

A Comprehensive Review over Contribution of *Agni*, *Kostha* and *Mahabhuta* in Digestion

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Abstract

Digestion is the process by which all living organism extract the principal source of energy to perform all the necessary activities. The substances ingested by living entity are needed to be made homologous with the bodily tissues for ready acceptance. This process if run successfully is the prime cause for proper growth and development of body. Even though the day-to-day lifestyle has made humans a very comfortable and progressive to ensure the joy through the life the alteration in dietary habits, sedentary lifestyle has indulged him into world of diseases as well. The type of food consumed, method of consumption like facts duly influence the process of digestion. The digestion in *Ayurveda* is mentioned in a series of events as *Avasthapaka*. This complex phenomenon is ultimately completed by *Agni* and *Panchamahabhuta* with assistance of three biological *Doshas*. The present topics elaborate the same to highlight the role of *Agni*, *Panchamahbhuta* in *Avasthapaka* with possible modern relevance.

Keywords

Agni, *Panchamahbhuta*, *Avasthapaka*, *Dosha*



Greentree Group

Received 07/11/16 Accepted 29/11/16 Published 10/01/17

INTRODUCTION

In the western schools, the *Agni* concept which is broadly known to be digestive fire is merely correlated with the digestive juices and secretions of primary and accessory organs involved under gastrointestinal system. The *Agni* is understood by sustaining the integrity of body and its organs and ultimately life by continuous transformation, transmutation, combustion, oxidation and reduction reactions which helps the ingested food to get converted into smaller constituents adaptable to bodily tissues. This is done by *Pakakarma* or biochemical metabolic processes and thus providing energy to sustain life in body to perform various physical, mental and other activities inside and through the body. The *Agni* is responsible for digestion, metabolism and absorption of proximal elements of food in a sequential pattern throughout the gut line. This *Agni* is said to be *Paramsukshma* (almost an atom like invisible) which transforms the food substances to meet the physiological and psychological requirements of body is therefore comprehensively known

something far apart from being just fire which exists in universe. The digestion is

accompanied by generation of *Ushma* (heat) which catalyses the metabolic transformations. This digestion process that occurs stage-wise throughout the gut is known as *Avasthapaka* and it is successfully completed by *Jatharagni* inside the body. Looking precisely, it can be said that *Jatharagni* has two types of actions viz., local and systemic. The former involving the gastric and intestinal digestive activities whereas the systemic involves the metabolism occurring at cellular and tissue level this can be again compared with the *Bhutagni* and *Dhatwagni*. So the digestive activities occurring throughout gut in a cascade needed to be overlooked beyond *Agni* concept and needed to be studied at cellular level.

OBJECTIVES

- 1) To highlight the *Avasthapaka* in relation to *Panchamahabhuta* correspondence from *Ayurvedic* and Modern point of view.
- 2) To explain the role of *Agni* and *Panchamahabhuta* during *Avasthapaka* from *Ayurvedic* and Modern view.
- 3) To show the digestion of constituents of food chronologically with influence of *Agni*, *Panchamahabhuta*.

REVIEW OF LITERATURE

Avasthapaka¹**:-**

The process by which the undigested food materials are broken down into smaller food materials so as to contribute to growth, development and nourishment of body is called as Digestion. The process in short involves technique by which the food particles of different form are made homologous with body tissues and organs and not contradictory naturally. This seems to be due to *Samanya* which is the only cause of increment¹. If this does not happen it leads to net loss of volume contents of body known as *Hrasa (Vishesh)* means degeneration and decay of bodily tissues.² This spontaneous digestion of ingested food substances occurring throughout gastro intestinal tract with respect to time is known as *Avasthapaka*. This *Avasthapaka* is divided into three stages in its entire length of intestinal tract.

Madhura Avasthapaka³**:-**

This stage starts just after intake of food, starting from mouth itself and extends till upper part of stomach (*Urdhva Amashaya*) involving digestion of mostly *Madhura* (sweet) substances as like carbohydrates and its derivatives. Small amounts of lipids and proteins are also being

digested from this first stage of digestion. In terms of foundation, food substances having *Prithvi* and *Aapa mahabhuta* as their constituents are mostly digested in this stage. So is also known to be *Madhura Avasthapaka*. This overall leads to vitiation of *Kapha dosha*. But it practically doesn't mean quantitative increase in *Kapha dosha* rather it leads to increase in the attributes and actions for which *Kapha dosha* is responsible. Physiologically it is seen increase in *Guru* (heavy), *Snigdha* (unctuous), *Mrudu* (soft), *Mrutsna* (slimy) attributes and simultaneously increase in weight and mass, heaviness, sleepiness, drowsiness like activities. The food substances having more than adequate quantity of *Snigdha*, *Mrudu*, *Guru*, *Mrutsna* like and taste wise enriched with *Madhura*, *Amla* and *Lavana* substances quantitatively increases more *Kapha dosha* and ultimately similar *Guna* and *Karma* in the body. The *Guru*, *Snigdha*, *Mrudu*, *Mrutsna* all *guna* shows a specific *panchabhautik* composition. The increase in these *gunas* states the increase in status of *Panchamahabhuta* composition inviting more free access to *Panchabhautikagni* to act over them for further digestion. Also if there is previously existing *Kaphaj*

vyadhimore precisely the bala of *Kaphaja vyadhi*, it also tends to increase during this *Madhura Avasthapaka* with influence of suitable conditions. This is the reason our ancient scholars mentioned to have *Areca catechu nut (supari)*, *Clove (lavanga)*, *Tambula* substances with *Katu*, *Tikta*, *Kashaya Rasato* overcome the more vitiated *Kapha dosha* during this *Avasthapaka*. The instant drinking of water after meal is over, leads to lower the digestive power as after meal your *Jatharagni* is having enough fuel⁴ in the form of food.

Why Amashaya for Madhura Avasthapaka?

Amashaya is said to be *sanchaya sthana* of *Shleshma*⁵. Thus consistent presence of *Kapha* in *Amashaya* sustains the function of hydrolyzing (*Kledana*) and softening (*Mrudvikaran*) of the ingested *Aahara*. The *Kledaka kapha* viz. juices and secretions from gastric tract moistens the food material owing to this the further digestion process becomes easy and the food stuff becomes more assimilable to *Sharir*, whereas due to lack of this moisture the food is not properly digested manifesting with *Vidaha*⁶ (Heart burns) like symptoms. Then the partially digested food is then propelled into *Pachyamanashaya* where *Pachaka pitta* acts and analyses *Sara* and *Kitta* part of the same

and completes the major part of digestive process.

Digestion of carbohydrates and lipids:-

Carbohydrates and its derivatives along with lipids molecules enter body through food and thus belong to category of proximal elements. Digestion of these substances and breaking down of macro molecules into micro which are easily assimilable viz. glucose, starts from mouth itself. The saliva secreted contains amylase (Ptylin) and lipases which acts on the same. Even it has some proteolytic enzymes but these account in a very negligible form. Further the digestion of carbohydrates and lipid occurs in gastric region as hydrochloric acid, amylases, lipases, nucleases, urease contribute to the process. The partially digested food containing carbohydrate and other proximal elements propels further in tract via peristalsis and are then absorbed from the intestinal tract through active process with energy expenditure so as to store the glucose in body for energy purpose. Hence small intestine is very well equipped with microvilli which increases the surface area for absorption. The glucose undergoing metabolism in tract and hepatic region as well is then stored in the form of glycogen in muscles and liver. Excess of

glucose is then dispersed from liver and expelled in circulation increasing blood

sugar level giving rise to hyperglycemic condition in certain circumstances.

Table 1 Depicting the *Avasthapaka* and the status of *Guna*, *Dosha*, elemental constitution and their outcome as respective function

Sr.No	Guna / Attribute	Panchabhautik Composition	Avasthapaka	Dosha	Karma
1	Guru	Prithvi + Aapa			
2	Snigdha	Aapa			
3	Mrudu	Aapa			
4	Mrutsna	Aapa	Madhura	Kapha	Kledana (Moist), Mrudvikaran (Softness), Gaurav (Heavyness), Glani (Drowsiness), Tandra (Dizziness)
5	Slakshna	Aapa			
6	Madhura	Prithvi + Aapa			
7	Lavana	Teja + Aapa			
8	Ushna	Teja			
9	Tikshna	Teja			
10	Laghu	Vayu			
11	Snigdha	Aapa	Amla	Pitta	Anna pachana (Digestion of food), Sara Kitta vibhajana (Analysis of useful and waste products after digestion of food), Trushna (Thirst), Daha (Burning sensation)
12	Amla	Prithvi + Teja			
13	Ruksha	Vayu			
14	Khara	Vayu			
15	Katu	Teja + Vayu	Katu	Vata	Vatanulomana (Flatus), Purish vegoudirana (Defecation), Kshudha (Hunger), Laghavta (Light weightedness)
16	Tikta	Aakash + Vayu			
17	Kashaya	Prithvi + Vayu			

***AmlaAvasthapaka*⁷:-**

It is the second stage of digestion starts with the partially digested food propelled from *Amashaya* into *Grahani*. In this stage the whole bolus gets tinted with *Amla rasa* viz. change in its natural taste due to mixture of gastric juices and chemical reactions over it. This is the *Sanskar* done by *Jatharagni* over it. Here digestion of almost all substances is done with pavement of *Sneha* (unctuous), *Laghu* (light weighted), *Ushna* (hot), *Tikshna* (sharp) *guna*. The increase in these *Gunas* states the increase in *Pitta* dosha having similar attributes thus contributing digestion by over heat. Moreover the

increased *Ushna*, *Tikshna* *Gunamanifests* over presence of *Teja Mahabhuta* and assimilation of its own components so as to make them homologous with bodily tissues. Many a times it is seen that during this stage the excess *Ushna Tikshna Gunaleads* to increase in *Vidaha*, *Trushna* (thirst). Involvement of dosha-the *Pachaka Pittais* said to be working under *Tyaktadravatva*⁸ circumstances it clearly states the highly acidic nature involving hormonal and enzymatic reactions producing heat which initiates at duodenum where the pancreatic duct, hepatic duct along with cystic duct from gall bladder

comes together. They major digestion process takes place here as all the enzymes and secretions necessary for degradation of proteins, carbohydrates, fats, nucleic acids, minerals acts here. Also if there is previously existing disease of *Pittaja Vyadhi*, the *Bala* of *Pittaja Vyadhi* thereby increases with influence of suitable conditions. Thus it would prove fruitful to have water only after 1-2 hours after ingestion of meal as it accompanies the digestion process.

Digestion of proteins:-

The crucial components of all the proximal elements are proteins which are being digested after crossing the gastric limitations in the tract. The proteins which are nitrogenous products being made up of amino acids are broken down in presence of highly degradative proteolytic enzymes and similar secretions. Thus it starts from intestinal tract where the secretions from liver, gall bladder, pancreas and intestine itself get aggregated. The essential enzyme and secretion are Pepsin, Trypsin, Chemotrypsin, Carboxypolypeptidase, Enterokinase, Secretin and Cholecystokimin-Pancreozymin; so all this secretions and enzymes together combats the protein molecules and breaks down into

amino acids through de-amination process in liver. These formed amino acids are then rejoined to form a new protein molecule so as to give a structural entity and maintain the integrity of body tissues through the process of trans-amination.

***KatuAvasthapaka*⁹:-**

It is the last stage of digestion, principally occurring at *Pakvashaya* (large intestine). After *Madhura* and *AmlaAvasthapaka*, the remnants are forcefully pushed into *Pakvashaya* where the even more *Saara* part is absorbed making the remnant dry, as a dry mass. This dry mass is then propelled through tract and increase in *Ruksha* (dry), *Khara* (rough) *Guna* assembling attributes of *Vata dosha*. Seeking through their *Panchabhautik* composition, the digestion and further assimilation of substances constituted by *Vayu* and *Akash Mahabhuta* occurs here. There is also change in *rasa* which is *Katu* (bitter), which is also responsible for vitiation of *Vata dosha*. Also if there is previously existing disease more precisely *Shakruta graha* or any *Vataja vyadhi*, it tends to increase during this *KatuAvasthapaka* with influence of suitable conditions. The movement leads to easy propulsion of remnant through the tract or else the dry mass is then difficult to move

through it leading to constipation. In the next meal timing, we starts ingesting food as usual following pseudo hunger and without movement the remnant remains stagnated in the tract leading to increased severity of constipation and this vicious cycle goes on.

Digestion and absorption of proximal elements:-

The large intestine is meant to reabsorb the nutrients and all other substances which are useful to body and specially water. Thus it is well developed with musculature. The processed and digested food items which after crossing small intestine propels through tract and enters colon where the water is specially absorbed and the final fecal matter is developed and is given the structural entity.

Influence of Agni during the process of digestion¹⁰:-

The *Jatharagni* is mainly responsible for the digestion of ingested food which is mainly constituted of *Panchamahabhutas* indeed; which transforms the macro to micro molecules. This altogether makes the bolus very assimilable, homologous and easily digestible which is then acted upon by *Panchabhutagni*. All the cells and other components of body are made up of *Panchamahabhutas* and which are needed to

be nourished and developed from time to time which is possible by supplement of ahara ultimately made up of *Panchamahabhutas*. *Panchabhautikagni* are the factors responsible for conversion of these five elements homologously into body tissues. In other words, after the digestion of food by the *Panchabhautikagni*, the digested materials containing the elements and qualities similar to each *Mahabhuta* nourish their own specific metaphysicalelements of the body.

In terms of modern system after the principle digestion is over in intestinal gut the processed food which is obviously to be made homologous to body tissues is then absorbed via villi and is circulated systemically. Prior to entering into the systemic circulation it is incorporated into liver tissues for metabolism to their simplest and tiny forms. Eg. Carbohydrates to Glucose, Proteins to Amino acids and Lipids to Fatty acids. Then finally the processed, conjugated and metabolized contents are then circulated systemically to heart and from it throughout body. From *Ayurvedic* perspective, the *Panchabhautik* contents are then metabolized and are made easily homologous to absorb by their respective factor which is meant to

transform the *Panchabhautik* elemental form in the bolus to increase the same *Panchabhautik* elemental form present inside *Sharir*. Now the easily converted constituents by *Panchabhautikagni* which are circulated throughout body enter body tissues. These respective elemental forms are responsible for growth and nourishment of the body tissues subject to again conversion into homologous forms of the respective tissues. So there needs a factor which converts these contents to similar contents of respective body tissues to incorporate the growth and nourishment of the same. This conversion factor indicates *Dhatwagni* which is nothing but the smallest form of the principal *Jatharagni*.

In view of this *Dhatwagni*, there emerges a different approach now-a-days that the hormones secreted by the thyroid gland are in action in such a way that they regulates and controls almost all the major tissues of body. Moreover the hyper and hypo functioning of body tissues eventually depends on the hyper and or hypo secretion of these hormones. Also the basal metabolic rate is maintained by the thyroid gland by influence of Tri-iodo-thyronine and Tetra-iodo-thyronine. As *Dhatwagni* is said to be the *Agni* that residing in tissues, is

responsible for the flourishing or deterioration of the tissues itself subject to the essential nutritional content supplied to it after being processed by *Jatharagni* and *Panchbhautikagni*. This can show a very close resemblance towards thyroidal hormones but on actual side it is hard to prove without any evidence regarding the same.

***Koshta* and its impact over digestion process^{11,12}**

The *Koshta* or in practical terms the gut line decides the fate of digestion and its possible outcomes. The *Koshta* is the term in *Ayurved* which indicates the meta-physical nature of the gut line depending on which the influence of *Dosha*, defecation process and therapeutic implementation is predicted and is assessed. Depending on the condition of the gut line or *Koshta*, the same is divided into three major types- *Krura*, *Madhyam*, *Mrudu*.

We often come across some peoples who have urge of defecation simply by ingestion of milk, tea, coffee or same. This shows the impact of *Drava*, *Mrudu guna* of *Pitta* which dominates the gut line and is unable to hold the contents in the same for a certain period of time. The result is expulsion of these contents as soon as they are ingested

which initiates the irritation to gut line mucosa and increases the motility of intestine. This accounts to *MruduKoshta*. Whereas we also come across some of the peoples who suffer from a constipation problem and even to such a severe extent that they have to endorse medication like laxatives or strong purgatives to relieve the same. This account the manifestation of *Ruksha, Shita guna* of *Vata dosha* dominating the gut line which perhaps restricts the intestinal motility and the contents in intestine stuck there for a longer period of time. This induces constipation and the problem vitiates with time and intake of homologous food stuffs repeating the vicious cycle. This manifests the *KruraKoshta*. While some of the peoples have regular and controlled defecation and intestinal motility. This shows the impact of *Sthira, Snigdha* and *Mandaguna* of *Kapha* dosha dominating gut line due to which it is possible to hold and maintain the contents in the gut line for a considerable span of time. Thus there is no need of any medication and no any abnormality regarding intestinal movement. This is indicative of *Madhya Koshta*.

Role of *Doshas* in digestion process-

In view of *Jatharagni* and its principal function of digestion, there exists an influence of *dosha* and their subtypes. The digestion is assisted by *Prana vayu*¹³ which enables and propels the food to inside the body from outside through mouth. The contents while propelling downwards in gastro intestinal tract, the *Kledaka kapha*¹⁴ moistens the bolus and makes it easily assimilable and digestible into a semi solid structure. Going below again the *Pachaka pitta*¹⁵ is responsible for actual digestion, analyzing and segregation of *Saara* and *Kitta* part of the food bolus. This is again assisted very rhythmically in healthy individuals by *Samana vayu* by its functions mentioned duly – *Grunhati, Pachati, Vivechayati, Munchati*¹⁶. The useful *Saara* part is then absorbed and transported to *Hridaya* from *Grahani* with the help of *Samana vayu*¹⁷, from there the *Vyana vayu*¹⁸ spreads this essence of *Saara* part throughout body and tissues. Mean while the useless and *Kitta* part is then expelled outside body after prior expelling the same in *Pakvashaya* with the help of *Apana vayu*¹⁹. The *Saara* part is then acted upon by the *Dhatwagnis* to convert the same into homologous part to that of bodily tissues. Morphologically the *Saara* part after

Munchati is brought in front of *Yakrita* (liver) tissues to convert again into a digestive, assimilable form indicating the existence of *Panchabhautikagni*.

CONCLUSION

- 1) After the above detailed discussion it is clear that the *Agni*, *Panchamahbhutas* carry a crucial importance in all body activities especially digestion.
- 2) Even though the *Agni* is responsible for digestion of food, it is unable to carry out its function without assistance of *Dosha*. This suggests the dominance of *Dosha* by influence of them on *Agnis* and *Panchamahbhutas* as well.
- 3) The type of food items consumed directly or indirectly decides the duration and overall progress of digestion after having meal. This again is influenced by the doshas and their respective *Gunas*. The entry of food inside body upto expulsion of excreta all the events occurring thereby are assisted by *Guna*, *Dosha* and *Agni*.
- 4) The morphological and chemical status of gut line decides the digestive prognosis and is helpful from therapeutic and *Panchakarma* point of view.
- 5) Liver is the site of *Bhautikagni* this can be stated clearly from logical point of view

but the evidence regarding the same on experimental basis again remains the debate full question.

6) Similarly another point of view can be postulated showing the similarity of thyroid hormones with *Dhatwagni*. This can be crossed by the view that showing thyroid hormones as *Dhatwagni* may create a controversy as *Dhatwagni* of each tissue must be logically located at each respective tissue level and not at a single site. But as the growth and deterioration of all the body tissues are under the working status of thyroid hormones it can be correlated and needs more specification.

7) *Jatharagni*, its visibility, its resemblance with *Pitta* and its site is yet another issue. The *Jatharagni* or *SharirasthaAgni* and *Pitta* are inter-related by *Ashraya Ashrayi* relation then the four types of *Jatharagni* again by *Vata-Pitta-Kapha* and *tridosha* is how possible?

8) On the other hand it is very clear that this *Jatharagni* is mainly responsible for digestion of all types of items entering into body through oral route and this is very well accompanied and dependant on elemental constitution of that content, the status of three biological humors inside body viz. *Sharir Doshas*.

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