

**Evidence of practice of Nutraceuticals/ Functional foods in our daily life described in Ayurveda.**

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**Abstract**

Ayurveda Scholars has considered food (Ahara) as an important pillar for development, sustenance of a healthy life and longevity. Considering the importance of food in health and disease. Charak has mentioned that the health or state of disease depends on rationale use of food. Food has been also considered as an etiological factor of several disorder as well as management and prevention of diseases. Ayurveda has given the comprehensive classification of food that are described in respect of their rasa(taste), vīrya(potency), vipāka (taste after digestion) and prabhāva (special actions) under the chapter Annapana Vidhi Adhyaya of Charak Samhita e.g. corn with spike/awn, corn with pods/legumes, pulses, meat, leaf, fruits, greens, leafy vegetables, wine, water, milk, products of sugar cane juice. In the mid of 1980s the term ‘functional food’ was coined in Japan to refer the food substances which have additional special health benefits. Spices and condiments which are commonly used in every kitchen on regular basis during different cooking preparations such as turmeric, ginger, garlic, onion, coriander, cinnamon, cumin, clove, fennel, barley, Indian gooseberry, tulsi, aloe vera etc. has been described in Ayurveda thousands year back with their special health benefits. In India there are number of traditional products used as functional food but needs more scientific validation, it could be a research opportunity in nutrition to explore the relation between certain diseases and these food components. Functional foods provide great potential for prevention of several chronic diseases, when consumed in balanced proportion in food preparations with a healthy lifestyle.

**Keywords:** Functional food, Ayurveda, Ahara, Nutrition, Spices and condiments

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## 1. Introduction

There are a lot of descriptions of functional foods available in traditional and ancient text of Ayurveda and used by common people on daily basis in their diet. There is a famous quote by ancient Greek physician Hippocrates (Father of Medicine) in the year 440 BC said, “Let food be thy medicine and let thy medicine be food”. According to FSSAI regulation act 2016 functional food is defined as foods which provide additional health benefits beyond basic nutrition and may play a role in reducing or preventing the risk of certain diseases and other health conditions. The word nutraceutical is made up of two words ‘nutrition’ and ‘pharmaceuticals’, coined by De Felice in 1989. Foundation of innovation in Medicine defined nutraceuticals as ‘any substance that can be considered as food or part of food and provides medical and health benefits, including the prevention and treatment of disease. In Annapana Vidhi Adhyaya of Charak Samhita (Sutrasthan) food (ahara) is classified into twelve classes i.e. class of corns, pulses, meat(mamsa), vegetables, fruits, green herbs, wines and alcoholic preparation, water, milk and its product, sugarcane and its product, cooked food preparations, food articles. (Ch. Su. 27<sup>th</sup> chapter) [1] During COVID-19 Ministry of Ayush recommended several measures which includes some easily available spices in every household kitchen e.g. turmeric, coriander, cumin, garlic etc. are used in different culinary practices and for promoting immunity recommendation of herbal tea/decoction(kadha) which includes Basil, cinnamon, black pepper, dry ginger, raisins, fresh lemon juice and jaggery. Apart from this papaya, barley, mandukparni, nutmeg, flax seed, bitter gourd, drumstick (moringa), long pepper (pippali), pomegranate, tomato are also possessing added health benefit. It is mentioned under nutraceuticals category of Gazette of India 2016[2]FSSAI and it is also prescribed in different ayurvedic textbook. These prescribed functional foods also used in different form in several ayurvedic preparation such as kwath(decoction), churna(powder), vati(tablet), herbo-mineral preparations etc. These suggested edible items in Ayurveda have good quality of balancing Vata, Pitta and Kapha dosha, Agni, thus help in maintenance of health and prevention of disorders.

## 2. Objectives:

To review the commonly used functional food that are mentioned in the textbook of Ayurveda.

## 3. Material and methods

The qualitative data was collected on the concept of functional food/nutraceuticals from the different textbook of Ayurveda, e-Nighantu and Food Science, review articles, research paper were obtained from the e-databases like Pubmed, Web of sciences, Scopus and published report of Gazette of India 2016 was searched for relevant information.

## 4. Review and discussion

### Functional food and Nutraceuticals

Functional food are processed food or a part of food having disease preventive and health promoting benefits in addition to nutritive value. There is not as such definition of nutraceuticals and functional foods available but in simple words we can understand it as when functional food aids in the prevention and/or management of certain disorder is called a nutraceutical. e.g., fortified dairy products (e.g., milk), and citrus fruits (e.g., orange juice) (Kalra 2003) [3]. Indian Gazette of India Ministry of Health and Family Welfare (Food Safety and Standard Authority of India) Notification 2016, Part-III Sec-4 consists several nutraceuticals/ingredients which are already used in every household in cooking different food items in the form of spices and condiments or herbal tea/decoction or used as home remedies for acute pain, swelling, illness, e.g. [4]

S.No.	Nutraceuticals	Common name
1.	Allium sativum	Garlic (Ch.Su.27/176)
2.	Aloe vera	Indian aloe, Ghrit kumari (Guduchyadi varga of Bhavprakash Nighantu verse no.196-197)
3.	Cinnamomum verum	Cinnamon (Dalchini) (Karpuradi varga of Bhavprakash Nighantu verse no.57)
4.	Syzygium aromaticum	Clove (Lavang) (Karpuradi varga of Bhavprakash)

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		Nighantu verse no. 51-52)
5.	Cuminum cyminum L	Cumin (Jeera) (Harityadi varga of Bhavprakash Nighantu verse no. 73-76)
6.	Curcuma longa	Turmeric (haldi) (Harityadi varga of Bhavprakash Nighantu verse no. 171-172)
7.	Emblica officinalis	Indian Gooseberry/ Amla (Ch.Su.27/147)
8.	Foeniculum vulgare	Fennel (Saunf) (Haritkyadi varga of Bhavprakash Nighantu verse no. 80-82)
9.	Ocimumtenuiflorum/Ocimum sanctum	Basil (Tulsi) (Pushpavarga of Bhavprakash Nighantu verse no. 50-51)
10.	Piper nigrum	Black pepper (Haritkyadi varga of Bhavprakash Nighantu verse no. 55-56)
11.	Trigonella-foenum-graecum	Fenugreek
12.	Zingiber officinale	Ginger (Ch.Su.27/296)

### Spices and condiments

According to International Organization for Standardization (ISO), Budapest, Hungary 109 spices grown in different parts of the world. After substantial discussions both ISO and ISI (BIS) experts have concluded that there is no clear-cut division between spices and condiments and now they are clubbed together. The natural plant or vegetable products or mixtures that are used in whole, powdered or ground form for enhancing flavor and color are known as spices and condiments. Some spices possess several activities such as anti-inflammatory, antibacterial and antioxidant properties.

#### 1. Garlic

Garlic contains variety of bioactive compounds such as organosulfur compounds, saponins, phenolic compounds and polysaccharides. Garlic contains allin (inactive form) which is converted to allicin (active form) by the enzyme alliinase and it further break down into allyl disulphide which is responsible for characteristics flavor. Several previous studies show that garlic possess several activities such as antioxidant[5], anti-inflammatory[6], antimicrobial [7], antihypertensive[8], anti-hyperlipidemic [9], hepatoprotective [10], anti-cancer [11], anti-diabetic [12]. In Ayurvedic textbook garlic is classified under the class of green herbs in the 27<sup>th</sup> chapter i.e. Annapana Vidhi Adhyaya, it is effective in the treatment of worms, dermatosis including leprosy, vata disorder, it is unctuous, heavy, pungent and aphrodisiac. (Ch.Su.27/176) [13]. It is usually used in every kitchen during different food preparations e.g. pickles, chutney, sauces, pulses, pulav and non-vegetarian dishes [14].

#### 2. Aloe vera

Its scientific name is Aloe barbadensis and it belong to the family liliaceae. Several previous studies show that aloe vera possess several activities such as skin and wound healing properties [15], anti-fungal activities [16], anti-diabetic effect [17], prevent tumour growth [18], free-radical scavenging activity[19]. In ayurvedic textbook it is known as kumari, ghritkumari, describes under the guduchyadi varga of Bhavprakash Nighantu. It has rejuvenating property and provide strength to the body. It helps in the treatment of liver disorder, skin diseases, kapha and fever [20]. Villagers of Rajasthan and Gujarat have been making vegetable and pickles of aloe vera. Juices and jelly are also made [21].

#### 3. Cinnamon

Cinnamon is a thin inner bark of the cinnamon tree and it contains 1 percent essential oil and the active components are eugenol, cineole and cinnamaldehyde. In cinnamon a flavonoid is present which act as antioxidant i.e. methyl hydroxy chalcone polymer. Several studies show that cinnamon possess several activities such as anti-inflammatory[22], antidiabetes [23, 24], helps in protection of digestive system [25]. In ayurvedic textbook it is also identified as tvak, darusita, describe under Karpuradi varga of Bhavprakash Nighantu and it helps in the management of vata and pitta [26]. It is one of the ingredients in different cooking preparations and enhances the flavour e.g. sauces, pickles, cakes, cookies, pulav, biryani and non-vegetarian dishes. It is one of the ingredients of Ayush kadha and garam masala powder [27].

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#### 4. Clove

It is belonging to the family of Myrtaceae. The major constituent of clove oil is eugenol which is a phenolic compound and acts as antioxidant which prevents food from turning rancid. Clove is reported to have the highest antioxidant activity (16532 DPHH (Trolox equi) mg/100g) among the spices [28]. It is extensively used in households in the treatment of minor illnesses like toothache, indigestion, flatulence etc. Several previous studies show that clove possess numerous activities such as antioxidant activity [29], antimicrobial activity [30]. In ayurvedic textbook it is also identified as lavang, devkusum, described under the karpuradi varga of Bhavprakash Nighantu. It possesses pungent and bitter taste, encourages digestive fire, helps in the treatment of pitta dosha disorder, cough, vomiting, acts as analgesic, hiccups and abdominal distension [31]. It is used in different food preparations and enhances the aroma and flavour e.g. pickles, ketchup, sauces and it is also used in spice and curries mixture [32].

#### 5. Cumin

The active principle is aldehyde cumino. It possesses several activities such as antimicrobial [33]. It is also identified as jeerak and ajaji and it is described under haritkyadi varga of Bhavprakash Nighantu. It is useful to promote digestive fire and helps in improvement of digestion, useful in treatment of urine retention and acts as analgesic [34]. It is usually used in daily food preparations e.g. pulses, soups, pulav, lassi, candies, and used in making of rasam, curry and sambar powder [35].

#### 6. Turmeric

The phenolic compound found in turmeric is curcuminoids. It possesses numerous activities such as useful in the treatment of cardiovascular diseases [36], hypo-glycaemic effect [37]. In ayurvedic textbook it is also identified as haridra, describe under haritkyadi varga of Bhavprakash Nighantu. It possesses pungent and bitter taste, helps in the pacification of kapha and pitta doshas, skin disorder, inflammation and anaemia [38]. It is used in the preparation of pickles, colouring agent in cakes and rice, khichdi, dal, kadhi, and used in marination of meat [39].

#### 7. Indian gooseberry (Amalaki)

Several studies have reported that amalaki possess several activities such as antioxidant [40], immunomodulatory [41], antimicrobial and antimutagenicity [42], hepatoprotective [43], cardioprotective [44], antipyretic and analgesic [45], antidiabetic properties [46]. It is richest source of vitamin C (600mg/100g). In ayurvedic textbook it is also known as amalaki, dhatriphala etc. it possesses all taste except salt and helpful in the pacification of kapha and pitta (Ch. Su. 27/147) [47]. It is used as edible items such as pickles, murabba (sweet dish), churna (dried form) and it is the one of the ingredients of chyawanprash which acts as anti-aging, immune-booster and antioxidant [48].

#### 8. Fennel

Anethole is the main constituent of fennel. It possesses several activities such as antibacterial [49]. It is also identified as madhura and misi in ayurvedic textbook and it is described under Haritkyadi varga of Bhavprakash Nighantu [50]. It is used in different food preparations e.g. pickles, biryani, cakes, cookies, non-vegetarian dishes, kachori etc. it is employed as mouth freshener after meal [51].

#### 9. Basil

It is worshipped in almost every household and it is recognized as holy plant. It possesses several activities such as antimicrobial and antioxidant activity [52], antihypercholesterolaemic [53]. It is also identified as tulsi, surasa, gramya and gauri etc. and it is described under the pushpavarga of Bhavprakash Nighantu. It helps in the pacification of vata and kapha, skin diseases and promotes digestive fire [54]. It is one of the ingredients of Ayush kadha and it is added to tea. It is commonly used to offer prasada to god and people worship tulsi plant.

#### 10. Black pepper

The major constituents are alkaloid piperine (4-10 percent). It possesses several activities such as anti-inflammatory [55], antimicrobial [56], good for gastrointestinal health [57]. It is also recognized as Maricha, Krishna etc. and describes under the haritkyadi varga of Bhavprakash Nighantu. It possesses pungent taste and used in the treatment of respiratory problems, works as analgesic and worm infestation

[58]. It is usually used in different food preparations e.g. rasam, fried rice, used in margination of non-vegetarian dish. Pepper powder addition to omelettes, sandwich, salads, papad and chips enhances the flavour [59]. It is one of the ingredients of Ayush kadha.

### 11. Fenugreek

It belongs to the family Leguminosae. It is a rich source of zinc, iron and calcium. [60] and used in the treatment of diabetes [61], possesses hypoglycemic and anti-hyperglycemic activity [62]. It is mainly used in small amount in seasoning like sambar and kadhi and preparation of pickles [63].

### 12. Ginger

The volatile oil gingerol and shogaol is present in ginger. It possesses several activities such as antioxidant [64], anti-inflammatory [65], antimicrobial [66], neuroprotection [67], antinausea and antiemetic activities [68]. It is slightly unctuous, promotes digestion, and pacify vata and kapha dosha (Ch. Su. 27/296) [69]. It is one of the main ingredients of different food preparation e.g. chutney, pickles, pulav, curries and non-vegetarian dishes [70]. It is one of the ingredients of Ayush kadha in dried form.

## 5. Conclusion

The edible ingredient which are used in cooking or added in diet in our day-to-day life to enhance the flavour, taste and colour have added health benefit along with their nutritional property. So, rationale use of prescribed functional food in Ayurveda which are commonly used in cooking in Indian cuisine may be helpful in management and prevention of diseases especially chronic disorder like metabolic syndrome. It may be a thrust area of research for those who are working in the field of nutrition and basic sciences.

## 6. Limitation

In this paper only those ingredients which are commonly used in kitchen i.e. spices and condiments have been mentioned and only the references of Charak Samhita and Bhavprakash Nighantu were selected.

## 7. Conflict of Interest: Nil

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