CONCEPT OF AGNI AND AHARA PAKA (METABOLIC TRANSFORMATION) IN AYURVEDA

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ABSTRACT

According to Ayurveda "Sarvam dravyam Panchabhautikam" i.e all creation arises out of five great elements known as mahabhutas. As per Ayurvedic theory, like all the universal matter our body is also formed by the panca mahabhutas. In this pancabautika sharira various paka (metabolic transformations) are going on continuously. Agni is a key factor in transformation of consumed ahara viharadi dravyas of vijatiya origin to sajatiya nature and converts the food consumed and produces energy. In these sequences, the term Agni comprehends various factors which participates and regulate the course of digestion and metabolism. The paper tries to validate this theory scientifically.

Keywords: Agni, ahara paka, panchabhautika sharira, Digestion, Metabolism

INTRODUCTION

The definitions from Vachaspatiyam, Sabda kalpadruma, Unadikosha, Agni has been described as the one who carries everything, moves everywhere, which can metamorphoses substances, which can bring transformation in substances, assimilates, which gives and takes, which has the capacity to enter into minute channels, which burns, which glows etc. All these definitions of Agni clearly states that Agni is the important key factor for transformation. Agni is key factor in transformation of consumed ahara viharadi dravyas of vijatiya origin to sajatiya nature. Agni is derivative of tejas (fire) mahabhuta, it carries metabolic transformations in which the inherent feature is change. Agni is having 13 categories. Jatharagni (1 type) looks after the functions of food digestion and absorption. Bhutagni (5 types) turns all the vijatiya panchabhautika dravyas consumed to sajatiya panchabhautika dravyas, i.e. conversion of heterogenous to homogenous. Dhatvagni (7 types) performs Synthesis and breakdown of tissues. Metabolic transformations occur after consumption of food. That leads to formation of two parts, Prasada (essence) and kitta (excretory waste). The Doshas and Dhatus, etc., get nourished by Prasada part (nutrients). Kitta part (metabolic waste) is to be excreted from the body in different forms. In Ayurveda the concept of agni and ahara paka (Metabolic transformation) provides an extensive field of research in the present day.

AIMS AND OBJECTIVES

1. To emphasize and discuss the Concept of Agni and ahara paka (Metabolic transformations) in Ayurvedic classical literature.
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2. To evaluate the process of digestion and metabolism in Ayurvedic classical texts and in modern texts.

MATERIALS AND METHODS

Basically this article is a review of various Ayurvedic classical texts. Materials related to agni, ahara paka (Metabolic transformations) in Ayurveda and other related topics have been collected from various Ayurvedic classical texts. The references were compiled, analyzed and discussed for a thorough and in-depth understanding of the concept of Agni and ahara paka (Metabolic transformations) in Ayurveda. The samhitas used in the present study were Charaka samhita, Shushruta samhita and Astanga Hridaya with commentaries on them. The modern medical literatures as well as other various related information were collected from related websites.

Agni

Agni converts food in the form of energy, which is responsible for all the vital functions of our body. Therefore, Ayurveda considers that Dehagni is the cause of life, complexion, strength, health, nourishment, lusture, oja, teja (energy) and prana (life energy)⁴. About the importance of Agni, Acharya Charak has mentioned that after stoppage of the function of Agni, the individual dies, and when the Agni of an individual is sama, then that person would be absolutely healthy and would lead a long, happy, healthy life. But, if the Agni of a person is vitiated, the whole metabolism in his body would be disturbed, resulting in ill health and disease. Hence, Agni is said to be the base (mool) of life⁵. Agni means it is a substance responsible for digestion and metabolism. All the 13 categories of agni are key factors in transformation of consumed ahara viharadi dravya of vijatiya origin to sajatiya nature.

Agni and Pitta

The term Pitta is derived from "tapasantape"⁶. Pitta is the factor, which regulates all the thermo dynamics, Chemo dynamic activities in the body, in which function of agni are a part⁷. Agni within the body is the change in the state of food substance in the amashaya and pakwasaya in the course of digestive process. In avasthapaka there are two phases called prapaka and vipaka. Prapaka phase contains three phases, Madhura Bhava, Amla Bhava and Katu Bhava.
Madhura Bhava in the Adho Amashaya: This phase commences from the entry of food into the mouth. Propulsion of food from the mouth to the Urdhva amashaya is brought by Prana Vayu (One type of Vata dosha out of five types, Prana, Samana, Vyana, Udana, Apana). This aspect of digestion in the upper portion of Urdhva amashaya is comprehended by Madhura bhava. The process of digestion, especially the fraction of it commences in the mouth, under the influence of Bodhaka Kapha. Bodhaka Kapha is one type of Kapha out of five types (Kledaka, Avalambaka, Tarpaka, Bodhaka, Sleshaka) responsible for taste perception, equalant to saliva. This stage of digestion is reminiscent of salivary digestion and completed in the fundus of stomach. The insoluble starch polysaccharides are converted to soluble dextrin, under the influence of salivary amylase (ptyalin). Salivary amylase action is bhinnasamghata (spitting) brought about by hydrolysis. The final rasa (taste) of the resultant product in the upper portion of the Urdhva amashaya (fundus of stomach) is Madhura and completed in the Urdhva amashaya (fundus of stomach). The insoluble starch polysaccharides are converted to soluble dextrin, under the influence of salivary amylase (ptyalin). Concept of Bodhaka Kapha is parallel to saliva secreted by the salivary glands. The action of Bodhaka Kapha on food, converts insoluble madhura portion to soluble and mixes up with the frothy Kledaka Kapha (mucous) present in Urdhva amashaya.

Amla bhava of Avasthapaka in pachyamanashaya: Digestion of proteins and fats occur in this stage by Pachaka pitta (HCl) secreted by the cells of the mucus membrane of the stomach. This makes the commencement of the Amlabhava or the acid (sour) phase of prapaka. This Paka (digestion) involves the conversion of insoluble proteins into the soluble ones under the influence of enzyme pepsin in the presence of HCl. This aspect of prapaka does not seem to have anything to do with the digestion of the end products of Madhura Paka. The outcome of this phase is acidified chyme. It is in pakhapakwam stage (not fully digested). It has to go for further digestion in adho amashaya. The partly digested food which has attained amlabhava is moved down and stimulates the humoral mechanism in Adho Amashya and discharge of Accha Pitta into it. Accha pitta (pancreatic juice) is secreted. The concept of accha Pitta includes the gall bladder, bile and pancreatic secretions, responsible for digestion of fats, proteins and carbohydrates. Acidified chyme passes down from the pylorus to the duodenum. It stimulates the Brunner's (duodenal) glands to secrete a number of intestinal juices. These are responsible for bile and pancreatic secretion to the duodenum for further digestion of partly digested carbohydrates, proteins, and fats of the chyme.

The Katubhava of Avasthapaka in Pakvashaya: It is the third phase of Avasthapaka describes the events in the pakwashaya (large intestine) leading the formation of faeces and gases. This aspect relates to the acrid and pungent (katu) nature of reactions that occur in the large intestine. The material passed down from the amashaya and reached the pakwashaya, is dehydrated (soshyamana) and converted in to lumps by heat, an acrid and pungent
(katu) gas being produced in the process\(^{14}\). The foregoing modern contribution is seen not only to confirm but also amplify the ancient Ayurvedic version of events that take place in the large intestine and the formation of feces with production of pungent Vayu\(^{15}\).

**Vipaka: Post-Digestive Effect**

The ultimate change in the *ahara rasa* that occurs at the end of digestion of *Jatharagnipaka* is called as *Vipaka*.\(^\text{16}\) According to Acharya Charaka, the six *rasas* yield three kinds of *Vipaka*. *Madhura* and *Lavana rasa* yield *Madhura vipaka* (sweet). *Amla Rasa* to *Amla Vipaka* (sour). *Katu, Tikta, Kasaya Rasa* to *Katu Vipaka* (acrid, pungent).

**Secondary Digestion – Metabolism:** The *Bhutagni paka* and *Dhatvagni paka* comes under Secondary Digestion and Metabolism.

**Bhutagni paka**

*Bhutagni* is the one that is present in a basic element (*Bhutas*). There are five *Agnis* in each of the five basic elements, namely, *Parthiva* (earth), *Apya* (water), *Tejas* (agni), *Vayavya* (vayu) and *Nabhasa* (akash). Each and every cell in our body is composed of the five *mahabhutas* (*panchabhoutika*). Each cell (*dhatu paramanu*) consists of these five *bhutagni* also. All the nutrients in this world that we eat also consist of the same five basic elements with their respective *agni*. Thus, they are completely similar with respect to the five basic elements with their *bhutagni* in our body cells as well in the entire outside nutrient that we ingest for the nutrition of our body. The *panchabhoutika sharira* is to be maintained and nourished with the *bahya panchabhoutika amshas*. To convert such alien *amshas* to part of the body there exists a process of *paka* (Metabolic transformation), which is attributed to *Bhutagni*. The five *Bhutagnis* digest their own part of the element present in the food materials. After the digestion of food by the *bhutagni*, digested materials containing the elements and qualities similar to each *bhutas* nourish their own specific *bhoutika* elements of the body. So, all the exogenous substances must be subjected to *Bhutagni paka* to become endogenous. Thus cause appropriate nourishment of tissues\(^\text{17}\). In the modern physiological perspective, the action of the *Bhutagni paka* can be equated with the conversion of digested materials in the liver\(^\text{18}\). The Vitamins, Essential amino acids, Essential fatty acids are to be supplemented essentially through the food for the conversion of concerned molecules in to the body tissues on to yield energy\(^\text{19}\). Thus the essential factors supplemented through food for the synthesis of this *panchabhoutika sharira* can be considered as *Bhutagni amshaas*, i.e. Vitamins, Essential amino acids, Essential fatty acids. The process of *Bhutagni paka* should start immediately after digestive process in GIT. Hence *Bhutagni* function starts immediately after absorption i.e. portal circulation to the liver ends before assimilation by delivering *asthayi dhatwamshas* into the circulation through hepatic vein. So the *Bhutagni* functions are carried in the portal system, liver and vascular system through which *ahara rasa* is circulated in the body for nourishing the *rasadi saptadhatu*. Hence liver is considered as centre of *Bhutagni vyapara*\(^\text{20}\). According to the physiology of Ayurveda, *Bhutagni paka* follows *jatharagni paka* and it completes the process of intestinal digestion. After completion of *Bhutagni paka* only, the formation of *ahara*.
Dhatvagni – Tissue metabolism

That which promotes the growth of sharira (body) is dhatu. Dhatus are seven in number, Rasa, Rakta, Mamsa, Meda, Asthi, Majja and shukra. Sapta dhatus get nourishment from ahara rasa or the chyle. chyle is the end product of digestion. Each dhatu is of two kinds, Asthayi (mobile or non static) or poshaka (meant to nourish) and Sthayi (fixed, sthira, static, already formed and existing) or poshya. Srotamsi do not transport Sthayi (poshya) dhatus. Dhatus are formed consecutively, one after another, from the Poshaka or asthayi dhatus. Dhatvagnis are seven (Rasagni, Rakagni, Mamsagni, Medogni, Asthayagni, Majjagni, shukragni), located in its own dhatu (tissues). After Jatharagni paka and Bhutagni paka adya ahara rasa (chyle) circulates in the body to reach all tissues. The circulating constituents of ahara rasa were selected by dhatu (tissue) through kalekapotha nyaya (law of selectivity - analogy of the pigeons carrying grains from a threshing field and flying out in different directions). Hence if Dhatvagni gets more vruddhi, tissue delivers more action and there by more catabolic activity (Dhatu kshaya). If Dhatvagni is of low profile only tissue synthesis takes place resulting in dhatuvruddhi. Functions of Dhatvagnis are mainly two. One is synthesis of new tissue. Second is to yield energy for the function of tissue. If Dhatvagni is impaired both of these will impair. Seven categories of agnis, & dhatus undergo metabolic transformation in two different ways for the sustainers of the body. One is Prasada paka and another is kitta paka. The Prasada paka is stated to yield the seven kinds of poshaka or Asthayi dhatus. kitta paka is the waste products.

The nutrient fraction of rasa (plasma) provides nourishment to rakta (blood), that of rakta (blood) to mamsa (muscle tissue), that of mamsa to medas (fat), that of medas to asthi (bone), that of asthi to majja (bone marrow), and the nutrient fraction of majja provides nourishment to shukra. The foetus (garbha) is the product of nutrient fraction of shukra. Each one of the seven kinds of poshaka or Asthayi dhatus is stated to be transported, as it is formed, to the respective poshya (sthayi) dhatus, through srotas (channels), specific to each such sthayi dhatu for being built up as part of the latter. These srotas are known as dhatuvaha srotamsi. These srotas are seven (Rasa vaha srotas, rakta vaha srotas, mamsa vaha srotas, meda vaha srotas, asthi vaha srotas, majja vaha srotas, shukra vaha srotas) in number. The nutrient fraction of Rasa, Rakta, Mamsa, Medo dhatus helps in formation of Upadhatus (subsidiary tissue).

DISSCUSSION AND CONCLUSION

Agni converts food in the form of energy, which is responsible for all the vital functions of our body. Agni is the invariable agent in the process of ahara paka (metabolic transformations). Ingested food is to be digested, absorbed and assimilated, which is unavoidable for the maintenance of life, and is performed by the Agni. Agni means it is a substance responsible for digestion and metabolism. In the first stage of digestion madhura bhava is manifested by the action of salivary amylase on starch, digestion of carbohydrates occur into simpler forms (glucose) rendering it fit for absorption. In the second stage of digestion amla bhava is manifested by release of
Accha pitta (bile/pancreatic secretions) resulting into acidified chyme formation in Urdhva amashaya (fundus of stomach) and pylorus of stomach. In parallel to modern physiology, digestion of proteins and fats occur in this stage resulting into simpler forms, i.e., amino acids and free fatty acids. In the third stage of digestion the absorption of nutrients occurs in the large intestine and formation of feces with production of pungent vayu (Katu bhava) occur. The ahara rasa which is having madhura and lavana rasa gets Madhura vipaka, amla rasa gets Amla Vipaka, Katu, Tikta, Kasaya rasa gets Katu Vipaka. Bhutagni, ignited by Jatharagni transforms the Vijatiya Annarasa into Sajatiya Poshaka dhatus (organism specific). After Jatharagni paka and Bhutagni paka adya ahara rasa (chyle) circulates in the body to reach all tissues. Dhatus that are formed consecutively, one after another, from the Prasada bhaga as Poshaka or asthayi dhatus. Kittabhaga is eliminated out as metabolic waste product. Ayurveda signifies its relevance with modern physiology of digestion and metabolism thus providing an extensive field of research and scientific status in the present scenario.

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