

Concept of Nutraceuticals in Ayurveda - A Review

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ABSTRACT

Nutraceutical is a combination of the terms "nutrition" and "pharmaceutical" and refers to any component that is either a food or a component of a food that has therapeutic or health benefits, such as aiding in the prevention or treatment of an illness. Dr. Stephen de Felice coined the phrase "nutraceutical" in 1989. The concept of the Nutraceuticals and functional foods can be found in the ancient system of Ayurveda. Nutraceuticals are gaining more importance globally. Nearly 85% of Nutraceuticals are vitamins and minerals while 10% are antioxidants and rest around 5% belong to herbal products. Ayurveda is the science of life which describes ways to prevent lifestyle disorders. *Anna* is considered as *Mahabhaishajya* (the superior medicine). Ayurvedic principles like *Hita ahara*, *Satmya ahara*, and *Pathya ahara*, *Rasayana dravyas* can be correlated to concept of Nutraceuticals.

Materials: Sources pertaining to concept of Nutraceuticals in Ayurveda have been gathered from the Ayurvedic classics like Charaka samhita, Sushruta samhita, Ashtanga hrudaya, laghutrayis and other related concepts from contemporary literature books, indexed journals and several websites.

Discussion: Nutraceutical benefits of many *dravyas* proved through research works.

Conclusion: Many of the *dravyas* having nutritive as well as therapeutic value in Ayurvedic science. Hence an attempt has been made to understand the different *dravyas* which can be considered as Nutraceuticals in Ayurveda.

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KEYWORDS: Nutraceuticals, Ayurveda, Hita, Rasayana, Pathya

INTRODUCTION

Nutraceuticals are the bioactive components which are beneficial to fight against the chronic diseases by boosting the immunity. The term Nutraceutical is coined in 1989 by Dr Stephen de-Felice, derived from combination of words nutrition and Pharmaceuticals means food or the food products which provide health and therapeutic benefits including prevention and treatment of diseases.ⁱ Ayurveda is Science of life and deals with longevity of life. The purpose of Ayurveda is "Swasthasya Swasthya rakshanam aturasya vikara prashamanam"ⁱⁱ which refers to prevention and curative of the diseases. The extensive principle of Ayurveda, preventive care derives from the concept of *Dinacharya*-daily regimen and *Rutucharya*-seasonal regimen to maintain healthy life. Improper intake of food can lead to many life style disorders.

Ayurvedic principles like *Hita ahara*, *Satmya ahara*, and *Pathya ahara* can be correlated to concept of Nutraceuticals. In the present scenario concepts of Nutraceutical is gaining more demand that includes antioxidants, digestive stimulants and probiotics etc. Hence with this review article, an attempt has been made to understand the concept of Nutraceutical *dravyas* in Ayurveda.

Nutraceuticals:

Nutraceuticals are the food components which have been used for the improvement of health including prevention and treatment of diseases. Nutraceuticals are gaining more importance globally. Global demand of Nutraceuticals increased about 5.8% more than \$15.5 billion from 2010- 2019.ⁱⁱⁱ Nearly 85% of Nutraceuticals are vitamins and minerals while

10% are anti oxidants and rest around 5% belong to herbal products. Nearly 85% of Nutraceuticals are vitamins and minerals while 10% are anti oxidants and rest around 5% belong to herbal products^{iv}. Generally nutraceuticals contains vitamins, lipids, protein, carbohydrates, minerals and other necessary nutrients. These are marketed in concentrated forms as pills, capsules, powders and extracts in a single compound or in combined form^v. Nowadays the environment is highly toxic and filled with pollution and pesticides due to which body loses its proper functioning power. Administration of artificial drugs causes side effects to the body. Hence a good quality dietary supplementation can strengthen our body, for which we are in need of nutraceuticals for preventing and treating the diseases.

Classification of Nutraceuticals ^{vi}:

1. Dietary supplements
2. Functional foods
3. Farmaceuticals
4. Medical foods

1. Dietary supplements^{vii}: According to FSSAI "The term dietary supplement means a product (other than tobacco) intended to supplement the diet that bears or contains one or more of the following dietary ingredients (A) a vitamin (B) a mineral (C) a herb or other botanical (D) an amino acid (E) a dietary substance for use by man to supplement the diet by increasing the total dietary intake. These are also defined as "products that are labeled as dietary supplements and are not represented for use as a conventional food or as a sole item of a meal or the diet. These are not integral part of regular meal and provide the therapeutic support to boost the health and energy.

2. Functional foods^{viii} - Foods which provide additional health benefits beyond the normal nutritional advantages. They include whole foods, fortified, enriched or enhanced foods have a potentially beneficial effect when consumed in sufficient amounts, in terms of promoting optimal health and reducing the risk of some diseases. Ex: Milk enriched with Vit D, Cereals flour added with fiber and folic acid. Some of the herbal drugs like *Ashwagandha*, *Tulasi*, *Yashtimadhu* are added to tea powder for enhancement of its benefits.

3. Farmaceuticals - It refers to medically valuable compounds produced from modified agricultural crops or animals (usually through biotechnology). Energy-providing foods, such as bread, alcohol, fermented starch, yogurt, cheese, vinegar and others are produced with the help of

biotechnology. The production of probiotics and the extraction of bioactive components by enzyme/fermentation technologies as well as genetic engineering technology are achieved through biotechnology^{ix}. Acharyas explained the different techniques of nourishing the plants for better yield by *Vrukshayurveda* method^x.

4. Medical foods - The medical foods are formulated to be consumed or administered internally under the supervision of a physician, and which is intended for the specific dietary management of a specific disease or conditions for which distinctive nutritional requirements, on the basis of recognized scientific principle, are established by the medical evaluation.

Concepts of Nutraceuticals in Ayurveda

Ahara is one among the *trayopastabha*^{xi}. It is having its own therapeutic and nutritive value which helps us to maintain our healthy life. As per Lolimbaraja "*Pathye sathi gadartasya krimoushadhinishhevanaihi pathye asathi gadarthasya krimoushadhinishhevanaihi*"^{xii} there is no need of medicine for one who follows proper diet and there is no use of medicine for the one who doesn't. So one should eat food not only for *Shareera poshana* or *dhatu poshana* but also to stay immunologically healthy. Ayurveda acharyas beautifully explained the different types of *aharas* that can help us to prevent and treat the different diseases. Acharya Charaka explained some *hita* (The food which donot harm the body) *ahita dravyas*^{xiii} (The food which harms the body) and Some of the *agrya dravyas*^{xiv} like *rasam tarpaniayanam* (Meat soup refreshes), *Kukkuto balyanam* (Meat of chicken strengthens), *Maahisha ksheera swapnajananaam* (Milk of Buffalo induces sleep) etc can be considered as nutraceuticals in Ayurveda. According to Acharya Charaka consumption of *Anna* provides *Varna* (complexion), *prasada* (Pleasure of mind), *Swara* (Voice), *Jeevana* (longevity), *Pratibha* (genious), *Sukha* (happiness), *Tushti* (Self satisfaction), *Pushtibala* (physical strength)"^{xv}. Acharya Sushruta explained the benefits of Food as *Preenana* (nourishes the body), *sadyabalakruta* (gives strength quickly), *dehadharaka* (maintains the body), *ayu* (increases age), *Utsaha* (enthusiasm), *Smruti* (memory), *Oja* (vigor) and *Agnivivardana* (fire).^{xvi} *Ahara varga*, *Drava varga*, *Rasayana*, and *Pathya kalpana* can be considered as Nutraceuticals in Ayurveda. In Ayurveda, the classification of *Aahar Varga* is described by Acharya Charaka in the 27th chapter of Charaka Samhita, Sutrasthan, as 12 Vargas. But Sushruta and Vagbhatta described it into two categories, *Dravdravyavidhi adhyaya*, and

Annapanvidhi adhyaya. Each *varga* includes a variety of *dravyas* that have nutritional and therapeutic

benefits and each *varga* plays an important role in maintenance of good health.

S.N	Charaka ^{xvii}	Sushruta		Vagbhata	
		<i>Anna varga</i> ^{xviii}	<i>Drava varga</i> ^{xix}	<i>Anna varga</i> ^{xx}	<i>Drava varga</i> ^{xxi}
1	<i>Shooka Dhanya</i>	<i>Shali varga</i>		<i>Shooka Dhanya</i>	<i>Toya varga</i>
2	<i>Shimbi</i>	<i>Kudhanya</i>	<i>Ksheera</i>	<i>Shimbi</i>	<i>Ksheera</i>
3	<i>Mamsa</i>	<i>Mamsa varga</i>	<i>Madhu</i>	<i>Mamsa</i>	<i>Madhu</i>
4	<i>Shakha varga</i>	<i>Shakha varga</i>	<i>Ghruta</i>	<i>Shakha</i>	
5	<i>Phala varga</i>	<i>Phala varga</i>	<i>Taila</i>	<i>Phala varga</i>	<i>Taila varga</i>
6	<i>Harita</i>	<i>Shakha</i>			<i>Mutra</i>
7	<i>Madhya</i>	<i>Pushpa</i>	<i>Madhya</i>	<i>Aushadha varga</i>	<i>Madhya</i>
8	<i>Jala</i>	<i>Kanda varga</i>	<i>Jala</i>		
9	<i>Ghorasa</i>	<i>Lavana varga</i>	<i>Mutra</i>		
10	<i>Ikshu</i>	<i>Bhakshya</i>	<i>Ikshu</i>		<i>Ikshu</i>
11	<i>Kritanna</i>	<i>Kritanna</i>	<i>Dadhi</i>	<i>Kritanna</i>	
12	<i>Aharayogi</i>	<i>Anupana</i>	<i>Takra</i>		

The Science of food and nutrition –Some *Vargas* in *Ayurveda*

Sl. No	Ahara vargas	Dravyas	Botanical names/English names
1	<i>Shooka Dhanya Varga</i>	<i>Upodika</i>	<i>Basella rubra</i> Linn
		<i>Mandukaparni</i>	<i>Centella asiatica</i> Linn
		<i>Tanduliyaka</i>	<i>Amaranthus spinosus</i> L
2	<i>Phala Varga</i>	<i>Kharjura</i>	<i>Phoenix sylvestris</i> Linn
		<i>Gambhari</i>	<i>Gmelina arborea</i> Roxb
		<i>Dadima</i>	<i>Punica granatum</i> Linn
3	<i>Shami Dhanya Varga</i>	<i>Mudga</i>	<i>Phaseolus aureus</i> Robs
		<i>Masha</i>	<i>Phaseolus mungo</i> Linn
		<i>Kulattha</i>	<i>Dolichosis biflorus</i> Linn
4	<i>Kritanna Varga</i>	<i>Peya</i>	Thin gruel
		<i>Vilepi</i>	Thick gruel
		<i>Manda</i>	Gruel water
5	<i>Gorasa Varga</i>	<i>Godugdha</i>	Milk of cow
		<i>Mahishadugdha</i>	Milk of buffalo
		<i>Ushtradugdha</i>	Milk of camel
6	<i>Ikshu varga</i>	<i>Poundraka</i>	Variety of cane
		<i>Guda</i>	Jaggery
		<i>Madhu</i>	Honey
7	<i>Aharayogi Varga</i>	<i>Taila</i>	Oils
		<i>Shunti</i>	<i>Zingiber officinale</i> Rosc
		<i>Pippali</i>	<i>Piper longum</i> L
9	<i>Jala varga</i>	<i>Antariksha Jala</i>	Rainwater
		<i>Nadijala</i>	River water
		<i>Samudrajala</i>	Sea water
10	<i>Mamsa varga</i>	<i>Jangala mamsa</i>	Meat of animals living in dry land forests
		<i>Anupa mamsa</i>	Meat of animals of marshy lands
		<i>Bhumishaya</i>	Animals which lives in burrows
11	<i>Harita varga</i>	<i>Grunjanaka</i>	<i>Daucus carota</i> Linn
		<i>Palandu</i>	<i>Allium cepa</i> Linn
		<i>Lashuna</i>	<i>Allium sativum</i> Linn
		<i>Dhanyaka</i>	<i>Coriandrum sativum</i> Linn

Karmas related to Nutraceutical aspects

Rasayana^{xxii} – Preventing the degenerative changes caused by ageing. Ex: *Triphala*, *Pippali*, *Ashwagandha*, *Shatavari*

Balya – Post illness nutrition. Ex: *Ashwagandha*, *Matsyandi* prepared by sugarcane, *Kharabuja*, *Jeeraka*

Bruhmana – *Kadali*^{xxiii}, *Draksha*, *Parushaka*, *Kumari*, *Rasona*, *Masha*, *Narikela*, *Vatadah*(*Badam*)

Jeevaniya - *Ksheera*

Vyadhikshamatwa^{xxiv} – Enhancing the immunity. It can be considered as immunomodulators. Ex : *Gudhuchi* (*Tinospora cordifolia*), *Haridra* (*Curcuma longa*) *Amalaki* (*Emblica officinalis*)

Vajeekarana^{xxv} - Aphrodisiac treatments and sexual rejuvenation. Ex: *Ikshumoola*, *Masha*, *Ghruta*, *Ksheera*, *Kharjura*, *Shatavari*, *Shunti*, *Dadima*

Tarpana –Refreshes.Ex: *Lapsika*, *Dadima*

Nutraceuticals based on season

➤ **Rutu haritaki**^{xxvi}

Haritaki possesses *lavanavarjita* pancharasa. When used with different *anupana dravyas* in various seasons, it balances the doshas, restores impaired *agni* to its proper state, and maintains the health of *dhatu* (bodily tissues) and *mala*(waste products), and also act as *rasayana*(rejuvenation).

Shishira rutu

In this *Ritu atmosphere will be* cold and dry due to clouds, wind and rain. Usually during this *Ritu Kapha Dosha* deposition takes place. *Haritaki* should be taken with *Pippali*, both are *Ushna* (hot) in potency, due to this they pacifies *Kapha*. *Snigdha Guna* of *Pippali* pacifies *Vata*. *Haritaki* and *Pippali* both are having the rejuvenation properties, it helps in maintenance of life for longer period, maintenance of health in healthy person and gives strength to body and increases intellectual power and memory. *Haritaki* and *Pippali* is indicated in *Kasa*(coughing), *Tamak Shwasa*(Bronchial Asthma), *Kapha Praseka*(salivation), *Chardi*(Vomiting), *Hikka*(hiccough), *Ajirna*(Indigestion), *Pandu*(Anemia), *Krimi Roga*(Intestinal worms) due to *Dipana*, *Pachana*, *Rochana* and *Dosha Prashamana*(Balancing between three *Doshas*) Properties.

Vasant Ritu

The accumulated *kapha* in *hemantha rutu* gets liquefies and causes diminution of *agni*. *Haritaki* should be taken with *Madhu*(honey). It is having the *lekhana* (scraping), *Grahi* (moisture absorption capacity), *Deepana* (digestive), *Vranaropana* (healing wounds), *Rochana*(appetizer) properties and *Haritaki* is having *Laghu* (light), *Ruksha* (dry), *Ushna* (hot) and *Anulomana* (regulation of the provocation and suppression of natural urges) properties which pacifies *Kapha* and prevents from the Common diseases of *Vasant Ritu*. *Madhu* enters in the minute channels and clears them. The potency of the combination increased due to its *yogavahi* nature(Carries the properties of associated adjuvant).

Grishma Ritu

Haritaki should be taken with *Guda* (jaggery) in this season, *Purana Guda* (old jaggery) pacifies *Pitta* and *Vata*, increases digestive fire does not block the channels and also *Raktaprasadaka*(Vitalises blood), *Mutrashodhana* (clears urine), and *Haritaki* is also light, digestive, appetizing in nature so this combination is beneficial.

Varsha Ritu

Haritaki should be taken with *Saindhava Lavana*. *Haritaki* and *Saindhava Lavana* having the *Tridoshamaka* (pacifying capacity of all three *Doshas*) properties. *Haritaki* pacifies *Kapha* and *Pitta* by its *Madhura*(sweet), *Tikta*(Bitter) and *Kashaya*(astringent) taste and also balances the *Vata* due to its *Amla*(sour) taste. It is not increasing *Vata* and *Pitta Doshas* by its *Katu*(pungent) and *Amla* (sour) taste because of its *Prabhava*(unspecified action) and *Saidhava Lavana* is having *Sheeta*(cold) potency so pacifies *Pitta Dosha*. Due to *Lavana rasa*(salty) it pacifies *Vata Dosha* and Chest congestion(due to sputum accumulation) relives by *Saindhava Lavana* hence it is pacifies *Kapha Dosha* too.

Sharad Ritu

Haritaki should be preferred with *Sharkara* (sugar) in *Sharad Ritu*. *Haritaki* pacifies *Pitta* by its *Madhura* (sweet), *Tikta* (bitter) and *Kashaya* (astringent) taste, *Sharkara* pacifies *pitta dosha* by its its *Sheeta*(cold) potency and *Madhura* (sweet) taste. *Haritaki* is indicated in *Kasa* (cough), *Tamaka Swasha* (bronchial asthma) mainly in *Kaphaja* disorder and *Mishri* is indicated in *Pitta* dominant disorders like *Daha* (burning sensation), *Raktagata Vikara* (bleeding disorders).

Hemant Ritu

The power of *Jataragni* is more in this season. If the *Jatharagni* affects the body *Vata Dosha* gets increased due to depletion of the *dhautus*. *Haritaki* should be taken with *Shunthi* (dried ginger), both are *Ushna*(hot) in potency and having sweet taste which is helpful in balancing the *Vata Dosha*. Diseases of this *Ritu* are mainly occurs due to vitiated *Vata* and *Kapha Dosha* *Haritaki* and *Shunthi* combination of both drugs are beneficial in *Kaphaja* and *Vataja Vikara* by the properties of *Laghu* (light), *Ruksha* (dry), *Ushna* (hot).

Nutraceuticals and *Rasayana* ^{xxvii}

The word *Rasayana* is composed of two words *rasa* and *ayana*. *Rasa* means which nourishes, stimulates immunity and maintains the health. *Ayana* means srotas or channels. *Rasayana dravyas* have originated from plants and minerals and played important role in maintenance of health by working at the level of *Dhatu*. So these *dravyas* can be used for the prevention of many diseases. So we can compare these *dravyas* with anti oxidant, regenerative, immune modulator and adaptogenic actions in modern. *Rasayana dravyas* which not only helps in treating the diseases, but can also be helpful in preventing a disease. On this basis they can be compared with the term Nutraceuticals.

Popular single rasayanas:

Amalaki (*Phyllanthus emblica*), *Haritaki* (*Terminalia chebula*), *Pippali* (*Piper longum*), *Ashwagandha* (*Withania somnifera*), *Guduchi* (*Tinospora cordifolia*), *Madhuyasti* (*Glycyrrhiza glabra*), *Mandukaparni* (*Centella asiatica*), *Brungaraja*(*Eclipta alba*).

Nutraceutical benefits of some of the *dravyas*

Sl. No.	Name of the plants	Botanical names	Traditional uses ^{xxviii}	Benefits
1	<i>Ashwagandha</i>	<i>Withania somnifera</i> L	Paste of leaves is applied on boils.	<i>Balya, Rasayana, Shukrala, shwitrashothakshayapaha, atishukrala</i> ^{xxix}
2	<i>Shunti</i>	<i>Zingiber officinale</i> Rosc	Take 100 gms of dry ginger put it in gomutra for 7 days. Change gomutra every day, dried and make it powder given orally in Appendicitis.	<i>Vrushya, Swarya, Shwasa, Shula, Kasa, Hrudaya, Sleepada, Shotha, Arsha, Anaha, Udara, Sangrahi</i> ^{xxx}
3	<i>Shatavari</i>	<i>Asparagus racemosus</i> Willd	<i>Shatavari</i> root is grinded with milk and taken in stanya kshaya.	<i>Medha, Agnipushtivardaka, netrya, shukrastanyakara, balya, Gulma, atisarahara, rasayana</i> ^{xxxi}
4	<i>Brahmi</i>	<i>Bacopa monniera</i> Linn	10 ml of juice of this whole plant is administered orally thrice daily with sugar in shweta pradara	<i>Rasayana, swarya, smrutiprada</i> ^{xxxii}
5	<i>Pippali</i>	<i>Piper longum</i> L	<i>Pippali</i> + <i>Maricha</i> roots are pounded with sugar candy. Pills are made and given orally in <i>Pratishyaya</i> .	<i>Deepana, Vrushya, Rasayana, Vataleshmahara, Shwasa, Kasa, Jwara, Kushta, Prameha, Gulma, Arsha, Pleea, Shula, Vatahara</i> ^{xxxiii}

Rasayanas indicated based on age^{xxxiv}

Aging is the natural phenomenon of human beings. During the life span, the body undergoes progressive involution and decay, ultimately leads to death. In Ayurveda *Kapha*, *Pitta*, and *Vata* are the *tridoshas*, said to predominate in particular phases of life like childhood, adulthood, and old age life respectively. Sharangadhara Samhita describes a particular scheme of biolosses in a ten-decade frame. A person loses his *balya*, *Vridhhi*, *Chhavi*, *medha*, *twak*, *dristi*, *shukra*, *vikrama*, *buddhi* and *karmendriya* in 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th and 10th decades of life respectively. The *Rasayana* therapy helps in the retardation of aging process.

Decades of life	Natural biological process	Suitable rasayana drugs
1-20	<i>Bala</i>	<i>Vacha, swarna grita, dugdha, Kasmari</i>
11-20	<i>Vruddhi</i>	<i>Bala, Ashwagandha, Kashmari</i>
21-30	<i>Chharvi</i>	<i>Amalaki, Haridra</i>
31-40	<i>Medha</i>	<i>Shankhapushpi, Brahmi, Jyotismati</i>
41-50	<i>Twak</i>	<i>Bringaraja, Priyala, Somaraji, Haridra</i>
51-60	<i>Drishti</i>	<i>Triphala, Jyotishmati, Shatavari</i>
61-70	<i>Shukra</i>	<i>Ashwagandha, Kapikachcchu, Atmagupta</i>
71-80	<i>Vikrama</i>	<i>Amalaki, Bala</i>
81-90	<i>Buddhi</i>	<i>Brahmi, Shankhapushpi</i>
91-100	<i>Karmendriya</i>	<i>Bala, Sharkara</i>

Acharya Charaka mentined 4 types of Ahara^{xxxv}

Ashita(Eatables)

Sl. No	Formulations	Diseases
1	Kwatha Siddha Yavagu prepared by Aamlaki, Shunthi, Khandasharkara	<i>Anidra</i>
2	<i>Kwatha Siddha Yavagu prepared by Pippali, Chitrak, Shunthi^{xxxvi}</i>	<i>Udarashula</i>
3	<i>Yavagu prepared by Vidanga, shigru, takra, maricha, swarjika Kshara^{xxxvii}</i>	<i>Krimighna, Deepana</i>

Peeta (Drinkables)

Sl. No	Formulations	Diseases
1	<i>Panchakola phanta</i>	<i>Pratishyaya, Kaphavikara, Vatavikara</i>
2	<i>Draksharishta</i>	<i>Kasa, Shwasa, Kshaya, Urakshata, Galamaya</i>
3	<i>Shungavera swarasa</i>	<i>Shwasa, Kasa, Pratisyaya</i>
4	<i>Shadanga paneeya^{xxxviii}</i>	<i>Jwara, Atisara, Chardi, Raktapitta, Prameha</i>

Khadita (Chewables)^{xxxix}– Saktu prepared from roasted barley /gram flour is santarpana, balya.

Leedha(Lickables)

Sl. No	Formulations	Diseases
1	<i>Kushmandavaleha</i>	<i>Raktapitta^{xl}Kshaya, Jwara, Shosha, Trushna, Bhrama, Shwasa, Kasa, Urakshata</i>
2	<i>Sarpiguda</i>	<i>Kshataksheena^{xli}</i>
3	<i>Drakshadi leha^{xlii}</i>	<i>Pandu, Kamala</i>

Value added products with Ayurveda herbs^{xliii}

Sl. No	Products	Description
1	Nutraceutical enriched Indian traditional Chikki.	The formulation and process for preparation of chikki with added herbs like <i>Ashwagandha, Tulasi, Ajwain</i> .
2	Debitterd Deodorized Turmeric Powder (Colorant)	This Powder is the natural colorant and can be directly used to impart yellow colour to food products prepared in powder or semi liquid form. This colorant can replace the present synthetic colors like Tartrazine.
3	Dehydrated green pepper without using chemicals.	Dehydrated pepper with its natural green colour satisfies this need and has been accepted well as garnishing spice in preference to the traditional black pepper in western countries.
4	Superior quality white pepper	Ground white pepper is used in the production of mayonnaise and salad dressings. Recently, an enzyme assisted process has been developed at the CFTRI, Mysore for the preparation of white pepper from fresh green pepper.
5	Natural Food Colourants	These are extracted from natural herbs, plant parts like <i>Vrukshamla, Palanka, Draksha</i> . The natural colourants could be a good substitute for the synthetic food colours.
6	Nano encapsulated Curcumin	Curcumin has been selected as a bioactive material to be nano encapsulated and finally to be incorporated in the convenience food.

7	Potato Peel	It is a waste by product of potato processing, is found to be a good source of both dietary fiber and polyphenols. Potato peel powder supplementation in diet was found to effectively attenuate diabetic alterations in rats.
8	Dehydrated ginger	Technology relates to its skin is peeled partially by mechanical peeling using an abrasive peeler such as one used for Potatoes, Beetroot, Carrots. Resulting in a loss of about 10-12%. The quality corresponds closely with the fully hand scrapped ginger.
9	Ginger paste	It is a viscous retaining the strong aroma and flavour of the raw material namely fresh ginger. The volatile oil content in the product is influenced by factors such as variety, raw material storage, handling and processing conditions.

Takra as Probiotic^{xliv}

Probiotics are live bacterias that are good for our health, especially for our digestive system. These are often called "good or helpful" bacterias because they help keep our gut healthy. Bacterias that are normally present in our intestines helps in digestion of food, and destroys the diseases causing microorganism. Probiotics are bacteria that lines digestive tract and support our body's ability to absorb nutrients and fight infection. These are naturally found in our body and also in some food supplements. *Takra* is one of the good probiotic in Ayurveda. It is rich in lactic acid bacteria which boosts the immunity and helps in digestion and lowers the blood pressure. *Takra* provides Calcium, Pottassium, Magnesium and other nutrients. *Takra* is indicated mainly in the conditions like *grahani*, *udara*, *arsha* etc. As probiotic it is effective in vaginal and urinary tract infections. In a study of candida infections in diabetic women, regular consumption of buttermilk has shown to reduce the infection and improve the health in general.

Nutraceuticals for Communicable diseases

Kushta^{xlv} – *Lashuna, karanja phala, brihati, Chakramarda, meshashrunji, patola, Triphala, mudga, yava, godhuma*

Jwara^{xlvi} - *Vartaka, Shigru, Karavellaka, Kapittha, Dadima, Draksha*

Phiranga^{xlvii} – *Nimbadi churna, chopachinni churna*

Masurika^{xlviii} - *Shastika, Sali, Canaka, Mudga, Masura, Yava, Shigru, Drakshaphala, Dadima*

Rajyakshma^{xlix} – *Kulattha, Yava, Godhuma, Shali, Moolaka yusha Dhatri, Kharhura, Narikela, Draksha, Gomahisha gruta*

Non communicable diseases

➤ ***Prameha^l*** (**Diabetes**) - *Kulattha, Mudga, Godhuma, shali, Triphala, Kharjura, Trikatu, Yav*

➤ ***Pandu^{li}*** (**Anaemia**) - *Pakva amra, patola, vrudha kushmanda, taruna kadali phala, Haridra, Mudga, Punarnava, Masura, Tanduliyaka*

➤ ***Vatavyadhi^{lii}*** (**Neurological diseases**) - *Rajamasha, Chanaka, Jambu, Mudga, Yava*

➤ ***Hridroga^{liii}*** (**Cardiac Diseases**) – *Yusha prepared by mudga and kulattha, Kadaliphala, Purana Kushmanda, Dadima, Lashuna, Shunti, Dhanyaka, Haritaki*

➤ ***Amavata^{liv}*** (**Rhematoid disorders**) - *Patola, Vartaka, Eranda taila, Shigru, Adraka*

Limitations of Nutraceuticals

- Not subjected to same testing and regulations as Pharmaceuticals.
- Majority not regulated by FDA in USA.
- Companies creating unregulated products to create a widen profit margin.
- Bioavailability of nutrients is lower.
- No regulatory definition.
- Effect may be attributed to that of Placebo.

Difference between Nutraceuticals and Pharmaceuticals^{lv}

Nutraceuticals	Pharmaceuticals
Low potency	High potency

Weak interaction with targets	Strong interaction with targets
Pleiotropic intervention with physiology mechanisms	More specific with physiology mechanisms
Long term application	Short term application
Emperical, low casual evidence	Emperical, often casual evidence

Discussion

Some of the dravyas which are explained in Ayurveda also shows benefits as pathya, rasayana and ahara specifically in each diseases as a preventive as well as curative measures which are enlisted. Some of the dravyas are also proved through research works substantiating their usage as a nutraceutical or medicinal food.

As *Lashuna* (*Allium sattivum*) is best known for cardiac problems. Numerous studies showed that it is proven for its lowering lipids and blood pressure, reduce atherosclerosis, decrease coagulation and platelet aggregation, and increase fibrinolysis of blood clots [DeBusk 2000; Hermann 2002]. It is made up of two different active ingredients: allicin and alliin which is sulphur-containing amino acid alliin, is converted by alliinase to allicin by crushing the Garlic. Allicin seems to be the component that causes the cardiovascular benefits [Frishman, Grattan, and Mamtani 2005]. *Lashuna* being nutritive compound, rasayana, and medicine helps in clearing the obstructed channels.

Ashwagandha

The plant is known for its varied therapeutic uses in Ayurvedic practice. It is one of the best *balya*, and *rasayana dravya*. The research study conducted on lifespan extension of *Caenorhabditis elegans* with

Withania somnifera root extract and shows extend lifespan of *C. elegans*.

Brahmi

Brahmi is well known medhya rasayana dravya. A randomized, double-blind, placebo-controlled clinical trial study shows effective in enhancement of memory performance in healthy older people, with improvements in both memory acquisition and retention.

Yava

It is one among the *shookadhanya varga*. It is pathya in *Prameha roga*. The research study shows that *Yava mantha* prevented alpha-amylase and alpha-glucosidase activity on starch indicating that release of glucose from these products is prevented.

Conclusion

Nutraceuticals helps us to maintain the health at optimum level. These provides the nutrition as well as therapeutic benefits in preventing as well as treating the diseases. Concept of nutraceuticals is already explained in Ayurveda classics like *ahara varga*, *drava varga*, *rasayana etc*. By consuming health promoting diet rather than intake of disease promoting food or junk food one can prevent the most common diseases.

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