



Review Article

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CORRELATION OF RASA DHATU IN MODERN PERSPECTIVE: A REVIEW

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ABSTRACT

Rasa- the fluid of life; The quantity of *rasadhātu* depends upon food intake. *Rasa* provides fluidity to circulating *rakta*; it is the fluid that carries dissolved nutrients. Salts and sugar are the most important among nutrients. As a result, taking nutritional fluid is the best way to replenish *rasa*. The *rasadhātu*, being made up of the element water, has similar qualities with *kapha*. *Rasa dhātu* has qualities very similar to *kapha dosha*, which is made up of *jala* and *prithvi*. In the formation of the *dhatu*s, *kapha* is the *mala* (waste product) produced during formation of *rasadhātu*. Some of the most common and important problems arise when a person becomes *sthool* or *krish*, it is due to the *rasa dhātu* as well. *Sthaulya* and *karshya* in itself is due to many other diseases or we can say these diseases are the combination of many other diseases. The quality of the *rasa dhātu* is dependent upon the health of *agni*, or digestive fire. Food and liquid are initially digested in the gastro intestinal tract and, turned into *ahara rasa*. This fluid then further undergo metabolism by the *rasagni* to form *rasa dhātu*. The condition of *agni* determines the quality of *rasa* produced. When the *rasagni* is sluggish, the efficiency of transformation is reduced. When the *rasagni* is too active, it efficiently converts *ahara rasa* to *rasa dhātu*, but also burns up some of the *rasa dhātu* that is being produced. There is a highly variable fluid intake that must be carefully matched by equal output of water from the body to prevent body fluid volumes from increasing or decreasing. In this article we are intended to make a correlation of *rasa dhātu* with modern perspective to have a clearer view about the *rasa dhātu*. For which the basic materials have been collected from the *Ayurvedic* classics with the available commentaries, as well as text books of contemporary modern medical science have been referred for better understanding of the concept and its comparison with contemporary science.

Keywords: *Ahara, Dhātu, Rasa, Kapha* and *Rasagni*

INTRODUCTION

Food is composed of either *panchbutas* (five primary elements-*prithvi, aap, tejas, vayu* and *akash*) or of four kinds (*peya*-drinkables, *lehya*- lickables, *bhojya*-chewables and *bhakshya*-eatables), or having six tastes (sweet, sour, salt, pungent, bitter and astringent) and two potencies (hot and cold) or eight potencies (*sheeta, ushna, snigdha, ruksha, vishad, pichila, mridu* and *tikshna*) and processing many properties, when ingested undergoes digestion in alimentary tract, after it is digested properly (by the *koshtagni*- fire agency present in the *pakvaamashyamadhya*) there arises its vital essence known as "*Rasa*" which is very subtle and suitable to move even through minute *srotamsi*. *Hridaya* (heart) is its seat i.e., chief place of stay, from the heart it travels through the twenty-four *dhamnis* (arteries), ten of them going upwards, ten going downwards and four going side wards obliquely; nourishes the entire body constantly, make it grow, supports and maintains it, by activities which are due to invisible causes¹. The decreased and increase of this *rasa* which is travelling all over the body (constantly) has to be inferred by the sign and symptoms produced. This *rasa* is moving through the entire organ and organ system. According to *Acharya Sushrut*, total number of *dhamnis* present in body is twenty-four and *rasa* also travels through all twenty-four *dhamnis*. So, this can be concluded that *rasa* travels all over the body through all *dhamnis*. *Rasadhatu* circulates throughout the body in many ways like the continuity of sound, flame and water. *Dhalhana* explains this stimulus interpreting the continuity of sound as sideward movement, that of flame as upward movement and that of water as downward movement. *Shabd* (sound) has

maximum conduction velocity, *archi* has medium conduction velocity and *jala* has minimum conduction velocity so there is gradual reduction in velocity as the *rasa* moves in forward direction. In the same way *rasadhātu* has maximum velocity at aorta, medium in the arteries and minimum in capillaries means conduction velocity is minimum at capillaries because capillaries have maximum cross-sectional area.

The basic theory of Ayurveda is to maintain the state of equilibrium of *Tridosha, Saptadhātu* and *Trimala*². All these are nourished well initially by the influence of potency of individual *Jatharagni* and productive nutrients (*Ahara Rasa*) are passed into each level of *Dhātu* (bodily tissues) for nourishment. Ultimately, necessary nutrients for the formation and development of tissues are supplied by one stream of pool. They carry their support to the site, where *Dhatu*s are located which is explained by *kedari kulya nayaya*. Thus, *Rasa, Rakta, Mamsa, Meda, Asthi, Majja* and *Shukra Dhatus* develop sequentially and nourish further *Dhatu*s (*ksheer dadhi nayaya*). *Rasadhatvagni* plays an important role in the formation of *Rasa Dhātu* from *Ahara Rasa* which further nourishes the *Rakta Dhātu* by the influence of *Raktadhathvagni*. Whenever potency of any level of *Dhatvagni* diminishes or elevates the business of production of next *Dhātu* is affected. During this process *Dhatumala* (tissue excreta) is produced. Any *Atipravritti* (excessive secretion) *sang* (complete or partial obstruction) *siragranthi* (new growth inside the srotas) or *vimarg gaman* (leaving its own path and entering into others path) causes *Srotodusti* (vitiation of srotas) may lead to abnormal formation of *dhatu*s. In Ayurveda, some theories of tissue formation and development (*Dhātu Poshana Nyaya*) are elucidated in this

regard. These theories are *Khale Kapota Nyaya*, *Ksheera Dadhi Nyaya*, *Kedari Kulya Nyaya* and *Ek Kala Dhatu Poshana Nyaya*.

Table 1: Panchbhautic Content of Rasadhātu

Panchmahabhuta	Related Panchbhautic Component In The Blood
<i>Prithvi</i> element	Proteins- Sr. albumin, Globulin, fibrinogen, prothrombin, etc.
	Nitrogenous- glutamine, creatine, urea, uric acid etc.
	Sugars- glucose, glycogen etc.
<i>Apya</i> element	Sneha- lipids, phospholipids, cholesterol etc.
	Body fluid- 60 %, All the Anions and Cations present in the body such as Sodium ion, Chloride ion, Potassium ion, Hydrogen ion etc.
<i>Agneya</i> element	Vitamin- A, D, E, K, C, B-complex, Niacin etc.
	Enzymes- Amyolytic, Lipolytic, Proteolytic etc
	Element- Sodium Potassium, Magnesium, Calcium, Iron etc
	Mineral drugs- Sulphur, Phosphorus
	All Endocrine secretions
<i>Vayavya</i> element	Gases- oxygen, carbon dioxide etc.

Comparison of Rasa functions with Modern Prospective

Hridaya (heart) is its seat i.e., chief place to stay, from the heart it travels through the twenty-four *dhamnis*, ten of them going upwards, ten going downwards and four going side wards obliquely. By travelling all along the body it provides the proper nourishment to the body and gives proper support to the body. It does the following functions i.e., it nourishes the entire body constantly (*tarpyati*), make it grow (*vardhyati*), supports (*dharyati*), and maintains the living (*yapyati*). The cause of these functions is inscrutable. This process continues for all day, day and night. It provides proper nutrition and support to the body.

Charaka and *Sushruta* have mentioned *hridaya* as the root organ of *rasavaha srotas*. *Sushruta* has mentioned that there are total twenty-four *dhamnis* present in the body which are body channels that carries *rasa* to the whole body. Therefore, *rasa* travels throughout the body and provides proper nourishment to the whole body. Due to the dominance of *jal mahabhutarasa* gains fluidity.

Ahara undergo changes as soon as it enters the alimentary tract. By the action of *kledak kapha*, *saman vayu* and *pachak pitta*, *Pachak pitta* helps in digestion, *Saman vayu* resides near *pachakagni* and swing around the *koshtha*, it helps in engulfing of food and provides *bala* to *jathragani* which helps in proper digestion of food and helps in dissociation of its *sara* (essence) and *kitta* (waste) *bhaga*. *Kledak kapha* helps in moistening of the food that enters in the alimentary canal. It helps to make bolus soft. It helps to make *anna* into *adra* form. *Ahara rasa* is formed from *ahara* after action of *jatharagni*. *Saman Vayu* brings the absorbed *ahara rasa* to *hridaya* thus control the venous return. *Vyaan vayu* ejects the *rasa* from the ventricle of the heart with appropriate pressure. The *rasadhātu* then circulates in the whole body always, continuously and simultaneously. From *hridaya* with the help of *vyan vayu* through all *dhamnisrasa* is reached to small arteries, arterioles, and capillaries and make it available to the level of all *dhatu*s and provide nourishment. Thus, *Vyana vayu* governs the process of cardiac output. *Samana vayu* brings the absorbed *rasa* back to the heart through *sira*. Thus, *Samana Vayu* governs the process of venous return. All tissues in the body are nourished in a circular fashion this is called *chakravat*, which occurs with the help of *Saman vayu* and *Vyana vayu*. *Jala mahabhuta* provides fluidity to *rasa* and *vyana vayu* ejects the *rasa* from heart to move *rasa* all over the body. And hence in this way *rasa* provides nourishment to each part of the body. Extracellular fluid is in constant motion throughout the body. It is transported rapidly in the circulating blood and then mixed between the blood and the tissue fluids by diffusion through the capillary walls. In the extracellular fluid are the ions and nutrients needed by the cells to maintain cell life. Thus, all cells live in essentially the

same environment—the extracellular fluid (ECF). Because of this, the extracellular fluid is also called the internal environment of the body. Cells are capable of living (*Yapyati*), growing (*vardhyati*) and performing their special functions for providing nourishment (*tarpyati*) as long as the proper concentrations of oxygen, glucose, different ions and other constituents are present in this internal environment. As ECF is the internal environment of the body and it doses all the functions of *rasa*. Therefore, *rasa* can also be said as internal environment of the body.

TARPYATI

Rasa dhatu helps to nourish *dhatu*s in every stage of life beginning from *balyawastha*, *madhyawastha* and up to *vriddhawastha* as well (till the end of this life). *Rasadhatu* is very important for maintenance of normal functions and to provide energy so as to make the one alive and kicking. *Rasadhatu* helps in transportation of proper nutrients from one tissue to another.

VARDHYATI

Rasa dhatu helps in growth of *dhatu*s during *balyawastha* because it carries growth hormone. In the first phase of life for the organogenesis and the *dhatuvridhhi*, the nutrients for the development and growing of these are very important. *Rasa dhatu* provides proper nourishment to all *dhatu* and *updhātu* in the *balya* phase, so as the body properly grow.

DHARYATI

Middle stage of life is *yuvawasta* and it is the most important *avastha* in one's life. One is supposed to be as fit as fiddle in this stage because of complete development of tissues and organ in this stage. So, in this stage *dosha*, *dhatu* and *mala* becomes more stable. This action comes under *dharana karma* of *rasadhātu*. Some *acharyas* has referred both word *dharana* and *Jeevan* are synonym. In this stage *swaroop* of *sharir* should remain in its original and proper shape which is only possible due to *rasa*.

YAPYATI

Due to *paripakvata* of *sharir* in *vriddhawastha*, *annarasa* does only little nourishment in this *avastha* so as only required for maintenance of life. This is called *yapan karma*. During the *vriddhawastha* all the *dhatu* gets *ksheena*. Ageing cause decrease in *dhatu*, *updhātu*, *dosha* and *mala* due to the degeneration of body tissues. In spite of degeneration of cells, *rasadhātu* helps to maintain the life and prevent the body from total destruction. This is called the *yapanakarma*. All the functions mentioned above in the body are happened because of invisible cause³.

Control of venous return by *Saman vayu*

Veins are thin walled structure which contains thin layers of smooth muscles in their wall. These smooth muscles are innervated by sympathetic fibres which when stimulated, increases the vasomotor tone (i.e., venous BP increases) → this leads to venoconstriction → leading to increased velocity of venous blood. Because of existence of valves in the veins (which allow only unidirectional flow of blood) → the venous blood always moves towards the heart.

Types of *Rasadhatu*

Chakrapani has commented there are basically two types of *rasa* i.e., *dwividho rasa sthayi poshakashya eti*

1. *Sthayi rasa*
2. *Poshak rasa*

Sthayi Rasa

It is a fraction of *rasa* that becomes *stayi* and it is called *stayi rasa* or *poshaya rasa*. *Sthayi rasa* is in fact *rasa dhatu*. *Sthayi rasa* is that part of the *rasa* whose concentration remains stable at the end of metabolic process and its concentration is regularly monitored by *poshak dhatu*. In modern prospective it can be compared with plasma including its composition e.g. proteins, hormones, plasma, glucose, amino-acids, lipids etc. Function of *rasadhatu* is *preenana* provide satiety which is achieved by normal concentration of glucose molecule in the blood. Glucose concentration stimulates the satiety centre and causes loss of appetite.

Poshak Rasa

It is also known as *asthyai rasa*. This *rasa* flows all over the body through all *dhamnis* which has its dimensions all over the body and do its functions during circulation in cardio vascular system. *Poshak rasa* is circulating one. It reaches to the tissue level and provides nourishment to it. As this *rasa* is rich in nutrients and do nourishment i.e., *poshana*, that is why it is called as *poshak rasa*. In modern prospective it can be compared with all molecules absorbed from gastro intestinal tract. According to *chakrapani*, when *ahaar* is digested by the action of *jathargani*, *ahaara rasa* is formed which further form the *rasa dhatu* after simultaneous action of both *bhutagni* and *jathragni*. *Rasa* absorbed from the gastro intestinal tract is *vijatiya dravya* and by the action of *bhootagni* it becomes *sajatiya* and converts it into *sthayi dhatu*; whereas, *Poshya* or *sthayi dhatu* is nothing but the body tissues i.e., the *rasa dhatu*. *Poshakdhatu* does nourishment of *poshya dhatu*. *Sthayi rasa*, *rasa dhatu* and *poshya dhatu* are synonyms of each other. Since *rasa* is liquid and possess properties such as unctuousness, enlivening, nourishing, supporting etc, it is *saumya* (cold in properties) in nature. Essence of food known as *ahara rasa* is formed first by the action of *jatharagni* (gastric juices in particular in the *amashaya* (stomach) and is a partially digested product. It passes through the *grahni* (duodenum) gets mixed with *acchapitta* (bile and pancreatic juice) reaches the *pachyamashaya* (small intestine). There it undergoes further digestion by the action of *bhutagni* (metabolic process). After these activities are complete, the first *dhatu*, *rasa dhatu* is formed with the help of *rasagni*. This is white thin liquid containing nutrient materials essential for the formation and growth of other *dhatu*s. This *rasa dhatu* travels all over the body constantly supplying nutrient materials (*dhatu poshak /poshak dhatu* or *asthayi dhatu*) to other static tissues (*sthayi* or *poshya dhatu*s). Portal vein drains absorbed *ahaar rasa* from the small intestine to liver and from there reaches the heart by inferior vena cava. When a little

quantity of blood is taken out, kept in a glass test tube, and prevented from clotting, after few minutes, we see two distinct portions separately, a thin watery liquid white portion, more in volume at the top and thick, red slimy portion at the bottom. The fluid portion at the top is called plasma and is equivalent to *rasa dhatu*, the thick red slimy portion at the bottom comprises of blood corpuscles- red and white and also platelets, this is equivalent to *rakta dhatu*. Both the portions remain together always and circulate throughout the body constantly (*rasa rakta shacharya* and *rasa-rakta samvahana*).

From *rasa dhatu*, *rakta* gets formed then from *rakta*, *mamsa* gets formed, from *mamsa*, *meda* is formed, from *meda*, *asthi* is formed, from *asthi*, *majja* is formed and from *majja*, *shukra* gets formed. For all these *dhatu*s, the essence of food (*ahar rasa*) is the supplier of nutrients. *Ahara rasa* is the main source of nutrition to the tissues. It contains nutritive materials (*poshaka ansha*) essential for all *dhatu*s and during its circulation throughout the body, every *dhatu* draws its own specific nutrient required for formation of *dhatu*. Such nutrient materials are utilized by the *dhatvagni* and made use of for its own growth. *Aahar rasa* can also be compared with chyme. As After food in the stomach has become thoroughly mixed with the stomach secretions, the resulting mixture that passes down the gut is called chyme. Chyme basically contains all the nutrients which further break down to provide nourishment to the body. In the same way *rasa dhatu* has all the important nutrients in it and provides nourishment to other *dhatu*s.

The formed *rasa* is called *tejobhuta*, it appears as *ghrita*. Every *dhatu* has its own *agni* called as *dhatvagni* which is specific to the *dhatu* in which it is present designated by the name of the *dhatu* (itself) viz. *rasagni*, *raktagni*, etc. this *agni* metabolise the *poshak ansha* (nutrient materials) supplied by the circulating *rasa*. After this kind of metabolism three kind of materials get formed viz-

1. *Sthula bhaga*
2. *Sukshma bhaga*
3. *Mala bhaga*

Sthula bhaga is major product meant for the maintenance and growth of the same *dhatu*. The *sthula bhaga* are *dhatu* which gets formed after the formation of former *dhatu*. *Sukshma bhaga* is little in quantity has precursor for genesis of next *dhatu*. All the factors which are responsible for the formation of other *dhatu* is called *sukshma bhaga*. Like vitamin B₁₂, folic acid, iron, erythropoietin etc which are responsible for the formation of *rakta dhatu* comes under *sukshma bhaga*. *Mala bhaga* represents the waste products of that tissue. All the waste products of the body come in *mala bhaga*. Our body has a way of getting rid of excess materials, whether food matter, oxygen, carbon dioxide, water, salt or waste. Human body has 60 percent of fluid. In our body the excretory system helps to keep salts and urea from building up to dangerous level and becoming toxic. Most of the waste substances that are not needed by the body, especially the metabolic end products such as urea, are reabsorbed poorly and passes through the renal tubules into the urine. So, *mala* travels with blood in the body and reach to kidneys for the excretion. Another *mala bhaga* is carbon dioxide. Carbon dioxide is the most abundant waste of all the ends product of metabolism. Carbon dioxide is absorbed in the blood and carried to the lungs and is removed by the lung during process of expiration. In this manner *dhatu*s gets formed in succeeding order, *purva dhatu* give rise to *uttar dhatu* by supplying its *sukshma bhaga* so commencing with the first *dhatu* – the *rasa dhatu*, the second *dhatu* *rakta dhatu* is formed. From *rakta*, *mamsa dhatu* is formed and so on till the seventh and last *dhatu* *shukra* is formed.

Diseases from *Rasa vikrati*

Rasa is responsible for *sthaulya* and *karshya* in the body⁴. Persons indulging in *shleshma* promoting diets, those who eat before the previous meal has been digested, those who do not do any physical exercise and habitual diurnal sleepers, in all of them the nutrient fluid circulating in the body in a stage of partial metabolism remains sweet and is converted into *medas* due to its nutrient fluid being a fat promoter and this process thus make them obese; the very obese readily from dyspnoea on effort, thirst, polyphagia, too much of sleep, excessive perspiration, bad odour from the body, snoring, a sense of depression in the body and blurred speech. On account of softness of adipose tissue, the obese are incapable of doing all physical activities. The channels are being obstructed by *kapha* and *medas*. They remain weak because of other *dhatu*s obtaining less nourishment due to the obstruction of the passage. The obese may die due to any of the complications such as boils associated with urine abnormalities, pyrexia, fistula in-ano, abscess and other *vatika* disorders. All diseases occurring in them i.e., obesity assume seriousness due to the obstruction in metabolic pathways. Therefore, one should avoid all the etiological factors which lead to obesity.

In all those who indulge in *vata* promoting diet, excessive physical exercise, excessive sexual intercourse, sternous study, fear, grief, anxiety, wakefulness in the night, thirst, hunger, anger, taking of astringents, partial starvation, etc, circulating *rasa* being reduced in quantity fails to nourish the tissues due to insufficiency, hence extreme emaciation or *karshyata* occurs.

The emaciated persons are intolerant to hunger, thirst, cold, hot air and rains are unable to carry weights. They also suffer from nervous diseases frequently and are weak in activities. They may die from any of the complications such as asthma, cough, consumption, splenomegaly, hypo activity of digestive mechanisms abdominal gaseous tumours and haemorrhagic diseases. All diseases occur with greater severity in them due to general weakness, they should avoid all the etiological factors which lead to emaciation.

Functions of *Rasadhatu* in the Body

Rasadhatu provides satisfaction, nutrition and supplies nourishment to the *raktadhatu*. As we discussed earlier that heart is the seat of *rasadhatu*. *Rasa* travels throughout the body with the help of all *dhamnis* i.e., 24 *dhamnis* which comes out from heart. So, in case of *rasa kshaya* it causes chest pain, palpitation, sense of emptiness and thirst⁵. If it becomes excess it produces oppression in the heart and increased nausea and salivation may occur.

According to *acharya sushruta* *rasadhatu* provides satisfaction and if any person does not meet up their satisfactory need they feel dejection and ends up in depression that is all due to *rasa*. *Acharya chakrapani* opines that as the milk gets completely transformed into curd by the action of certain bacteria and microbes, curd into butter and butter into ghee in the particular order. In the same way *rasadhatu* gets completely transformed into *rakta* by the help of *rasagni*; then *rakta* to *mansa*, *mansa* to *meda*, *meda* to *asthi*, *asthi* to *majja* and *majja* to *shukra*. Due to this complete transformation of *rasa* to *shukra*, it is called *sarvaatman parinam paksha* and because the *chakrapani* quoted the example of *ksheer* and *dadhi* and known as *khseer dadhi nyaya*. It is also important to note that conversion of *ahar rasa* to *rasa dhatu* occur in one day; whereas, *rasa* to *rakta* transformation occur in 3015 *kala* i.e. about 5 days. Therefore, if a person does not consume *ahaar* for more than 6 days that person will start developing *dhatukshaya*. As we can compare it in modern prospective that completes conversion of mesenchymal tissue into bone by the process of ossification. This ossification process is one of the examples of *ksheer dadhi nyaya*. The

conversion of 25 hydroxy vitamin D₃ to 1, 25 dihydroxy vitamin D₃ is also one of the examples of *sarvatam parinam paksha*.

Next is *kedari kulya nyaya*. The word *Kedar* means small pieces of land and *Kulya* means drain. Crops in the field get irrigated by creating *Kulya* and *Kedar*. The *Kedar* (small pieces of land) get irrigated one by one through *Kulya* (drain) in sequence. Likewise, different *Dhatu*s of the body get nutrition one by one in sequence through vessels. Firstly, *Rasa Dhatu* gets nutrition from *Ahara Rasa*. Then *Rakta Dhatu* get nutrition from the rest part of *Ahara Rasa* and likewise till the end i.e. *Shukra Dhatu*. In this context the *kedari* is compared with *dhatu*s and *kulya* is compared to the body channels which carry fluids and nutrients to the target organ. In the harvesting field as the water reach nearby fields before than the far away fields same happens in case of *dhatuposhan*. According to this *nyaya*, *rasadhatu* carry *rakta poshak ansh* and reach to the *rakadhatu* and provides nourishment for the further formation of the *rakta dhatu*. Same way *rasa* reaches the *mansadhatu* and provides nourishment to the *mansa dhatu*. And so on. It is only which moves to and reach the *dhatu* and helps in formation of *dhatu*s. *Charak rasadraktam*, *sushruta khalvapyao rasa* and *harita saptahadarvaaka* supports this *nyaya*. According to modern physiology passive diffusion comes in *kedari kulya nyaya*. Selective absorption takes place. One of the best examples is exchange of gases in respiratory system because of pressure gradient.

Ayurvedic law of nutrition of *dhatu* is transformed as follows:

When the digestion starts first *aahar rasa* reaches the *Rasavaha Shrotas* and *rasadhatwagni* processed the *Ahara Rasa*. In this process it is divided into three parts *Sthoola bhaga* which is macroscopic in nature, *sookshma bhaga* which is microscopic and *Malabhaga* the excretory part. Among them the *sthoala* part gives nourishment to its very own *dhatu* i.e., *Rasa dhatu* whereas *sukhsma* part nourish the descent *dhatu* which is *rakta dhatu* and *mala* nourishes its *mala* that is *kapha* in *rasa dhatu*.

The next is *khale kapot nyaya*. The word *khale* means pot and *kapota* means pigeon, the bird. The pigeon has to come to the pot of grain to relax their thirst, likewise the nearest *Dhatu*s are directly nourished by *Ahar Rasa* without considering the sequence of nutrition.

Absorption of *Aahar rasa*

After the intake of *aahara*, it moves towards the *kostha* by the help of *prana vayu*. The site of *pachakagni* is *grahani* or *pakvamashaya* better known as *pittadhara kala*. *Samana vayu* which is present in the vicinity of *agni* stimulate the *pachakagni* for the digestion and separation of food as well as *shoshyati* i.e., absorption of water and nutrients⁶. This absorption of nutrient and water requires movement which is the main function of *vata*. So here both *samana vata* and *pachakagi* is responsible for absorption. Absorption from small intestine each day consists of several hundred grams of carbohydrate, 100 or more gram of fats, 50-100 gram of amino acids, 50-100 gram of ions, and 7-8 lit of water. In small intestine sodium absorption is powered by active transport of sodium from inside the epithelial cells. This active transport requires energy. Part of sodium ion is absorbed along with chloride ion⁷.

The negatively charged chloride ions are passively dragged by the positive electric charge of sodium ions. Sodium is also co transported by specific carrier proteins including sodium glucose co-transporter, sodium amino acid co-transporter and sodium-hydrogen exchanger. The next step is the osmosis of water. This osmosis occurs because a large osmotic gradient has been created by the elevation of concentration of ions. This process in small intestine need energy which is nearly similar to *khalekapota nyaya* in which the pigeons have to spend energy to procure the

grain and this process is active one⁸. Two types of *paka* occur in process of digestion namely *avastha paka* and *nistha paka*. *Avasthapaka* is of three types i.e., *madhuraavastha paka*, *amla avastha paka*, *katu avastha paka*. In the process of *katu avastha paka* (*soshyamanena vanhina*) *jatharagni* helps in absorption of water⁹. Most of the water present in the chyme is absorbed in the colon. This process may be similar to *kedarikulya nyaya*¹⁰. It does not require energy. This theory can explain the passive diffusion where different field receive water through different channel without expenditure of energy.

DISCUSSION

Dosha, dhatu and *mala* are the root of life "*Dosha dhatu mala mulam hi shariram*"¹¹. These are the biological forces which work through the medium of *dhatu*s and *malas*. *Dhatu*s and *malas* are the structural units and the *doshas* are not. Hence the *doshas* are called as *asrayees* and *dhatu*s called as *asrayas*. *Dosha*. *Rasa* 60-65 % of water and 35-40 % solids. *Rasa* is the primary important *dhatu* in the body which helps in the formation of other *dhatu*s of the body. It circulates into the body whole time and keeps the entire body functioning constantly. *Acharyas* described that the disease which are caused by the *dusti* of *rasa* are either due to *vridhhi* (increase in quantity) or due to *kshaya* (decrease in quantity). Thus, *rasa* is the main *dhatu* in the body which produce directly from *anna rasa* and it is one of the vital tissues for the nourishment and development of body. So, all fluid present in the body is *rasayukta* and this is main factor for the *Vardhan, dharna, tarpan* and *yapan karma* in the human body.

CONCLUSION

Rasadhatu which is called the fluid of life is made up of *Ahara rasa*. Fluidity is present in it because of predominance of *jala mahabhuta* and it can travel in *param sukshma srotas* of the body. It is basically of two types' *sthayi rasa* and *poshak rasa*. *Poshak rasa* is the circulating one and carry the nutrients for the nourishment of *sthayi* or static *dhatu*. *Sthayi dhatu* is *rasadhatu* only or we can say *sthayi dhatu*, *rasa dhatu* and *poshya dhatu* all are synonyms. Composition of *rasa dhatu* is the deciding factor for *sthaulya* and *karshya* in the body. *Rasa dhatu* provides core nutrition for the further *dhatu*s. *Rasa dhatu* is compared with plasma and it has three major components solids, water and gases. Solids are 7-8 % and contains organic substances like plasma proteins, carbohydrate, enzymes, non protein nitrogenous substances, amino acids, internal secretions like hormones and antibodies whereas inorganic substances include sodium,

calcium, potassium, magnesium, bicarbonate, chloride, phosphate, iodide, iron and copper. Water is 92-93 % and gases include oxygen, carbon dioxide and nitrogen. *Rasavaha srotas dushti* can cause many diseases in the human body so it is the necessity to maintain the proper quantity and quality of *rasa* in the human body. So, it is important to have a balanced diet, so balanced *ahara rasa* will formed and hence the balanced formation of *rasa dhatu* will takes place in the *sharir*.

REFERENCES

1. Moharana, Pritam & Roushan, Rakesh. (2019). A critical review of Vyana Vayu in modern Physiological Perspective. 8. 75-82.
2. Moharana, Pritam & Roushan, Rakesh. (2018). Role of Agni in Digestion and Metabolism-A Critical Review. 9. 2018.
3. Pritam Moharana and Rakesh Roushan. A critical review of pachaka pitta in modern physiological perspective. Int. J. Res. Ayurveda Pharm. 2019;10(1):18-20 <http://dx.doi.org/10.7897/2277-4343.10015>
4. Moharana, Pritam & Roushan, Rakesh. (2018). Role of Agni in Digestion and Metabolism-A Critical Review. 9. 2018.
5. Sushruta, Sushruta Samhita, Ayurvedatvatvasandipika Hindi Commentary by Kaviraj Dr. Ambikadutt Shastri. Sutrasthan, 15/13 Varanasi: Chaukhamba Sanskrit Samsthana; 2001.
6. Moharana, Pritam & Roushan, Rakesh. (2018). A Critical Review of Samana Vayu in the Modern Perspective. 9. 188-197.
7. Hall E, Guyton. C. Gastrointestinal physiology, Textbook of medical physiology, New Delhi (India), Elsevier; 2016. p. 451.
8. Moharana, Pritam & Roushan, Rakesh. (2018). Role of Agni in Digestion and Metabolism-A Critical Review. 9. 2018.
9. Moharana, Pritam & Roushan, Rakesh. (2018). Role of Agni in Digestion and Metabolism-A Critical Review. 9. 2018.
10. Rawat, Neha & Roushan, Rakesh. (2018). Ashtavidha Ahar Vidhi Visheshayatan an Explanation of Healthy and Balanced Diet- A Review. 9. 51-58.
11. Moharana, Pritam & Roushan, Rakesh. (2018). A Critical Review of Prana Vayu in the Modern Perspective. 9. 446-457.

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