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A CONCEPTUAL STUDY ON THE SIGNIFICANCE OF THENUTRIENT POOL AND ITS ROLE IN THE NOURISHMENT OF THE BODY — WITH SPECIAL REFERENCE TO THE KSHEERADADHINYAYA

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ABSTRACT

In metabolism a nutrient pool refers to the readily available reserves of nutrients like carbohydrates, proteins and fats that the body can draw up for energy and other metabolic processes. In ayurveda nutrient pool can be correlated to *ahara rasa*. *Ahara rasa* denotes *Sara* portion of food thatnourishes *dhatus*. Dhatus are structural elements of the body which are vested with the function of nourishing the body. The formation and nourishment of dhatu is a continuous process from the embryonic stage of the foetus to death. The theories which explain the formation of *dhatus* is known as *dhatu poshana Nyaya*. *Dhatu poshananyayas* are *KsheeraDadhi Nyaya*, *Khale Kapota Nyaya*, *Kedari Kulya nyaya*and *Ek Kaal Dhatu Poshan Nyaya* . In modern *dhatu poshana* can be correlated to metabolism. This review is an attempt to explore the Ayurveda's view on nutrient pool with reference to *ksheeradadhi Nyaya*. The term metabolism of a food substance is meant by a series of specific biochemical reactions occurring within the living organism from the time of its incorporation into the cell or tissue till its excretion, of which some are concerned with tissue synthesis termed as anabolism and others with tissue breakdown termed as catabolism .The same explanation is elaborated in Ayurveda classics by various *Acharyas* on *Dhatu Poshana*. Classical concept of *KsheeradadhiNyaya* can be related to different physiological processes described in metabolic transformations of food.

INTRODUCTION

In an era where the role of dietician is increasingly relevant in the management of many diseases, the significance of nutrient pool cannot be underestimated. Food is the essential need of any living organism. All the physiological activities of the bodyare dependent on food. According to ayurveda *ahara* is considered to be one of the three accessory pillars of life. Forproper growth and development of the body , one should get sufficient nutrients .The production of nutrients depends upon the metabolism. Metabolic transformations are mediated by various enzymes, hormones, neurotransmitters which can be related to *agni* described in classics and transformation to be *parinama.* As a result of *ahara* parinama, *ahara rasa* or nutrients are formed.

According to Ayurveda, food is endowed with qualities such as complexion, radiance, a pleasant voice, vitality, intelligence, nourishment, strength, and clarity of mind. Once consumed, food undergoes digestion through three types of digestive fires: *Pachakagn*i, *Dhatwagni,* and *Bhutagni*, ultimately forming nutritive essence. In the initial stage of *jatharagni paka* (gastric digestion), food is separated into two parts: *prasadabhaga* (essence) and *kittabhaga* (waste). The waste portion is eliminated from the body as mala (excreta), while the essence proceeds to the next stage.

During *bhutagnipaka*, the *vijatiya*(foreign) elements are transformed into *sajatiya*(compatible) substances, making them suitable for absorption by the *dhatwagnis*. At the *dhatvagnipaka* stage, each dhatu-specific digestive fire extracts the necessary nutrients from the product of *bhutagnipaka* to nourish its corresponding *dhatu* .*Dhatvagnipaka* also involves a division into *prasadapaka* (nutritive fraction) and *kittapaka*(waste fraction). The *prasadabhaga* is transported via *dhatuvahasrotas* (tissue channels) to replenish and sustain the dhatus. Top of Form Bottom of Form *Dhatu poshana* is a continuous process which persists throughout the life, but it is different during different phases of life. *Acharayas* postulated different theories to explain *dhatu poshanas* and such nyayas are called *Dhatu poshana Nyaya*.

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Dhatu poshananyayas are of four types

KsheeraDadhi Nyaya **(**Law of sequential tansformation**)**

Khale Kapota Nyaya (Law of simultaneous nourishment)

Kedari Kulya Nyaya (Law of selective absorption)

Ek Kaal Dhatu Poshan Nyaya (simultaneous supply of nutrients to whole body).

All these *Nyayas* are equivalent to each other.

This *nyäyäs* explains physiology of the body with regard to its sustenance and maintenance and also discusses the bio conversion of nutrients in the body. They do not interfere with each other nor do they oppose each other, it is therefore needed to accept all laws together and interpret replenishment of seven dhatus in a fashion where all laws become applicable.

KSHSEERA DADHI-NYAYA (LAW OF SEQUENTIAL TANSFORMATION)

***Ksheera* means milk and *dadhi* means curd.**

The concept of *Ksheera Dadhi Nyaya* can be correlated with the processes of digestion and metabolism. During digestion, ingested food undergoes acidification due to the action of hydrochloric acid (HCl) in the stomach. The mechanical movements involved resemble the churning process that transforms milk into curd. By the end of digestion, carbohydrates are broken down into glucose and stored as glycogen, while proteins are converted into amino acids-both of which serve as essential energy sources for the body. This transformation of carbohydrates and proteins parallels the gradual conversion of milk (*ksheera*) into curd (*dadhi*).

Application of Ksheera Dadhi Nyaya in Clinical Conditions:

Protein-Energy Malnutrition (PEM): PEM represents a spectrum of nutritional disorders caused by a simultaneous deficiency of dietary protein and energy, in varying degrees. According to Ayurvedic principles, this condition can be interpreted through the lens of *Ksheera Dadhi Nyaya*, which explains the sequential transformation of one substance into another-just as milk gradually transforms into curd.

In PEM, due to insufficient and unbalanced nutritional intake, the proper formation of *ahara rasa* (nutritive essence) is disrupted. This initial impairment hinders the adequate formation of *rasa dhatu* (plasma/lymph), resulting in symptoms such as edema. Since *rasa dhatu* is the precursor to *rakta dhatu* (blood), its deficiency leads to anemiaThe compromised formation of *rakta dhatu* subsequently affects the production of *mamsa dhatu* (muscle tissue), manifesting as muscle wasting. A deficiency in *medo dhatu* (fat tissue) contributes to emaciation, while inadequate *asthi dhatu* (bone tissue) results in brittle bones and nails. Furthermore, an insufficiency in *majja dhatu* (bone marrow and nervous tissue) leads to weakened sensory functions. Thus, the sequential failure in dhatu formation-mirroring the disrupted transformation in *Ksheera Dadhi Nyaya*-explains the progressive nature and clinical features of PEM from an Ayurvedic perspective.

The disease *Rajayakshma* can also be understood through the principle of *Ksheera Dadhi Nyaya.* Acharya Charaka has described four primary causes of this condition, including *sahasa*(over exertion)*, vegasandharana* (suppression of natural urges) *, kshaya*(tissue depletion) and *vishamashana* (improper diet). Among these, insufficient intake of balanced and wholesome food leads to improper formation of *ahara rasa* (nutritive essence), which disrupts the nourishment and proper development of *dhatus*(body tissues). As a result, the individual experiences progressive depletion of *dhatus,* ultimately causing *kshaya* (wasting) within the body.

Bottom of Form

Limitations of *ksheera dadhi Nyaya*

This principle cannot be fully accepted, as it is unrealistic for an entire dhatu to be completely transformed into the next dhatu. For instance, if the entire *rasa dhatu* were to convert into *rakta dhatu*, and *rakta* into *mamsa,* continuing in this way, the body would eventually become deficient in all seven dhatus.Additionally, the *Poshya-Poshaka* theory of dhatu nourishment cannot be explained by this principle. During the transformation process, *ahara rasa* is divided into *prasadabhaga* (essence) and *kittabhaga* (waste). The prasada portion is further classified into *poshya* (stable) and *poshaka* (circulating) components. The *poshya* fraction sustains the existing *sthayi* (stable) *dhatu*, while the *poshaka* fraction nourishes and replenishes the *dhatus*.

If this law were strictly applied, it would imply that after fasting for a week, a person would lose all dhatus except *shukra dhatu*, which is not the case in practice. This hypothesis was neither fully accepted nor completely rejected by scholars of that period. Some reasons for its acceptance include the consideration of time factor as explained by Acharya Sushruta, who stated that *Rasa Dhatu* is replenished within 24 hours, while each subsequent *dhatu* takes approximately five days to be nourished. The theory also finds support in certain disease conditions like *Rajayakshma*, where obstruction in *Rakta Dhatu* leads to the depletion of *Mamsa Dhatu*, aligning with the concept of sequential *dhatu* transformation.

However, there are notable reasons for its rejection. For instance, consumption of milk is believed to instantly nourish *shukra Dhatu*, but if this law were strictly followed, it would require nearly a month for *shukra Dhatu* to be replenished, which contradicts clinical observations. Additionally, according to this theory, an increase in *medo Dhatu* should be followed by a corresponding increase in *Asthi Dhatu*, yet such a correlation is not observed in practice. Due to these inconsistencies, the theory was not fully accepted by the scholars of that era.

CONCLUSION

In Ayurveda, the concept of the nutrient pool can be correlated with *Ahara Rasa*. *Ahara Rasa* plays a vital role in nourishing the body and supporting the formation of *Dhatus* (tissues). The principle that describes the nourishment process of *Dhatus* is known as *KsheeraDadhi Nyaya* (the milk-curd analogy). According to this principle, *Dhatus* are nourished in a sequential order. However, this sequential model does not fully account for all types of metabolic transformations. Nevertheless, it effectively highlights the significance of the nutrient pool - an inadequate nutrient pool results in poor nourishment, hindering the proper growth and development of tissues.

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