

PHARMACOLOGICAL POTENTIAL OF POLYHERBAL AYURVEDIC FORMULATIONS – A REVIEW

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ABSTRACT

Ayurveda is an ancient traditional medical care system. The major aim of Ayurveda is to prevent unnecessary suffering and aiding healthy long life. Ayurveda incorporates natural constituents to make potential medicines that are believed to eliminate the root cause of the diseases. Forty-five thousand plant species are found in the subcontinent of India making it one of the largest biodiversity centers. In India alone, 15,000 medicinal plant species have been reported out of which 7500 species are used by the communities to cure different diseases. Ayurveda uses single or polyherbal for treatment. In these traditional medicine systems, various formulations are prepared one of which is fermented formulations, namely, arishtas and asavas. These formulations are prepared using a decoction of herbal drugs and contain self-generated alcohol. Fermented formulations are known for their stability and efficacy. Indian traditional literature states the usage of these formulations regularly with scientific validation strengthens one immunity and well-being. The current review focuses on Vidangarishta, Punarnavasava, Chandanasava, their preparations, therapeutics uses, and their toxic effects. A thorough understating of these formulations aids in standardizing Ayurveda as a marginalized medicine.

Keywords: Arishta, Asava, Ayurveda.

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INTRODUCTION

Ayurveda is a medical approach that is known as the world's ancient healing system developed in India. The practice of this healing process is more than 3000-year-old and has its penned in the Vedas as well as [1]. Ayurveda is made up of two words, ayu meaning life and Veda meaning knowledge [2]. Its main motive is to improve good health rather than fighting off the ailment. However, certain treatments may be focused on a particular health issue. Ayurvedic treatments are performed on the belief that wellness and health rely on a delicate equilibrium with one's body, mind, and spirit. The western world considers Ayurveda as a type of complementary and alternative medicine [3]. This is because ayurvedic drugs are not completely explored and their basic ideologies are not scientifically accepted because of the poor evidence [4]. Whereas other medical approaches are scientifically proven and have become highly advanced. Ayurvedic treatments are more efficient against chronic diseases when compared to the allopathy [5]. Ayurvedic medicines or formulations are herbal extracts of medicinal value. Consistency, chemical composition, and biological activity are the main requirements for efficient and safe administration. Several allopathic treatments are expensive in economically poor countries and depend on ayurvedic treatments more. Since Ayurveda relies on nature, it brings minimal side effects [6]. According to Ayurveda, a human body is made up of five elements, that is, earth, water, fire, air, and space. The elements of matter make the three life forces called doshas, which are called Vata dosha, pitta dosha, and Kapha dosha. Vata dosha is the most powerful and controls blood circulation, defecation, breathing, skin problems, etc. Pitta dosha controls metabolism, digestion, and infections. Kapha dosha deals with the body's strength, stability, and immunity [7]. The growing awareness of the ill effects of allopathy makes people inclined toward ayurvedic treatments and therapies [8].

The medicines used in ayurvedic treatments are mostly fermented decoctions (arishta) or fermented infusions (asava) [9]. Both of them are considered superior to tinctures for intestinal absorption since they are incompletely digested (from fermentation). The metabolic degradation of herbal extracts is easily absorbed into the body when compared to its powdered form [10]. According to Susruta, aristas possess good functions and properties when compared to other drug preparation modes due to their unique combination of medicinal materials and

phytochemical conversion [11]. The method of preparation of asava-arishta is a continuous hydro-alcoholic extraction process that is practiced since the ancient period. This method of preparation enables the potent transformation of phytochemical compounds from herbs, a non-toxic form that helps in faster absorption into the body. The fermented formulations are self-generated alcoholic medicines prepared by fermenting herbal juice or its decoction by adding sugar [12]. The difference in the preparation of aristas and asvasas lies in the fact that the former is prepared with herbal decoction whereas fresh herbal juices are used in the latter. The maximum alcoholic content of such formulations is 12% v/v, with a slightly acidic and sweetish taste with a pleasant aroma [13]. Alcoholic content in the formulation increases its shelf-life, better the extraction of drug molecules from herbs, better drug delivery into the body, and intensifies the therapeutic properties of [14]. Sadhana Kalpana in Ayurveda is the term used for the method of asava-arista preparation. Micro-organisms are employed in the fermentation process and it biologically transforms the basic herbal ingredients into better therapeutic final product [15].

PREPARATION OF FORMULATIONS

The plant material used for preparing the medicine can be fresh or dried plant parts. Freshly collected plant part is cleaned thoroughly, pulverized, and pressed to collect its juice. The dried plant part is finely chopped, and either powdered or made into a decoction. For asava preparation, the ingredients are coarsely crushed and mixed with water along with sugar, jaggery, or honey [16]. In the case of arishta, the herbs or their extracts are boiled in a specified volume of potable water. The natural sweeteners (sugar, jaggery, and honey) should be added and dissolved with great care. The sweeteners should be fully dissolved along with the herbal extract, it should be pure in form. Old jaggery is preferred over freshly prepared ones since it does not support digestion. An earthen pot or an earthen jar is preferred as fermenting vessel. The vessel is examined for cracks and weak spots before preparation and so is its lid. The pot should be made of soft mud obtained from the silt in water bodies. The surface of the pot should be thick, light, smooth, greasy, homogenous, and free of any cracks. A pot is selected which produces an echo in the internal area, has 42 angular circumferences in the middle, and 43 angulars in tall and one angular in thickness. Before pouring the herbal mixture into the jar, its internal surface is cleaned

with a clean cloth, dried, and smeared with cow's ghee to prevent the contents from oozing out. Instead of an earthen pot, a glazed porcelain vessel having similar properties can also be used. However, huge airtight wooden vats with covers are preferred for industrial preparation. The filtration is done using electric filters along with filter sheets that separate the clear medicine from the suspended particles. Superheated steam under pressure boilers is used for preparing the herbal decoction [15].

Fermentation is an anaerobic process in which organic compounds are metabolically fragmented by microorganisms. In chemical terms, fermentation is a chemical change of a substrate brought by the anaerobic metabolic action of micro-organisms or its extract to obtain economically useful product [17]. Bacteria and yeast species are employed for this purpose, based on the biochemical content of the substrate the product odor and taste vary. The enzymatic action of microorganisms used, species, and their concentration also play a key role in the quality of the final product [18].

All the ingredients are mixed, poured to the three-fourth capacity of the jar and left undisturbed for a month. The head-space provides space for fermentation which rises because of the frothing and the released gases [19]. Yeast species favor fermentation of any substance; however, here *Woodfordia fruticosa* (dhataki flowers) is the inoculum used for the fermentation process. To the surprise, the addition of dhataki flowers introduces the wild yeast species into the fermentation medium [20]. In addition to dhataki, honey and other resins also introduce wild yeast spores. After the ingredients are added, a clay-smeared cloth is wound over the rim of the vessel to create a sealed environment and the preparation is kept in a poor-ventilated and dark room for about a month. Post-fermentation comprises filtering the liquid and stored in food-grade bottles for therapeutic purposes. The efficiency of fermentation is determined by the crude match-box method which assesses the amount of CO₂ released from the product. The volume of the solvent used, fermentation period, and temperature add to the quality factors. The fermentation process breaks plant cells, which are then acted on by microbial enzymes [21]. The method of the crude matchbox is employed to determine the efficiency of fermentation. Sugar molecules in the menstruum are acted on by zymase released by yeast cells in the absence of oxygen and convert to ethanol and carbon dioxide [22].

Dhataki is mostly used in asava and arishta preparation. *W. fruticosa* is nectariferous, rich in tannin, and has yeast spores. Tannin facilitates yeast growth and the addition of dhataki flowers into fermentation media distributes the spores when stirred. Its floral parts are majorly preferred due to their rich medicinal value. The flower is pungent, uterine sedative, anthelmintic, alexiteric, cooling, pungent, and acrid. Its medicinal values are useful against blood diseases, dysentery, leprosy, leucorrhoea, etc. [20].

The fermentation process draws out a more active ingredient from plant parts than other extraction methods. In this kind of anaerobic process, the plant part's cells are ruptured and exposed to microbial cells and their enzymes. Since the plant cells are more exposed to biologically active enzymes, it gets transformed into a beneficial end product. The inoculum of yeast acts as a self-cleaning system since it binds to pesticide residues and heavy metals. Therefore, fermented ayurvedic formulations are much safer and more efficient than their powdered form [23].

The unique hydroalcoholic formulations and the self-generated extraction of alcohol from phytochemicals have great therapeutic activity. Arishta not only aids in improving the digestive system but also improves the respiratory tract and overall health. On the other hand, asava improves mental health, and energy, and induces sleep, digestion, and strength [24]. The microflora present in the herbal formulation acts as a probiotic thereby maintaining the gut-microbiome. The preparation of arishtas and asavas are continuous, controlled, and

complex biochemical reactions which yield more effective products in the final product [25].

Preparation of arishta and asava

The common methods used in asava and arishta preparation are decoction and infusion.

Decoction

The crude herbal extract is boiled in a specified amount of water for a particular time until the volume comes down to one-fourth of the initial mixture. The recommended ratio of herbal extract to water is 1:4 ratio. After the contents are cooled, it is filtered down and used, sometimes it requires a processing step. Only heat-stable and water-soluble components are preferred for the decoction [26].

Infusion

Fresh herbal extracts are liquified and mixed with boiled or cold water. It is then mixed in the fermentation vessel and left undisturbed for a month. There are four main components present in the infusion, that is, the main herb for the formulation, flavoring agents, inoculum, and sugars [27].

CHANDANSAVA

India is known to have rich diversity and heritage of plants, since time era. Moreover, hence, Ayurveda is known to be an essential part of the health-care system in the population.

Chandansava is a very commonly known ayurvedic formulation. This polyherbal formulation is made up of *Santalum album* L. and other 24 plant ingredients [28].

The table shows the list and amount of ingredients added in the preparation of Chandanasava [28].

Asavas and aristas are generally produced by the process of fermentation. The usual fermenting period as per the texts is 1 month. However, the Ayurvedic practitioners believe that prolonged incubation results in increased alcohol content of the products [29].

Maximum alcohol production (9.8%) in 30 days was reached in the earthen pot. With the progress of time beyond 30 days, there was a loss of yield, alcohol, and sugar [30].

The Chandansava formulation is a fermented traditional medicine, which has the main ingredients as Chandan=Sandalwood and Asava=Sweetening agent, which is mostly jaggery that is a fermented infusion. Moreover hence, it has around 5-10% self-generated alcohol content present [31].

The potential of arishta and asava is controlled by the profile of chemical compounds and can be modulated based on the ingredients, type of fermentation, and microorganisms involved.

It shows the change in smell, touch, and taste of Chandanasava during fermentation.

The asava are native fermentations and valuable therapeutics because of their ability to preserve for a longer time and their enhanced therapeutic properties. The former quality is due to the action of microbes in the fermentation process while the latter is due to the biotransformation of initial ingredients to therapeutic end products [32].

Storage: Should be stored in a dark and cool place in a tightly closed amber-colored bottle.

Chandanasava is beneficial in following health conditions. It is effective against urinary tract infections, pyuria, burning micturition, dysuria, renal calculi, cystitis, chronic kidney failure, pyospermia, and hyperuricemia [33] [Table 1].

Safed Chandan (White sandalwood) is the primary ingredient of the formulation. It possesses antiseptic, antimicrobial, and anti-inflammatory properties due to its phytochemical constituents [34].

Jaggery has two important roles in the formulation, that is, it acts as a sweetening agent as well as acts as a sugar source. Unlike, regular sugar (sucrose) jaggery takes prolonged time for catalysis and gets absorbed faster thereby acting as a long-time energy source [35].

Ficus bengalensis shows hypoglycemic and immunomodulatory properties. The extracts obtained from the bark of the tree are effective against worms [36].

Draksha or raisins are rich in tannic acid, tartaric acid, malic acid and other monosaccharides. Soaked raisins are administered to treat constipation and iron deficiency. When raisins are ingested along with sandalwood powder, the consumer is relieved from excess thirst, and burning sensation caused due to excess body heat [37].

The piperine alkaloid and volatile oils present in *Piper longum* possess several medical importance. Caryophyllene, bisabolene, pentadecane, and Vitamin A and E are the volatile substances. The combined action of these phytoconstituents acts for anticancer, antioxidant, anti-inflammatory, non-specific immunostimulatory activity, and antimicrobial properties [38].

Bark of *Lodhra* has flavanol, glucosides, and oleanolic acid which is why it is used for treating antibacterial infections and parasitic infections [39]. *Patha* is used for treating angina, breathing problems and worm infections. Phenols and alkaloids are the major phytochemical constituent present in the ingredient [40].

Rubia cordifolia commonly known as Manhishttha is rich in rubimallin that results in producing anti-inflammatory action [41]. It also inhibits inflammatory mediators by inhibiting the lipoxygenase enzyme pathway. The Rubiadin compound present in the plant results in the anti-oxidant property. When these plant compounds act along with other phytochemical constituents, it brings out their anti-bacterial property [42] [Table 2].

PUNARNAVASAVA

Boerhaavia diffusa also known as Punarnava represents a phytochemical reservoir of medicinal values. The plant consists of various polyphenolic compounds, glycosides, steroids, and flavonoids. All these phytochemicals contribute to its excellent medicinal properties including, antioxidant, anti-inflammatory, ophthalmic, spermatogenic, aphrodisiac, immunostimulant, antiasthmatic, and hepatoprotective properties [43]. *B. diffusa* commonly known as Punarnava is a perennial creeping herb found all over India. Various parts of the plant are used for the preparation of various ayurvedic formulations which can cure cancer, jaundice, inflammation, abdominal pain, and even act as an anti-stress agent [44]. Punarnava is rich in phytochemical constituents including, alkaloids, phytosterols, lignans, rotenoids, xanthenes, and salts. It is a pungent smell and bitter in taste. The leaf juice acts against dyspepsia, jaundice, enlargement of the spleen, and abdominal pain. *B. diffusa* leaves are used as green vegetables in different parts of India [45]. The use of leaves cures ulcers of cornea and night blindness. Seeds of this plant are used as an energizer and it helps in digestion. *B. diffusa* roots benefit in treating liver disorders. These roots are diuretics, and laxatives used to cure asthma, urinary disorders, rheumatism, and encephalitis [46]. This herb got many therapeutic uses. The herb is used for the treatment of jaundice, abdominal pain, and enlargement of the spleen. Moreover, it got diuretic, stomachic, and expectorant properties [47].

Punarnavasava is manufactured using about 25 ingredients. The medicine is prepared using fruits, rhizome, stem, stem bark, fruit rind, root, and leaves of herbs. Draksha (Dry grapes), Pippali (long pepper), Maricha (Pepper), and Amla are the fruits utilized for the

preparation of this medicine. Gokshura, Kantakari, Brihati, Durlabha, and vasaka contribute their root portion or the whole plant itself for the manufacture of this medicine. The stem bark of Neem and flower of Dhataki also contributes some medicinal value to the medicine. Fruit rind of Vibhakti and Haritaki also benefits the medicine. Shunti rhizome and patola leaf are used for the manufacturing of this medicine. Along with these herbs, water, sugar, and honey are required for the preparation [48]. Long pepper (Pippali) benefits the appetite and digestion as well as treats gastritis, stomach-related problems, indigestion, etc. A chemical known as Piperine is present in the long pepper which fights against certain parasites that can infect people. This has the power to change the lining of the stomach which benefits in the better absorbance of drugs and other substances taken by the people to their body. That is how piperine works in pepper contributing to its medicinal value [49].

Gingers are very good at halting the growth of bacteria. Gingerol a bioactive component plays a major role in the medicinal properties of ginger. This bioactive component has high anti-inflammatory and high anti-oxidant properties. Ginger is possibly effective against nausea, vomiting, osteoarthritis, menstrual cramp, etc. [50].

Amla (Indian gooseberry) improves immunity, digestion, respiratory health, and skin. It reduces stress and treats anemia. It has a very good diuretic property. Its fruit juice is very rich in Vitamin C. Fruit juice contains moisture, protein, fat, minerals, fibers and carbohydrates. Calcium, phosphate, iron, and other elements are present in vitamins and minerals [51].

Haritaki also read as Triphala is known as the Indian walnut because it has several benefits. It benefits detoxification and rejuvenation. It has potent properties including laxative, astringent, purgative, anti-Bilous, and anti-inflammatory properties for the treatment of different diseases [52].

Vasaka commonly known as 'Malabar nut' is considered an ultimate remedy for a lot of health anomalies such as cough, breathing problems, nasal congestion, sore throat, asthma, bronchitis, respiratory tract infection, [53]. Bioactive components include Visicine, Luteolin, Carotene, vasakin and other essential oils, and phytochemicals constituents such as tannins, flavonoids, alkaloids, and phenols present on the leaves of this herb provide powerful anti-bacterial, anti-inflammatory, anti-spasmodic, bronchodilator, and antitussive properties [54]. This medicine acts against upper respiratory infection, tuberculosis, heart problems, constipation, dengue, etc. Above all, this medicine promotes gut health, purifies blood, heals ulcers, prevents infection, and treats uremia [55].

Erandamoola (Castor root) is used in the form of powder. The Castor plant (*Ricinus communis*) is a semi-woody shrub used in the production of various ayurvedic formulations due to its ultimate medicinal properties. This plant's roots, leaves, seeds, and stems have medicinal properties. This herb shows diuretic properties. It acts against dysuria, urine retention, and other urinary tract-related infection. The stem bark of this decoction is eminent and purgative [56].

Katuki is a wild plant which better benefits the health of the liver and kidney. It may also help regulate blood sugar levels, enzymes, and cholesterol levels. It has potent anti-inflammatory properties which can expel irritants, open up nasal passages, and ease congestion. This herb carries respiratory and immune-boosting benefits which can prevent the chances of severe infection [57].

Punarnava belongs to the 4'o clock *Nyctaginaceae* family. This plant is used to rejuvenate and replenish the body. This plant can cure edema, rheumatoid arthritis, liver disorders, stomach issues, etc. The plant is nutrient-rich consisting of proteins, Vitamin C, sodium, calcium, iron, etc, which can cure arthritis, digestion, diabetes, urinary disorders, weight loss etc., this herb removes AMA doshas which are toxic to our body [44].

Gokshura is another ayurvedic herb which benefits immunity-boosting, aphrodisiac, and rejuvenation properties. It exhibits diuretic property which helps treat urinary tract-related infections [58].

Kantakari is commonly known as 'yellow berried nightshade which aids in treating respiratory problems including cough, asthma, and indigestion. It shows anti-inflammatory, anti-tussive, antipyretic, anti-histaminic, anti-tumor, and cytotoxic activity [59].

Brihati is one of the ten roots of Dashamula. It has a great anti-inflammatory property. It helps cure respiratory disorders including cough, asthma, heart diseases, chronic fever, and difficulty in urination. Fruits of this plant also possess analgesic, antipyretic, anti-inflammatory, and CNS depressant properties. The leaves and roots of this plant are rich with phytochemical components, including steroidal alkaloids, solanine, and solanidine. The seed oil of this plant is rich in acids including, stearic, glyceric, oleic, and linoleic acids [60]. Fruits consist of components including carbohydrates, which can hydrolyse to produce many other components including maltose, sucrose, and enzymes. Carbohydrate is a source for the preparation of cortisone and sex hormones. This plant has the property of digestion. Some other properties of Brihati include anti-helminthic, diuretic, anthelmintic, antioxidant, depurative, and expectorant properties [61].

Roots, stems, leaves, bark, flowers, fruits, and seeds of the neem tree are used to prepare ayurvedic formulations due to their excellent medicinal properties. Most commonly neem leaves are used for the treatment of skin-related issues, diseases related to heart and blood vessels, fever, diabetes, and liver problems to [62]. Neem is a strong insecticide. Certain chemicals present in the neem prevent ulcers in the digestive tract and plaque formation in the mouth kills bacteria. These chemicals can lower blood sugar levels [63].

In most ayurvedic formulations, dry grapes are used for their preparation. Raisins are used for the treatment of intestinal disorders, respiratory problems, gout, liver disorders, etc. Catechin, epicatechin, ergosterol, jasmonic acid, and B-sitosterol are the chemicals present in grapes. Resveratrol is a kind of phenol found in grapes which can act against heart diseases and cancer [64].

In Ayurveda, honey can be used both internally and externally. Honey is majorly used for the treatment of worm infestation, wound healing, leprosy, vomiting, diabetes, etc. The major components of honey include fructose, glucose, water, and maltose. The small amount of other higher carbohydrates, sucrose, minerals, vitamins, and enzymes is also present in honey which contributes to its medicinal properties [65].

VIDANGARISHTA

Vidangarishta is an ayurvedic vermifuge produced by the anaerobic activity of microorganisms. It has rich antibacterial and anthelmintic activities and helps the patient to enhance their health. Parasitic infections lead to loss of appetite, anemia, blotting, etc. [66]. Administration of vidangarishta helps to treat urinary disorders, appetite problems, prostate enlargement, and skin disorders. The major ingredients constitute vidanga, kutajtwak, pippali, Amalaki, rasna, alavaluka, indrajav, Madhu (honey), dhataki etc. The name of the arishta is based on the major ingredient in the formulation, that is, vidanga (False Black Pepper) and dhataki flowers incorporate wild *Saccharomyces cerevisiae* spores [Table 3].

Preparation: The following ingredients are prepared into a decoction in 2048 parts of water. It is reduced to its 1/4th volume and allowed to cool and filtered.

Once the decoction is filtered, the following ingredients are added while it is slightly warm.

After the addition, the contents are mixed well in a clay-smeared cloth and allowed to ferment for a month. The so-obtained vidangarishta

Table 1: Composition of chandanasava

Ingredient	Scientific name	Plant part	Composition (g)
Chandanam	<i>Santalum album</i> L.	Wood	120
Hriberam	<i>Plectranthus</i> <i>vettiveroides</i>	Root	120
Musta	<i>Cyperus</i> <i>rotundus</i> L.	Tuber	120
Kasmari	<i>Gmelina arborea</i> <i>Roxb.</i>	Wood	120
Indivara	<i>Monochoria</i> <i>vaginalis</i> C	Tuber	120
Priyangu	<i>Callicarpa</i> <i>macrophylla</i>	Flower	120
Padmaka	<i>Prunus</i> <i>cerosoides</i>	Wood	120
Lodhra	<i>Symplocos</i> <i>cochinchinensis</i>	Bark	120
Manjista	<i>Rubia cordifolia</i>	Tuber	120
Rakthachandana	<i>Pterocarpus</i> <i>santalinus</i> L.	Wood	120
Patha	<i>Cyclea peltata</i>	Tuber	120
Bhunimba	<i>Andrographis</i> <i>paniculata</i>	Whole plant	120
Vatha	<i>Ficus</i> <i>benghalensis</i> L.	Bark	120
Pippla	<i>Ficus religiosa</i> L.	Bark	120
Sathi	<i>Karmpferia</i> <i>galanga</i> L.	Tuber	120
Parpata	<i>Hedyotis</i> <i>corymbosa</i> L.	Whole plant	120
Madhuca	<i>Glycyrrhiza</i> <i>glabra</i> L.	Rhizome	120
Rasna	<i>Alpinia galanga</i> Wild.	Tuber	120
Patola	<i>Trichosanthes</i> <i>lobata</i> Rox	Stem	120
Kanchanara	<i>Bauhinia</i> <i>variegata</i> L.	Bark	120
Amra	<i>Mangifera indica</i> L.	Bark	120
Mocarasa	<i>Bombax ceiba</i> L.	Gum	120
Mridvika	<i>Vitis vinifera</i> L.	Fruit	2400
Guda	Jaggery		6000
Dhataki	<i>Woodfodia</i> <i>fruticosa</i> Kurz	Flower	1800
	Sugar		9000
	Water		70L

Table 2: Changes in organoleptic characters of Chandanasava during fermentation

Color	Smell	Touch	Taste
Brown	Herbal	Watery	Sweet/Slightly bitter
Brown	Slightly alcoholic	Watery	Astringent/Bitter
Brown	Slightly alcoholic	Watery	Astringent/Bitter
Dark Brown	Alcoholic	Watery	Astringent/Bitter
Dark Brown	Alcoholic	Watery	Astringent
Dark Brown	Alcoholic	Watery	Astringent
Dark Brown	Fragrant	Watery	Astringent
Dark Brown	Fragrant	Watery	Astringent

is filtered and preserved in food-grade bottles for medicinal consumption [67] [Table 4].

According to Ayurveda, all the organisms ranging from microscopic size to macroscopic size are termed Krimi. Such infections lead to epigastric pain, diarrhea, and periumbilical pain. Prolonged helminthic infections lead to skin disorders, anemia, weakness, perianal dermatitis, and

Table 3: Ingredient of Vidangarishta added in the initial step

Ingredient	Quantity
Vaividang (False Pepper)	5 parts
Piplamool (Long Pepper)	5 Parts
Rasna	5 parts
Indrayava	5 parts
Patha	5 parts
Elachi	5 parts
Amalakki (Indian Gooseberry)	5 parts

Table 4: Ingredients of Vidangarishta were added in the later stage of preparation

Ingredient	Quantity
Shahad (Honey)	300 Parts
Trikatu Churna	24 Parts
Dhataki flower	20
<i>Dalchini</i> (Cinnamon)	2
<i>Elachi</i> (cardamon)	2
<i>Tejapata</i> (Indian Bay Leaf)	2
Priyangu flowers (<i>Callicarpa macrophylla</i>)	1
<i>Kachanar-Bauhinia variegata</i> Bark	1
<i>Lodhra-Symplocos racemosa</i>	1

malnutrition [68]. Administration of 10–30 ml of Vidangarishta twice daily for a month can eliminate the nematodes from the gut region. It can cure acute or chronic infections, therefore, is considered a good vermifuge. Vidangarishta is also administered for treating renal calculi, torticollis, cervical lymphadenitis, loss of appetite, urinary disorders, fistula-in any, and abscess [69].

False pepper is scientifically known as *Embelia ribes*, which is recognized by the Medical Board Government of India for its medicinal purpose [70]. *E. ribes* has rich antibacterial properties that heal abdominal discomforts. Its biochemical property of the herb also soothes a sore throat, mouth ulcers, and fungus infections, and has antioxidant properties. The active component present in the plant is known as embelin which appears as golden yellow needles and exhibits anthelmintic, anti-diabetic, as well as antioxidant properties [71].

The large woody root of *Piper longum* has certain phytochemicals such as norcepharodione and piperolactam that treats bloating and induce appetite [72]. The presence of piperine alkaloid improves the action against bacteria and exhibits hepatoprotective property [73].

Certain parts of the intestines are heavily controlled by nerves. This neurological action is enhanced by Rasna. Pluchine is one of the biologically active components of the herb that acts against bacteria and relieves the consumer from the problem of constipation and digestive problems [74].

Around 2% of the alkaloid present in the bark of *Holarrhena antidysenterica* blocks Ca²⁺ channels and activates histamine receptors. This phytochemical action of the herb treats several gut-related ailments such as diarrhea, constipation, appetite loss, and so on [75]. Calcium channel blocking activity makes the herb a potent anthelmintic agent which is enhanced by conanines, 3-aminopregnans, and its derivatives [76]. The antibacterial action is delivered by conessine, the bioactive compound of the ingredient [77].

Amla, aka Indian Gooseberry, is known for its immunity boosting and as well as antioxidant activity. The extract of the fruit reinforces γ -IFN production and inhibits the immunosuppression [78]. The phytochemicals such as tannins, flavonoids, alkaloids, and polyphenols relieve the problem of anemia, bacterial infection, hemorrhoids, loose stools, and constipation. When used with honey, the fruit extract gives good vermifuge action [79].

Natural sweetener, honey is used as a sweetening agent in Vidangarishta. Honey has a broad range of antimicrobial action [80] and exhibits preserving action. The presence of phenols inhibits oxidative stress in the body [81]. A unique feature of honey is known for its therapeutic enhancement; that is, it conjugates with drug molecules and improves its medical action [65].

CONCLUSION

Ayurvedic fermented formulations are prescribed effectively in the classics of Ayurveda. Being a fermented product they exert therapeutical properties, presence of multiple components sums up the interaction with the human body. The phytoconstituents present in the formulations vary greatly and depend on the factors that influence the preparation process. Understanding the effect of the factors and their therapeutical role will help in optimising such products. The therapeutic action of fermentative formulations could be understood by experimental evidence and may build confidence in this new research field.

CONFLICTS OF INTERESTS

There are no conflicts of interest.

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