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## TO STUDY THE ROLE VIPAKA TO PHARMACOKINETICS – A Review

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### ABSTRACT

In Ayurvedic pharmacology, the dravya works on their rasa, guna, vipaka, prabhava. Here vipaka means the final outcome after the jathargni vyapar. Agni is important to transform the dravya (Aahar & Aushadh), it convert to food in to energy and responsible for the vital fuction of the body.In the present article we are discussing regarding the role of vipaka to study the pharmacokinetics

**Keywords: Vipaka , Pharmoco kinetics**



## INTRODUCTION

Ayurveda is the science of life. The main aim of ayurved is "prayojanam chasya swasthasya swasthaya rakshanam aaturasch vikaraprashamanm cha"<sup>1</sup>. Mool of arogya is based on samyak agni. Vipaka:-According to Acharya Vagbhat Jathrenagnina yogatyatudetirasantaram rasanam parinamante sah vipaka iti smritah<sup>2</sup> Means when we intake a food which is rasa pradhana (rasa pradhana aahara), it is digested by the agni (jathar agni) the final resultant we found is called Vipaka, which is different from rasa dhatu. It is only a literary meaning but the same definition covers a very vast area of the human body Physiology. Dhatawagni specially rasadhatwagni acts on Vipaka and forms Rasa Dhatu. Recently the use of Ayurvedic medicines has become rational which enhances global acceptance of Ayurvedic medicines. The practice of Ayurvedic science is based on the experiential, observational and inferential knowledge. Ayurveda encompasses science of traditional knowledge running through the ages. There are various texts available which deal with different concepts of Ayurvedic science. Recently many researchers investigated the conceptual belongings of Ayurvedic system to explore a rational understanding of traditional medicinal system. The focus research in the field of Ayurveda needs logical discussion of Ayurvedic concepts; this article emphasizes one of such Ayurvedic concepts "Vipaka", here the article describes

modern aspects of Vipaka along with its role in the field of Ayurveda. As per Ayurveda the properties of dravya mainly depend upon the rasa, guna, virya, vipaka and prabhava of the dravya, out of them vipaka contributes greatly towards the pharmacokinetics of dravya; which refers to the bio-transformed state of metabolized dravya. Agni plays a vital role in this process which converts food into the form of energy. Jatharagni paka means avastha - paka in Ayurveda, the process of vipaka starts in the stomach. [1-3]

Agni is the moola of life (moolamagni tasmad niruchyate)<sup>3</sup>. Function of agni is to transform the one substance into another substance and liberate energy. In Ayurveda 13 types of agni are described:- Jatharagni, Bhootagni, Dhatwagni. Ayurveda considers that Dehagni is the cause of life, complexion, strength, health, nourishment, lustre, oja, teja (energy) and prana (life energy). Agni is responsible for digestion and metabolism. All 13 types of agni are key factors for transforming the consumed aahar into vijaatiya into sajatiya dravya. Jatharagni paka:- Jatharagni paka is described as avasthapaka. Avasthapaka is the transformation of food into amashaya, pachyamana, and pakwashaya, there are two phases of digestion: Prapaka and Vipaka. Prapaka has three types:- Madhura avasthapaka, Amla avasthapaka, Katuavasthapaka. Three types of Vipaka:- According to Acharya Charak: Madhura Vipaka, Amla Vipaka, Katu Vipaka. According to Acharya Susruta: two types of Vipaka<sup>4</sup>:- Madhura

Vipaka (priti+jal mahabhut pradhan)Katu vipaka( agni + vayu+ aakash mahabhoot prdhan)Madhur vipaka also called guru Vipaka and katu Vipaka called laghu Vipaka.Role of Vipaka:-According to Acharya Chakrapani,dravya are two types-Aahara dravyaand Aushadhi dravya. Aahara dravyas are mainly Rasapradhana. Here jatharagni and dhatwagni works. Aahara dravya provide the building materials for body to form healthy dhatu. Aushadhi dravya are mainly viryapradhana.Virya denotes the power or energy.it also denote the guna of dravya. Here the main action of bhootagni. After the jatharagni paka the substract form is vipaka which is transformable material for rasa dhatu5.Determination of Vipaka:-According to Acharya Charak, "Vipaka karmanishthya6" the assessment of Vipaka by the anuman. Thus it can be said that the Vipaka can be assessed by its (action performing) karma on body.Pharmacokinetics:-The term "Pharmacokinetics" denotes to "What body does to the drug"?Pharmacokinetics, sometimes abbreviated as PK, (from Ancient Greek pharmakon "drug" and kinetikos "to do with motion"; see chemical kinetics) is a branch of pharmacology dedicated to the determination of the fate of substances administered externally to aliving organism. 4 steps of pharmacokinetics

There are various drugs their action can be correlated with their tastes; similarly the action of many drugs may be attributed to

their vipaka. Ayurveda suggested that some dravayas possess similar vipaka property may be substituted for each other if they act through their vipaka. As per ayurveda principle property of dravya resembles specific function with respect to drug substances like; rasa offers therapeutic property, guna represents quality of drug, virya resembles potency of drug, vipaka means resultant of metabolic process while prabhava denoted drug effect. In the era of modernization, evidence based Ayurveda is a hot topic for clinician, student of Ayurveda medicine, planners, patient and public in large. Ayurveda is the science of life defines the trinity of life as body, mind and spiritual awareness which are associated with health and illness of human body [1]. The use of Ayurvedic medicines has become accepted in other countries as well. For example, according to the 2007 National Health Interview Survey, more than 200,000 US adults had used Ayurvedic medicine in 2006 alone [2]. Govt of India has emerged all alternative medicines under one umbrella- the department of AYUSH, where the Ayurveda, Yoga, Unani, Sidha and Homeopathy are flourishing well [3]. Though, gradually the Ayurveda scholars are showing interest in writing research papers and evidence based documentations but couples of thirst areas are laying remain untouched for producing evidence based documents, such as – Setting up a standard protocol for Ayurveda herb's Pharmacokinetics. Pharmacokinetic (PK) is branch of

Pharmacology which deals with “What Body does to the Drug”? The term – VIPAKA denotes very vast meaning which explain to the digestion, Assimilation, Metabolism, Absorption and Bio-transformation up to the cellular level of ingested drug or food. Along with it, Novel drug delivery approach may help to understand the Ayurvedic theory of mechanism of action of a drug. Reverse pharmacology concept is also helpful to understand the “Mode and Mechanism of Action of a Drug”. Another thrust area of research is the Threat of Superbug, Fibromyalgia, Ayur-genomics, Role of nano technology in Ayurveda drug's formulation – especially Rasamedicines, etc. Ayurveda described vipaka as per the rasa of dravya like; sweet and salty rasas generally possess sweet vipaka, sour rasa often possess sour vipaka while bitter rasas have pungent vipaka. The conclusively article summarizes that katu vipaka, offers light guna which aggravates vata, reduces semen and may cause obstruction in the excretion of stool and urine. Madhura vipaka, possess heavy guna which aggravates kapha, promotes semen and support Role of Vipaka in Ahara Agni acts on ingested food or drug and liberate substance at molecular level. As per Ayurveda there are 2 types of dravyas; aahara and aushadhi. Rasa dhatu and dhatwagni is mainly responsible for its functioning over aahara dravyas therefore; aaharadravyas mainly undergoes Dhatwagnivyapara. Agni; jatharagni and bhootagni bio-transformed ingested food into nutritional substances

which provides energy at cellular level. Role of Vipaka in Aushadhi Aushadhi is also considered as dravya as per Ayurveda and it refers viryapradhana since virya is a gunatmaka and bhutagni helps in its functioning. aushadhadryas undergoes bhutagnivyapara through jatharagni paka to the bhutagnivyapara in the liver which is functioning of rasa. After bhutagnipaka the process of vipaka starts and it ends with the biotransformation of rasa. [6]

Diet and drugs undergo some inevitable changes during digestion. This may not feel change in the taste of the ingested substance. The characters are modified by agni in such a way that the ingested foreign substance can be assimilated by the body. Even though some properties of the substance persist after digestion, the end outcome of the digestion is governed by the vipaka of the substance. This vipaka is ultimately governed by the agni of the individual. Thus, vipaka can be predicted only by logical inference after observing the action on various components of the body. Vipaka mainly starts in stomach and duodenum (grahani), and is responsible for the ultimate effect of the food or medicine ingested. The effect in the time of avasthapaka is momentary and confined to the region of the process, while the effect of vipaka can be seen on the whole body. The concept of 'vipaka' holds significant importance in ayurvedic approach of metabolism as well as pharmaco-therapeutics. Vipaka is one of the components of rasa panchaka i.e. pharmacodynamic attributes of the drug.

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The pharmacological , toxicological & clinical action „Karma“ of a drug are

attributed to 5 qualities of a drug broadly classified as rasa ,guna ,veerya ,vipaka) & prabhava After intake of aahara dravya (Diet or drug) due to the action of agni, it alters in rupa and rasa; after metabolized of aahar dravya,there is sara-kitta vibhajana. Sara bhaga of bhukta dravya goes to hrudaya; there from circulates in all over body with the help of vyan vayu. Then this sara bhaga resides in all dhatus and get metabolized by the respective dhatwagni. This aadyarasa and rasadhatu combine causes vrudhi and kshaya of a particular body tissue (dhatu) due to dhatuguna saamya and vishesha during the Dhatvagni-paka.<sup>8</sup> The pharmacokinetic and pharmacodynamics action of ayurvedic drugs not explain in modern parameters,where allopathic medicines or chemicals act on receptors and the effect on their response, while according to ayurveda aushadhi works on the basis of rasa,guna,vipaka,virya prabhava. Digestion of dravya in three level or three tupes of agni digest the dravya-jatharagni, dhatwagni , bhootagni. After the digestion, dravya divided in twoparts-Sara bhag and Kitta Bhaga. Sara bhaga helps in forming the progressively healthy dhatu and kitta bhag like sweda , mutra ,purisha excreted.Bioavailability of drugs Bio-availability of a drug (availability of biologically active drug) is defined as the amount or percentage of drug that is absorbed from a given dosage forms and reaches the systemic circulation following non-vascular administration. When the drug is given I.V., the bio-

availability is 100%.[21] This may not be so after oral administration. Acharyas of Ayurveda preached and practiced the oral route of administration for majority of drugs. „Anupana" (substance administered either with the drug or after its administration) facilitates for better absorption of the drug and helps in achieving higher percentage of bio-availability of the drug. 1. Drugs are metabolised by the enzymes. 2. Drugs could change spontaneously into other substance without intervention of enzymes. 3. Drug could be excreted unchanged. Nowadays with the advancement in the technology, novel drug delivery systems open the door towards the development of enhancing bioavailability of herbal drug delivery systems. For last one decade many novel carriers such as liposomes, microspheres, nanoparticles, transferosomes, ethosomes, lipid based systems etc. have been reported for successful modified delivery of various herbal drugs. In ayurveda the concept of bio-inhancer present in centuries year ago, as a yogvahi as example- trikatu, where pippali act as yogvahi. Lots of dravya ghrt, madhu are described in ayurveda which enhance the bio-availability of dravya.9Vipaka and Mechanisms of Action of Herbal Bioenhancers There are several mechanisms of action by which herbal bioenhancers act. Different herbal bioenhancers may have same or different mechanism of action. Nutritional bioenhancers enhance absorption by

acting on gastrointestinal tract. Antimicrobial bioenhancers mostly act on drug metabolism process. Among the various mechanisms of action postulated for herbal bioenhancers some are as follows (a) Reduction in hydrochloric acid secretion and increase in gastrointestinal blood supply10(b) Inhibition of gastrointestinal transit, gastric emptying time and intestinal motility.11(c) Modifications in GIT epithelial cell membrane permeability.12(d) Cholagogous effect13(e) Bioenergetics and thermogenic properties14(f) Suppression of first pass metabolism and inhibition of drug metabolizing enzymes.15(a,b,c) and stimulation of gamma glutamyl transpeptidase (GGT) activity which enhances uptake of amino acids.

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