



Review Article

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CRITICAL STUDY OF ANUPANA WITH SPECIAL REFERENCE TO MODE OF ACTION OF THE AYURVEDIC DRUGS

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ABSTRACT

In the present era human beings are having Mandagni (Poor digestive capacity) Hrasva (Short physical stature) and Heenasatva (Weak mental power). Drug also having Heenaveerya (Poor potency) because of their general rule of Dravyasangrahanakala (Time of drug collection), Vidhi (Drug collecting procedure) Bhumi (Place of drug collection) etc. are changing due to increase in population, reduced vegetation area, industrialization, environmental pollution etc. Hence there is an Anupana (Adjuvant) having important role in improvement of Rogibala (strength of patients) and Aushadhabala (Potency of medicine). Panchavidhakashaya Kalpana (Five basic dosage form of Ayurvedic medicine) and their corresponding Upakalpanas (Derived formulations) like different kind of formulations are mentioned in Ayurvedic classics. These are mentioned according to drug dose, time and route of administration, duration and relevant Anupana correlated with pharmacological phenomena including pharmacokinetics and pharmacodynamics. Adjuvant is the fluid vehicle which are consumed along with or after intake of medicine. In survey of Ayurvedic text ample references were found regarding Anupana. In this work Literary material was compiled, critically analyzed, assessed, evaluated and interpreted. According to Yogaratnakara, Anupana has enhanced the activity of main drug. As per Charakacharya, administration of Anupana refresh body immediately and help in easy digestion of the drug. Sarangdhara opinions such as oil spread quickly on water similarly medicines spread inside the body due to the strength of vehicle. When Anupana add to the drugs, potency of drugs is increased, adverse effect reduced and improved Agnidipana (Stimulate digestive power) property then enhance the pharmacokinetics and dynamics of the drug.

Keywords: Anupana, Pharmacokinetics, Pharmacodynamics, Rasa Pancaka.

INTRODUCTION

The word Anupana has been derived from combining two words which are,

Anu+ pana

'Anu' - pashchat.

Pana = 'paa' dhatu and 'lyut' pratyaya¹

Definitions of anupana as per Ayurved scientist

1. Dalhana commentary on Susrutha Samhita has written as below

"Anupana is the liquid consumed immediately after food or along with it"².

2. Chakrapani commentary on Caraka Samhita

"In the context of administration of medicinal recipes or food, Anupana stands for the vehicles which mean liquids are mixed with medicine or food"³.

3. As per Vagbhatacharya

"Anupana is the media which can be given either before or after or along with drug or diet"⁴.

4. Dravya Guna Vigyana Part 1

"Consumption of the medicine and food are Anu Saha Pashcat (along and after) taken liquids known as Anupana."

5. According to Raja Nigantu

"Anupana is a part of medicine which is in liquid form. Anupana should be administered after intake of medicine with some gap of time."

6. Yogaratnakara has described as below

"If medicine is given by the intelligent physicians for curing particular disease along with Anupana, it will cures that specific disease definitely by the strength of Anupana"⁵.

7. Rasa Tarangani the latest Rasa Grantha has mentioned Anupana as below

"Sahapana which is the liquid form taken along with main drug and which can facilitates easy disintegration, absorption and uniform distribution of medicine all over the body hence that liquid form is called as Anupana."

8. According to Vacaspatyam

"The liquid media which opposite to Ahara (food) and similar to the body tissues is known as Anupana and it is a part of the main medicine. It may be either taken along with or soon after the main medicine."

9. As per Adhamalla commentary on Sarangdhara

"Anupana has defined as the vehicle used after administration of the main drug."

In modern medical dictionary

"The vehicle is an inert agent that carries the active ingredient in medicine e.g. syrup in a liquid preparation. Adjuvant is that

which assists, specially a drug edit to a prescription to hasten or increase the action of a principal ingredient. The carrier is a molecule that when combined with another substance facilitates it to pass through cell membrane as occurs in facilitated diffusion or some other transport mechanism".

Potentiating action of anupana

Acarya Sharangdhara has mentioned in his Samhita the medicine which is administered along with Anupana that medicine spread all over the body rapidly as a drop of oil spreads in water very quickly⁶. Other than this, he has quoted the dose of Anupana in Curna (Powders), Avaleha, Gutika (Pills), Kalka (Paste) etc. is 3, 2 and 1 Pala respectively for disease of Vata, Pitta, and Kapha. By the influence of Anupana drugs get absorbed and assimilated quickly in to the body.

While explaining the enhancing action of the mode of action of the medicine and digesting food through Anupana, Acarya Charaka opined that generally Anupana should have properties opposite to those of the foods taken and such Anupana should not harmful to the Dhatu (Tissue elements) of the body. If disease is occurred by aggravation of Vatadosha the after drink should have properties of Snigdga (unctuous) and Ushna (hot). Similarly, in Pitta Madhura (sweet) and Sheeta (cold) and in Kapha Ruksha and Ushna (hot). Meat soup should be used for Kshayaja Roga (Emaciation). Administration of proper Anupana brings refreshment of body quickly then helps in easy digestion resulting the promotion of longevity, strength, pleasure, softening, liquefying the food, digesting, assimilation and instant diffusion of the food⁷.

As per Ashtanga Hridaya chapter of Matrashitiya the valuable Anupana should have opposite properties of the food but not incompatibles with them and helps to invigorate, contentment, proper movements of the food in the gastro intestinal tract, stability of the body parts, softening of the hard food mass, moistening and digestion⁸.

According to Acarya Susruta Anupana has properties of Rocana (pleasant taste), Brimhana (stouten of the body), Vrisya (aphrodisiac), Dosa Sangata Bhedana (splits the lumps of the Dosas), Tarpana (Nourishing), Mardhavakara (softness), Srama (relieves fatigue), Klamahara (exhaustion), Sukha (confers happiness), Dipanam (stimulate the digestive power), Dosasamana (mitigates the Dosa), Pipasacchedana (relieving thirst), Balya (strength), Varnakara (improve colour)⁹. Madhu (Bee's honey) and water are the commonly used Anupana in the system of Ayurveda. Madhu is used along with different medicinal formulations it cures particular diseases due to its Yogavahi Guna (Substance which enhances the properties and actions of the substances with which it combines)¹⁰.

Yogarathnakara quoted the Anupana of any medicine are responsible factor for minimizing the drug dose and to get synergetic effects and it plays a major role to increase therapeutic effectiveness of formulation. If there are some toxic or adverse effects manifested by Ayurvedic formulations, it can be subsided by the influence of Adjuvant and drug dose can be minimized.

Mode of action of Ayurvedic drugs

The modern scientist of phytochemistry have identified several important pharmacologically active principles in medicinal plant such as Alkaloids (insoluble in water but if combine with acids to form water soluble salts), Glycosides, Glucosides (foxed oils, volatile oils, mineral oils), Resins (Insoluble in water and soluble in alcohol), oleoresins (mixtures of volatile oils and resins), Gums (dispersible in water), Tannins (anti microbial substances). However according to modern pharmacology actions of the drugs is explained with its chemical structure or active principles. But in Ayurvedic pharmacology that was

explained in different way such as Rasapancaka (Rasa, Guna, Veerya, Vipaka, Prabhava).

Rasa (taste of the drug) indicates the effect of the drugs on body components like Tridosha, Saptadhatu, Trimala, Srotas (channels), Agni (power of digestion and metabolism of food and drug). Every single and formulated drug has different taste according to their ingredients. Rasa is the only one quality which can be directly perceivable and manifested at the level of tongue. The taste sensation is complex bio-physical and psychological events which cannot be evaluated without the help of tongue.

Guna (properties) may not be measurable in general way. It should be inferred through their pharmacological action by adopting Yukti Pramana (Logical thinking). Rasa and Guna are the separate principles co-existent in the Dravya (Substance) which means Rasa can act with its own and independent of the Guna.

Virya and Vipaka are directly related to mode of action of the food and drugs. Paka of foods and drugs (physiochemical reactions) at the level of Annava Srotas (Gastro intestinal tract) and Dhatu (Tissue) are done by Virya which is power of action. Absence of Virya, there is no any actions related to Paka of food and drugs¹¹. According to Charaka Virya has two types such as Ushna and Sita. But as per Susruta there are eight types such as Mrudu, Teekshna, Guru, Laghu, Snigdha, Ruksha, Ushna and Sita. There are direct correlation with Rasa and Viraya as well as Guna and Virya as mention below.

Table 1: Correlation of Rasa with Virya of Dravya

Rasa of Dravya	Virya Of Dravya
Katu, Amla and Lavana Rasa	Ushna Virya
Tikta, Kashaya and Madhura Rasa	Sita Virya

Table 2: Correlation of Guna with Virya of Dravya

Guna of Dravya	Virya Of Dravya
Laghu, Ushna, Ruksha, Tikshna, Sara, Mrudu, Vishada, Khara, Sukshma, Drava Gunas	Ushna Virya
Guru, Sita, Snigdha, Manda, Sthira, Khatina, Picchila, Shlakshna, Sthula, Sandra Gunas	Sita virya

Action of the drugs have mentioned according to Virya of the drugs as below as per Susruta.

Table 3: Action of Dravya according to Virya

Action of Dravya	Virya of Dravya
Bhrama (giddiness), Trushna (thirst), Glani (exhaustion), Sweda (sweating), Daha (burning sensation), Asupakita (accelerates biochemical reaction), Vata Kaphahara	Ushna Virya
Hridana (pleasure of mind), Jivana (sustain life), Stambhana (preventing secretions), Raktapitta Prasadana (cleanses Rakta and Pitta) Kledana, Vishyandana	Sita Virya
Bhrnhana (increase the body weight), Vatahara	Guru Virya
Langhana (reduces the body weight), Kaphahara	Laghu Virya
Snehana, Kledana, Balya, Varnya, Bhrnhana, Vajikarana	Snigdha Virya
Soshana, Sangrahana, Peedana, Ropana	Ruksha Virya
Pitta Prashamana, Raktamamsa Prasadana	Mrudu Virya
Sleshmahara, Sangrahana, Sravana, Dharana, Avachushana, Sodhana	Tikshna

As per Susruta opine the Virya can be determined through Pratyaksha Pramana (direct perception), but Caraka opines it should be identified through Anumana Pramana (Inference) according to its taste perception.

The Rasa of the substances are converted in to other taste due to contact with Jatharagni Paka is called as Vipaka. As per Charaka Vipaka have three types such as Madhura, Amla and Katu¹².

Table 4: Correlation of Rasa and Vipaka with Virya of Dravya

Rasa and Vipaka of Dravya	Virya Of Dravya
Madhura Rasa and Madhura Vipaka	Sita Virya
Amla Rasa and Amla Vipaka	Ushna Virya
Katu Rasa and Katu Vipaka	Ushna virya

Susruta has mentioned there are two types of Vipaka such as Madhura and Katu. Generally, Taste has two types such as Rasa of the tongue level – Shad Rasa it can be identified through direct perception (Nipata) and Rasa which is produced by after subjected to Jatharagni Paka Karma assess through the final action (Nishthapaka).

The substances may show special type of properties which is produced by different and opposite actions other than actions of Rasa, Guna, Virya and Vipaka such properties is known as Prabhava.

Acharya Charaka has mentioned in his treatise drugs which are having Ushna (hot), Tikshna (sharp), Sukshma (subtle), Vyavayi (disperse the body before digested), Vikashi (looseness of joints) Guna, it reach the heart due to their own potency. Then enter the circulation through vessels circulate whole over the body¹³. The Ayurvedic principles are taken as a root, pharmacodynamics of the Ayurvedic drugs can be described comparatively. The biological and therapeutic effect of the drugs which means what drugs does to the body can be explained through Ayurvedic Siddhantha (Principles). These Siddhantha also influence the pharmacokinetics (details study of the absorption, distribution, metabolism and excretion) of the drugs.

Factors enhancing mode of action of drugs

Desha: The drug may show maximum therapeutic effects when their potency augmented by collecting the raw materials from the appropriate habitat.

Dravya Sangrahana Kala: Collection of the raw drugs in the appropriate season.

Dravya Sangrahana Avastha: Collection of plant's part when those are enriched with maximum potency.

Bhajana: Store and process these in appropriate containers.

Veerya: Potency of the recipe.

Samyoga: Addition of ingredients.

Vishlesha: Elimination of the ingredients.

Aushadha Sevana Kala: Appropriate time for administration.

Samskara: Proper Agni, Jala etc. processing methods.

Anupana: Proper Adjuvant with Synergistic action which means facilitation to a pharmacological response through together use of two or more drugs. The word 'synergism' is derived from the two Greek words ergo (work) and syn (with) indicates a pharmacologic co-operation. Due to this a total effect greater than the sum of their independent actions

Rasa Pancaka of the recipe

Prakruti, Agni, Koshtha

Drug: GACP - Good agriculture and collection practice

GMP - Good manufacturing practice

GSP - Good storage practice

GDP - Good distribution practice

Quality control and standardization

Bhaishajya Prayoga Marga: Route of administration of drugs

Correlation between anupana and mode of action of Ayurvedic drugs

Clarification of Anupana and mode of action of Ayurvedic drugs already have elaborated in previous para. In here onwards will be described correlation between them. According to classics, Anupana should be used as per Doshic involvement of the diseased condition. The drug which are used to treat Vatajaroga should be impregnated with Sura, Sauviraka, Tushodaka, Medaka, Dhanyamla, Phalamla, Dhadyamala etc. and in Pittaja disease Mridvika, Amalaka, Madhu, Madhuka, Parushaka, Phanita, milk etc. and for the treatment of disease caused by Kapha there should be added Madhu, Mutra, Kashaya of Kaphahara Dravyas etc.

As per modern medicine, Bio-availability of intravenously administered drug is 100%. But most of the Ayurvedic drugs administered through oral route are expecting systemic action. Hence their bio-availability is definitely less than 100%. Other than the Bhasma and liquid preparation, in most of the dosage forms of Ayurvedic drugs particle size are not so fine viz. Vati, Guggul, Churna, Kalka etc. Particle size also affects the rate of absorption. Absorption of coarse powder is less than absorption of fine powder. Hence Anupana plays a major role to increase absorption accordingly potentiating action of the Anupana as per mentioned above. E.g. Ushnajala, Madhu, Ghrita, Takra etc. fasten the absorption of drugs and its bio-availability. Acidic drugs are quickly absorbed through stomach and alkaline drugs absorb in small intestine with the help of alkaline environment. Anupana of some drugs are acidic as well as some are alkaline (Amla Varga and Kshara Varga) which are helpful for absorption. In regard of Panchavidha Kashaya Kalpana, from Swarasa (fresh juice) to Phanta (hot infusion) have shown reduced Guru Guna and increase Laghuta as well as increase in absorption. Because of that reason the Anupana has mentioned separately. These are very common in drugs in which water soluble, alcohol soluble and lipid soluble active ingredients which are mixed together in Ayurvedic formula.

E.g. Asavarishta – water soluble and alcohol soluble, Ghrita and tTaila – Water soluble and lipid soluble.

If drugs are administered along with proper Anupana, absorption may promote with most of the active ingredients. The time between the administration of drug and the development of response is known as the biological lag. Mercurial preparations have shown less biological lag than herbal drugs. If both of the mercurial and herbal drugs are administered along with proper Anupana biological lag of these medicine can be done less. It is very difficult to calculate the biological half-life (rate of lowering of drugs of plasma concentration) of the herbal drugs because of presence of many active principles. Due to this reason, assessment of plasma concentration level of particular herbal drugs has not been developed well till a days and study of total pharmacokinetics of these drugs are not complete. In one article it is concluded that in some life style disorders use of conventional medicine is inevitable. In such conditions conventional medicines will be used along with bio enhancers so as to increase the bio availability and efficacy of drugs¹⁴.

According to Ayurvedic physiology after administration of foods and drugs, it digested and metabolize to produce nutritive and active principles along with Kitta such as Sweda, Mutra, Purisha. To enhance these biological process, Anupana which is containing particular properties can be administered with main drug.

By-product of metabolism of drugs also excreted through Kitta as mentioned above. But excretion of each and every Ayurvedic

drugs has not studied and documented yet. The Siddhantha of Ayurveda is taken as an interest. So we can infer that the Anupana plays a major role for intervention of excretion of by-products. Anupana is known to counteract the Tikshnata, Ugrata, Kashayata, Tiktata or any other undesirable property of the drug with which it is given. E.g.

Bhallataka along with milk: The main drug and Anupana with opposite Virya viz. Ushna and Sita.

Shunthi along with milk: The main drug and Anupana with opposite Guna viz. Tikshna and Snigdha.

Panchatikta Kashaya with sugar: Opposite Rasa viz. Tikta and Madhura.

Maha Sudarshana Churna with Honey: Opposite Rasa viz. Tikta and Madhura.

It is also known to assist and hasten the drug action to obtain better drug efficacy. E.g.

Eranda Saptakakashaya with Eranda Taila (castor oil): Both are Vatashaman and Anulomana.

Kaphaketu Rasa with Ginger juice: Main drug and Anupana has same Kaphahara property¹⁵.

Punarnavashthaka Kashaya with Gomutra: Both are diuretics.

CONCLUSION

Anupana play a major role regarding potentiating of drug action through pharmacodynamics and pharmacokinetics as well as improvement of Aushadha Bala and Rogi Bala. With the help of same drugs, we can treat many kinds of diseases with different Anupana which means Anupana can easily intervene the mode of action of the main drug (E.g. Rasa Sindura). Other than intervention of drug action, Anupana helps in palatability (e.g. honey, sugar, sugar candy, Jaggery etc.), easy administration (e.g. along with water, Ghee, Swarasa, Decoction etc.) and prevent irritation of mouth, throat and stomach. (Ghee, egg, yolk, Tila Taila, Kumari Swarasa etc.). It also control adverse drug effect and drug allergies due to its anticorrosive action and minimising action of toxicity.

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