

Chapter 19

Functional Foods of the Indian Subcontinent

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ABSTRACT

The medicinal effects of food have been recognized on the Indian subcontinent since many centuries. The current thinking on functional foods can easily be applied to many traditional Indian subcontinent foods as these are based on whole grains, legumes, oilseeds, nuts, vegetables, fruits, spices, condiments, and many fermented milk products. Consumption of such foods on a regular basis not only provides most of nutrients in adequate quantities but also improve gastrointestinal health, boost immune functions, improve bone health, lower cholesterol, oxidative stress, reduce the risk of cardiovascular diseases, various types of cancers, neurodegenerative diseases, ill-effects of obesity, and metabolic syndrome. Various chemical and biological components present in Indian subcontinent traditional foods, such as phytochemicals, dietary fiber, oligosaccharides, lignins, omega-3 fatty acids, phenolics, flavonoids, carotenoids, and probiotic bacteria play an important role in improving the health of consumers of these foods. The history of Indian traditional foods has been adequately reviewed by Srinivasan (2011). The traditional food habits of each specific area of the Indian subcontinent have been influenced by the culture and the availability of locally grown food materials. Some of the important functional foods of India subcontinent will be briefly discussed in this chapter.

FUNCTIONAL FOODS FROM VARIOUS COMMODITIES

Under this section, functional foods based on cereals, legumes, milk and milk products, oilseeds, herbs and condiments, fruits, vegetables, nuts and some miscellaneous commodities will be briefly discussed.

Cereals

The food industry is focused on producing functional foods based on various cereals due to consumer demands for healthier foods. Some of the major cereals such as wheat, barley, and oats being rich in many phytochemicals and other nutrients, thus offer an excellent opportunity for the production of functional foods (Sidhu et al. 1989; Seibel et al. 1990; Singh et al. 1993; Sidhu, 1995). Whole grain wheat is rich in dietary fiber which has association with cardiovascular diseases, type-2 diabetes, bowel function and colon cancer; vitamins and provitamins such as vitamin E, B-group vitamins, carotenoids; minerals like magnesium and selenium; other bio-actives, such as, polyphenols, phenolic acids, ferulic acid, alkylresorcinols, flavonoids, phytosterols, lignins (Dalton et al. 2012; Zhu et al. 2015; Lu et al. 2015a). Bran, aleurone and germ are the components of whole grains that are rich in above mentioned nutritional compounds (Table 1 and Figure 1) providing high health benefits (Chhabra & Sidhu 1988; Bajaj et al. 1991; Sidhu et al. 1999; Al-Hooti et al. 2000; Al-Saqer et al. 2000; Sidhu et al. 2001; Al-Hooti et al. 2001; Adom et al. 2005; Chen et al. 2015; Rosa-Sibakov et al. 2015; Levent et al. 2015). With reduction in particle size of bran as well as during fermentation of wheat dough, a significant increase in extraction of anthocyanins, carotenoids and antioxidant properties has been reported (Chhabra & Sidhu 1988; Brewer et al. 2014; Pekkinen et al. 2014; Savolainen et al. 2015).

Table 1. Principal components and phytochemicals (g/100g) in wheat grain fractions

Constituents	Whole Grain	Bran	Aleurone
Arabinoxylan	6.5	22-30	24.3
β -glucans	0.7	2.2-2.6	3.9
Lignin	1.9	5.6	-
Cellulose	2.1	6.5-9.9	3.0
Ferulic acid monomer	0.02-0.21	0.5-0.7	0.66-.82
Ferulic acid dimer	0.01	0.8-1.0	0.03-0.1
Sinapic acid	0.06	0.02	0.03
<i>p</i> -Coumaric acid	0.00	0.01	0.02
Flavonoids (in μ g)	37	28	8
Lignans (in μ g)	0.2-0.7	5	7
Phytic acid	0.90	4.20	15-20
Minerals	1.1	3.4	12.0
Alkylresorcinols	0.07	0.27	0.17
Betaine	0.02	0.87	1.50

Adapted from: Rosa-Sibakov et al. (2015)

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