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RESEARCH ARTICLE

Versatile Natural Products as Antioxidants

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Abstract

The antioxidants present in diverse natural products have received significant attention in food industry and health issues because of their exceptional medicinal properties. Many commonly used herbs and traditional medicinal plants have diverse antioxidant organic molecules. In general, antioxidants act as free radical scavengers inhibiting and restoring damages triggered by Reactive Oxygen Species. However, further research is necessary to study the biological effects of antioxidant-rich herbs and spices.

Keywords: Natural Products, Antioxidant, Reactive Oxygen Species, Herbs and Spices

Introduction

Natural products have been applied as folk medicines against different clinical problems (Figure 1) since human population were familiarized with the micro-organisms [1-3]. Nowadays, there are a strong interest and attention concerning the safety facets of chemical components used in clinical trial and food industry [4,5]. On the other hand natural products serve as potential and significant medicinal sources of both nutritional and clinical aspects. Natural antioxidants also establish an extensive choice of pharmacological and environmental accomplishments and are measured to have valuable effects in nutrition and clinical approach [6,7] (Figure 1).

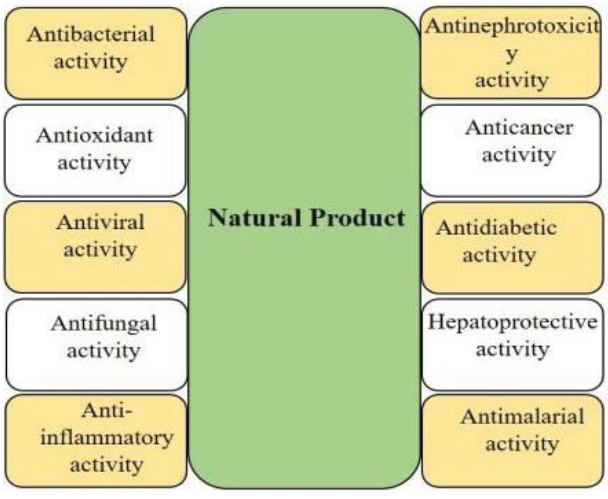

Figure 1: Use of natural products in clinical disorders.

Results and Discussions

An increasing awareness to antioxidants has been established in natural products for the comprehensive development concerning the significance in the food industry and health issues [8]. Antioxidants are components that inhibit the action of other reactive chemical species like free radicals and lower the possibility of degenerative diseases and cancers. Free radicals are extremely reactive components that can produce injury to cells and leads to cancer in many instances. Antioxidants perform as free radical scavengers by inhibiting and restoring damages triggered by ROS (Reactive Oxygen Species) [9,10]. Natural source of antioxidants predominantly originate from medicinal plants typically in the form of ascorbic acid, carotenoids and most importantly flavonoids. Flavonoids constitute one of the maximum researched classes of phenolic compounds with carbohydrates that are significant for their bioactivities. Flavonoid possess an extensive variety of biological effects such as, anti-inflammatory, antimicrobial and anti-histaminic by scavenging free radicles and inhibiting cell proliferation [11, 12]. The dietary antioxidants also exemplified by tocopherol, vitamin D, carotenoids and tannins. Carotenoids present in almost thousands of plants identified as a most ubiquitous source. Carotenoids also present in plants with their complex form as α- and β- carotene, hydroxyl

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Family Name	General name	Antioxidant component
Ocimum sanctum Linn.	Tulsi, Basil	Terpinoids, Chicoric acid, thymol, estragole, eugenol
Momordica charantia Linn.	Karela, Bitter melon	Triterpene glycosides, stearic acid
Santalum album Linn.	Chandan, Sandal wood	A-santalol, B-santalol, β-sitosterol, volatile oil
Mangifera indica Linn.	Aam, Mango	Gallic acid, β-sitosterol, Vit A and C, polyphenol, ellagic acid.
Withania somnifera Dunal	Ashwagandha	Withanolides, withanine, glycine, steroidal lactone.
Swertia chirayita	Chirata, Chiretta	Xanthones, chiratin, swertinin, arginine, mangiferin
Camellia sinensis	Cha, Tea	Vit C and E, polyphenol, Tannin
Origanum vulgare	Oregano	Tymol, caffeic acid, protocatechuic acid, dihydroquercetin, dihydrokaempherol, Rosmarinic acid
Rosmarinus officinalis	Rosemary	Rosmarinic acid, isorosmanol, rosmariquinone, rosmaridiphenol, carnosol, rosmanol, rosmadial, carnosic acid
Salvia officinalis	Sage	Carnosol, carnosic acid, rosmarinic acid, thujone
Terminalia arjuna	Arjuna	Arjunic acid, tannic acid, tannins, gallic acid, saponins

Table 1: Antioxidant component of most commonly used herbs and traditional medicinal plants [16-21].

Family Name	Common name	Antioxidant component
Curcuma longa	Haldi, Turmeric	Curcumin, 4-hydroxycinnamoyl methane, Vit C
Zingiber officinale	Adrak, ginger	Zingerone, Vit C, gingerol, shogaol
Allium sativum	Rasun, garlic	Phenolic acid, gallic acid, flaonoids
Tamarindus indica	Imli, Tamarind	Phyto-nutrients, crypto-xanthin- β, lutein-zeaxanthin
Piper nigrum	Morich, Black pepper	Quercetin, kaempferol, rhamnetin
Capsicum frutescence L.	Chili pepper	Capsaicinol, capsaicin
Cuminum cymunum	Jira, Cumin	Cuminal, pinocarveol, carotol, γ-terpinene
Portulaca oleracea	Purslane	Glutathione, Vit A, C and E
Trachyspermum ammi	Ajwain	Thymol, linoleic acid, xylene, cymene, oleic acid, β- pinene
Thymus vulgaris	Thyme	Thymol, CAVACROL, phenolic acids, rosmarinic acid, flavonoids
Cinnamomum zeylanicum	Darchini, Cinnamon	Volatile oil, cinnamyl acetate, β-carotenelinoleate, caryophyllene, phosphomolybdenum
Elettaria cardamomum	Elaichi, Cardamom	A-terpinyl acetate, linalyl acetate, limonene, linalool, terpinolene

Table 2: Antioxidant component of most commonly used spices/herbs [22-26].

carotenoids, lycopene, lutein and zeaxanthin. Plant carotenoids are antioxidants by virtue of the light harvesting as auxiliary constituents and reducing the excited molecules like singlet oxygen that generally forms during photosynthesis [13]. The consumption of antioxidants from diet is continuously intended to complement the organism's protection and confirm comprehensive defense. It has been proved that many foods act as an antioxidant source and provide a balance arrangement that defend against oxidative stress and damage without distressing the typical role of ROS [14,15]. In this paper, we have described antioxidant properties of a few natural products (Table 1 and 2).

Conclusions

There has been a growing attention in consuming natural ingredients in dietary products. Plants containing flavonoids, phenolic compounds and vitamins have extraordinary antioxidant activity. The herbs and medicinal plants conversed in this paper, displayed important clinical and pharmacological activity without any known side effects.

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