



Review Article

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## AYURVEDA AND MODERN VIEW ON PHYSIOLOGY OF DIGESTION W.S.R. TO DESCRIPTION OF CONCEPT OF AVASTHA PAK

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### Abstract

The medical science described digestion as the process in which breakdown of complex food take places into simplest form with the help of enzymatic process. These all phenomena occur in gastrointestinal tract. Ayurveda described role of *Jathragni*, *Dhatwagni* and *Bhutagni* in the conversion of complex food into its simplest monomers. The *Agni* play key role in this process thus proper functioning of *Agni* is prerequisite for the digestive physiology. *Grahani* or *Pakvamashaya* is also known as *Pittadhara Kala* which described as the site of *Jathragni*. The various elements like *Samana vayu*, *Kledaka kapha* and *Pachaka pitta* helps in the process of digestion. *Samana vayu* stimulate the *Pachakagni* for the separation of food, *Kledaka kapha* softens food materials and *Pachaka pitta* contributed towards the process of digestion. The digestion starts with the consumption of food and this process completed in three stages namely *Avastha paka*, these stages of *Avastha paka* are *Madhur avastha paka*, *Amla avastha paka* and *Katu avastha paka*.

**Keywords:** Ayurveda, Digestion, Avastha paka, Agni, Ahara

## Introduction

*Ahara* is considered as one of the pillar of life that governs physiology and maintain regulation of all activities of body. The nutrition obtained from food offers several healths benefits and boost *Dhatus*. The nutritious essence only obtained from food materials if it get digested properly. The functioning of *Agni* and metabolic enzyme helps in the digestion of food materials in which complex food converted into simplest form leading to the formation of nutrition which serve to the body and full fill the requirement for governing normal physiological functioning [1-4].

The proper digestion of foods maintain balances of *Dosha*, *Agni* and *Dhatus*, etc. *Ahara* after digestion produces nutrition which provides strength, longevity and complexion, etc. The physiology of digestion merely depends upon the properties of food materials like *Gurutava* (heaviness) and *Laghutava* (lightness). In relation to the physiology of digestion Ayurveda mentioned concept of *Avasthapaka* which refers to processes that take places during the digestion of food. *Ahara dravyas* in *Kostha* under the influence of *Agni* digested to form essential nutrients. The chemical, enzyme and *Agni* are considered responsible for the process of *Ahara Pachana* [4-7]. The three stages of *Avasthapaka* are depicted in **Figure 1**.



**Figure 1: Various stages of *Avasthapaka***

Initially the stage of *Madhura Avasthapaka* occurs in which *Madhura bhava* attains by *Ahara* in *Amashaya*. The action of salivary amylase on carbohydrates forms glucose which gets absorbed to serve sources of energy.

The *Amla Avasthapaka* is considered as second stage of *Avasthapaka* in which *Ahara* subjected to vigorous digestion in *Pachhmanasaya*. The acidic medium of chyme resulted

*Amlabhava*. Here digestion and absorption of partially digested food occurs in *Pachymanasaya*. The third phase is *Katu Avasthapaka*, the absorption of electrolytes and water take places in the large intestine. Water and electrolytes absorbed from the *pakwasaya*, bolus of fecal matter forms after the maximum absorption of water [6-8].

### ***Avastha-paka***

Gastrointestinal digestion of food described as *Avasthapaka* in which changes in one form of food take places to another form. *Amashaya*, *Pachyamaanaasaya* and *Pakwasaya* are involves in the process. The *Prapaka* and *Vipaka* described here as *Pratham paka* or first change and final transformed state respectively. The transformations take places by *Jatharagni* in which *Prathampaka* subjected to final transformation.

The biochemical changes occur in three stages of food digestion depending upon the involvement of *Madhur*, *Amla* & *Katu* element in process. *Avasthapaka* on this basis classified into *Madhura Avastha Paka*, *Amla Avastha Paka* and *Katu Avastha Paka*.

### ***Madhura avastha-paka***

Food consisting of various *Rasa* including *Madhur Rasa* that manifested during the *Avastha-paka* as a part of first stage. This stage results formation of *Kapha* which is considered as thin & frothy substance. This stage occurs in *Amashaya* since it is comprehended by *Madhur bhava*. The *Kledaka Kapha*, *Agni* and *Samana Vayu*, etc. in stomach contributed towards the physiology of *Madhura awastha paka*.

As per modern science this stage can be correlated to the transformation of carbohydrate into simple sugar. The digestion of carbohydrate in buccal cavity by salivary enzyme helps in the transformation of carbohydrates into sugar. As the food reaches in oral cavity it triggers secretion of saliva which contains amylase enzyme that favors digestion of carbohydrates in oral cavity. Saliva in mouth initiates *Pachana* and *Kledana* of carbohydrate and related food materials. That after *Prana vayu* and *Samana vayu* facilitates deglutition of food to the *Amashaya*. In this stage carbohydrates get converted into simple sugars like; sucrose, lactose and maltose, etc. These substances possess sweet nature, therefore this stage of digestion is termed as *Madhur avastha pak*.

**Amla Avastha-Paka:**

*Amla Avastha-Paka* takes places in *Pachmanasaya* in the form of chyme. The digestion of remaining food after the first stage occurs in *Pachyamansaya* under the influence of pancreatic amylase. Some parts of *Madhur awastha paka* undergo in *Pachyamanasaya* therefore it is considered as partial site for the *Madhur avastha pak*. The secretion of hydrochloric acid in the stomach partially ceases the activity of amylase leading to the partial end of *Madhur awastha paka*. In *Amla avastha pak* the food occurs in *Vidagdha* form in *Pachyamanasaya*.

The acidic medium of the chime develop *Amlabhava* and results sourness. The commencement of *Amlabhava* occurs during this phase and full digestion of remaining food take places in *Amla avastha pak*. The digestive site (*Grahni*) involves actions of *Pachak pitta* and *Agni* in the form of different digestive enzymes. *Grahani* keeps indigested food which further subjected to the action of *Agni*. The action of *Agni* helps to digest food while absorption of *Sara bhag* occurs with the help of *Samana vayu*. The undigested food is directed towards the peristaltic movement. *Grahni* is located between *Amashya* & *Pakvashya*, thus termed as *Pachyamanashya*. It is also considered as seat of *Agni* and various secretions of pancreas & liver acts here for the purpose of digestion.

*Achchha pitta* brings pH at the level to facilitate action of various enzymatic secretions of small intestine. In *Amlavastha* products like peptone and fatty acids, etc. are formed, food possesses properties of *Amla rasa* therefore this stage termed as *Amlavastha*. *Ahararasa* absorbed through *Pittadharakala* & *Apakva* food remains after *Amlavastha* is expelled by virtue of the effects of *Samana vayu*.

Pepsinogen secreted by peptic cells of gastric glands present in stomach. Pepsinogen form pepsin that helps in the partial digestion of protein. The major portions of protein get digested in *Pachyamanasya* by the enzyme of pancreatic secretions. The *Vidagdha Ahara* in *Pachyamanasaya* induces secretion of *Achchha pitta*. The *Achchha Pitta* includes bile and pancreatic secretions that facilitate digestion of fats, carbohydrates and

proteins. Pepsin helps in the conversion of protein to proteoses, polypeptides and peptones.

### ***Katu avastha-paka:***

The third *Avasthapka* of digestion is *Katu avastha-paka* in which digested food materials subjected for further processing in *Pakvashaya*. The remaining undigested foods undergo fermentation process under the influence of intestinal bacteria. The production of *Vayu* gets stimulated in this process. The movement of food from *Pachya-manashaya* to *Pakvashaya*, then *Shoshymanasya* witnesses drying of food stuffs due to the absorption of water content. The waste products such as feces converted into stool form due to the removal of water content.

As per the modern concept the digestion and absorption mainly take places in small intestine. In large intestine, absorption of remaining water occurs and bacterial action occurs in *Pakvashaya* (colon). Bacterial activity causes production of gases that contribute to flatus in the colon. The odor of fecal matter attributed to its components i.e.; indole, mercaptans, hydrogen sulphide and sketole. These all possess *Katu bhava* therefore this stage termed as *Katu avastha-paka*. The formation of feces and production of pungent *Vayu* mainly contributed to the specific odour of waste material that is to be extracted from body.

The gases are generated like; carbon dioxide and methane, etc. due to the bacterial action in large intestine. The excess expulsion of gases may occur when large intestine get stimulated, this promotes peristaltic expulsion of gases even before their absorption [7-11].

### **Pathological Consideration of Abnormal physiology of *Avastha-paka*:**

The unhealthy lifestyle, low fiber in diet, food incompatibility, infections and stress, etc. may cause abnormalities of physiology of *Avastha-paka* leading to the pathological symptoms like; bloating, diarrhoea, gas, stomach pain, stomach cramps, nausea, vomiting and constipation, etc. The common digestive problems associated with these symptoms are; indigestion, heartburn, irritable bowel syndrome and anorexia, etc. Ayurveda

suggested disciplinary conducts of life style for curing digestive problems or restoring normal physiology of digestion.

## Conclusion

Ayurveda classified process of digestion of food materials into three phases i.e. *Madhura Avastha Paka*, *Amla Avastha Paka* and *Katu Avastha Paka*. The first stage is *Madhura Avastha Paka* which is related with the digestion of carbohydrate and here salivary amylase play major role. The second stage is *Amla Avastha Paka* which involves digestion of *Vidagdha* form of food in *Pachyamanasaya*. The *Amlabhava* acquire due to the secretion of acidic HCL in stomach. The third stage of *Avasthapka* is *Katu Avastha Paka* in which food material reaches to *Pakvashaya* and residual materials undergo to the fermentation process under the influence of intestinal bacteria. The bolus from of fecal matter and gases formed during this stage with characteristics odour. The Ayurveda concept of *Avastha paka* can be correlated with the modern concept of physiological process of digestion and metabolism.

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