

Review

Role of Ayurvedic formulation in digestion

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Ayurvedic formulations were amalgamation of various herbs used to cure various lifestyle diseases. The secret of the natural health is based on the laws of ayurveda and on standardization of ayurvedic formulation that were well documented in the great treatises. These ayurvedic herbal formulations were processed under the most hygienic condition and were available in vacuum-sealed packaging in different quantities. Digestion is the mechanical and chemical breakdown of food into smaller components that were more easily absorbed into a blood stream, for instance. Digestion is a form of catabolism; a breakdown of large food molecules to smaller ones. The present study on ayurvedic formulation for digestive purpose will improve the motivation of the use of the medicinal herbs assets in the new form of formulation and also will serve as the research for new digestive ayurvedic formulation. The folk application of the herbs may be helpful for finding their proper pharmaceutical applications.

Keywords: Ayurvedic formulation, herbs, digestion.

INTRODUCTION

Ayurveda is one of the most ancient systems of medicine of India since last 5000 years. It is also one of the most noted systems of medicine in the world which date back to 6000 BC. The term Ayurveda in Sanskrit consists of two words "Ayur" meaning life and "Veda" means sacred knowledge of science. Thus Ayurveda can be denoted as the science of life. Thus Ayurveda can be denoted as the science of life. It is basically considered as the Upadeha or Atharvaveda which deals with different types of herbs, plants, the anatomy and physiology of different organs of the body and the principle of treatment of the disease (Rangari, 2004).

Ayurveda is based on the hypothesis that everything in the universe is composed of five basic elements, i.e., space, air, energy, liquid, and solid. They exist in human body in combined forms like Vata (Space and Air), Pitta (Energy and Liquid), and Kapha (Liquid and Solid). These three are called together as Tridosha (Three pillars of Life) (Kokate et al., 2006).

History of Ayurvedic Formulation

The authentic information of Ayurveda has been com-

plied by ancient Indian Medicine Practitioners in forms called Samhita. Sushruta firstly introduced surgery in Ayurveda in "Sushruta Samhita" which was also written by him and that is why he is considered as the father of Surgical Medicine (Trease and Evans, 2002).

Another eminent personality who developed the Ayurveda system of medicine was Nagarjuna. He applied metallurgy and alchemy to the Ayurvedic medicines. As we know heavy metals are much more harmful for such kind of formulations, but in spite of all those problems Hg was used, even in present era it is also used to some extent; because according to Ayurveda those substances which are going to be used in the formulation, have main two criteria, i.e.; Karma and Guna (Rangari, 2004). The most commonly used Ayurvedic Formulations are listed below (Shivranjan et al., 1940):(Table 1).

Apart from this several Ayurvedic formulations are prepared such as Lauha, Arka, Kvatha, Dravaka, Lavana Ksara, Guggulu, Rasa-Yoga, Pisti, Parpati Kalpas, Sattava, Kupipakva and Rasayana, Varti-Netrabindu and Anjana, Mandura, Kalka, Ghana-saar, Swarasa, Siddha-milks, kajjali, Matras, Nassayas, Fant(fanta), Nikadha etc.

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Table 1. List of some commonly used Ayurvedic formulations.

Sl. No.	Name of the Formulation	Definition of the Formulation	Example
1.	Arista	These are the alcoholic preparations which are prepared from decoction of the raw drug mixed with sugar to undergo fermentation.	Ashokarista, Vidangarista, Draksharista etc.
2.	Asava	These are the alcoholic preparations which are prepared from juices of fresh plants or water soaked dry drugs mixed with sugar to undergo fermentation.	Lohasava, Kumariasava, Madhukasava etc.
3.	Bhama	Powder of a substance obtained by iggery ions called Bhasma.	Mukta bhasma , Naga bhasma, Tamra bhasma etc.
4.	Churna	Fine powder of drug or drugs is known as Churna.	Mandukaparni churna , Rasnadi churna , Ashwagandha churna etc.
5.	Ghrita	These are the preparations in which ghee is boiled with prescribed Kasayas (decoction of the drug or drugs) and Kalkas (a fine paste of drug or drugs) according to the formula .	Bhrami ghrita , Asoka ghrita , Satpala ghrita etc.
6.	Gutika and Vati	Medicaments prepared in the form of pills or tablets are known as Gutika and Vati respectively.	Eladi gutika , Pranada gutika,Dugdha vati etc.
7.	Taila	Tailas are the medicated preparations in which taila is boiled with prescribed Kasayas and Kalkas according to the formula.	Bhringaraj taila , Kanaka taila, Trifaladi taila etc.
8.	Avaleha	Avaleha is a semi-solid preparation of drugs, prepared with the addition of iggery or sugar-candy and boiled with prescribed juice of the drug or its decoction.	Draksavaleha,Vasavaleha etc.
9.	Lepa	Medicaments in the form of a paste used for external application are called as Lepas.	Chandrakala lepa , Dasanga lepa , Dosaghna lepa etc.
10.	Praash	These are semi-solid preparations like jams. These are highly palatable preparations used for refreshing or rejuvenation of the body.	Chyavanpraash .

Role of Herbs in Ayurvedic Formulation

News on the beginning of life on the Earth, have forever remained controversial and unending subject of debate. Nevertheless, we can say with certainty that the vegetable kingdom was already there when man made appearance on earth .With the time men know about different plants serve themselves for the benefit of mankind. It was just based on the philosophy , common customs and basic principles which was described and furthermore shown in various alternative systems of medicine such as Ayurveda , Unani , Siddha , TCM (Traditional Chinese Medicine) , Homeopathy and latter on in modern medicines too (Pharmacopoeia of China,1992) .

On the basis of Ethno pharmacological approaches men used plants or parts of the plants for the

procurement of several diseases. As Ayurveda belongs to the group of ancient systems of medicines, it involves usage of different plants in its several formulations. Even on the basis of hypothesis, philosophy and basic principle minerals like Mercury and Lead, which is considered as the heavy metals in modern pharmacy ,were used as they belongs to the category of "Guna and Karma" used in several formulations (Tsai et al., 1996) .

The treatment of Ayurveda is totally based on natural herbs and most importantly each herb has certain medicinal value or property. Medicinal value of the plants mainly depends upon the season in which they are grown and collected. Our ancestors generally preferred the use of fresh plants but they also instructed that if it was not possible to collect fresh plants then the preserved or well stored drugs, not more than a year old, could be used (Lawrence, 1967).

Various herbs have various effects on our body. Herbs work by supplying different nutrients to the body. Because of their diverse chemical formation, they are effective in small doses and produce few side effects. Some herbs work as general tonic that cleanse, nourish and rebuild on a cellular level. Others have an affinity for a specific system or organ and may be used to treat related imbalances or symptoms. They work gently naturally to support the body's own healing processes. Such kind of herbs used in Ayurveda may be classified into five types. They are as follows-

➤ According to Origin :- (Shivranjan et al., 1940, Tsai et al., 1996)

In this category herbs are subdivided into five different groups according to their origin. Dravyas are constituted by Panchakarma-bootas (five elements). There are five types of dravyas such as Parthiv, Apaya, Tajjas, Vayaveeya and Akasheeya.

➤ According to habitat:- (Shivranjan et al., 1940, Tsai et al., 1996)

This includes four subdivisions such as Sthalaj, Jalaj, Vruksharuha and Vrukshadan.

➤ According to action :- (Shivranjan et al., 1940, Tsai et al., 1996, Blackburn et al., 1993)

This category involves different action of different herbs in the body. Such as herbs used for Cardiac diseases (e.g. – Arjuna, Guggulu), herbs used for Asthma (e.g.- Devdaru), herbs used for Congestive heart failure (e.g. Neem), herbs used for Constipation (e.g.- Haritaki, Amlaki, Bohera), herbs used for Depression (e.g. – Ashvatha, Bhuriphali), herbs used for Diabetes (e.g. – Pitasara, Gulancha, Korela, Neem) etc.

➤ According to Action on Doshas:- (Shivranjan et al., 1940, Blackburn et al., 1993)

This includes three sub parts such as Shaman, Kopan, Swasthahita.

➤ According to depending on their use :- (Shivranjan et al., 1940, Blackburn et al., 1993)

It only includes two sub types – Aushadh dravya (Drugs) and Ahar Dravya (Diet).

Ayurvedic Formulation for Digestive Purpose

Ayurvedic formulations are generally specific and noteworthy. Medicinal herbs and minerals are processed in about two hundred different preparations that are suitable to various body types. Some of the toxic and poisonous herbs as well as most of minerals are purified, processed with herbs and calcined in a strategic way to render them harmless, enhance their bioavailability and potency. These pharmaceutical procedures were developed thousands of years before at a time when sophisticated chemical laboratories were absent. These procedures are still a marvel for the most profound alchemist or chemist (Rangari, 2004).

Most of these Ayurvedic formulations have dual roles

in supporting and enhancing health and in curing various disorders. They can be used for supporting various physiological systems specifically and overall body and mind generally, e.g. – Triphala is a good Ayurvedic formulation that can be taken round the year as in many disorders like constipation, eye and skin disorders etc.

Ayurvedic formulations made for digestive purpose are available. From the beginning of Ayurvedic System of Medicine men are using such kind of formulation among which Triphala is very important to mention. It is basically made by taking three different fruits such as Amlaki, Haritaki and Bahera. This formulation is well accepted for its reliable and balanced activities. This has typically laxative property. Thus it is helpful for digestive system (Brady and Taylor, Pharmacognosy).

Another vital Ayurvedic formulation is very common, i.e.; Chyawanprash which have the main functions to improve digestion and respiration (Kokate et al., 2006). From the past there are so many herbs which serves themselves in its individual formulation such includes – Amlaki, Arjuna, Ashwagandha, Bhrigaraj, Bibitaki, Garcinia, Guduchi, Kutki, Neem, Shatavari etc.

Apart from formulations made by using single herb, there are other formulations, too, which were used traditionally and even now it is continued. Among them some are of greater value. They are as follows,

1. The decoction of Cumin, Fennel and Coriander is useful in relieving gas problem.
2. Decoction of Pippali is very useful in low appetite.
3. Infusion of Amlaki, Haritaki and Bohera is effective against constipation, acidity, bowel clearance etc.
4. Infusion, decoction of Fennel, Dhania is also effective against indigestion.

Besides this a no. of formulations look helpful in digestive purpose such as – Agnitundi Vati, Amlaki Rasayan, Chitrakadi Vati, Triphala Guggulu, Kutzaghan Vati, Maha-Shankh Vati, Sanjeevani Vati, Arogyavardhni Vati etc (Kokate et al., 2006; Trease and Evans, 2002; Bowers et al., 1953).

In presence of all modern medicines, Ayurvedic medicines keep their own place by offering tremendous formulations used for Digestive purpose. Some are mentioned below (Indian Herbal Pharmacopoeia, 1999):(Table 2).

Herbs Used for Digestive Purpose

India is such kind of country which is rich in plant sources, minerals, animals and others too. Drugs obtained from plant sources play an important role for procurement of several diseases. Plant drugs are very complex in nature and that is why it looks difficult to isolate them out. In spite of these, several studies on plant drugs are carried out for several years all over the world.

To facilitate digestive system of human body various plants, sometimes the whole plant or sometimes a speci-

Table 2. List of some Ayurvedic digestive formulations.

Sl. No.	Contents of the formulation	Action
1.	Arjuna , Ashwagandha , Shatavari	Proper Digestion, Control cholesterol level, maintains blood pressure.
2.	Ashwagandha , Boswelia, Turmeric, Ginger	Proper Digestion, Inflammation.
3.	Ginger , Clove , Fennel , Black piper	Proper Digestion.
4.	Sitopaladi, Triphala , Trikatu and Mahasudarsan	Proper Digestion, Strengthen immune system.
5.	Guggulu , Haritaki	Proper Digestion, Joint Pain.
6.	Turmeric , Guggulu , Triphala	Vascular Support and Digestion.
7.	Kalmegh , Amlaki , Bohera , Black piper	Rejuvenative for GIT.
8.	Neem , Ashwagandha , Fennel	Proper Digestion and Dysentery.
9.	Biranga, Haritaki , Chritaka , Pudina	Proper Digestion.
10.	Senna , Amlaki , Aloe , Clove	Bowel regulator, Relief from constipation.

fic part of the plant which contains the maximum no. of active constituents responsible for giving expected and desirable action, are used. Amongst them Chritaka, Dhania, Bahera, Guduchi, Hingu or Sunthi, Biranga, Bhingaraj, Indrajab, Mutha, Bhuiamlaki, Tewrimool, Ghritakumari, Pittapapada, Jau or Jab are very important (Ayurvedic Pharmacopoeia of India, 2008).

Apart from this *Hydrastic canadensis*, *Gentian chirata*, *Carduas mar*, *Chelidonium maj*, *Curcuma longa* are also used as digestive aid (Brady and Taylor, Pharmacognosy).

In Ayurvedic Pharmacy drugs obtained from sources like Hingu or Hing, Ginger, Garlic, Goldenseal, Calendine, is of greater value. Previously in Ayurveda single therapeutically active herbs were used for the disease management, or sometimes similarly therapeutically active herbs used as the substitute (De Silva et al., 1982)

Goldenseal or *Hydrastis canadensis* was one of the major herbs used traditionally for the treatment of digestive disorders. It is said to stimulate appetite and generally have a toning effect on the whole body. It promotes the functioning capacity of the heart and respiratory system, the liver, the spleen, the pancreas and the colon (Zhang, 1986).

Roots of Chritaka or *Plumbago zeylanica*, belongs to the family of Plumbaginaceae, contains mainly plumbagin which helps to increase digestion capability. On the other hand dried and mature stem of Guduchi or *Tinospora cordifolia* (Family: Menispermaceae) rich in terpenoids and alkaloids which is also used in several digestive formulation.

Bohera is one of the known drugs that are used in various digestive formulations. Bohera or *Terminalia belerica* (Family : Combretaceae) which mainly contains Gallic acid, tannic acid and glycosides which is responsible for giving astringent property along with the treatment of dyspepsia and diarrhoea. The half ripe fruit of Bohera which contains maximum amount of fixed oil, responsible for giving purgative action. Its gum also used as a demulcent and purgative.

Another important drug that is used in several digestive formulations is Biranga or *Embelia ribes* (Family: Myrsinaceae) which contains alkaloids, tannins, essential oil etc. It mainly contains hydroquinone derivative embelin and emblic acid which is effective against tapeworms. Due to its anthelmintic property decoction of its fruits along with milk is often given to the children to reduce tapeworm infection (Ayurvedic Pharmacopoeia of India, 2008).

On the other hand dried rhizomes of Mutha or Musta (Sc.Name: *Cyperus rotundus*, Family: Cyperaceae) is used in a no. of digestive formulation. Volatile oil present in it as the chief constituent along with sesquiterpene, hydrocarbons, etc.; responsible for giving Anti-inflammatory, Estrogenic, Antipyretic, Anthelmintic, Diuretic and Hypotensive activity (Ayurvedic Pharmacopoeia of India, 2009).

Bhuamlaki or Tamalaki (Sc. Name : *Phyllanthus niruri*, Family : Euphorbiaceae) reaches in numerous lignan derivatives, Tewrimool (Sc.Name : *Ipomoea turpethum*, Family : Convolvulaceae) reaches in specially Resinous glycosides, Pittapapada (Sc. Name : *Fumeria parviflora*, Family : Fumaraceae) are also effective in improper digestion and used in several digestive formulation (Ayurvedic Pharmacopoeia of India, 2008-2009).

In conventional treatment like Ayurveda includes the avoidance of problem foods, such as Citrus fruits, Spicy foods, Milk and beans. Other herbs that may be useful in digestion of foods such as Caraway (*Carum carvi*), Fennel (*Foeniculum vulgare*), Ginger (*Zingiber officinalis*), Linden (*Tilia* spp.), Peppermint (*Mentha piperita*), Sage (*Salvia officinalis*) etc (Ayurvedic Pharmacopoeia of India, 2009).

It has been seen that three major categories of herbs are used to treat indigestion when no cause for the condition is known such as Bitters (Digestive stimulant), Carminatives (Gas relieving herbs) and Demulcents (Soothing herbs). The effects of these different categories on heart burn and low stomach acid will be discussed individually.

Bitter herbs are used though to stimulate digestive function by increasing saliva production and promoting both stomach acid and digestive enzyme production. Some examples of bitter herbs are Bitter melon, Bitter orange, Centuary, Elecampane, Gentian, Juniper, Yarrow etc.

Carminatives which are also called as Aromatic Digestive Tonics or Aromatic Bitters may be used to relieve symptoms of indigestion, particularly when there is excessive gas. It is believed that Carminative agents work, at least in part, by relieving spasms in the intestinal tract. Among the most notable and well-studied Carminatives are peppermint, fennel and caraway. Other includes in this category are Anise, Basil, Cardamom, Cinnamon, Clove, Coriander, Dill, Rosemary, Thyme etc.

Demulcents belong to those categories of herbs used to treat indigestion and heart burn. These herbs seem to work by decreasing inflammation and forming a physical barrier against stomach acid or other abdominal irritants. Examples of demulcent herbs include Ginger, Liquorice and Slippery elm.

Besides this herb like Condurango, Ceanothus, *Urtica urens*, *Sabal serrulata* plays an important role during the manufacturing of different digestive formulations. In addition to this herbs like Horehound or *Marrubium vulgare* (Fam : Labiatae), Hops or *Humulus lupulus* (Fam : Rosaceae), Ginseng or *Panax ginseng* (Fam : Araliaceae), Ginkgo or *Ginkgo biloba* (Fam : Ginkgoaceae) may be incorporated which can be used in such kind of digestive formulations meant for stronger digestion of food (Jhang, 1956).

Efficacy of various ayurvedic formulations

In the field of medical science, Ayurveda was carefully and systematically developed. As a result, it is now being confirmed by measures of many scientific parameters. It not only provides well-based medical cures for disease, but its holistic approaches use unique principles of diet, life-style and, particularly, therapeutics, to balance and enrich all aspects of the physiology and psyche. The basic principles of Ayurveda gave rise to the common belief that Ayurvedic medicines are safe. The Ayurvedic literature gives details of drug-drug and drug-diet incompatibilities based on elaborately described qualitative differences in ingredients or quantitative proportions (Satkopan, 2000). Ayurveda's Anupan therapeutic method and Shodhan pharmaceuticals principles probably also contribute to the prevention of many undesired and unforeseen events. Prevention of this kind is a major goal of pharmacovigilance programs. Pharmacovigilance is a corrective process originating in pharmaco-epidemiology. Pharmacovigilance is defined as 'the detection, assessment, understanding, and prevention of adverse effects of drugs or any other possible drug related problems' The importance of

Pharmacovigilance, 2002 (The Pharma Review, 2005). The pharmacovigilance program promises to close the gap between Ayurvedic drugs' potential and reality. An important aspect of the pharmacovigilance program is formulations' economic evaluation, which may be carried out at any stage in a health care strategy's life cycle (Effective communications in Pharmacovigilance, 1997). Data from such studies differs from that for clinical trials, and requires business-style analysis. When new drugs are developed, the pharmacovigilance program with its social perspective requires economic evaluation of all aspects of their use in treatment, including side effects, adverse reactions, and their additional treatment costs, in addition to routine therapeutic evaluation. The pharmaceutical industry also needs to take responsibility for these added facets of pharmacovigilance (Galib M, 2008). There is a need for a proper postmarketing surveillance program to observe quality, safety, and efficacy of Ayurvedic drugs.

Mechanism of drugs used in digestion

Ayurveda is the classical health care system. Good digestion is vital to overall well-being and healthiness. The basis of Ayurveda is prevention-strengthening the body's defense system and self-repair mechanisms have the ability to naturally resist disease. Like Chinese medicine, Ayurvedic medicine is especially valuable to people who perceive spiritual health and physical health as inextricably intertwined.

Life-force in Ayurveda is called *prana*. From the center of the being *prana* controls the functioning of the body's organs and physiological processes. Channels, called *srotas*, similar to the channels of acupuncture, facilitate the circulation of *prana*. Disease is caused by blockage of these channels and by pranic insufficiency. Ayurveda describes individuals according to their constitutional or body-mind types, called *doshas*. The three basic doshas are *vatta*, *pitta*, and *kapha*.

- *Vatta* governs bodily and mental functions concerned with movement and metabolism
- *Pitta* governs bodily and mental functions concerned with heat, the catabolic break-down of things taken into the body-mind, and energy production.
- *Kapha* governs bodily and mental functions concerned with the building up and maintenance of structure and fluids. The Ayurvedic drugs act by specifically interfering with cellular or biochemical processes, often called 'targets'. The classic example of a drug target is an enzyme which is inhibited by the drug. Metabolic processes will produce reactive oxygen intermediates (ROI) which can damage cellular components such as lipids, proteins, and nucleic acids. The high metabolic activity of most protozoan pathogens will result in production of even higher levels of ROI (Foley et al., 1998). ROI is a consequence of hemoglobin digestion

and the release of free heme. All cells have mechanisms by which the ROI can be detoxified. Drugs which specifically increase the levels of oxidative stress in the parasite may overwhelm these ROI defense mechanisms and lead to parasite death. Levels of oxidative stress can be increased by drugs that are direct oxidants, as well as by drugs which participated in oxidation-reduction cycling, sometimes called redox cycling. Many of the drugs participating in redox reactions need to be activated before they are effective against their target(s) (Hyde, 2007).

Contraindication of the ayurvedic medicines

If its to viewing biologically active agents as analogs to drugs, then its suspend dose standards dealing with most herb preparations. Some of these plants can be reduced to the pharmacology of specific constituents, and they are so noted. The majority of potential reactions occur when an herb stimulates metabolic processes that are already in an excited state. The usual models of drug toxicology will fail to predict such reactions; these are not, strictly speaking, drug reactions, but often predictable idiopathic synergies.

Herbs should be free of side effects within their therapeutic window and when used by a person whose constitution is complimented, not antagonized by the herbs. Whether or not you accept any value to Botanical Medicine, this is Conventional Wisdom amongst herbalists. Side effects from herbs are unwanted, both by herbalists wishing to strengthen, not denigrate homeostasis, and by skeptics who doubt any value to herbs except from placebo or accidental drug effects.

On the other hand, a careful evaluation of potential drug therapy starts with the basic understanding that drugs have side effects at the proper dose, and the value must be weighed against the detriment (www.Swsbm.com/Manuals MM/ herbmedcontra1.pdf). Some physicians feel any self-treatment with biologically active agents is dangerous. Many people consider this either professional arrogance or the attempt to stifle competition. There is little intrinsic danger in using herbs, since few have the potential for DRUG side effects. The side effects are usually idiosyncratic or idiopathic, and not predictable by drug standards.

CONCLUSION

Recently the WHO (World Health Organisation) has stated "there is a growing need to develop guidelines for the quality testing standards of herbal and ayurvedic medicines derived from plant sources. The guidelines will not be resting on identification of active ingredients alone for batch to batch uniformity but also the quality control of raw herbs and standardising the process of extraction and manufacturing". Therefore the central council of

research in Ayurveda and Siddha may thereafter need to review Pharmacopoeial Standards for Ayurvedic Formulary and Pharmacopoeia (Franceworths et al., 1985; The Pharma Review, 2005).

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