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Mini Review

Complimentary Roles of Fruits and Vegetables as Nutraceuticals

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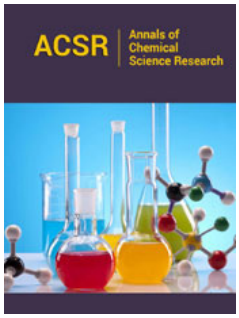

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Abstract

Fruits and vegetables have established and confirmed nutritional role in humans. They are useful raw materials in several industries such as alcohol and pharmaceuticals. In this review, essential role of fruits and vegetables as nutraceuticals are examined and linked to the phytochemicals in fruits. Some selected health conditions that have been successfully handled by fruits and vegetables have been highlighted and recommendation for others have also been listed out.

Introduction

Fruits and vegetables have a significant nutritional role in human systems, which cannot be provided by other classes of food. In addition, beyond human nutrition, fruits and vegetables are known for their nutraceutical functions. A nutraceutical is any food materials that provide nutrition and also have the potentials to offer health benefits, including the prevention and treatment of diseases [1].

Pharmaceutical and medicinal roles of fruits and vegetables can be pictured in two major routes, namely:

A. Fruits and vegetable acting as drugs towards healing or treatment

B. Fruits and vegetable interacting with drugs

There are several literatures that have addressed fruits and vegetables as essential sources of pharmaceutical products. One approach is their content of bioactive constituents, which has the potential of effecting healing [2].

For example, the dietary fibre contents of fruits and vegetable is unique and helps prevent cases of cardiovascular diseases, maintenance of blood sugar, improvement in bowel functioning and control of obesity [2]. Fruits and vegetables are the major natural and recommended sources of vitamins and minerals, which are essential requirement for the maintenance of sound health [3]. Phytochemicals are useful as antioxidants, anti-inflammatory, phytoestrogens, and provide protections to several organs of the body. They are the major components of drugs

Fruits and vegetables include a diverse group of plant foods that vary greatly in content of energy and nutrients. Additionally, fruits and vegetables supply dietary fiber, and fiber intake is linked to lower incidence of cardiovascular disease and obesity. Some of the dietary contents of fruits are presented in Table 1 [4-6].

Table 1: Fibre content of some common fruits and vegetables.

Source	Dietary Fibre (g/100 g Edible Portion)		
	Total	Insoluble	Soluble
Bitter gourd	16.6	13.5	3.1
Beetroot	7.8	5.4	2.4
Fenugreek leaves	4.9	4.2	0.7
Ladyfinger	4.3	3.0	1.3
Spinach, raw	2.6	2.1	0.5
Turnips	2.0	1.5	0.5
Tomato, raw	1.2	0.8	0.4
Green onions, raw	2.2	2.2	0.0
Eggplant	6.6	5.3	1.3
Cucumbers, peeled	0.6	0.5	0.1
Cauliflower, raw	1.8	1.1	0.7
Celery, raw	1.5	1.0	0.5
Carrot, raw	2.5	2.30	0.20
Broccoli, raw	3.29	3.00	0.29
Apple, unpeeled	2.0	1.8	0.2
Kiwi	3.39	2.61	0.80
Mango	1.80	1.06	0.74
Pineapple	1.20	1.10	0.10
Pomegranate	0.60	0.49	0.11
Watermelon	0.50	0.30	0.20
Grapes	1.2	0.7	0.5
Oranges	1.8	0.7	1.1
Plums	1.6	0.7	0.9
Strawberry	2.2	1.3	0.9
Bananas	1.7	1.2	0.5
Peach	1.9	1.0	0.9
Pear	3.0	2.0	1.0

Grains have the highest fibre content among all classes of food. Some of the reported concentrations (g/100g) are 17.3 (barley), 13.4 (corn), 10.3 (oats), 12.6 (wheat), 0.7 -1.3 (rice) and 12.6-14.0 (wheat). The fibre content of legumes ranges from 1.30 to 15.0 g/100g while that of nuts and seed range from 6 to 22.3 g/100g. Compared with the fibre content of some staple foods listed above, it is evident that the medicinal role of fruits and vegetables concerning fibre cannot be underestimated (Shungra et al., 2012). Fruits and vegetables also supply vitamins and minerals to the diet and are sources of phytochemicals that function as antioxidants, phytoestrogens, and anti-inflammatory agents and through other protective mechanisms [7,8].

Review of some nutraceutical roles of fruits and vegetables

The results of investigations reported by Bertoia et al. [9] indicated that the continuous consumption of non-starchy foods, fruits and vegetables can lead to weight loss [9]. Similar observation was also recorded by Nour et al. [10] after a series of cohort analysis. The roles of fruits and vegetables in weight loss has been linked to their tendency to impact low energy density due to low carbohydrate and fat contents [11]. However, studies reviewed by Dreher and Ford [12] indicated that fruits and vegetables that have relatively high starch and higher glycemic load tends to increase weight loss while the non-starchy fruits with low glycemic load causes weight loss. Therefore, fruits are useful in the regulation of human's body weight.

Fruits and vegetables have also been acknowledged as potent nutraceuticals for the Type-2 diabetes, which is primarily believed to be caused by obesity arising from unguarded lifestyle (such as overeating and lack of physical exercise) and indigestion [13]. Consequently, fruits and vegetables have a significant interference role of abating the development of diabetic conditions especially before its onset, at infantry and post infantry stages [14]. Banderali et al. [15] reported the effectiveness of phytosterol and alkaloids to regulate dyslipidemia condition in pediatric patients that was caused by high levels of cholesterol, However, phytosterols are not produced by humans, therefore, to regulate this condition, they recommended the continuous consumption of fruits and vegetables. Calvani et al. [16] have also reported that the risk of cancer, the inhibition of cell proliferation and the inducement of cancer cells can be regulated through the consumption of nutraceuticals, functional foods and micronutrients. Consequently, a strong dimensional application of vegetables and fruits against cancer risk can be envisage through their anti-oxidation roles [17]. Also, several health-related parameters have been confirmed to be substantially enhanced through the consumption of fruits and vegetables, which provide significant concentrations of polyphenols 2 [18]. The mechanism of action of fruits and vegetables as nutraceutical is generally linked to their interactive roles with the target problems [19-22].

Conclusion

Fruits and vegetables have other functions in nature apart from their nutritional roles. In several pharmaceutical and medicinal chemistry, they have been found to be useful and are widely applied. Also, investigations of nutraceutical applications of fruits and vegetables have given hope on the management of several health-related issues [23-25].

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