

# International Research Journal of Ayurveda & Yoga

An International Peer Reviewed Journal for Ayurveda & Yoga



## An Analytical Study Of Annarasa To Maintain Sharira Dhatu by Agni

Dr. Sanjay Kumar Bhatnagar<sup>1</sup> Prof. (Dr.) Rajesh Kumar Sharma<sup>2</sup> Dr. Dinesh Chandra Sharma<sup>3</sup>

ICV-70.44-ISRA 1.318

VOLUME 4 ISSUE 4

1. M.D.Scholar (Dpt. Of *Kriya Sharir*), DSRRAU JODHPUR
2. Professor & HOD (P.G. Dpt. Of *Kriya Sharir*), DSRRAU JODHPUR
3. Asso. Prof. (P.G. Dpt. Of *Kriya Sharir*), DSRRAU JODHPUR

**Corresponding Author :-** Dr. Sanjay Kumar Bhatnagar M.D. Scholar (Dpt. Of *Kriya Sharir*), bhatnagarsanjay95@gmail.com DSRRAU JODHPUR

Article received on 2nd March 2021

Article Accepted 20th April 2021

Article published 30th April 2021

### ABSTRACT: -

According to *Ayurveda* "*Sarvamdravyam 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 *Pancha Mahabhutas*. In this *Panchabhautika Sharira Various Paka* (metabolic transformations) are going on continuously. <sup>[1]</sup>

*Agni* is the invariable agent in the process of *Paka* (digestion, transformation). Ingested food is to be digested, absorbed and assimilated, which is unavoidable for the maintenance of life, and is performed by the *Agni*. Different examples are available in our classics to indicate that *Pitta* is the same as *Agni*, but some doubt arises behind this concept, that *Pitta* is *Agni*. *Agni* is innumerable because of its presence in each and every *Paramanu* of the body. But, the enumeration of the number of *Agni* varies in various classical *Ayurvedic* texts. According to the functions and site of action, *Agni* has been divided into 13 types, i.e. one *Jatharagni*, five *Bhutagni* and seven *Dhatvagni*. *Jatharagni* is the most important one, which digests four types of food and transforms it into *Rasa* and *Mala*. <sup>[2]</sup> 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:** *Ayurveda, Agni, Aahar-pachan, Annarasa, Dhatu-poshan.*



This work is licensed under a creative attribution -Non-commercial-No derivatives 4.0 International License commons

**How to cite this article:** - Dr. Sanjay Kumar Bhatnagar, Prof. (Dr.) Rajesh Kumar Sharma Dr. Dinesh Chandra Sharma "An Analytical Study Of Annarasa To Maintain Sharira Dhatu By Agni" IRJAY, April: 2021, Vol-4, Issue-4;114-121 ; [Doi: https://doi.org/10.47223/IRJAY.2021.4413](https://doi.org/10.47223/IRJAY.2021.4413)

## INTRODUCTION

*Ayurveda* has described an important factor of digestion and metabolism in our body as *Agni*. Ingested food is to be digested, absorbed and assimilated, which is unavoidable for the maintenance of life, and is performed by *Agni*. In *Ayurveda*, the term "Agni" is used in the sense of digestion of food and metabolic products. *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, lustre, *Oja*, *Teja* (energy) and *Prana* (life energy).<sup>[1]</sup>

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 life.<sup>[3]</sup>

In *Sushruta*, we can see how the "Avayavaas" are formed from "various dhatus" Thus, based on *Charaka* and *Sushruta*, the above cells can be considered as "Dhatu-Paramanus." For these constant processes in all cells, a biological energy is constantly essential, without which the survival of our body will be quite impossible. 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 *Aharapaka* (Metabolic

transformation) provides an extensive field of research in the present day.<sup>[9]</sup>

## AIMS AND OBJECTIVES

1. To emphasize and discuss the Concept of *Agni* and their types in *Ayurvedic* classical literature and modern review.
2. Review of Analysis of *Annarasa* to maintain *Sharira Dhatu* in in *Ayurvedic* classical literature and modern review.

## AGNI REVIEW

The definitions from *Vachaspatyam*, *Sabdakalpadruma*, *Unadikosha*, *Agni* has been described as the one who carries everything, moves everywhere, which can meta morphoses 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.<sup>[13]</sup> 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* (1type) looks after the functions of food digestion and absorption. *Bhutagni* (5types) turns all the *Vijatiya Panchabhautika Dravyas* consumed to *Sajatiya Panchabhautika Dravyas*, i.e., conversion of heterogonous to homogenous. *Dhatvagni* (7 types) performs Synthesis and breakdown of tissues.<sup>[10]</sup>

**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* (stomach) and *Pakwasaya* (large intestine) in the course of digestive process. In *Avastha Paka* there are two phases called *Prapaka* And *Vipaka*. *Prapaka* phase contains three phases, *Madhura Bhava*, *Amla Bhava* and *Katu Bhava*.<sup>[3]</sup>

**Vipaka:**

**Post-Digestive Effect** The ultimate change in the *Ahara Rasa* (digestive food) that occurs at the end of digestion of *Jatharagni paka* is called as *Vipaka* (Post-Digestive Effect). 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).<sup>[9]</sup>

**Secondary Digestion – Metabolism:**

The *Bhutagnipaka* and *Dhatvagnipaka* 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.<sup>[2]</sup>

The *Panchabhoutika Sharira* is to be maintained and nourished with the *Bahya Panchaboutika Amshas*. To convert such alien *Amshas* (part) 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 *Bhutagnipaka* to become endogenous. Thus, cause appropriate nourishment of tissues.<sup>[10]</sup>

In the modern physiological perspective, the action of the *Bhutagni paka* can be equated with the conversion of digested materials in the liver. 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. 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. 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 *Ahararasa* (digestive food) is completed and *Rasa* absorption is possible.<sup>[13]</sup>

**Dhatvagni Paka – 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 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 nonstatic) or *poshaka*

(meant to nourish) and *Sthayi* (fixed, *sthira*, static, already formed and existing) or *poshya*. *Srotamsi* do not transport *Sthayi stable- (poshya) dhatus*. *Dhatus* are formed consecutively, one after another, from the *Poshaka* or *asthayi dhatus*. *Dhatvagnis* are seven (*Rasagni*, *Raktagni*, *Mamsagni*, *Medogni*, *Asthyagni*, *Majjagni*, *Shukragni*), located in its own *dhatus* (tissues). After *Jatharagni paka* and *Bhutagni paka adyaahara rasa* (chyle) circulates in the body to reach all tissues. [9]

The circulating constituents of *ahararasa* were selected by *dhatu* (tissue) through *khale kapotha 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 *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*. [4]

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 *Prasadapaka* and another is *kittapaka*. The *Prasadapaka* is stated to yield the seven kinds of *poshaka* or *Asthayi dhatus*. *Kittapaka* 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*. [2]

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. [2]

These *Srotas* (channels) are known as *Dhatuvaha Srotamsi*. These *Srotas* are seven (*Rasavaha Srotas*, *Raktavaha Srotas*, *Mamsavaha Srotas*, *Medovaha Srotas*, *Asthivaha Srotas*, *Majjavaha Srotas*, *Shukravaha Srotas*) in number. The nutrient fraction of *Rasa*, *Rakta*, *Mamsa*, *Medo dhatus* helps in formation of *Upadhatus* (subsidiary tissue).

### **Agni and Pitta:**

*Pitta* is the factor, which regulates all the thermo dynamics, Chemo dynamic activities in the body, in which function of *Agni* (digestive fire) are a part. *Agni* within the body represented by heat of the *pitta*. [10]

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 complexion.

*Agni* and *pitta* both have few similarities and dissimilarities. The similarities of *Agni* (digestive fire) and *Pitta* are *Dahana* (burning sensation), *Pachana Karmas* (digestion) and similar response to *Sheetala* (cold), *Ushna* (hot). Both are possessing moieties of *Agni Mahabhoota*. The Dissimilarities are, *Agni* is *Sushka* (dry) and *Ruksha* (rough) in nature, *Pitta* is *drava* (liquid) and *snigda* (unctuousness). *Agni* maintains *Pakadi Karmas* but *pitta* maintains *Dhi* (retention power), *Buddhi* (intellect), body maintenance in addition to *Pakadi Karmas*. *Ghrita* (*ghee*) 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. [9]

## ***Dhatu Poshana Nyaya's***

### **1) *Kshira Dadhi Nyaya :***

Also known as the Law of Transformation, or the *Sarvatmana Parinama Paksha*, the *Ksheera dadhi Nyaya* has been the first of the theories placed forward towards the understanding of the *Dhatu Poshana* (nourishment of tissues). According to this *Nyaya*, the one *Dhatu* transforms into the other successive *Dhatu* just as the milk transforms into the curd so is the term “*Ksheera Dadhi Nyaya*.” As per this *Nyaya*, and maintaining them. The term *Dhatu* pertain to nutrients also in transit and not only to tissue that already exist such as bones, muscles, blood etc. [7] The implications of this theory have been sought to be explained in terms of three different hypotheses. These theories regarding the nourishment of the *Dhatu*s are termed as “*Dhatu Poshana Nyaya*.” One *Dhatu* becomes the nutrient for the other. This implies the transformation of the *Rasa* into *Rakta*, *Rakta* into *Mamsa*, and *Mamsa* into *Meda* and so on. Thus, the previous *Dhatu* acts as a substratum for the successive one. The time taken for transformation of *Rasa* into the *Shukra* as per this *Nyaya* is explained in various ways by the seers of yore. As per the strength of the *Dhatavagni* and the *Bhootagni*, the *Rasa Dhatu* undergoes transformation into the successive *Dhatu*s. [8]

### **2) *Kedari Kulya Nyaya :***

According to this theory, the process of nourishment of tissues can be compared to the irrigation of different fields by water from a canal. Crops in a field get irrigated by creating *Kuliya* (drains) and *Kedar* (small pieces of land). The *Kedar* (small pieces of land) get irrigated one by one through *Kuliya* (drains) in sequence. In the same way, different *Dhatu*s of the body get nutrition one by one in sequence through *Srotasa* (vessels). The 1<sup>st</sup> *dhatu*; *Rasa*

*Dhatu*, gets nutrition from *Ahar Rasa* (digested food), Then *Rakta Dhatu*(blood) gets nutrition from the rest of *Ahar Rasa* and likewise up to *Shukra Dhatu*(semen). *Kedari Kulya Nyaya* or microcirculation and tissue perfusion. This *nyaya* states that the living body is provided with innumerable micro vascular channels (*srotas*) which carry nourishment to the respective sites in *Dhatu*s (tissues). The cells and tissues are literally perfused with nutrient plasma but mere tissue perfusion is not enough to complete the process of nourishment. This needs the complementary play of the subsequent two *nyayas*. [8]

### **3) *Ek Kala Dhatu Poshan Nyaya :***

*Rasa* (including *rakta*) is always, everywhere, continuously and simultaneously thrown (into circulation) in the body by the *Vyana Vata* performing the function. *Rasa* (plasma) while in circulation if sticks somewhere due to morbidity in channel, it causes disorder there like cloud in the sky causing rain. *Dohsa* also get aggravated in localized parts in the same way. The site of *Rasa Dhatu*(plasma) is *Hridaya* (heart), but it circulates throughout the body. Even though separate sites have been stated for the seven *dhatu*s, they are present throughout the body. Therefore the *Ahara Rasa*, which circulates quickly in the body is stated to nourish all *dhatu*s at the same time. This method of utilisation of the nutrients derived from the food indicates only nourishment of *Sthayi Dhatu*s. According to *Acharya Charaka*, the nutrient homology of *Dhatu*s is circulating in the body continuously like a rotating wheel. In the event of the strength of the *Agni* is good, the *Dhatu poshana* is conducted faster, if they are in decreased state, the *Dhatu poshana* is slow. According to *Acharya Sushruta*, *rasa* develops from the diet in one day. The circulating fluid i.e. the *rasa Dhatu* transporting the nutrients stays in each one of the remaining six *dhatu*s for a period of

3015 *kalas*. Therefore, it takes for the *rasa* one month to be formed into *Shukra* (semen) in the case of men and *Artava* (menstrual blood) in women. The total time taken for the conversion of *rasa* into the *seven Dhatus* is 18090 *kalas*. According to above *rasa* says in each *Dhatu* for 5 days and *Dhatu poshana* completes in a month that is till the *Shukra* (semen) is nourished.<sup>[4]</sup>

#### 4) *Khale Kapot Nyaya* :

*Khale Kapot Nyaya* refers to the selective uptake of nutrients by respective cells and tissues in the same way as the birds of different species pickup selective grains and cereals from common harvesting ground because the *Kedari Kulya Nyaya* provides a total pool of nutrients at the site of all tissues but the different tissues require different specific nutrients and hence there is a need of active selective uptake. As an example the bone tissue will only take the amino acids and minerals like Calcium Phosphorus, while the blood tissue will uptake specifically the nutrients like Iron etc. which is necessary for formation of blood.<sup>[3]</sup>

## DISCUSSION

- *Agni* is the invariable agent in the process of *Aharapaka* (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.<sup>[13]</sup>
- In the first stage of digestion *Madhura Bhava* (sweet essence) is manifested by the action of salivary amylase on starch, digestion of carbohydrates occurs 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 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* (digestive juice) 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 dhatu* (organism specific). After *Jatharagni paka* and *Bhutagni paka adyaahara rasa* (chyle) circulates in the body to reach all tissues. *Dhatu* that are formed consecutively, one after another, from the *Prasadabhaga* as *Poshaka* or *asthaya dhatu*. *Kittabhaga* is eliminated out as metabolic waste product.
- Each *Dhatvagni* or the bioenergy present in each *Dhatu* synthesizes and transforms the essential *Rasa Dhatu* required for that particular *Dhatu* or cell from the basic nutrients present in the *Anna Rasa* or essence of the diet that we consume. Each *Dhatvagni* has got a speciality to synthesize and transform the constituents suitable to its particular *Dhatu*. This action is a sort of selective action.<sup>[1]</sup>
- According to physiology *Acharya Charaka* states about tissue nutrition in a series of verse in *Grahani Chikitsa* which is elaborated by Principles of *Nyayas*. It can be understood and co-relate nearly with digestion, Absorption, metabolism and energy transformation.
- Very first Principle *Ksheer Dadhi Nyaya* is first stage of digestion in which if you want the final product of *Ksheer (Ghrita)*, it should convert first in *Dadhi* (Digestion process product). *Charaka* clearly states that food nourishes *dhatu*s, *ojas*, strength, complexion etc. depends on *Agni* because *rasa* can't be produced by undigested food.<sup>[2]</sup>

- The second principle of tissue nutrition *Kedari Kulya Nyaya* is directly related to the absorption process of digestion which is mostly occur through the intestinal wall and into the general circulation.
- The third principle in this way is *Khale kapota nyaya* which resembles with different tissues require different specific nutrients for *Dhatu Poshana* (nourishment) like *Mamsa dhatu* (muscle Tissue) need protein, bones need Calcium supplements and other micronutrients.
- Fourth and last *Nayaya* is *Ek Kala Poshana* means “at a time *Rasa* nourish all the relative *dhatu*.” This is a continuous process of ATP synthesis in a pathway, runs in different types of tissue to nourish the organ cells. Even a man does not eat the energy stored by liver and transformation the energy when body needs it. [4]

## CONCLUSION

- After a detailed discussion on *Pitta* and *Agni*, it is concluded that all theories in their regard have their own importance, and it is very difficult to conclude which theory is more appropriate. But, one conclusion that can be drawn after going through the details is that in regard of treatment, *Pitta* and *Agni* are the same, whereas in accordance to their, build they differ from each other. [9]
- In *Ayurveda*, *Charaka Samhita* and *Sushruta Samhita* known about the role of diet in lifespan. Both of them explained about the importance of healthy *Rasa Dhatu* (Plasma) formation. They explained about the proper physiology of metabolism and tissue Nutrition in a series of verses.
- *Agni* converts food in the form of energy, which is responsible for all the vital functions of our body.
- The *Ahara rasa* (digestive juice) which is having *Madhura* and *Lavana rasa* (sweet and salty) gets *Madhura vipaka*, *amla rasa* gets

*Amla Vipaka* (post digestive effect), *Katu*(bitter), *Tikta*(pungent), *Kasaya rasa* (astringent) gets *Katu Vipaka*. [13]

- *Dhatu*s that are formed consecutively, one after another, from the *Prasadabhaga* as *Poshaka* or *Asthayi dhatu*s. *Kitta bhaga* is eliminated out as metabolic waste product.
- According to physiology *Acharya Charaka* states about tissue nutrition in a series of verse in *Grahani Chikitsa* which is elaborated by Principles of *Nyayas*. It can be understanding and co-relate nearly with digestion, Absorption, metabolism and energy transformation. [10]

**Acknowledgment:** Nil.

**Financial Support:** Nil.

**Conflict of Interest:** Nil

## REFERENCES

1. R. k. Sharma Agnivesa's Charaka samhita, Cikitsa Sthana 15/3, text with English translation volume III, Published by Chowkhamba Sanskrit series, Varanasi. 2009 ,pp-987
2. R. k. Sharma Agnivesa's Charaka samhita, Cikitsa Sthana 15/16, text with English translation volume III, Published by Chowkhamba Sanskrit series, Varanasi. 2009 ,pp-453
3. R. k. Sharma Agnivesa's Charaka samhita, Cikitsa Sthana 15/13, text with English translation volume III, Published by Chowkhamba Sanskrit series, Varanasi. 2009 ,pp-1087
4. Vaidya Harishatri Paradakara, Ashtanga Hrudaya of Vagbhata, Sutra sthana, 9/20, 9th edition, Varanasi, Chawkhambha Orientalia, 2009 pp-543
5. Sharma, D. H., Sharma, D. R. K., & Sharma, D. D. C. Physiological Evaluation and Correlation between Agnimandhya and Hypothyroidism:

- International Research Journal of Ayurveda & Yoga, (2021) 4(1), 211-216.
6. Ramarao A.V.S: A Text book of Biochemistry, UBS PD, London, 7th edition.
  7. R. k. Sharma Agnivesa's Charaka samhita, Vimana Sthana 5/3, text with English translation volume III, Published by Chowkhamba Sanskrit series, Varanasi. 2009 ,pp-453
  8. R. k. Sharma Agnivesa's Charaka samhita, Cikitsa Sthana 8/13, text with English translation volume III, Published by Chowkhamba Sanskrit series, Varanasi. 2009 ,pp-234
  9. Priavrat Sharma, Susruta Samhita Sutra sthanam with English Translation of text and Dalhana's commentary along with critical notes. 21/5, Vol.I, Edited & translated Chowkhamba Visvabharati Oriental Publishrt& Distributors 2009, pp-765
  10. Priavrat Sharma, Susruta Samhita Sutra sthanam with English Translation of text and Dalhana's commentary along with critical notes. 21/9, Vol.I, Edited & translated Chowkhamba Visvabharati Oriental Publishrt& Distributors 2009,pp-865
  11. R. k. Sharma Agnivesa's Charaka samhita, Sutra Sthana 5/9, text with English translation volume III, Published by Chowkhamba Sanskrit series, Varanasi. 2009 ,pp-453
  12. Shukla M, Sharma RK, Sharma DC. Physiology of Dhatu Poshan (Tissue Nutrition). *J Adv Res Ayur Yoga Unani SiddHomeo*2020; 7(1&2): 6-11.
  13. Goverdhanam Vani, J. S. R. A. Prasad; Concept of Agni and Aharapaka ( Metabolic Transformation) in Ayurveda : Volume 1; Issue 4; July – Aug 2013,90-104.

