as coffee and tea, they are characteristic components of healthy dietary patterns [1]. Recent evidence has proposed that a higher dietary intake of polyphenols may be inversely associated with overall and CVD-related mortality [2], certain cancers [3], cardiovascular diseases (CVDs) [4], anthropometric measures [5], and mood disorders [6,7]. Thus, several molecular mechanisms have been suggested, however, one of the most investigated biological activities of polyphenols is their antioxidant activity.

This Special Issue “Effects of Polyphenol-Rich Foods on Human Health” comprises 64 peer-reviewed papers, including 43 original research papers [8–50], one case-report [51] and 20 literature reviews [52–71]. They report on the most recent evidence regarding the dietary intake of polyphenols and polyphenol-rich foods, as well as their effect toward the prevention and treatment of non-communicable diseases.

The Special Issue included systematic reviews and meta-analysis summarizing the level of evidence on both polyphenols and polyphenol-rich foods. In particular, published articles demonstrated that a moderate intake of coffee is inversely associated with the risk of hypertension [23], and cancer, including liver [21], endometrial [58] and postmenopausal breast cancer [28]. Marventano et al. reported that a high dietary intake of whole-grain foods is able to improve postprandial glucose and insulin homeostasis in healthy individuals [61]. Moreover, the results of a comprehensive meta-analysis on randomized clinical trials showed that intake of flavanol-containing products is associated with body composition and blood lipids level [56]. Shivappa et al. reported that a diet with lower inflammatory potential is inversely associated with risk of CVD and colorectal cancer [65,66]. Finally, a meta-analysis exploring the association between polyphenol biomarkers and CVD and mortality, revealed that higher enterolactone concentrations were associated with all-cause and CVD mortality risk [63].

Epidemiological and clinical studies reported the following associations of polyphenols and polyphenol food extracts: silibinin and non-alcoholic fatty liver disease [9,39], resveratrol and hepatic encephalopathy [33], coffee polyphenols and cardiovascular risk factors [34], flavonoids and ventilator

function [20], tea and stress and sleep quality (depending on caffeine content) [46], tea and glycemic response [44], polyphenols and obesity [24], phenolic acids and hypertension [22], healthy diet and neurofibromatosis [51].

Importantly, numerous reviews summarized the evidence regarding polyphenols and polyphenol-rich foods and their association with NCDs related to oxidative stress and inflammation, including CVDs, diabetes, hypertension, obesity, certain cancers and neurodegenerative diseases [19,45,52–55,57,59,60,62,64,67–71].

Several contributions investigated polyphenol metabolism and transformation into bioavailable molecules and underlined the importance of the clarification of the metabolic fate of polyphenols and their bioavailability in order to fully understand the molecular forms responsible for the preventive actions of polyphenols [13,15,17,26,35,36,43].

Polyphenols have been demonstrated to be responsible for the anti-inflammatory and antioxidant properties of potentially functional foods. Numerous studies explored in detail the molecular mechanisms underlying the protective effects of polyphenols, including antioxidant capacity, that can be attributed to the regulation of redox enzymes through reducing reactive oxygen species (ROS) production and modulation of the II-phase enzymes responsible for the cellular oxidative response; other studies explored the chemo-preventive effects of polyphenols, including the elimination of carcinogenic agents, the modulation of pathways responsible for cancer cell signaling and cell cycle progression, and in the promotion of apoptosis [8,10–12,14,16,18,25,27,29–32,37,38,40–42,47–50].

As a guest editor, I would like to acknowledge all the authors for their valuable contributions and the reviewers for their constructive remarks. Special thanks to the publishing team of the journal *Nutrients* for their professional help in the completion of this Special Issue.

Conflicts of Interest: The author declares no conflict of interest.

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