



Review Article

A CRITICAL ANALYSIS OF *DHATUMALA* (METABOLIC WASTE PRODUCT)

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KEYWORDS: *Dhatumala*,
Dhatuagnipaka, *Mahakoshta*,
Sara, *Kitta*.

ABSTRACT

Ayurveda imparts a great emphasis upon the maintenance of positive health of a person. According to WHO, health is a complete state of physical, mental, social, spiritual well being and not merely the absence of disease. *Sushrutha's* quotation regarding *Swastha* is exactly same which was told many decades back. Healthy body is the outcome of healthy food and lifestyle and it is the basis for health and disease. Nutrient rich diet which is consumed in proper time and amount will help the body which contributes it to maintain the homeostasis. Food has to be properly digested for the nourishment and formation of healthy *Dhathu*. Digestion takes place in *Mahakoshta* and as a result of this, food is converted into *Prasadamsa* and *Kittamsa*. *Dhatus* are formed in a series from *Rasa* to *Shukra* from this *Prasada* portion. *Dhatus* after their *Dhatuagni paka* is divided into *Sara* and *Kitta bhaga*, and from this *Kitta bhaga dhatu malas* are formed. *Malas* represent a wide variety of substances produced by the body through different *Pakas* conducted in the body. Removal of metabolites and waste products are the basic physiological functions of body. *Mala* are the waste products that need to be eliminated from the body periodically. Scope of the experiment: Here in this article the physiological interpretation of *Dhatumala* and its need to be flushed out on regular basis is explained. Physiological view point of *Dhathumala* will help to understand what it is and how it is formed in the body in a better way to the present generation.

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INTRODUCTION

Dhathus are the entities which support and nourish the body, and proper diet is very essential for that. Food is one among the sub pillars of the body^[1] and it has to be properly digested for the nourishment and formation of healthy *Dhatu*. This process is called *Ahara Parinama*. The action of *Jadaragni* converts food into *Sara* and *Kitta* portions. *Prasada bhaga* will be *Annarasa* and *Kitta bhaga* will produce *Purisha* and *Mootra*. *Dhatus* are formed one after the other from *Annarasa* by the action of the respective *Dhatuagni*. *Dhatus* are maintained in its normal state by the action of *Dhatuagni* situated in each *Dhatu*. *Dhatuagni* residing in *Rasa dhatu* will be acted upon the *Annarasa* and results in the production of *Prasada amsa* and *Kittamsa*. *Kittamsa* will form the *Dhathumala*. *Prasada amsa* is having *Sthoola bhaga*

and *Sookshma bhaga*. In *Sthoolamsa* the said *Dhathu (Sthayi dhatu)* get nourished or formed as in case. The *Sookshma bhaga*, again divided into two parts which leads to the formation of *Upadhathu* and the other part becomes subsequent *Poshaka rasa* in which the subsequent *Dhatuagni* act to form the next *Dhatu*.

MATERIALS AND METHODS

Ayurvedic Reference Regarding *Dhatumala* (metabolic waste products)

Dosha, *Dhatu*, and *Mala* concept is unique in Ayurveda^[2]. *Malas* are the substances produced in the body through different *Pakas* undergoing in subsequent stages. In Ayurveda for the bioconversion of food *Agni* is the main entity. After the action of *Agni* on digestive system the end product which is absorbable is *Sara* and the one

which is separated from body is called as *Kitta*. *Kshudra mala*. *Dhatumalas* are *Kshudramalas* and *Kitta* or *Mala* is again divided into *Brihath mala* and are formed by the action of *Dhatuagni* on *Dhatu*.

Table 1: Name of *Dhatu* and its *Dhatumalas* mentioned in various *Samihiatas*

S. No	Name of <i>Dhatu</i>	<i>Charaka, Ashtanga Sangraha</i>	<i>Sushruta, Ashtanga Hridaya</i>	<i>Sarangadhara</i>
1	<i>Rasa</i>	<i>Kapha (Ch), Kapha, Lasika (AS)</i>	<i>Kapha</i>	<i>Jihwa, Netra, Kapolanam jalam</i>
2	<i>Rakta</i>	<i>Pitta</i>	<i>Pitta</i>	<i>Ranjaka Pitta</i>
3	<i>Mamsa</i>	<i>Kheshumala (Ch) Karna nasa aasya romakoopa prajanana mala (AS)</i>	<i>Kheshumala</i>	<i>Karna vit</i>
4	<i>Meda</i>	<i>Sweda</i>	<i>Sweda</i>	<i>Danthakakshamedrarasana mala</i>
5	<i>Asthi</i>	<i>Kesa, Roma Ch) Sweda Nakha, Roma (AS)</i>	<i>Nakha, Roma</i>	<i>Nakha, Netramala</i>
6	<i>Majja</i>	<i>Akshimala, Twakmala (Ch) Akshimala, Twaksneha (AS)</i>	<i>Akshimala, Twaksneha</i>	<i>Vaktrasnigdatwam</i>
7	<i>Shukra</i>	NA	<i>Ojas (AH)</i>	<i>Pindika</i>

Formation of *Dhatumala*

Food intake in the form of *Charvya* (chewable), *Chooshya* (mastication), *Lehya* (licked) and *Peya* (drunk) are digested by *Jadaragni* and results in the breakdown of complex particles into their elemental forms which is non homologous to body. *Bhoothagni paka* convert them to pre-homologous substances, on which *Dhatuagni* will act and results in the production of *Prasadakhya* and *Malakhya Dhathus*. *Dhatuagni* when acted upon the concerned nutrients circulating as *Poshakamsa* in the diet and results in the production of *Prasadakhya Dhatu* and *Kitta*. The *Kitta* fraction contributes in part to the formation of various kinds of excrements and impart to the nourishment and synthesis of such structures of the body as hair, nails.

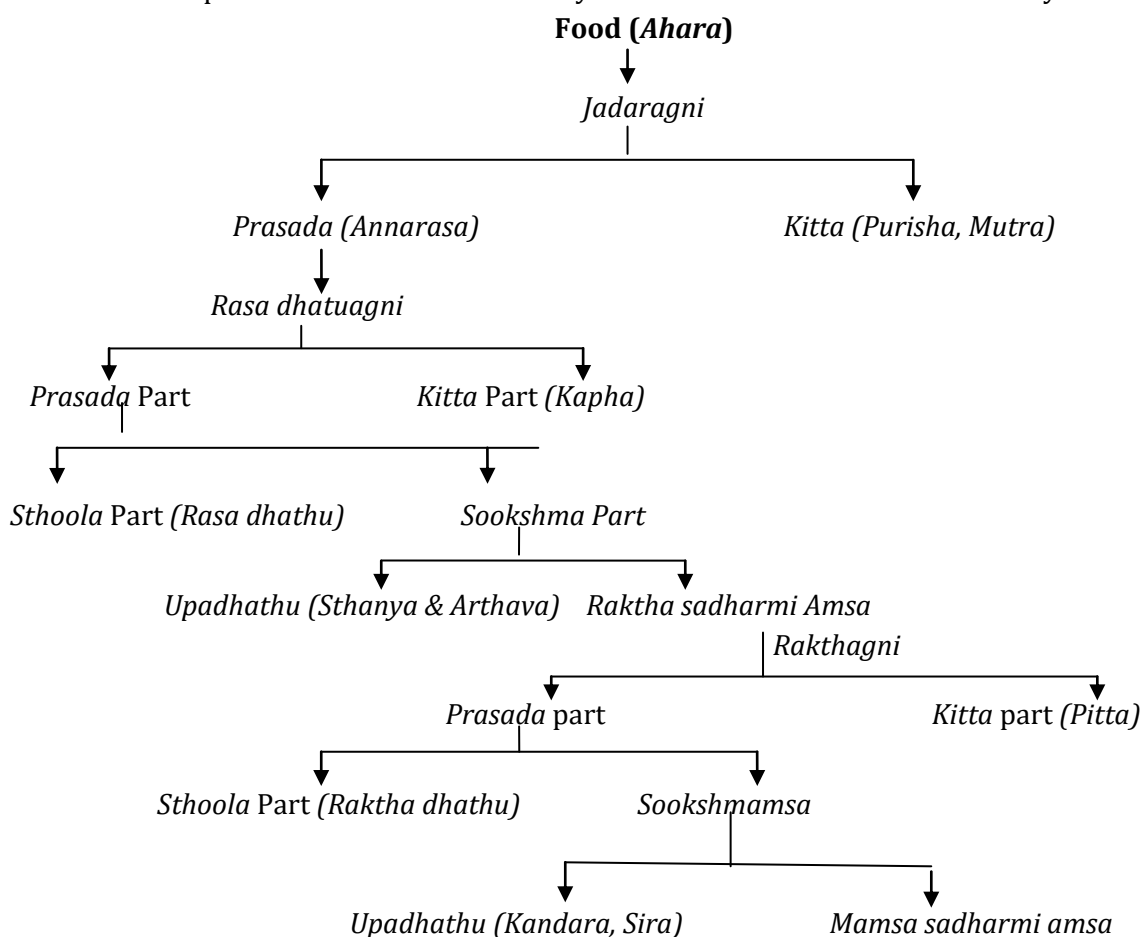


Table 2: The following table shows the action of different *Dhatuagni* upon the food

No	Name of the <i>Dhatuagni</i>	Fraction on which <i>Agni</i> acts	Formation of <i>Sthira Dhatu</i>	Formation of <i>Upadhatu</i>	Formation of <i>Malas</i>
1	<i>Rasagni</i>	<i>Anna rasa</i>	<i>Rasa</i>	<i>Sthanya, Arthava</i>	<i>Kapha</i>
2	<i>Raktagni</i>	<i>Rakta sadarmi amsa</i>	<i>Rakta</i>	<i>Kandara, Sira</i>	<i>Pitta</i>
3	<i>Mamsagni</i>	<i>Mamsa sadarmi amsa</i>	<i>Mamsa</i>	<i>Vasa, Twak</i>	<i>Khamala</i>
4	<i>Medogni</i>	<i>Medosadarmi amsa</i>	<i>Medas</i>	<i>Snayu</i>	<i>Sweda</i>
5	<i>Asthyagni</i>	<i>Asthi sadarmi amsa</i>	<i>Asthi</i>	-	<i>Kesa, Loma, Nakha, Smasru</i>
6	<i>Majjagni</i>	<i>Majja sadarmi amsa</i>	<i>Majja</i>	-	<i>Snehamsa of Akshi, Vit, twak</i>
7	<i>Shukragni</i>	<i>Shukra sadarmi amsa</i>	<i>Shukra</i>	-	<i>Oja and Pindika</i>

RESULT AND DISCUSSION

Rasa

Rasa Dhatu is the first and foremost *Dhatu* formed from *Ahara rasa* and is circulating through *Rasavaha srotas* to supply nutrition to entire body. Functional aspect of *Rasa dhathu* is related to growth and development of body. *Rasa Dhathuagni* (Metabolic process) acts on *Anna Rasa* and form the metabolic waste products which is to be eliminated from the body for maintaining the homeostasis. According to classical reference the following are the *Dhatu malas*.

- *Kapha*^[1,3-4]
- *Kapha, Lasika*^[5]
- *Jihwanetrakapolanam Jalam*^[6]

Here *Kapha (Dhathumala)*, mentioned in all *Brihatthrayis* is different from the *Prakrutha Kapha Dosh*. *Kapha dosha* and *Kapha as Dhathu mala*, both are having different origin and function. The production of *Tridoshas* from food takes place during three *Avasthapaaka*. A perfectly ingested food contain 6 *Rasas*, is converted into *Madhura Rasa* in *Amasaya*. The food becomes frothy in this stage and *Kapha dosha* is produced.

Dhathumala Kapha is formed in *Rasavaha srotas*. So here *Kapha* may be compared to mucous or phlegm which is secreted to avoid tissue damage. Mucous membrane or mucosa is a membrane lines various cavities in the body and secrete mucus, a thick protective fluid. Mucus serves to protect epithelial cells in different systems. phlegem is a specialized term for mucus that is restricted to the respiratory tract where it protects the lungs by trapping foreign particles that enter through nose, and discard them. The presence of mucus in the nose and throat is normal, but increased quantities can impede comfortable breathing and must be cleared by expectoring it as sputum from the throat. Similarly in GIT the layer of mucus lining the inner walls of stomach is vital to protect the cell linings of that organ from the highly acidic environment

within. In female reproductive system, cervical mucus prevents infection. Polyelectrolyte effect in mucus (polymers with charged molecules) controls the influx and outflux of water within mucus.

Ashtanga Sangraha has given *Lasika* (Serum) as the *Mala* of *Rasa dhathu*. That which oozes from *Vrana* (ulcer) may be compared to *Lasika*. Serum is a clear fluid that, oozes from the site of injury, and is to be discarded from the site of injury, proves it is *Mala*. *Jihwa, Kapola* (Tongue, cheeks) and *Netrajala* (tear) are the *Dhathumala* according to *Sarangdhara*. Saliva contributes to the digestion of food and to the maintenance of oral hygiene. Saliva coats the oral mucosa and lubricates mouth by its secretion. Excess salivary secretion results from poor oral hygiene, sinus, throat and peritonsillar infection flush the exogenous and endogenous microorganism and their product into the gut or outside through mouth. *Netra jala* means fluid present in eyes. Here the lacrimal secretions which cleanses and protects the eye's surface may be taken. Tear produced from Lacrimal gland lubricate and protect the cornea and eyeball from injury which may result from small particles such as dust.

Raktha

Raktha dhathu is formed from *Rasa dhathu* as a part of *Dhathuparinama* process, and characterized by its colour.

- *Pitta*^[1,3-4-5] *Ranjaka pitta*^[6]

Mala roopi pitha is the *Kitta* of *Raktha dhathu*, which is nothing but the *Achapitta*. The ingested food, undergo digestion and attain acidic nature, thereafter in the small intestine release of *Acha pitta* (liquid bile) takes place. The bilirubin formed in the macrophages after degradation of hemoglobin enters the liver (hepatic cell) and conjugated with uridine diphosphate glucuronic acid (UDP-glucuronic acid) converts it into water soluble conjugated bilirubin. Most of the conjugated

bilirubin is excreted into the bile and enters the intestine. Stercobilin and urobilin is then excreted out of the body as *Mala*.

Ranjaka pitta is the one which gives colour to *Raktha dhathu*, and may be haemoglobin the colouring pigment of blood can be incorporated here.

Mamsa

- *Kheshu mala*^[1,3-4]
- *Karna nasa aasya romakoopa prajanana mala* ^[5]
- *Karna vit*^[6]

Mamsa dhathu mala is *Kha mala*, which is produced in the open spaces especially *Bahirmukha srotas*. All *Bahirmukha srotas* as have direct contact with the environment and tend to accumulate dirt if proper hygiene is not maintained. The exocrine gland situated near these areas secretes the products which along with dirt forms the *Kha mala*.

Meda

- *Sweda*^[1,3-4]
- *Dantha Kaksha Medra Rasana mala*^[6]

Sweda is the *mala* of *Medo dhathu*, which is produced as a result of *Paka* happened in *Medo dhathu*. The main function of adipose tissue is insulation of heat. Physical exercise to burn fat will produce excess amount of sweat which can be related to fat mobilization from adipose tissue. The process of sweating at the time of fat mobilization can be taken as the *Paka* taking place in *Medo Dhathu*.

Asthi

- *Kesa Roma*^[3]
- *Nakha Roma*^[5]

Asthi dhathu includes all those structures of the body, which resist easy degradation. Nails, hair and hair follicle are included in *Asthi dhathu mala*. It is called as integumentary system and serves various functions. A healthy finger nail has the function of protecting the distal phalanx, the finger tip and the surrounding soft tissue from injuries. Hair follicle is a sensitive touch receptor and produce oily secretion to help condition the hair and surrounding skin. All *Asthi dhathu mala* grows continuously and this is to be cut and maintained properly.

Majja

- *Akshimala Twakmala*^[3]
- *Akshimala Twaksneha*^[1-4-5]
- *Vaktrasnigdatwa*^[6]

Majja is the sixth *Dhathu* which is developed from *Asthi dhathu*. Extreme unctuousness is its chief property, which is capable of offering strength to

the body. Rheum is the thin mucus, naturally discharged from eyes during sleep. Rheum dries and gathers as a crust in the corners of eyes. It is formed by the combination of mucus, blood cells, skin cells or dust. When individual is awake, due to continuous blinking of eyelids causes rheum to be washed away with tears through nasolacrimal duct. Absence of this action results in accumulation of dry rheum. Here may be rheum can be compared to *Akshimala* and it is the product of *Majja paka* by *Majja dhatwagni*. Rheum is a waste product and it contains the different types of cells present in bone marrow.

Twakmala or *Twak sneha* is nothing but the sebaceous secretions of skin. Sebum is a complex mixture of fatty acids (57%), wax esters (26%), squalene (12%) and cholesterol (4.5%). The oily nature of skin is because of the mixture of sweat, dead skin cells and sebum. Sebum is also having antimicrobial action. The one which is giving moistness, acting as antimicrobial and discarded from body is *Twaksneha*.

Vakra snigdatwa is maintained by salivary secretion. The flushing out effect of saliva is very important because it effectively removes exogenous and endogenous microorganisms and their products into the gut and also supplies continuous presence of immune factors in the mouth.

Majja dhathu is the site where haemopoietic stem cells are produced and they function as the immune system.

Shukra

- *Ojas*^[1]
- *Pindika*^[6]

Shukra dhathu is the seventh *Dhathu* which is related to sexual and reproductive function. Here *Ojas* and *Pindika/Mukhadooshika* are considered as the *Mala* of *Shukra dhathu*. *Shukra dhathu* will be active only when the person attains puberty. Puberty is the physiological transition from childhood to reproductive maturity. It is associated with a growth spurt and development of secondary sexual characters. Acne is the localized inflammatory condition of the skin, characterized by pimples on face, chest and back, due to over activity of sebaceous gland. It develops during adolescence. Testosterone increases the secretory activity of sebaceous gland. So at the time of puberty, when body is exposed to sudden increase in testosterone secretion, the excess secretion of sebum leads to development of acne on the face. *Ojas* is nothing but the essence of *Saptha Dhathu*. If proper functions are maintained it will nourish the body or it will harm the system.

CONCLUSION

The concept of *Dhathumala* depicts the ancient knowledge of the tissue metabolism. The waste products formed after metabolism is to be eliminated for maintaining equilibrium. As it is told in our classics *Dosha- dhathu- mala mulam hi sareeram*, normal homeostatic mechanism is very essential to maintain the equilibrium. All *Dosha*, *Dhathu* and *Malas* are doing their respective functions in our body in order to keep it healthy. *Malas* are the important entity in our body and its importance in clearing out in regular basis is explained in this article along with its physiological importance.

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