

# Ayurveda and its concept of dietetics (*Pathya ahaar kalpana*) – a potential approach to healthy gut Microbiota

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**Abstract** - The present article deals with the general history of Ayurveda and its concept of dietetics for healthy microbiota. Ayurveda is an ancient science of life which has been practiced in India for the past thousands of years. In addition to the treatment, it provides knowledge about healthy lifestyles through yoga and diet regimens. In Ayurveda, the essence to live a healthy life is through strengthening the tripods of life which are *aahar*, *nidra* and *brahmacharya*. The *aahar* on the diet not only provides the material needed by our body to grow and maintain its day-to-day function but also individual conditions *mana*. Therefore, there is a need to consider food types and food regimens according to *dosha* and *prakriti* to enrich healthy microbiota which further will enrich a healthy body and mind.

**Keywords:** Ayurveda, Gut microbiota, Aahar, Lifestyle, Yoga, Balanced diet

## Introduction

AYUSH is an acronym for Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy and are the six Indian systems of medicine prevalent and practiced in India and some of the neighbouring Asian countries with very few exceptions in some

of the developed countries. Ayurveda or the science of life is more than 5000 years old (Pandey et al., 2013). Ayurveda had its origin right from the day of creation as it was remembered by Lord Brahma. He is considered the first preceptor of Ayurveda who later on passed the knowledge to his son Daksha Prajapati and in his turn to Lord Ashwini Kumar as who were considered eternal physicians. They in turn passed on the knowledge to Lord Indra the king of Gods. It was Lord Indra who is believed to have taught the same to Sage Bharadwaja who in turn spread the science of Ayurveda on earth by preaching and teaching it to many other sages. This period can be again bifurcated into two periods namely the Vedic and the Samhita Period (Mahesh, 2019).

The Vedic Period was the time when the Vedic thoughts, concepts and practices were composed. The *Samhita* period dedicated to Ayurveda texts namely the *Charaka Samhita*, *Sushruta Samhita*, *Astanga Hridaya*, *Astanga Sangraha* and *Bhela Samhita* got composed and was put into practice. The *Aṣṭang Hridaya* was originally written in Sanskrit by the ancient Indian scholar Vagbhata. It is a part of the *Brhat Trayi* and is one of the principal texts of Ayurveda (Vagbhata, 1939). Ashtang

Ayurveda refers to the main eight sections of Ayurveda (Fig. 1). Sushruta, Charaka, and

Vagbhata are considered to be “The Trinity” of Ayurvedic knowledge.



**Figure- 1 Eight major branches of Ayurveda (Ashtang Ayurveda)**

Teaching, learning and practice of Ayurveda mainly take place through sages, Gurukul and father to son. Later there were seats of higher institutionalized learning like the Nalanda, Banaras and Taxashila. The fall of the ancient period marked great influence with the destruction of the universities of Nalanda by Islamic invaders resulting in the migration of scholars. The period from 500 AD to 1500 AD is known for the destruction by the Persian-Afghan invasion followed by the Islamic invasion.. Initially during the British rule in India, the modern education system that dealt more with western philosophy resulted in the opening of the Modern system of medicine in India as well. But the indigenous system of education was still in vogue and supported by the British initially which was suspended in 1835. The British era saw a rise in the modern

education system along with the opening of the people to international levels of interaction and understanding.

The revival of Ayurveda started from the year 1885 to 1947 for its legitimate right and position and more intensely from 1920 to 1930. People like G. Srinivasa Murthi, M. M. Gananath Sen of Bengal, Jivaram Kalidas Shastri of Gondal, A Lakshmipathi of Madras, etc were the proponents of this revival who got engaged in a reasoned analysis of the pros and cons contained in different systems of medicine (Ganesan, 2010).

Madan Mohan Malaviya knows that Ayurveda is an ancient medical science based on fundamental natural principles of living a healthy long life. To make it

practically useful in the present era, the integration of current scientific inputs is essential. He created an environment, eminent graduates and licentiates, in European medicine and Surgery were employed to give instruction and training to the students of Ayurveda and to help the Vaidyas in preparing works in Sanskrit and

Indian vernaculars, on Anatomy, Physiology, Surgery, and Hygiene and other sciences auxiliary to the Ayurveda (Dar and Somaskhandan, 1966).

### Ayurvedic concept of dietetics

In today's scenario, malnutrition is one of the leading causes of the development of diseases in man. The word malnutrition not only means deficiency of some nutrients but also the excess of them. Today we might have curbed the effect of communicable diseases by the use of antibiotics but we have also passed the way for lifestyle disorders in our society. Marasmus,

kwashiorkor, diabetes, obesity, hypertension, cardiovascular disorder, and many more have set up roots in our society all of which have strong concordance with improper diet and lifestyle. Ayurveda set a strong emphasis on the diet and its effect on the body. In Ayurveda, the food in our diet possesses its action through five routes namely *rasa*, *guna*, *veerya*, *vipaka* and *prabhava* (Payyappallimana and Venkatasubramanian, 2016).

**Rasa (taste)** - All the food materials in the world possess 6 basic tastes through which they exert their action in the body as soon as we eat them (Fig. 2). These are *madhur* (sweet), *amla* (sour), *lavana* (salty), *katu* (pungent), *tikta* (bitter) and *kasay* (astringent); for example giloy has *tikta ras* (bitter taste). On the basis of their physical properties, the food materials are categorized into *khadya*, *peet*, *leh* and *leedha*. *Khadya* is the food items that we chew, *peet* are those that we drink, *leedha* and *leh* are paste-like that we suck.



**Figure- 2** Selected examples of six *rasa* (taste)

**Guna (quality)** - *Guna* is an important property of food because of its pharmacological action. Each food item has its own *Guna* like some food items are having anti-inflammatory action such as haldi, some are cardio-protective such as arjuna, some are expectorant such as mulethi and many more.

**Veerya (potency)** - *Veerya* is the potency of food, for example, black pepper has *ushna veerya* (hot potency). It absorbs after the action of digestive juices.

**Vipaka (active principle)** - *Vipaka* is the active principle which reaches the blood after getting metabolized in the liver. The taste conversion after digestion is also called *vipaka* for example Jaggery has *madhur vipaka* after digestion.

**Prabhava (effect)** - Prabhava is the effect of food item. A food shows specific prabhava for example Rudraksha is an anti-hypertensive, Brahmi is a brain tonic (Medhya). Few examples of herbs (foods) and their properties are shown in Table 1.

**Table-1 Different foods and their properties in terms of Ayurveda**

Herb/ food	Rasa	Veerya	Vipaka	Prabhava
Guggulu	Astringent, pungent and sweet	Heating	Pungent	Sciatica, neuro-muscular problems and chronic vata dosha
Tagar	Astringent	Heating	Pungent	Insomnia and CNS disorders
Yasthimadhu	Bitter and sweet	Cooling	Sweet	Sore throat and hoarseness
Vidari	Bitter and sweet	Cooling	Sweet	Emaciation and infertility
Vacha	Bitter and pungent	Heating	Pungent	Kapha depression and epilepsy
Vidanga	Pungent	Heating	Pungent	Krumi
Shilajit	Astringent, bitter, pungent and salty	Heating	Pungent	Diabetes, urinary problems and infertility

## Food and nutrition in modern science

The balanced diet in today's scenario comprises carbohydrates, protein, fats, nutrients and minerals in such a quantity and proportion which are necessary for growth and proper function of the body and also has provision for the reserve to withstand a brief period of starvation. In today's fast-moving world, people are reliant on fast food which does not cater to our need for nutrients. This practice eventually leads to deficiency and finally malnutrition. This initiates a vicious cycle of malnutrition and disease which complement each other until and unless one breaks them. In one only consume a carbohydrate-rich diet he/ she would

eventually land into kwashiorkor which is due to a deficiency of protein in the body. There is stunted growth and wasting in the body is oedematous, the person is irritable, and has altered bowel movements leading to diarrhoea. Another condition called marasmus is a deficiency of carbohydrates in the diet, these two are categorized under protein energy malnutrition which affects children throughout the world. Due to this deficiency, there is a delay in achieving the goals of a child. There is hampered growth and development, which also results in decreased immunity. So to tackle this crisis, one must be cautious about a balanced diet in children. For infants up to 6 months, the mother's milk is sufficient to meet the needs but milk is not whole until and unless the

mother is taking a properly balanced diet (UNICEF, 2019). Any deficiency in the mother would reflect over the infant as the milk would be deficient in it. On average, lactating women require 550 kcal more than a normal woman per day and 29 grams of extra protein.

The most adversely affected age groups by malnutrition comprise children and pregnant or lactating women. Pregnancy is a stressful condition for the mother as there is an exponential increase in the demand for nutrients and other materials by the growing foetus. This usually leads to depletion in the reserves in the body of the mother which makes her weak and vulnerable to various diseases. So any deficiency in this state can adversely affect the mother and the children in her womb, e.g. deficiency of folic acid leads to anaemia in the mother and neural tube defects in the child. Moreover, a deficiency of iodine in the mother leads to affect the brain development of the baby. According to the World Health Organization (WHO, 2020), a healthy diet helps to protect against malnutrition in all its forms, as well as non-communicable diseases, including diabetes, heart disease, stroke and cancer.

### **Ayurvedic Balanced Diet**

The food is also composed of the *panchamahabootas* i.e. *prithvi*, *jal*, *agni (tej)*, *vayu* and *akash*. The *mana* in the food is provided by the *prithvi* component, the binding strength by the *jal*, the taste of the food is provided by the *agni (tej)* and *vayu*, and all these are waisted in the *akash* (space) (Madan et al., 2021). One cannot tell the nutritive values of a food item just by looking so to make things easier the concept of *shada rasa* and *sapta varna* is coined in Ayurveda for maintaining a balanced diet. It emphasizes that a diet is said to be balanced when the items in it have all six tastes i.e.

*madhur* (carbohydrates), *amla* (citrus), *lavana* (sodium chloride) *katu* (pungent), *tikta* (bitter) and *kasay* (astringent) and possess seven colours in them. Chewing food is an important step in digestion. By chewing properly, one breaks down the food into smaller particles and mixes the saliva thoroughly which acts as a lubricant for the food so that it can be easily swallowed and also helps the enzymes in the saliva to act effectively over it. Improper chewing may result in the swallowing of dry, rough food material which may damage the pharynx, oesophagus and stomach. Improper chewing also decreases the surface area for the action of the digestive enzymes. Saliva is the secretion which is poured into the oral cavity by the salivary glands. On average, one person produces over 1000 to 1500 ml of saliva per day. The saliva possesses various enzymes like salivary amylase, maltase, and lingual lipase which act on carbohydrates and lipids and initiate their breakdown process. The presence of lysozyme in the saliva inhibits the growth of bacteria also. After chewing, the food is swallowed & pushed into the oesophagus which opens into the stomach. The stomach is a muscular hollow bag of 1-1.5 litre capacity which produces pepsinogen which under the influence of Hydrochloric acid gets activated to break proteins into amino acids. The food here stays for 3-4 hours and is slowly released into the intestine.

Gastric secretion is controlled by neuronal and hormonal mechanisms. The vagus nerve innervating the stomach increases the gastric secretions when stimulated and so does the gastrin hormone secreted by G cells in the mucosa of the stomach. Whereas secretion of CCK-PZ, somatostatin, VIP and GIP will have an inhibiting effect on gastric secretion. The food bolus in the stomach gets converted into chyme which is released slowly into the

intestine for the remaining digestion. In the intestine, it is acted upon by pancreatic lipase, protease and amylase and converts fats, and protein glucose into fatty acids, amino acids and glucose respectively. All these digested materials are finally absorbed in the distal part of the intestine the ileum. The undigested food is then pushed into the large intestine in which the water and electrolytes are absorbed. Thus by selecting the food in a particular quantity and proportion one can direct the effect of the food efficiently into the body.

### **Gut Microbiota and Ayurvedic Diet**

The gut microbiota can be correlated with the Ayurvedic concept of *Sahaj krimi* (nonpathogenic microbes). Mainly the function of gut microbiota depends upon the status of Agni (digestive fire). The digestive system has long been an area of critical importance in individuals' physical and mental health (Fulzele and Nagdeve, 2022). In these days, research on the microbiome has started to help us to explore the Ayurveda theories of *Agni* (digestive fire) and *Ama* (metabolic toxins) from a modern perspective. As per the theory of Ayurveda, no disease ever arises without the derangement of Agni. Therefore, the whole preventive and treatment methodology in Ayurveda focuses on the modulation and management of *Agni*. Hence gut microbiota. It is already established that if there is derangement of *Agni*, *Ama* (metabolic toxin) is produced and further it vitiates the doshas which spread throughout the body and manifest as varied diseases. Similarly, from a biomedical perspective, dysbiosis of microbial flora causes a leaky gut by which the toxins of deranged digestive metabolism enter the bloodstream. Consequently, an inflammatory response occurs within the body which expresses as diseases

opportunistically (Deepthi et al., 2021). A recent study has shown those gut microbiomes are *prakriti* and physiological characteristics specific in healthy individuals. However, needed to be explored in a broad population of healthy individuals over time and account for all factors that can influence the microbial diversity patterns such as age, gender, geography, food habits and cultural traditions, in order to discover features of the gut microbiome that are unique to different geographical areas/lifestyles and aid discovery of statistically enriched biomarkers for each *prakriti* (Shalin et al., 2021).

It is now quite evident that the changes in the composition, diversity and abundance of the gut microbiome are affected by several variables including medication (consumption of antibiotics), blood parameters such as RBC count and haemoglobin concentration, bowel habits, dietary composition, health status, anthropometric features, lifestyle and gender (Lopez-Siles et al., 2018). Therefore there are variations in gut microbiota throughout the world. Even in the Indian population, the gut microbiome of healthy adults varies with various factors such as geography, age, gender, diet and/ or *prakriti*. (Dhakan et al., 2019) found that the gut microbiome of the northern Indian population was significantly associated with *Prevotella*, while the southern Indian was associated with *Bacteroides*, *Faecali-bacterium* and *Ruminococcus*. They further observed the enrichment of metabolic pathways involved in the degradation of complex polysaccharides in Indian plant-based foods. As, a diet provides macronutrients (carbohydrates, proteins, and fats), micronutrients (vitamins and minerals), and phytochemicals (non-nutrient bioactive compounds) which influence the metabolic activity of the mammalian gut microbiota.

Food in western countries is poor in complex carbohydrates; fibre etc. which results in progressive loss of beneficial bacteria and microbial diversity and which further causes chronic disease.

## Conclusion and Perspectives

As per Ayurvedic principles eating according to your dosha, especially your dominant dosha, will help to create more balance in the body and it will not only improve gut health but overall health and well-being. The seven *Pathya* of herbal and animal origin mentioned earlier have *Agnivardhaka* (digestive/metabolic stimulating) properties due to their *Laghu* (easy to digest), *Ushna* (hot potency) and *Tikshna Guna* (helping for easy assimilation) and due to these *Guna* (attribute/property) they possess therapeutic activities such as clearing of *Ama*, pacify *Kapha* and *Vata Dosha*. Thus, they stimulate *Agni*, digest *Ama*, remove excessive *Kledaka Kapha* (subtypes of *Kapha* situated in the *Amashaya*), prevent further production of *Ama* (clear obstruction in channels of circulation) and transport *Pakwa Dosha* from *Shakha* (circulation) to *Koshtha* (cavities of body/hollow organs) for removal from the body. Thus, microbiota in the host acts as a host-microbiota co-metabolic structure, which carries out various metabolic processes in the human body (Ranade et al., 2019). Therefore Indian thali or Ayurvedic thali is an ancient approach to diet that provides both fibre and different phytochemicals by incorporating a variety of plant foods in different colours. This variety helps to restore diversity in the gut bacteria and may potentially prevent or reverse chronic disease (Shondelmyer et al., 2018). Therefore, there is a need to design thali (food) based on *Dosha* and *Prakriti* to enrich

good microbiota which further will enrich a good and healthy body and mind.

## Disclaimer Statement

Authors declare that no competing interest exists. The products used for this research

are commonly used products in research. There is no conflict of interest between authors and producers of the products.

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