A Critical Review on Concept of Adjuvant

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Authors’ contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: The concepts of Ayurveda are unique when considered it in terms of treatment of diseases as well as preventive care in healthy persons. ‘Anupana’ is one among them, which is practiced with medicine and food. It helps in fast spreading, quick absorbing of medicine and food in the body. By changing the Anupana of one drug, it can be used in different diseases, which makes it unique. In order to drag attention of researchers to this unexplored topic, critical review has been prepared to highlight it in different features.

Methods: References were sought in Pub Med, AYUSH research portal, DHARA online and Google Scholar by utilizing all key words and MeSh terminologies along with Ayurveda textbooks. Based on PRISMA guideline, 06 full text articles were included in this study. Clinical studies were also found where Anupana was used as modality for management.

Discussion: Present systematic review put the light on the different aspects of Anupana as a theoretically and clinically proven novel concept to enhance the efficacy of formulation or drug...
quickly. Anupana facilitates the action of pharmacokinetics as well as pharmacodynamics. 

**Conclusion:** Anupana has multi-dimensional benefits, including nutritional, stimulating, preventative, and curative properties. An appropriate Anupana should be chosen that is suitable for us in order to receive all of the benefits from its intake. Hence it can be concluded that Anupana concept is an integral aspect of Ayurveda and a blessing to human beings in terms of health.

**Keywords:** Anupana; Ayurveda; bioavailability; bio-enhancer; pharmacokinetics; pharmacodynamics; PRISMA guidelines.

### 1. INTRODUCTION

Ayurveda is considered as one of the oldest sciences of life. It is having many unique concepts, which play an important role in treatment and makes it unique among all other systems of medicine.

One such concept is ‘Anupana’ means a substance, which is taken along with food or medicine. Anupana is having synonym like *vahana* (vehicle which carries), *madhyama* (media) etc. This can be used as a vehicle for the drug, to increase the palatability and making the drug more potentiate one. Based on different diseases, *Prakruti* (body constituent) of a person and nature of the medicine, different *Anupana dravya* are being advised. Based upon the density or consistency of a drug or formulation, it may be solid or liquid.

Many *Anupana dravya* are being described in Ayurveda in different context. Action of a herb can be changed by switching Anupana on different diseases for e.g *Triphala* (combination of three fruits *Terminalia chebula* Retz., *Terminalia belerica* Roxb., *Emblical officinalis* Gaertn.) can be given along with warm water in constipation, in diabetes with turmeric and in splenomegaly with *Pippali* (*Piper longum* Linn.). Other example like *Narayana churna* (poly herbal formulation) is indicated with different Anupana for different diseases like in abdominal disease along with *takra* (butter milk), *Badara kashaya* (decoction of *Zizyphus jujuba* Lam.) in *Gulma* (tumor), *suramadhya* (alcoholic preparation of a kind of rice) for *vibandha* (constipation) and *usnaambu* (luke warm water) for *Ajirna* (indigestion) are described in *Bhaisajya Ratnavali* [1]. Apart from this, many other Anupana have been mentioned like cow urine, ghee, honey, rain water, long pepper fruit, Ginger, Sugar, rock salt, jaggery, milk, meat juice, pomegranate juice etc. It also plays a very good role in ethical clinical practices [2]. In this review the main focus is to throw a light on this exclusive concept of Anupana, which will attract the new researchers to work on it.

### 2. MATERIALS AND METHODS

#### 2.1 Literature Search Strategy

A systematic search was conducted on the articles published in database including PubMed, AYUSH Research portal, DHARA online and Google scholar using key words like Anupana, Ayurveda, Bioavailability and Bio-enhancer. Authors also searched Ayurveda textbooks such as *Charak Samhita*, *Sushruta Samhita*, *Sharangadhara Samhita*, *Yogaratnakara*, *Raj Nighantu* and other published books of Ayurveda compendia.

#### 2.2 Inclusion and Exclusion Criteria

The study is focused on Anupana, an inimitable concept of Ayurveda used for treatment, medical administration, day-to-day food habits etc. In order to be included, the articles must have key words Anupana and Ayurveda published in English language, irrespective of journal, author, year etc. Articles published until May 2021 were included. All the articles collected from online database were compiled and screened. We have excluded the contents from letters, meeting abstracts, conference proceedings. Some articles have been excluded due to inappropriateness for following reasons; 1) Not related to topic, 2) Unavailability of abstract or full text. In the next stage, qualification of each article was assessed by reading the abstract and full text. Those articles satisfied for all the inclusion criteria were only included and rest all were excluded.

#### 2.3 Observation

As per availability, final selected articles were screened by reading full text or abstract and were analyzed further. The preferred reporting items of systematic review and meta-analysis
(PRISMA) guideline were followed while conducting this systematic review [3].

Following a systematic search, we mainly focused on Anupana and Ayurveda key words and retrieved 1520, 4, 3 and 4 articles from Google scholar, AYUSH portal, DHARA online and PubMed respectively. Thus, 1531 potentially relevant records using keyword related to topic of interest were found. Subsequently after removing duplicate records, the titles and abstracts of remaining articles were screened for eligibility leading to extraction process. Finally, 06 articles were included for this systematic review on Anupana.

2.3.1 Nirukti

‘Anu’ upasarga, ‘Pa’ dhatu and ‘Lyt’ pratyaya combinely forms the word Anupana. ‘Anu’ means along with, after or near to and ‘Pana’ means drink [4].

2.3.2 Paribhasha/Definition

Anupana is a substance which is taken immediately after or with medicine or food which simultaneously enhance the property of it [5]. It is a substance, which is taken at appropriate time with specification [6].

2.3.3 Paryaya/Synonyms

Different terms are being mentioned as synonyms of Anupana such as ‘Vahana’ which means one which carries, ‘Saahayogi means the one which brings together, ‘Maadhyama’ means one which act as media, ‘Anutarsha’ means one which is beneficial for thirst, ‘Anupeya’ means one which is taken along with or after food, ‘Anupanaeeya’ means which is taken along with food, ‘Oushadanga peya’ means the peya which is used along with medicines [7].

2.3.4 Lakshana of Anupana (Characteristics)

Anupana should possess the properties opposite to the food that is taken but it should not produce any harmful effect to the body elements [8].

2.3.5 Classification of Anupana

Anupana can be classified based on its usage like Aaharaupayogi and Aushadhaupayogi. Aaharaupayogi means which administered with food items and Aushadhaupayogi means which administered with drugs [9].

Based on the form of Anupana it can be classified as Drava and Sushka. ‘Drava’ which is liquid in nature for example Jala, Dugdha etc. and ‘Sushka’ which is solid in nature for example Sharkara, Shita etc [10,11].

2.3.6 Anupana Dravya

I. Shreshtha Anupana (Best adjuvant):- Acharya Sushruta has considered Mahendra jala (Rain water) as best Anupana dravya in all types of liquid. According to Acharya Vagbhatta, Jala (water) is the best because it is the chief source of all Rasas (tastes), it is habituated to all living beings, and it possesses the properties of sustaining life [12].

II. Commonly used Anupana:-

There are Some Anupana which are commonly used, such as Sheeta Jala (Cold water), Ushna Jala (Hot water), Asava (Fermented liquid medicine), Madya (alcoholic preparation), Yusha, Phalamla (Alcohol prepared from fruits), Dhanyamla (alcohol prepared from grains), Mamsa rasa (Meat soup) and Ksheera (milk) [13].

III. Anukta Anupana:-

Madhu (honey) or Jala (water) has to be considered as Anukta anupana (not specific) means if in classical texts specific Anupana is not mentioned to follow then this Anukta Anupana dravya has to considered in general [14].

2.3.7 Action of Anupana

The drug consumed along with Anupana spreads throughout the body in fraction of time as the drop of oil spreads so fast when put over the surface of water [15].

2.3.8 Anupana Kala

Depending upon the desired effect in the body the Anupana Kala (time) can be decided, for example for Karshanartha (emaciation) Adipana (early), for Sthapanartha (maintenance) Madhyapana (mid) and for Brumhana (nourishment) Antapana (last) is indicated [16].

2.3.9 Properties of Anupana

There are many properties described about Anupana few of them are like Tarpayati (it imparts refreshment), Preenayati (gives pleasure), Urjayati (provides energy), Brimhayati (it gives nourishment), Bhuktamavasadayati.
As the drop of oil spreads on water very fast likewise the Anupana also have the capacity to carry and distribute the drug throughout the body. Therefore due to increase in strength and potency the drug reaches all parts of the body. Anupana may relieve the side effect of medicine as well as facilitate the bioavailability of any drug [17] they can also serve as catalytic agent that is Yogavahi. They help to act direct effect of medicine to the deeper and subtler tissue to the body [18].

2.3.10 Matra/quantity of Anupana

Based on nature of Vyadhi (disease), Kala (time) and Gunas of Dravya (property of drug) Matra (dose) and Prakara (type) of Anupana should be decided. According to the type of formulations like Churna (powder), Avaleha (semi solid) and Gutika (tablet) Acharya Sharangadharas has mentioned the dose of Anupana based on predominance of Dosha like for Vata, Pitta and Kapha Roga the dose should be 3 Pala, 2 Pala and 1 Pala respectively [19].

2.3.11 Factors for selecting Anupana

Based on predominance of Dosha in diseases the different properties of Anupana should be considered. In Vata Dosha predominance the Anupana Dravya should be Snigdha and Ushna, in Pitta Dosha it should be Ruksha and Sheeta, in Kapha Dosha it should be Ruksha and Ushna. In case of Kshaya condition in patient Mamsa Rasa is indicated [20].

Based on diseases also different types of Anupana Dravyas are indicated like in Shula/pain condition, Hinga mixed with Ghrita is indicated, in Purana Jwara Pippali mixed with Madhu, in Jwara Musta and Parpataka, in Chhardi lajaudaka, in Atisara Kutaja, similarly, Vasa in Raktapitta, and Vidanga Kwatha in Udara Krumi.

These are some Anupana Dravyas advised according to the diseases [21].

2.3.12 Contra indications for Anupana

In some conditions like Kasa (cough), Hikka (hiccups), Shwasa (dyspnea), Pinasa (rhinitis), Urukshata (injury to chest), Urdhwajatrugata roga (disease above clavicle), engaged in excessive singing, Aadhyna (excessive studying), Atibhasya (excessive speaking), why because Jala (water) Anupana removes the Snehsa (unctuousness or moisture) of these parts leading to Vata Prakopa (aggravation) hence Anupana may causes disease instead of mitigating it.

Also, while giving Anupana some caution should be followed, else it may cause Ashaya Dushhti. It may diminish Agni by Aabhisyandi properties of Sneha, which is located in Ura and Kantha and may cause Vamana [22].

3. DISCUSSION

The concept of Anupana plays a very important role in the treatment. One drug can be used with different Anupana in different diseases. It can be beneficial in the condition where particular drug is unavailable; we can add a specific Anupana and can replace the unavailable drug. It plays an important role in carrying the medicine to the subtler tissue as it has synonyms ‘Vahana.’ It helps in fast acting and spreading of drug in body very quickly, so desired action of a drug can be obtained in a stipulate time period, which will be more beneficial for patients suffering from chronic as well as acute conditions. It is not only beneficial while using along with medicines but also it improves digestive fire, helps in digestion; break down the food particles and in easy absorption in the body. Anupana also have direct impact on body constituents when used in proper time. To evaluate Yogavahi (bioenhancer) property of Anupana is the need of the hour. Due to rapid advances in the field of pharmacy, drug designing and technology a large number of drugs have been introduced. Therefore, now a day’s bioavailability enhancing concept is attracting the researchers to increase the drug absorption and to maintain the effective drug concentration to achieve desired pharmacological effect. So researcher can focus on the aspect on Anupana in different ways to help the mankind. Few researches have been carried out to prove the potency of Anupana [23]. A clinical study on efficacy of Nagar chuna.
along with Kanji as Anupana was conducted in 60 patients of Amavata for 21 days. In this study, 750 mg of Nagara churna along with 15 ml Kanji produces Agni Deepana, Ama pachana, Vatanulomana, Shrotomukha vishodhana and Malanulomana effect which reliefs Shotha and Shula in patients. The study reveals that Sunthi churna with Kanji, as Anupana is effective in Amavata [24].

In children of age group of 0 to 5 years suffering from upper respiratory tract infection with symptoms like nasal discharge, congestion, cough with expectoration or dry cough, tachypnea, breathlessness, adventitious sounds, lack of appetite, irritability, sleeplessness were treated with Kasahara kwath, Tila taila with warm water as Anupana. This therapy shows statistically significant result in this study [25].

Another study has been conducted by Ediriwerra E.R.H.S.S. and Parera M.S.S in Pakshaghata (hemiplegia) Chandra kalka with Mahadalu Anupana used successfully in the treatment of early stage of Pakshaghata. The study was conducted on 30 patients randomly divided into two groups. One group receives 250mg Chandra kalka with 40 ml Mahadalu Anupana three times a day internally for 14 days and other group receives placebo therapy. In the trial group with Anupana of Mahadalu recorded statistically significant reduction in symptoms of Pakshaghata. The authors also clearly mentioned that the Mahadalu Anupana acts as a vehicle for main drug which activated, catalyzed or accelerated after combining with main drug. The Anupana of the Mahadalu enhances the action of Chandra Kalka. Therefore, great scope is there with this unexplored concept of Ayurveda, which needs to be established in a scientific way [26, 27, 28].

Considering all the above facts it can be Presumed that the Anupana increases digestion and absorption. Due to its Yogavahi property it may increases the oral bioavailability, decrease adverse effects of drug and makes the drug reaches the systemic circulation very quickly.

**4. FURTHER SCOPE**

*Carum carvi* is a common herb which is used in many Ayurvedic formulations and also used as carminative, diuretics shows bio-enhancing property when used with antitubercular drugs [29].

The concept of bioavailability enhancing effects of Anupana in Ayurveda is only documented. However, few recent scientific literatures practically proved it. Hence, this kind of innovative study will prove the anupana concept in Ayurveda and same kind of study can be done on other Anupana dravya.

To enhance the bioavailability many approaches are initiated based on herbal origin. It would be presumed that this kind of study will be intrinsic to new researchers to perform in detail at cellular level.

**5. CONCLUSION**

Anupana is a unique contribution of Ayurveda, which is a very essential part of food as well as medicine. Anupana not only enhances the drug potency, brings the desired effect but also cure the diseases by producing quick action. Considering the role of Anupana with food, it can nullify the untoward effect if present. It also improves the process of digestion and easy absorption of food. It has multidimensional role as it can be used as stimulant, nutritive, preventive and curative aspect in day-to-day life.

**DISCLAIMER**

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

**NOTE**

The study highlights the efficacy of "Anupana" which is an ancient tradition, used in some parts of India. This ancient concept should be carefully evaluated in the light of modern medical science and can be utilized partially if found suitable.

**CONSENT**

It is not applicable.
ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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