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Dhatuparinama – An Ayurvedic approach of Metabolic Transformation

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ABSTRACT

The human body it has been composed of *Doshas*, *Dhatu*s and *Malas*. For the maintenance of life these three plays an important role. Among these *Dhatu*s has its main function in structuring the body and supports the body. The food material is first broken down and converted into an assimilable form called *Aahararasa*. This *Aahararasa* is then absorbed in the body and the *Dosha*, *Dhatu*, *Mala* are refurbished from it. The production of *Dosha*, *Dhatu* and *Mala* from *Aahararasa* takes place at micro level and can only be inferred from logical inferences. The Food substances undergo metabolic transformation by the effect of *Jatharagni*, *Bhutagni* and *Dhatwagni*. After this process the *Paaka* of the food occurs and it nourishes the *Dhatu*s. This process of digestion at Micro level is called as *Dhatuparinama*. The metabolic transformation of food which is explained in contemporary science; it is also explained in *Ayurveda*. *Acharaya Charaka* explains '*Dhatavo hi dhatvahara*' it means that the *Dhatu* produced by assimilating the food material i.e. *Aahara Rasa* is in itself the diet of different *Dhatu*s and hence is responsible to maintain them in a healthy state.

Key words: *Dhatu*, *Dhatuparinama*, *Aahararasa*.

INTRODUCTION

Food is one of the three sub pillars (*Trayoupasthambha*) that supports the life having ability to govern the *Samavastha* of *Tridosha*.^[1] Food substances which we consume is present in complex form i.e., *Vijatiya Dravyas*; they should be correctly processed by means of *Samskara* before they are consumed there by making them analogous to the

*Sarira Dhatu*s and the process of assimilation is aided by one more process called *Paaka* i.e. Digestion through which the consumed food undergo transformation to simpler components i.e., *Sajatiya dravyas*. This form of *Sajatiya Dravyas* are easily absorbed from the gut and further picked up by body tissue as specific substances hence called as '*Dhatuaaharas*' (nutrients specific to each *Dhatu*).^[2]

The term digestion may be defined as the process of biochemical transformation of complex food articles in the gut with the help of enzymes converts into simpler form, which is suitable for absorption and assimilation.^[3] Process of digestion in contemporary science as well as in *Ayurveda* explained briefly. The main function of the *Pachaka Pitta* is *Aahara Pachana*. The action is *Sanghatbheda* (splitting up) of food substances into their basic entities. Change in the state or form of the food substances is called as *Paaka*. Such *Paaka* or transformation is made possible by *Jatharagni*, *Bhutagni* and *Dhatwagni Paakas*. This

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process of nourishment and development is called as *Dhatuparinama*.^[4]

REVIEW OF LITERATURE

Aaharaparinama

All the transformation in the universe is brought by *Agni* or *Tejas*. Similarly all the changes or transformations in the universe are represented by a single term called *Paaka*. The *Paaka* has been defined in *Amarkosha* as, that which causes *Parinama* (conversion or transformation) and *Paravritta* (transmutation). By '*Lokapurasha Samyavada*', representation of *Agni* which is present in universe also present in humans in the form of *Kayagni*, *Audarya*, *Pachakagni* etc. Hence this process of transformation is represented by *Agni*. It digests the food and helps in absorption, transformation of digested food into body entities.^[5]

The various nutrients like proteins, fats and carbohydrates cannot be assimilated into the blood stream in their complex molecular forms. They need to be broken down into simpler forms so that they can be absorbed by blood and then transported to different parts of the body, for example, proteins need to be broken into amino acids, carbohydrates into polysaccharides etc. this process done by the various digestive enzymes and then nutrients absorbed into the blood.^[6]

This process of digestion is brought by hydrating the complex molecule by water molecule (H₂O) dividing into two simpler molecules the same process is stated as a function of *Kledaka Kapha* is called as *Kledana Karma*. This relevance is also appreciated as function of *Anupana*.^[7] Such a process of *Kledana Karma* is facilitated by *Aaharaparinamakar Bhavas*; like *Vayu*, *Ushma*, *Kleda*, *Sneha*, *Kala*, *Samyoga* are essential components for such transformation. The *Ushma* digests the food, *Vayu* pushes it forward, *Kleda* synthesis the food material and *Sneha* is responsible for making it soft. The *Kala* helps it gradually transform into digestible form and the coexistence of all these factors is very essential for appropriate digestion of food material. Thus *Ushma* refers to the

Jatharagni, the *Vayu* are *Samana* and *Prana*, the *Kleda* and *Sneha* are provided by *Kapha*. When these factors are remains in balanced stage, the digestion takes place properly and the body constituents will be maintained in normal state.^[7]

Stages of Paaka - (Stages of Transformation)

This is preferable to the *Samyoga* and *Vibhaga* that goes on in different kinds of transformations. This process of *Ahara Paaka* can be explained on 3 stages.^[8]

1. *Jatharagnipaaka*
2. *Panchabhautikagnipaaka*
3. *Dhatwagnipaaka*

Jatharagnipaka

The life span, complexion, vitality, good health, enthusiasm, luster are derived from the Thermogenetic process in the body i.e. nothing but *Jatharagni*. The food which is considered the nourishing factor of the body element, vitality and complexion depends on the action of *Jatharagni*, as from the undigested food the body elements cannot be formed. When a man endowed with it (*Jatharagni*) adequately, he lives long in good health, when it is deranged; he begins to be ill. Therefore the thermal function is said to be the main sustainer of life.^[9]

The process of digestion is mainly under the control of two *Vata Bhedas Prana and Samana*, the *Prana Vata* whose function is to ingest the food draws it in to the stomach. In stomach the food having mixed with the digestive fluid, broken down and being mixed with unctuous substance becomes softened. Then the *Jatharagni* being triggered by *Samana Vata*, initiates digestion and digest the ingested food when consumed in proper dose and at the proper time, supports life.^[10]

Bhutagni Paaka

The digestion of food by *Jatharagni* results in the breakdown of food into five distinct *Bhautika* or Physico-chemical groups viz. *Parthiva*, *Apya*, *Agneya*, *Vayavya*, *Akasiya*. This process activates *Bhutagnis* which digests the substance of that particular group

of *Dravya*. Thus the *Agni*, which is present in the molecule having predominance of *Prthvi Mahabhuta* called the *Parthivagni*, digests that part of food having dominancy of *Prthvi Mahabhuta*. Similarly *Apyagni* digests the material of these kind molecules and similar is the case with the *Agneya*, *Vayavya* and *Akashiya* types of molecules. The transformation of the characteristic qualities of each group and the assumption by them of "*Vilaksana Gunas*" is the outcome of this kind of digestion according to *Chakrapani*.^[11] Each one of the five kinds of *Dravyas*, the outcome of *Bhutagni Paaka* proceeds to augment the corresponding *Bhautika* elements that compose the human body.^[12]

Pancamahabutas at the fundamental site of Pancamahabhautikagni.

According to *Ayurveda* '*Sarvadravyam Panchabhoutiktwa Asmin Arhte*'; all the matters in the universe are *Panchabhautika*. In the body every cell has its *Panchabhautika* constitution and respective *Agni* also. So *Panchabhautika Agni's* are spread all over the body, it is impossible to locate the *Panchabhautikagni* at a particular site. *Jatharagni* as well as *Dhatvagni's* are also part of *Panchabhutagni*, by only '*Sthnavishesha*' we called it as *Dhatvagni* and *Jatharagni*. The concept of *Bhutagni Paaka* was shown to postulate the view that the end products of *Jatharagnipaka* classified on the basis of their physico-chemical or *Bhautika* properties, are digested by the *Agni*.^[13]

The separation of the *Sarabhaga* or nutrient fraction of the food from *Annakitta* i.e. indigestible residue of the food takes place after the completion of the *Bhutagnipaka*.

Thus while *Jatharagni Paaka* leads to the break down or *Sanghata Bheda* of different proximate components of the food and renders them fit for *Soshana* or Absorption.

Bhutagnipaka is processes that converts the nutrients absorbed from *Adhoamasaya* as pre-homologous of substances which are meant finally to be utilized for the *Upacaya* or building up of the *Sthayi Dhatus* i.e. the seven basic structural elements of the body.^[14]

Dhatvagnipaaka

According to Acharya Charaka the *Sarabhaga* or *Anna Rasa* of the food ingested, an outcome of *Jatharagni* and *Bhutagni Paaka*, is absorbed from *Adho-Amasaya* and distributed throughout the body by *Dhamanis*. This process of absorption of *Annarasa* in the body is described under the concept of *Dhatvagni Paaka* or *Dhatvagnivyapara*. In the term *Dhatvagni Paaka*, two terms are important to discuss that is *Agni* and *Paaka*. *Paaka* was seen to stand for chemical transformations both reversible and non reversible.^[15]

Dhatvagni

There are 7 *Dhatvagnis* are explained in the *Ayurvedic* classics. *Dhatvagnis* are also a part of *Bhutagnis* but as they are situated in the *Dhatu* they termed as '*Dhatvagnis*' due to *Sthana Vishesa*.^[16]

Site of Dhatvagni

There are several opinions about the site of *Dhatvagni*. The *Sthana* of *Dhatvagni* is in their respective *Srotas*. *Acharaya Charaka* quotes, "*Srotamsi Khalu Parimana Apadyamananam Dhatunama Abhivaahini Bhavanti Ayan Arthen*". The term '*Apyadyamanam*' indicate that the process is going on in the *Srotas*. *Dhatvagni* is the one who processed and convert the *Poshaka Dhatu* into *Poshya Dhatu*, so the site of the *Dhatvagni* is *Srotas*.^[17]

Due to *Srotoavarodha* the conversion of food material in to the respective *Dhatu* by *Dhatvagni* could not take place properly. This quotation proves that, the *Srotas* are the *Sthana* of *Dhatvagni*. Some scholars opined that *Yakrta* and *Hridaya* are sites of *Raktagni* and *Rasagni* respectively, because conversion of *Rasa Dhatu* in *Rakta Dhatu* takes place in the *Yakrta* while *Hridaya* is the *Mula Sthana* of *Rasa Vaha Srotasa*. The aspect of *Kayagni* which are located in its own place i.e. *Dhatu* is termed as '*Dhatvagnis*'. A decrease of *Dhatvagni* will precipitate in to the *Dhatu Vrddhi* while increase of *Dhatvagni* will result into the *Dhatu Kshaya*. *Dhatus* or nutrient substances undergo *Paaka* or metabolic transformations under the influence of their own *Ushma* and are thereafter, transported to the *Dhatus* through their own specific *Srotamsi*.^[18]

Functional elements in the process of digestion

The *Aahara rasa* is carried to all the parts of the body for digestion by *Vyana Vayu*. This *Rasadhatu* is again transformed with the help of *Dhatvagni* in more assimilable forms of *Dhatu*s and *Upadhatu*s. This *Dhatvagni* are located in all *Srotas* and parts of the main *Jatharagni* itself. Similarly to the necessity of *Kledaka Kapha* for the process of digestion in the *Mahasrotas*, there is need of *Kledaka Kapha* in the digestion process. Thus *Vyana Vayu*, *Pachaka Pitta* in the form of *Dhatvagni* and *Kledaka Kapha* are the principle elements functional in the process of digestion.

Concept of Dhatupaaka

The word '*Dhatupaaka*' is used to indicate replenishment and nourishment of the *Dhatu*. This process is carried out in *Srotas* of their respective *Dhatu*. *Agni* is situated in each *Srotas* of the particular *Dhatu*. This *Agni* is responsible for digestion or bioconversion of *Aahara Rasa*. When food is consumed, due to digestive fire, *Agni* of each food material gets induced and starts its action; this induction leads to '*Dhatupaaka*'. Due to actions of *Agni* food changes its own appearance, after changing it turns into *Dhatu*.^[19]

Types of Paaka

The aim of the *Paaka* process, the food consumed is to contribute to the formation and maintenance of the 7 *Dhatu*s. The *Paaka* or metabolic transformation of 7 *Dhatu*s is of two types,

1. **Prasada Bhaga** - contributes to the formation of *Saara*
2. **Kitta Bhaga** - contributes to the formation of *Mala*

These *Paaka* occurs at different levels i.e. *Jatharagnipaka* level as well as *Dhatwagnipaka* level. Through this the separation of the essence portion of the food and waste portion of the food takes place. At the level of the *Jathragni Paaka*, the essence of the *Aahararasa* and *Mutra*, *Purisha* are formed. At the level of the *Dhatwagnipaka*, the *Prasaadabhaga* contributes to the formation of the *Dhatu*, i.e. *Sthayi*

Dhatu and *Upadhatu* while the *Kittabhaga* contributes to the formation of the *Dhatu Malas*. It is the nutrient fraction of the *Dhatu*s, which provides nourishment to the other *Dhatu*s in successive order.^[20]

Concept of Anupaka

After the digestion process in the *Mahasrotas*, this process further assimilation of *Aahara Rasa* and its conversion to bodily elements which is cognizable only by inference is called digestion at micro levels. The production of *Aahararasa* from the food material consumed is the first step and is known as '*Sthula Pachana*' or digestion at macro level, while the further assimilation of *Aahararasa* into bodily elements is known as '*Sukshuma Pachana*' or digestion at micro level. This digestion at micro level is known as '*Anu Paka*' or the digestion which takes place after the completion of the digestion at macro level. This unique terminology used by *Acharaya Chakrapanidatta*.^[21] This *Aahara Rasa* which is absorbed in the body is the base of further activities of digestion at micro levels. The nourishment of all seven *Dhatu* is the function of this *Aahara Rasa*. These are nourished in a sequence one after other like *Rasa* nourishes *Rakta*, *Rakta Mamsa* etc.

Nourishment of the Dhatu

The *Aahara Rasa* will be distributed in the body first *Rasa Dhatu* will be nourished then followed by *Rakta*, *Mamsa*, *Meda*, *Asthi*, *Majja* and last the most essence of all *Dhatu*s i.e. *Sukra* will get nourishment. Likewise the nourishment of the *Dhatu* takes place in the order. There are different theories postulated by some authors for the nourishment of the *Dhatu*s.^[22]

Acharya Vagbhata says that, as the flame of the forest fire tends to increase or decrease according to the quantity of the fuel, so also is the case with *Dhatuparinama*. *Dravyas* are either with similar qualities or opposite to qualities of the *Dhatu*, which cause an increase or decrease of the *Dhatu*s due to properties potentially inherited by them, as in the case of seed; homologous properties of *Dravyas* gives sufficient and rapid increase of homologous properties in *Dhatu*s.^[23]

Acharya Charaka explains the production of different *Dhatu*s and *Upadhatu*s is a continuous and ongoing process of the body. It is essential that this process of nourishing is uninterrupted in the body as to repair the wear and tear of the bodily tissues. For maintaining this continuous process there needs to be a healthy state of the *Srotasa*, the proper condition of *Vayu* which supplies the *Srotas* with the *Ahara Rasa* and the *Dhatvagni* which digests this *Ahara Rasa*, all these have to be in proper condition to produce *Dhatu*s which are normal and healthy.^[24] *Chakrapanidatta* emphasis the same point that even if a single component does not function properly for example, the *Dhatvagni* is weak and cannot transform all the contents properly or *Vyana Vayu* fails to regularly supply *Ahara Rasa*, or even if the *Srotas* are unfit and diseased condition, there cannot be a proper production of healthy *Dhatu*s and *Upadhatu*s as well as the body is also not nourished properly.^[25] *Acharaya Charaka* explains 'Dhatavo Hi Dhatvahara' it means that the *Dhatu* produced by assimilating the food material i.e. *Ahara Rasa* is in itself the diet of different *Dhatu*s and hence is responsible to maintain them in a healthy state.^[26]

Relation of *Dhatu Saara* and *Dhatuparinama*

The healthy state of *Dhatu* is represented by the *Saara*. Thus the corresponding *Saaras* represent qualitatively and quantitatively perfect *Dhatu*s i.e. *Dhatu*s are in their excellent state.^[27]

The concept of *Saara* is related with the excellence of *Dhatu*. With a view to determine the specific measure of strength are depending into eight categories, depending upon *Saara* or excellence of *Dhatu*s. Though the body of every individual is made up of seven *Dhatu*s, it is found that at the level of the excellence of *Dhatu*s each individual differ from another. This may be due to the divergence of *Dhatuparinama*. The ratio of *Dhatuparinama* is not same in each and every person, thus the body which is composed of seven *Dhatu*s of different quantities, vary from one another. One of the main factor affecting the *Paaka*, which contributes to the maintenance of *Dhatu Saara* is *Dhatvagni* without it the formation of *Dhatu* is not possible. Hence the

Saara not only represents the healthy state of *Dhatu*, but also projects the perfect performance of their respective *Dhatvagni*.^[28]

DISCUSSION

The transformation of the nutrients is derived from *Ahara Rasa* and *Dhatvagnipaaka* can be compared with enzymes and coenzymes which are responsible for various tissue metabolism has its major role in the whole process.

Acharaya Sharangdhara quotes the importance of *Agni*, he mentions that the *Pitta* which exists in *Agniyasaya* is just like the flame and its quantity is that *Tila Pramana*. This *Pitta* does the digestion of *Ahara Rasa* and *Dhatupaaka* takes place.

Even if all the scholars have the same opinion about the sequence of *Dhatu* formation, there seem to be certain differences on the time period required for the same. As per the strength of the *Dhatvagni* and the *Bhutagni*, the *Rasa Dhatu* undergoes transformation into the successive *Dhatu*s. Some *Acharyas* say that the *Rasa* transforms into the *Shukra* in six days. *Parashara* says that the *Ahara Rasa* transforms into the *Rasadhatu* in 24 hours, *Raktadhatu* is formed on the third day, *Mamsa* forms on the fourth day, *Meda* on the fifth, *Asthi* on the sixth, *Majja* on the seventh and the *Shukra* is formed on the eighth day. *Acharaya Sushruta* mentions that the *Rasa* stays in each *Dhatu* for a period of 3015 *Kalas*, approximate 5 days. Thus, in about a month the *Shukra* and the *Artava* are formed in the Male and Female respectively.

While describing the etiology and pathogenesis of *Rajyakshma*, *Acharya Charaka* narrates the nourishing tissue elements gets metabolized first by their respective *Dhatvagni* and from these *Poshaka Dhatu*s the *Poshya Dhatu* get nourished, through their respective channels of circulation. If there is obstruction in these channels of circulation or diminution of stable tissue elements or diminution of *Dhatvagni* the *Rajyakshma* is manifested. Due to all these factors, the major portion of the food material which is the source of strength and nourishment get

changed into *Mala* (waste product) and very small part of it contributes to the nourishment of *Dhatu*s.

The nutritive part of the food helps in the nourishment of *Rasa*, *Rakta*, *Mamsa*, *Meda*, *Asthi*, *Majja*, *Shukra* and *Oja*. The mala also replenishes its own counterparts like *Sweda*, *Mutra*, *Purisha* etc. All these are essential in maintaining the body in a normal healthy state. This function of these elements can be carried out only till their own normal state (quantity and quality wise) is maintained. An imbalance in any of these is the cause of different ailments in the body. To maintain a state of balance in the nutritive essence elements of the body, it is essential to maintain a balance in the diet while to sustain a balanced state of the excretory wastes it is essential to follow the treatments of *Shodhana*. All these *Saara* and *Kitta* elements in the body are replenished by the digestive activities in their respective *Srotas*.

CONCLUSION

Ayurveda aims at “*Swasthasya swastha rakshanam, aturasya vikarprashamana*”. The main aim is to restore health and maintain body’s well being. The maintenance of normalcy of *Dhatu*s and *Doshas* are plays an important role to restore the health. For the nourishment of the *Sharira Dhatu*s transformation is made possible by the biochemical entities present in the body i.e. *Jatharagni*, *Bhutagni* and *Dhatvagni*. When these all entities act on *Ahara rasa* it gets converted into *Paaka* i.e. called as *Dhatu Parinama*. The transformation of *Ahara Rasa* into the respective *Dhatu*s takes place due to their respective *Agni* i.e. *Dhatvagni*. *Chakrapani* used the term “*Posaka Dhatu*” (*Asthayi Dhatu*) for the nutrient part and *Poshya Dhatu* (*Sthayi Dhatu*) for the part which is being nourished, so in nutshell one can say that the conversion of *Asthayi Dhatu* (*Posaka Dhatu*) into *Sthayi Dhatu* (*Posya Dhatu*) takes place due to *Dhatvagni*. This process is also known as “*Suksma Pachana*”. When the *Ahara Rasa* subjected to the digestion by the *Dhatvagni* it is spitted into three parts the *Sthula* part will nourish that particular *Dhatu*, *Suksma* part will be nutrient of the subsequent *Dhatu* and the remaining will nourish the *Mala* (waste

product). Likewise the concept of *Dhatuparinama* explains the physiology of the nourishment of the *Dhatu*s.

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