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COMPARATIVE STUDY OF AVASTHAPAKA IN AYURVEDIC LITERATURE AND CONCEPT OF DIGESTION IN MODERN SCIENCE

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ABSTRACT

As per Ayurvedic methodology our body is formed by *Panchamahabhutas*, in *Panchabhautic Sharira* various metabolic process are going continuously resulting into loss of various elements. Acharya Charaka stats that body is outcome of *Ahara* and *Agni* plays major role in digestion and metabolism of *Ahara*. When the *Ahara* comes into *Agnikshetra* and processing by *Agni* is started on it. *Ahara* is transformed slowly and *Rasa* of *Ahara* changes as per the place of digestion in Alimentary canal. This changing of *Rasa* of *Ahara* is called as *Avasthapaka*. It is seen that the place where the *Rasa* of *Ahara* changes and the digestion of carbohydrates proteins and fat in that place according to modern science – is exactly the same.

KEYWORDS: *Ahara, Agni, Agnikshetra, Aharapaka, Avasthapaka*.

INTRODUCTION

Ayurveda is the most ancient science of life. The concept of *Aharapaka* in Ayurveda we must know the role of *Agni*[1] in digestion of consumed diet containing all elements firstly gets digested in *Amashaya* by the action of *Jatharagni*. After this initial digestion and related metabolic process specific elements get metabolised by related *Agni* known as *Bhutagni*. Formation of *Dhatus* (tissues) is possible only by maturation of basic elements by particular type of *Agni* i.e. *Dhatwagni*. While eating, food masticated and then swallowed. The process is called as *Nigiran*. It is also called as *Aadan* of *Ahara*. Due to *Aadan Ahara* enters the field of *Agni*, *Aharapaka* starts and *Ahara i*s transformed through three *Avasthapaka*.[2] *These are Madhura Avasthapaka*[3], *Amla Avasthapaka*[4] and *Katu Avasthapaka*.[5]

The processes that are explained under *Avasthapaka* can be correlated with the digestion of food according to modern science, which stats that digestion is the process that is characterised by specific sequence of events following the digestion of foods. These events allows the food to interact with the various secretions such as enzymes, emulsifying agents, acids, or alkaline substances thereby facilitating the breakdown of complex molecules into simpler molecules under optimal pH. Which is very place specific. For correlation, process of Digestion can be divided into three places of Alimentary canal.[6] As *in* Mouth and upper part of stomach. Lower part of stomach and small Intestine and Large intestine.

AIMS AND OBJECTIVES

1. To study three *Avasthapakas* with respect to *Aharapaka kriya*.
2. To study digestion of food according to modern science in stomach, small intestine, and large intestine.
3. To compare *Avasthapaka* in Ayurved and digestion of food in modern science.

MATERIALS AND METHODS

1. Madhura Avasthapaka (Prathamavastha/Avidagdhavastha)

Explanation according to Ayurved

It is the first phase of *Aharapaka*. in oral cavity at the time of mastication, *Bodhaka kapha* is mixed with the food and the Rasa of this undigested food becomes Madhura. Due to *Adan* food enters to the *Urdhva Amashaya*. Here food is mixed with *Kledaka kapha*. The food again becomes *Madhura*. In first *Avasthapaka pruthvi and aap mahabhut* predominant elements are degraded and formation of *Fenbhoot kapha* having predominance of *Pruthvi* and *Aap Mahabuta*.

Digestion in Mouth and Stomach according to Modern science

Digestion of Carbohydrates[7]

Carbohydrates Foods of the Diet- Major sources are sucrose, lactose and starches other in slight extent, which are amylose glycogen etc. When food is chewed, which contains the digestive enzyme ptyalin (an α amylase) secreted mainly by the parotid gland. the disaccharide and other small polymers of glucose that contain 3-9 glucose molecules. In stomach an α amylase converts 40 % of starches into maltose and glucose polymers. In small intestine digestion by pancreatic enzymes (α amylase) 50-80% starches converted to maltose and glucose before passing beyond duodenum. Thus the final product of carbohydrates digestion are all monosaccharides, they are water soluble and sweet in nature.

2. Amla Avasthapaka (Dvitiyaavstha/Vidagdhavstha)

Explanation according to Ayurved

It is the second phase of *Aharapaka.* After *Madhura Avasthapaka*, food becomes *Vidagdha* (acidic) and its rasa changes to *Amla.* According to Acharya Charak, when *Ahara* is propelled into *Amashaya* it is mixed with *Pachaka Pitta* and becomes *Vidagdha* and *Amla*. In Ashtang Hridaya it is stated that – in *Amla Avasthapaka*, complete food becomes Amla and Pitta is formed.

Digestion of Food in Lower Part of Stomach and Small Intestine According to Modern Science

Digestion of Protiens[8]

Proteins of the diet. Dietary proteins are chemically long chains of amino acids bound together by peptide linkages. Digestion of proteins in the stomach. Pepsin, an important peptic enzyme of the stomach, is most active at pH 2.0-3.0. Partial cells (oxyntic) in the glands secret hydrochloric acid of pH of about 0.8 due to mixing with the food it averages to 2.0-3.0, a highly favorable range for pepsin activity. pepsin only initiate the process of protein digestion, usually providing only 10-20% of the total protein digestion to convert the protein to proteoses. most protein digestion results from actions of pancreatic proteolytic enzymes. the major proteolytic pancreatic enzymes: trypsin, chymotrypsin, carboxypolypeptidase and the elastase. due to these enzyme polypeptides are converted into tripeptides, dipeptides and finally into amino acids. HCl is secreted from Parietal cells. It is mixed with the food and food becomes acidic and sour. Moreover, in small intestine, Bile and pancreatic juices are mixed with the food and food remains acidic.

3. *Katu Avasthapaka (Trutiyavstha/Pakvavstha)*

Explanation according to Ayurved

It is the third phase of *Aharapaka.* In small intestine, after digestion of food, nutrients are absorbed. The remaining part of food is pushed forward into large intestine. In large intestine, fats and watery content of food is absorbed and food is transformed into semisolid *malabhaga (Purisha*, Feces).

Due to this absorption, food becomes dry, semisolid and *Katu* in taste. Hence this phase is called as *katu Avasthapaka*. Due to dryness and *katu rasa*, in this *Avasthapaka, Vata dosha* is formed.

Digestion of Food in Large Intestine according to Modern Science

Digestion of Protiens[9]

fats of the diet - are the neutral fat, also known as triglycerides, each molecule of which is composed of a glycerol nucleus and three fatty acids side chains. lingual lipase -lingual glands of the mouth less than 10% of digestion of triglycerides. gastric lipase fonds area of stomach less than 10% of digestion of triglycerides. Pancreatic lipase essentially all triglycerides are digested by pancreatic lipase to monoglycerides and glycerol.

During digestion process in large intestine, formation of gases can be noted as follows--

1. After digestion of Carbohydrates – Formation of CO2
2. After digestion of Cellulose — Formation of Methane
3. After digestion of Protein — Formation of Indole and Skotol

Thus after the completion of digestion in large intestine, gases are formed. These gases are excreted separately or along with faces.

RESULT

A: Comparison of *Madhura Avasthapaka* and digestion of food according to modern science Table 1

Comparison points	***Madhura Avasthapaka***	**Digestion of Carbohydrates**
Place	*Mukha Urdhava Amashaya*	Mouth funds of stomach (upper portion of stomach)
Formation of *Rasa*	*Madhura Rasa*	Formation of glucose, fructose water soluble and sweet in taste.
End product	Kapha having characteristics of *Guru, Manda, Hima, Snigdha.*	Glucose having same characteristics (Kapha increasing factor) like *Kapha Dosha*.

B - Comparison of *Amla Avasthapaka* and digestion of food according to modern science – Table 2

Comparison points	**Amla Avasthapaka**	**Digestion of protiens**
Place	*Adho Amshaya*	Lower portion of stomach. (initial portion of small intestine)
Formation of *Rasa*	*Amla Rasa*	Due HCL and pancreatic enzymes food become acidic or sour,
End product	*pitta* having characteristics of *Tikshna, Ushna, laghu Vinstra, Sara, Dravam.*	Amino acids which resemble with the characteristics of *pitta.*

C - Comparison of *Katu Avasthapaka* and digestion of food according to modern science – Table 3

Comparison points	*Katu Avasthapaka*	Digestion of fats
Place	*Pakvashaya*	Small and large intestine.
Formation of *Rasa*	*Katu Rasa*	Emulsification of fat forms fatty acids having bile salts and bile pigments from liver.
End product	Vata having characteristics of Ruksha, Laghu. Khara.	During digestion by bacteria, various gases are formed. E.g. CO2, Methane, Indole, Skatol etc.

DISCUSSION

Strength of stages of digestion depends on what type of food is ingested. If heavy, sweet ood is eaten, first stage of digestion proves to be strong, generating large amount of *Kapha*. If spicy, hot food which creates burning sensation to mucus membrane, is eaten; second stage of digestion proves to be strong, generating large amount of *Pitta*. If very less very light, least nourishing food is eaten; third stage of digestion proves to be strong, generating large amount of *Vata*. Hence it is important to have *Shadrasatmaka Ahara* i.e. Food which contains six Rasas.

These stages are due to inborn location of *Dosa*. In upper part of body, above heart, *Dosa Kapha* prevails by default. Hence food when traverses this part of body through gastrointestinal tract, first stage prevails. In middle part of body, between heart and umbilicus, *Dosa* pitta prevails by default. Hence food when traverses this part of body through gastrointestinal tract, second stage prevails. In lower part of body, below umbilicus, *Dosa Vata* prevails by default. Hence food when traverses this part of body through gastrointestinal tract, third stage prevails.

During *Avasthapaka* process, *Doshas* do not raise up to remarkable level So they cannot cause any discomfort to *Indriya*, *Mana* and *Atma*. Hence they cannot cause diseases.

CONCLUSION

From above tables, it can be concluded that –

In Ayurved, *Aharpaka* is explained in terms of three *Avasthapakas*. There are distinct places in Alimentary canal where these *Avasthapakas* occur. If the digestion process which takes

place in these respective places of *Avasthapakas* is considered, it is seen that, there is similarity in Ayurvedic aspect of *Avasthapaka* and digestion according to modern science.

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