

Sandhankalpana- An Ayurvedic Overview**Vd. Riyazuddin Siddiqui**

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Abstract

Ayurveda is a traditional Indian medicinal system being practiced for thousands of years. More than 1,200 species of plants, nearly 100 minerals and over 100 animal products comprise the Ayurvedic Pharmacopoeia. Asava and Arishta are unique dosage forms discovered by Ayurveda having indefinite shelf life and it was said that the "older the better it is". Because this dosage form has an inherent attribute of continuous hydro-alcoholic extraction and probably formation of natural analogues of the chemical compounds present in the medicinal plants. The main objective of this paper is to document this knowledge available in the traditional literature as well as from the traditional practices, bring out the technological details, analyze and list out their medical applications.

Key words : Asava, Arishta, Fermentation, Preparation.

Introduction

Ayurveda is considered by many scientists to be the oldest healing science. In Sanskrit, Ayurveda means "The Science of Life". Ayurvedic knowledge originated in India more than 5,000 years ago and is often called the "Mother of All Healing"^[1]. Ayurveda translates into *knowledge (Veda) of life (Ayur)* and is one of the oldest and still widely practiced medical systems in the Indian subcontinent^[2]. The concept of Ayurvedic medicine is to promote health, rather than to fight disease, and Ayurveda in daily life aims at maintaining harmony between nature and the "individual" to ensure optimal health.

Ayurveda contains 8 branches of sciences and 10 different diagnostic tools based on *tridosha* theory (three humours of body). Ayurveda comprises of various types of medicines including the fermented forms namely *arishtas* (fermented decoctions) and *asavas* (fermented infusions). These are regarded as valuable therapeutics due to their efficacy and desirable features.

Asava-arishta is a novel yet least exploited continuous hydro-alcoholic extraction method, being traditionally used in Ayurveda. This advanced dosage form probably results into transformation of several phytochemical compounds present in the herbs used to prepare it and thereby either rendering them less toxic or more potent, besides helping in their faster absorption^[3]. *Arishtas* and *asavas* are self-generated herbal fermentations of traditional Ayurvedic system. They are alcoholic medicaments prepared by allowing the herbal juices or their decoctions to undergo fermentation with the addition of sugars. *Arishtas* are made with decoctions of herbs in boiling water while *asavas* are prepared by directly using fresh herbal juices^[4-9]. Fermentation of

both preparations is taken place by the addition of a source of sugar with *dhataki* (*Woodfordia fruticosa* Kurz) flowers. Many preparations contain additional spices for improving their assimilation. They are moderately alcoholic (up to 12% by volume) and sweetish with slight acidity and agreeable aroma. Presence of alcohol in the preparation shows several advantages, like better keeping quality, enhanced therapeutic properties, improvement in the efficiency of extraction of drug molecules from the herbs and improvement in drug delivery into the human body sites^[10]. Indian Ayurvedic literature that included arishta and asava are Charaka Samhita, Sushruta Samhita, Astanga Hridaya, Bhaishajya Ratnavali, Arsashikitsa, Sagasrayogam, Chikitsasthanam, Yogaratnagaram, Asavarishtasangraham, How shathagunasangraham and Astangasangraham.

Preparation Of Arishta And Asava

This method of preparing asava arishtas is known as sandhana kalpana in Ayurveda. General Methods used in the Extraction of Medicinal Plants in asava and arishta are infusion and decoction.

Decoction :

In this process, the crude drug is boiled in a specified volume of water for a defined time; it is then cooled and strained or filtered. This procedure is suitable for extracting water-soluble, heat-stable constituents. This process is typically used in preparation of Ayurvedic extracts called "quath" or "kawath". The starting ratio of crude drug to water is fixed, e.g. 1:4 or 1:16. The volume is then brought down to one-fourth its original volume by boiling during the extraction procedure. Then, the concentrated extract is filtered and used as such or processed further.

Infusion :

Fresh infusions are prepared by macerating the crude drug for a short period of time with cold or boiling water. These are dilute solutions of the readily soluble constituents of crude drugs. The basic equipment required for preparation of arishta and asava an earthen pot sufficiently large and glazed, porcelain jar of suitable size; a lid to close the vessel, a cloth ribbon to seal the vessel; a paddle like stirrer; a clean cloth of fine and strong texture for filtering, vessel to keep the juices or boil the drugs The major components are divided into 4 types according to their specific role in the process These include: the main herbs from which the extract or decoction is taken out. They yield drugs, which are pharmacologically and therapeutically much important in the given medicine and the name of the medicine is derived from these herbs denoting their importance. The flavouring agents used in asava and arishta not only contributing to the flavour of the medicine but having their own pharmacological action too. The fermentation initiator provides inoculum for the fermentation to start. The medium of sugars is required for fermentation. In Asokarishta, the main herb is asoka (*Saraca asoca* De Wilde) Other components which contribute for flavours are *Cuminum cyminum* L., *Santalum album* L. and *Zingiber officinale* Roscoe. *Woodfordia fruticosa*(L.) Kurz as fermentation initiator and jaggery as a source of sugar are also present. Similarly in Kanakasava, Kanaka (*Datura metel* L.) is the main herb while *Piper longum* L. and *Zingiber officinale* Roscoe contribute for flavor

Woodfordia fruticosa are mostly used in asava and aishtha. Although all parts of this plant possess valuable medicinal properties, there is a heavy demand for the flowers, both in domestic and international markets specialized in the preparation of herbal medicines. According to the Indian Systems of Medicine, this flower is pungent, acrid, cooling, toxic, alexiteric, uterine sedative, and anthelmintic, and is useful in thirst, dysentery, leprosy, erysipelas, blood diseases, leucorrhoea, menorrhagia and toothache

Collection Of Plant Material And Preparation Before Fermentation

Medicinal substances such as roots, leaves or barks, etc. are cut into pieces, and powdered or decoction The basic drugs from which the extract is to be prepared are first cleaned and rinsed in water to get rid of dirt. In the case of fresh plants, they are cleaned, pulverized and pressed for collection of juice. If the drug is dry and to be used in the preparation of asava, it is coarsely crushed and added to water to which the prescribed quantities of

honey or sugar are added. If it is an *arishta*, a decoction is obtained by boiling the drugs in the specified volume of water as given in the recipe. The water used should be clean, clear and potable When the extracts are obtained, the sugar (cane sugar), jaggery/or honey are added and completely dissolved. The sugar, jaggery and honey should be pure. The jaggery to be added should be very old (*prapurana*) because fresh jaggery aggravates *kapha* and suppresses the power of digestion The flavouring agents are coarsely powdered and added to the sweetened extract. Very fine powder of the flavouring agent is undesirable as it causes sedimentation in the prepared medicine and its filtration is difficult. In *asavas*, the *avapa* (drugs which are added in powder form at the end) should be one in tenth in quantity and honey should be three fourth in quantity of jaggery. The earthen pot or jar intended for fermenting the medicine is tested for weak spots and cracks and similarly a lid is also chosen It should be prepared of the soft mud collected from the silt in the bank of river or lake. It should be greasy, thick, light and smooth. It should be free from holes or cracks and homogenous. Echo should come out from inside of this jar. Its circumference in the middle should be 42 *angulas* (1 *angula* = $\frac{3}{4}$ inches) and its height should be 43 *angulas*. Its wall should be one *angula* in thickness and compact. In shape (pot shape), it should be like the fruit of *bakula* (*Mimusops elengi* L.) [8]. The internal surfaces of the pot and the lid are wiped with a clean dry cloth and cow's ghee is smeared on this surface to prevent oozing out of the contents.

The pot should be perfectly dry before ghee is smeared and if it be moist, ghee will not stick, penetrate and block the pores. The infiltration of the pot besides preventing oozing strengthens the pot also. Glazed porcelain ware may also be used instead of earthen ware In large scale, the fermentation is carried out in huge wooden vats with wooden covers. The vat is made air tight. The filtration is carried out by electric filter presses with filter sheets which efficiently separate the suspended particles and isolate clear medicine. The powdering, grinding and mixing are done by mills, pulverizers and mixing machines. The decoctions are prepared in large steam jacketed boilers, heated by superheated steam under pressure

Inoculum

When the pot or the jar is ready, the sweetened and flavoured drug extract is poured into pot, up to three fourth of the capacity. The unfilled space provides room for the fermenting liquid when it rises up due to frothing and evolving of a large

amount of gases. Otherwise, the medium may damage the container and flow out. Then, the inoculum has to be added to initiate fermentation. The process of fermentation necessitates the presence of fermenting microorganisms, yeasts. In the preparation of alcoholic medicaments in the Ayurvedic Systems, the inoculum of yeasts comes from the dhataki flowers, which contain the wild species of yeast. These flowers are nectariferous and highly tanniferous. The flowers contain the yeast spores in the dry nectariferous region. The presence of tannin in flowers favours suitable environment for yeast growth. The flowers are added and the contents are stirred well to distribute the inoculum of yeast. Apart from the fire flame flowers (dhataki), if other ingredients like honey and resins (gum) are added

they also contain wild yeasts. When fire flame flowers are not used in some preparations, the inoculum of yeasts is done either from the mahua (*Madhuca longifolia* Macbr.) flowers, honey or resins initiating the process of fermentation. The yeasts multiply rapidly by division in a short time. Finally, the vessel should be closed and sealed. Sealing is done by winding around a long ribbon of cloth smeared with clay on one surface. While sealing, the blank surface of the ribbon should line the rim of the vessel and lid, the clay side should be external. After sealing, the vessel is placed in a dark place without much circulation of air. It may be kept in a grain store buried in a heap of grain or into a pit in the soil. Soft packing of straw should be provided around the vessel to prevent breakage by any force

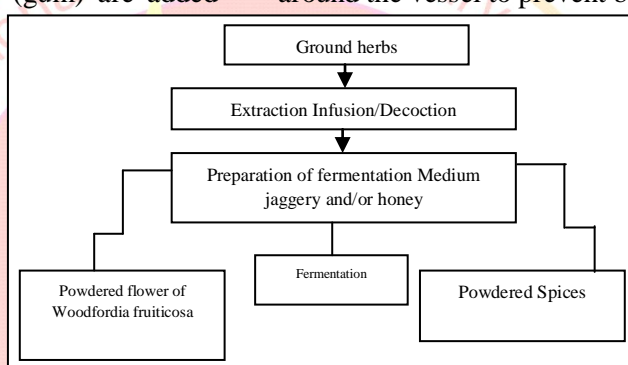


Fig. No. 1 : Schematic representation of asava/ arishta preparation (3)

Fermentation Process

During autumn and summer seasons, fermentation takes place in 6 days. In winter, it takes 10 days. During rainy season and spring, fermentation takes place in 8 days. The fermentation vessel is left undisturbed for a month and then opened. The medicine is filtered and taken for use. If the filtered medicine shows further sedimentation, it is allowed to stand for few more days and again filtered to separate the sediment. In the usual practice, 7-10 days are enough in the hot tropical climate and the long period of 30 days is allowed in cool temperature climate when biological activity is at its low. In old practices, performing fermentation in a heap of whole grain of that season was indicated. A crude match-box method is applied to check whether fermentation has occurred. This method depends upon the release of carbon dioxide during the process. The major role in this dosage form is played by *Woodfordia fruticosa*, which is used as inoculum for fermentation but appears to play a role beyond that

Transformation of chemical compounds during self fermentation

Fermentation processes help in rupturing of cells of the herbs and expose its contents to the bacteria and enzymes for transformation. Fermentation also creates active transport system with dissolved constituents from the herbal material. There are claims that yeast cell walls naturally bind heavy metals and pesticide residues and act as natural cleaning system, making self-fermentation of herbal products safer than powder decoctions

Merits of the Fermentation Process

Prahst has mentioned some of the benefits of fermented herbal products which are summarized below:

1. Fermentation removes most of the undesirable sugars from plant material, makes the product more bio-available and eliminates side effects such as gas and bloating.
2. Fermentation extracts a wider range of active ingredients from the herb than any extraction method since the menstruum undergoes a gradient of rising alcohol levels.

3. Yeast cell walls naturally bind heavy metals and pesticide residues and, therefore, act as a natural cleansing system.
4. Fermentation not only removes contaminants, it can also lower the toxicity of some of the toxic components in plants.
5. Fermentation actively ruptures the cells of the herb, exposing it openly to the menstruum and bacteria have enzymes that break down cell walls to further assist in the leaching process. Fermentation also creates an active transport system that moves the dissolved constituents from the herbal material to the menstruum

Conclusion

Arishta and asava are considered as best formulation in Ayurveda because they possess better keeping quality, which is likely due to the contribution of fermentation to preservation. The microbes involved in this process mediate this process; enhanced therapeutic properties, which may be due to the microbial biotransformation of the initial ingredients of *arishta* and *asava* into more effective therapeutics as end products, alcohol-aqueous milieu, which is also produced by microbes; improvement in drug delivery in the body is also increases due to alcohol-aqueous milieu. These products in general possess preservative properties, potentiation of drug due to biotransformation mediated by native microbes.

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