

**UNDERSTANDING NUTRACEUTICALS AND FUNCTIONAL FOODS IN AYURVEDIC FRAMEWORK w.s.r AJASRIKA SARPI-DUGHA RASAYANA - A REVIEW**Amulya Murthy Aku<sup>1</sup>; Ashok Patil<sup>2</sup><sup>1</sup>MD Scholar, Dept of P.G. Studies in Swasthavritta

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**Article Received: 25/04//2022 - Peer Reviewed: 29/04/2022 - Accepted for Publication: 30/04/2022****ABSTRACT**

Urbanization and technology have contributed to a sedentary and stressful lifestyle that has harmed human health. The modern population is plagued with metabolic, lifestyle, and degenerative diseases. A big nutritional gap exists between what the body requires and what we give it. People need to consume nutritious meals to be healthy and happy. As a consequence, more research is being done on the functional properties of plant and animal diets that are linked to their health advantages. Many naturally occurring health-enhancing chemicals are plant-based, however certain physiologically active components in animal products need consideration.

Nutraceuticals and functional foods come into play here. They are regarded as important as individuals grow more aware of the need of living a healthy lifestyle. Nutraceuticals are nutritional supplements that also have health benefits such as sickness prevention or health promotion. Nutraceuticals and functional foods have their roots in Ayurvedic medicine. Ayurveda, the science of life, has wonderfully articulated the significance of health.

The ancient Ayurvedic medical system inspired nutraceuticals and functional foods. Several references are seen in Ayurveda regarding food groups, food preparations, and Rasayana which seem to be the closest entities to be

linked with Nutraceuticals and functional foods. Food preparations may be consumed daily to defend against external and internal pressures and increase the quality of life. These preparations are called 'Aajasrik Rasayana'. This paper discusses nutraceuticals and functional foods from an Ayurvedic viewpoint, as well as several food preparations that may be eaten as functional foods/nutraceuticals.

**Keywords:** Ayurveda, Nutraceuticals, Ajasrika Rasayana, Functional Foods, Prevention, Promotion, Rejuvenation

## 1. INTRODUCTION

"Change is constant" - this is true to its very extent the human race has evolved in all aspects and always had this quest to find something new and better for the race. As we progress towards civilization, industrialization, urbanization, technology, etc., there is a change observed in an individual's lifestyle, food habits, and needs. It has exacted the human beings into eating fast food, as it is made instantly and gives satisfaction to taste buds, but it lacks the nutritional value and is thus called junk. The quality and the number of nutrients that we get from food are drastically affected. This nutritional gap created by altered dietary habits leads to increased lifestyle disorders, metabolic disorders, immune dysfunction, and degenerative disorders.

Although in recent years people are highly concerned and recognizant about their health. Every individual thrives on being in an excellent physical and mental state. All these factors have led us to explore Nutraceuticals, as they have a potential role in filling the significant nutritional gap. Nutraceutical is the midway between food and drug. The term Nutraceuticals is made by combining two terms,

"Nutrition" and "Pharmaceutical," were coined by Dr. Stephan Defelice in 1989. According to Dr. Defelice, "Nutraceuticals are food or part of food that provides medical or health benefits including the prevention and treatment of a disease".<sup>1</sup>

The concept of prevention is not new to the Ancient Indian system of Medicine ~Ayurveda. Ayurveda, the "science of life" which is 5000 years old, describes its primary objective as "Swasthasya swasthya Rakshanam"<sup>2</sup>, which means "maintaining the health of the healthy individual, i.e., preservation of health is the primary objective. Ayurvedic preventive, pro-

tective, and restorative principles are primarily dependent on food (Ahara) and lifestyle (Vihara); among these, ahara (food) is given great importance and is called the "primitive medicine" (mahabhaishajyam). The concept of Rasayana in Ayurveda is capacious and surpasses the concept of Nutraceuticals.

The ayurvedic principles of Ahara (food) depend upon various aspects like Prakriti (basic constitution – as Ayurveda believes every person is unique), Desha (environment/ surroundings), Dosha (Vata, Pitta, Kapha), Kala, Vaya, etc.

Ahara is classified as–

1. Hitkara – Ahitkara (Beneficial – non-Beneficial)
2. Pathya- Apathya (Righteous – Un-righteous)
3. Sathmaya – Asathmaya (wholesome or agreeable to the natural constitution and its opposite).

Ayurveda emphasizes the quality of food as Rasayana (Rejuvenation), Balyas (Increases strength and endurance), Vyadhikhsamtvas (Enhances Immunity), Vajikarana (virility), etc.

## 2. MATERIALS AND METHODS

All of the literature on Rasayana, Nutraceuticals and Functional Food was gathered from several Ayurvedic classical books. Scientific sources like PubMed and Google scholar were used to look up the most current publications in the field's existing literature.

## 3. RESULTS

### 3.1. NUTRACEUTICALS

The term "Nutraceutical" is often used synonymously with "functional food," although they differ in their chemistry and physiological aspects. Nutraceuticals are naturally extracted bioactive compounds derived from and are the part of food that is non-toxic and generally comprises vitamins, minerals, lipids, proteins, carbohydrates, and minerals (macro and micro-

nutrients). They are available in pills, capsules, powders, and extracts in a single or combined form on the market. Nutraceuticals range widely from genetically modified foods, and processed foods to nutrients and dietary supplements.

### **3.1.2 Classification:**

Nutraceuticals are broadly classified into

1. Dietary Supplements
2. Functional Foods
3. Farmaceuticals (Farm + Pharmaceuticals)
4. Medical Foods

#### **1. Dietary Supplements:**

These are the dietary nutrients derived from food products: vitamins, minerals, amino acids, herbs, or other botanicals and enzymes. Usually, these are manufactured in tablets, capsules, soft gels, gel caps, liquids, and powders.

These are further divided into:

##### **1. Dietary Fibres**

These are the food materials derived from plants that are not hydrolyzed by the enzymes secreted in the gut but are digested in the colon by intestinal microflora—Eg. Cellulose, hemicelluloses, gums, pectins, etc.

##### **2. Probiotics:**

These live microbial food supplements are advantageous to the host as they improve intestinal microbial activity when administered in measured amounts.

##### **3. Prebiotics:**

Dietary components beneficially affect the host either by selectively altering the composition or metabolism of gut microbiota. Consumption of prebiotics typically promotes the production of lactobacillus and bifidobacterial in the gut, thus helping in the metabolism.

##### **4. Polyunsaturated Fatty Acids:**

These usually have two main categories omega 3 and omega 6.

##### **5. Antioxidant vitamins:**

Comprise mainly of vitamin C, vitamin E, and carotenoids.

##### **6. Spices:**

Many recent pieces of research give revelations about dietary spices that spices, when taken in low quantity, significantly influence health as they have antioxidant, anti-inflammatory, chemopreventive, antimutagenic, and immune-modulatory effects on bodily systems.

#### **2. Functional foods:**

These are also known as fortified Nutraceuticals; basically, regular ordinary food is added with certain ingredients or components that give a specific medical and physiological ease, rather than taking dietary supplements. e.g., milk added with an enriched quantity of Vit. D

#### **3. Farmaceuticals:**

The term is made up of two words, "farm" and "pharmaceuticals," which is more frequently associated with agricultural circles where genetically engineered crops or animals have a potential medical application. Energy-providing foods such as bread, cheese, fermented starch, and many more are produced with the help of biotechnology.

#### **4. Medical foods:**

These are either ingested through the mouth or tube feeding. Medical foods are usually given to patients with illnesses to meet specific nutritional requirements.

F.D.A. regulates medicinal foods and is prescribed and monitored under the supervision of a physician.

### **3.2. NUTRACEUTICALS IN AYURVEDA: CONCEPT OF RASAYANA**

Ayurveda puts great emphasis on food (Ahara) and believes that "If the righteous wholesome diet is given in a planned way, then there is no need to administer medicines, and if the wholesome diet is not given then too there is no need to administer medicine, as it will not be curing the disease in the absence of wholesome diet" <sup>3</sup>

In the Indian system of Medicine, food items are categorized into twelve classes, while Sushruta classified them into ten and thirteen. Following is the broad classification that Ayurveda Scholars categorized food into:

**Table 1:** Ayurvedic Classification of Food

1. Corns With Bristles, (Shuka Dhanya)
2. Pulses Or Legumes, (Shami Dhanya)
3. Meat, (Mamsa Varga)
4. Leafy Vegetables, (Harita Varga)
5. Fruit, (Phala Varga)
6. Vegetables Which Are Consumed Raw
7. Wines, (Madhya)
8. Water From Different Sources
9. Milk And Milk Products
10. Products Of Sugarcane
11. Food Preparations
12. Accessory Food Items Such as Oils and Salts

**Table 2:** The closest Contemporary entities of the Ayurvedic Classification of Food:

Names	Definition	Ayurvedic Perspective
Dietary Fibres	Not hydrolyzed by enzymes + digested by the microflora of the gut	Raw Vegetables (Shaka Vargas), Millets – Yava, Godhuma (Shukta Varga)
Fatty Acids	Buildings blocks of fats	Dugdha Varga – Ghrita, Navneeta
Prebiotics	Promotes – probiotics	Harita shaka Varga (green vegetables)
Vitamins	Antioxidants	Phala Vargas – Amlaki, Draksha
Minerals	Inorganic nutrients	Shilajatu Rasayana
Spices		Pippali Rasayana, Lashun, Ksheerapaka

Also, the groups mentioned above were explained in detail and were further sub-categorized. This proves that the science of food and nutrition in Ayurveda was profoundly developed. Ayurveda lays a great emphasis on the quality of nutritious food because of the following reasons:

- Prevents the degenerative changes caused by aging (Rasayana),
- Maintains strength and endurance and helps in recovery after an illness (Balya),
- Enhances the immune system (roga-pratibandhaka Rasayana),
- Maintains the vigor and vitality (Vajikarana Dravya)
- Maintains the life: Jeevaniya Gana

## 4. DISCUSSION

### 4.1. RASAYANA AND NUTRACEUTICALS:

The concept of Rasayana is one of the novel concepts in Ayurveda, which has much more substance to it than the concept of Nutraceuticals. The word Rasayana is composed of two words Rasa and Ayana.

Rasa (nutritional plasma) and Ayana mean pathway (microcirculatory channels in the body) 4, which means – one which helps to get high quality "Rasa" (Rasa is the by-product of the digestion in the form of nourishing fluid). Rasayana is one of the eight branches of Ashtanga Ayurveda (eight clinical specialties), a specialized procedure practiced in rejuvenating recipes and dietary regimens, other than being a drug therapy with exceptional health-promoting conduct and behavior. Rasayana is the process through which longevity, memory, intelligence, freedom from disorder, youthfulness, the excellence of luster, complexion, and voice, the optimum level of physical strength, and sense organs can be acquired. Rasayana drugs act on a sub-cellular level. It can be collectively compared with antioxidant, regenerative, immunomodulatory, adaptogenic. Rasayana does not only help in treating a disease but can also help prevent a disease<sup>5</sup>. Many of the Rasayana drugs have Nutraceutical action. The best examples are Aajasrika Rasayana, which deals with food products that can be partaken daily for improving the quality of life & re-

juvenating the body. Proper use of Rasayana in an appropriate condition is supposed to give better outcomes since it will work at different stratum or levels of the body – subcellular level. the mode of action can be explained by:

- By improving the nutritional value of the Rasa (nutritional plasma)
- By improving the Agni Vyapara (Agnivardhak)/digestive power (metabolism) in the body, thereby responsible for the proper functioning of the body at different levels.

#### 4.2. TYPES OF RASAYANA:

1. Ausadha Rasayana-Drug therapy directed to specific diseases
2. Ahara /Ajasrika Rasayana- Dietary therapy
3. Achara Rasayana – Code of Conduct and Daily Habits for overall well-being especially covers a mental and spiritual aspect of health.

Although all the three Rasayanas have they're on importance Ajasrika Rasayana and Achara Rasayana are the types of Rasayanas that will help to prevent all the diseases and maintain the immunity of the healthy individual. For a healthy individual, it is important to

have all Doshas and Dhatus in balance and functioning properly.

#### Ajasrika Rasayana:

Food products are consumed daily for improving the quality of life & rejuvenate the body. These include Dietary products - like Milk, Ghee, Honey, etc. Which are easy to use and readily available. One of the most Popular Ajasrika Rasayana is “*Sarpi-Dugdha*”. This combination is advised to be consumed by the healthy individual daily to maintain the immunity

#### The combination of Milk and Ghee:

Ghee is used in India for a very long time and is involved in our culture and tradition since always. and its benefits are nothing new. Ghrita (ghee) considered the foremost substance in Indian cuisine for centuries. Ghee is rich in omega 3 fatty acids that can cross B.B.B. thus have an effect on the brain as protective and proliferative. Scholars in Ayurveda say consumption of ghee has a cognitive function. Milk is called complete food as it contains all the essential vitamins and minerals required and thus helps in overall well-being.

**Table 3:** Nutritional composition of Ghee<sup>6</sup>:

Fats & fatty acids	Amounts per 100 g of Ghee
Total fat	99.5 g (153% DV)
Saturated fat	61.9 g (310% DV)
Monounsaturated fat	28.7 g
Polyunsaturated fat	3.7 g
Trans fats	4 g
Omega-3 fatty acids	1.447 mg
Omega-6 fatty acids	2.247 mg
Omega-9 fatty acids	25.026 mg
Other non-fat nutrients	Amounts per 100 g of Ghee
Carbohydrates	0
Minerals	0
Cholesterol	256 mg (85% DV)
Phytosterols	0
Vitamin A	3069 IU (61% DV)
Vitamin B, C, D	0
Vitamin E	2.8 mg (14% DV)
Vitamin K	8.6 µg (11% DV)

**Table 4:** Average composition of Goat, Sheep, Cow, and Human milk <sup>7</sup>

	Goat	Sheep	Cow	Human
<b>Fat (%)</b>	3.8	7.9	3.6	4.0
<b>Lactose (%)</b>	4.1	4.9	4.7	6.9
<b>Protein (%)</b>	3.4	6.2	3.2	1.2
<b>Energy (kcal/100ml)</b>	70	105	69	68
<b>Calcium (mg/100g)</b>	134	193	122	33
<b>Phosphorus (mg/100g)</b>	121	158	119	43
<b>Vitamin A (IU)</b>	185	146	126	190
<b>Vitamin D (IU)</b>	2.3	0.18 (µg)	2.0	1.4

**Table 5:** Biological functions and concentrations of the main milk proteins <sup>7</sup>

Protein	Concentration (g/l)		Function
	Cow	Human	
Total caseins	26.0	2.7	Mineral transport (Ca, PO <sub>4</sub> , Fe, Zn, Cu)
α-Casein	13.0		
β-Casein	9.3		
k-Casein	3.3		
Total whey proteins	6.3	67.3	
β -Lactoglobulin	3.2		Retinol and fatty acids binding; possible antioxidant
α - Lactoalbumin	1.2	1.9	Lactose production, calcium transport, immunomodulatory; anticarcinogen
Imunoglobulin (A, M e G)	0.7	1.3	Immune protection
Serum albumin	0.4	0.4	
Lactoferrin	0.1	1.5	Antimicrobial, antioxidant, immunomodulator, iron absorption, anticarcinogen
Lactoperoxidase	0.03		Antimicrobial
Lysozyme	0.0004	0.1	Antimicrobial, synergy actions with Immunoglobulins and lactoferrin
Others	0.8	1.1	
Proteose-peptone	1.2		
Glycomacropeptides	1.2		Antiviral, bifidogen

**Table 6:** Average nutritional composition of the whole, low fat, and skim milk <sup>7</sup>

COMPOSITION (100 GMS)	WHOLE	LOW FAT	SKIM
Energy (kcal)	62	47	34
Water (g)	88.1	89.1	90.5
Protein (g)	3	3.4	3.3
Fat (g)	3.5	1.6	0.2
Carbohydrates (g)	4.7	4.9	4.9



Colesterol (mg)	13	8	1
Vitamin A (g)	59	22	0
Vitamin D (g)	0.05	0.05	0
Vitamin B1 (mg)	0.04	0.04	0.05
Vitamin B2 (mg)	0.14	0.11	0.05
Na (mg)	43	41	41
Ca (mg)	109	112	114
Mg (mg)	9	9	10

**Table 7:** Average Mineral and Vitamin Contents in Cow Milk<sup>7</sup>

Mineral	mg/100g	Amount in 1 cup (244g) and % DRI	
Calcium	119-124	297.50-310	37-40%
Phosphorus	93-101	232.50-252.5	16-32%
Magnesium	11-14	27.5-35	8-10%
Potassium	151-166	377.5-415	8-9%
Zinc	0.4-0.6	1-1.5	9-14%
Vitamin	/100g	Amount in 1 cup (244g) and % DRI	
B1 (Thiamin)	0.04-0.05mg	0.091-0.1104 mg	9.1-11%
B2 (Riboflavin)	0.16-0.17mg	0.395-0.4514 mg	35.9-0.41%
B3 (Niacin)	0.08-0.09mg	0.204 – 0.229 mg	1.7-1.9%
B6 (Pyridoxine)	0.04-0.04mg	0.089-0.105 mg	8,0-9,5%
Folate	5 – 5.2µg	12.2 – 12.688 µg	3,8-4,0%
B12 (Cobalamin)	0.357 – 0.500 µg	0.871 – 1.22 µg	36,3-61,0%

#### 4.3 MODE OF ACTION:

Vitamin A, D, E, B-complex, K, and bioflavonoids act as antioxidant defenses. Most of the drugs described under Rasayana have nutritional status and antioxidant properties with immuno-modulator effects. The combination of ghee and milk fulfills this completely as ghee is full of vitamin A, E, and K while milk has vitamin A, D, E, and K therefore this combination act as antioxidants and reduces the effect of free radicals in the body and hence slows down the process of aging and maintains or preserves and restores health

#### 5. CONCLUSION

Lifestyle disorders are hazardous diseases mainly caused due to bad food habits and lifestyles – creat-

ing a huge nutritional gap. The nutritional gap has to be well addressed and can be rightly fulfilled through Nutraceuticals. Ayurveda being natural science can help in this through Rasayana. As the world is looking for a natural and safe way to be healthy the Nutraceutical science and Ayurveda can collaboratively work and meet the needs. In recent years there is a rise in awareness among people all around the world towards the health and nutritional benefits of "food" in terms of disease prevention and health enhancement. This increased understanding of the probable mechanism of the bioactive constituents of food, which can improve health, reduce the risk of disease, and overall well-being.

An emerging field in Nutraceuticals are Nanoneutraceuticals, Nutrigenomics, Nutrigenetics,

Molecular nutrition, and the safety and efficacy of Nutraceuticals. Huge demands for herbal products project the pharmaceutical industries to produce herbal nutritional supplements. This discussion concluded that Nutraceuticals have a historical link to Ayurveda. Rasayanas especially “Ajasrika Rasayana” is easy to follow Rasayana that can be used in daily life to prevent disorders. Efforts should be made with the help of modern technology to give better products for a healthy life. From the above concepts, it is clear that Ayurveda and Nutraceuticals are comparable.

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