

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 *pancabhautika 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 *Vachaspatyam*, *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.^{1,2,3}. 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.

2. To evaluate the process of digestion and metabolism in *Ayurvedic* classical texts and in modern texts.

MATERIALS AND METHODS

Basically this article is 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 represented by heat of the *pitta*. In normal state it brings proper digestion, Vision, joy, happiness, maintains normal bodily heat and normal complexion. In abnormal state it brings indigestion, loss of vision, fear, anger, bewilderment, abnormal bodily heat and abnormal complexion⁸. *Agni* and *pitta* both have few similarities and dissimilarities. The similarities of *agni* and *pitta* are *dahana*, *pachana karmas* and similar response to *sheetala*, *ushna*. Both are possessing moieties of *agni mahabhoota*. The Dissimilarities are, *agni* is *sushka* and *ruksha* in nature, *Pitta* is *drava* and *snigdha*. *Agni* maintains *pakadi karmas* but *pitta* maintains *dhi*, *buddhi*, body maintenance in addition to *pakadi karmas*. *Ghrita* causes *agni vruddhi* and *pitta shamana*. *Pitta* has got wider aspect of functions apart from *agni* functions. *Agni* has got similar function to that of *pitta* in aspects of digestion and metabolism.

Jatharagni Paka

Jatharagni Paka (Gastro intestinal digestion) is described as *Avasthapaka* in *Ayurveda*. *Avasthapaka* 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*⁹ (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 hydrolysis¹⁰. 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*¹¹.

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*¹². The outcome of this phase is acidified chyme. It is in *pakwapakwam* 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. *Achcha 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 carbohydrates¹³. 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 process¹⁴. 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*.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* (acid, 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 panchaboutika 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 tissues¹⁷. In the modern physiological perspective, the action of the *Bhutagni paka* can be equated with the conversion of digested materials in the liver¹⁸. 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 energy¹⁹. 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 *asthaya 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 sapta dhatus*. Hence liver is considered as centre of *Bhutagni vyapara*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*

rasa is completed and *rasa* absorption is possible.

Dhatvagni – Tissue metabolism

That which promotes the growth of *sharira* (body) is *dhatu*. *Dhatu*s are seven in number, *Rasa*, *Rakta*, *Mamsa*, *Meda*, *Asthi*, *Majja* and *shukra*. *Sapta dhatu*s 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*) *dhatu*s. *Dhatu*s are formed consecutively, one after another, from the *Poshaka* or *asthayi dhatu*s²¹. *Dhatvagnis* are seven (*Rasagni*, *Raktagni*, *Mamsagni*, *Medogni*, *Asthyagni*, *Majjagni*, *shukragni*), located in its own *dhatu*s (tissues)²². After *Jatharagni paka* and *Bhutagni paka adya ahara rasa* (chyle) circulates in the body to reach all tissues. The circulating constituents of *ahararasa* were selected by *dhatu* (tissue) through *kalekapotha nyaya* (law of selectivity - analogy of the pigeons carrying grains from a thrashing field and flying out in different directions). Hence if *Dhatvagni* gets more *vriddhi*, 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 *dhatuvriddhi*²³. 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*, & *dhatu*s 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 dhatu*s. *kitta paka* is the waste products²⁴. 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*²⁵. Each one of the seven kinds of *poshaka* or *Asthayi dhatu*s is stated to be transported, as it is formed, to the respective *poshya* (*sthayi*) *dhatu*s, 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*, *raktavaha srotas*, *mamsa vaha srotas*, *medo vaha srotas*, *asthi vaha srotas*, *majja vaha srotas*, *shukra vaha srotas*) in number. The nutrient fraction of *Rasa*, *Rakta*, *Mamsa*, *Medo dhatu*s helps in formation of *Upadhatus* (subsidiary tissue).

DISCUSSION 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 *asthaya 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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