

REVIEW ARTICLE

Traditional Fermented Formulations – Asava and Arishta

B. N. Nandre*, S. R. Bakliwal, B. R. Rane, S. P. Pawar

Department of pharmaceuticals, P.S.G.V.P.M's College of Pharmacy, Shahada, Dist – Nandurbar, Maharashtra-425409, India

Received 18 Sep 2012; Revised 05 Dec 2012; Accepted 13 Dec 2012

ABSTRACT

Ayurved has a long and strong heritage use of poly herbal drugs and formulations to treat various diseases. It comprises various types of medicines including fermented forms, namely asavas and arishta. They are alcoholic medicaments prepared by allowing the herbal juices or their decoctions to undergo fermentation with the addition of sugars. Asava and arishta are very popular forms of ayurvedic system of medicine because of certain special properties which make them more beneficial than other preparations. They are effective, palatable, stable and most importantly they have no any side effects. The present paper gives an account of update information about asava and arishtas, different methods that are use for the extraction of herbal drug for the preparation of asavarishta, their method of preparation, shelf life of formulation, different advantages of fermentation process and design of fermenter required for preparation of asavarishta. Most importantly, this paper also includes that, asava arishta can also helpful for the diabetic patients by addition of very less quantity of sugar (1-3%).

Key words: Asava-Arishta, fermentation, extraction, ayurveda, herbal drugs.

INTRODUCTION

The word 'Ayurveda' is composed of two parts *Ayur* (Life) and *Veda* (knowledge). The origin of this science of life indeed difficult to pinpoint, it have been placed by scholars of Ayurveda and ancient Indian literature at somewhere around 6000 BC [1]. Traditional medicines have nurtured the knowledge of natural remedies against disease since ages. Ayurved has a long and strong heritage of use of poly herbal drugs and formulations to treat various diseases [2]. 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 [3].

Ayurvedic medicine as define in the drugs and cosmetic act 1940, includes all medicines intended for internal or external use, for or in the diagnosis, treatment, or prevention of diseases or disorders in human being or animal and manufactured in accordance with the formulae describe in the authoritative books of ayurvedic system of

medicine specified in the first schedule of the act [4].

Arishtas are made with decoctions of herbs in boiling water while asavas are prepared by directly using fresh herbal juices. These are unique liquid dosage form that contains self generated alcohol. Arishtas are classical Ayurvedic preparations typically used as digestive and cardiogenic [5]. Arishta (fermented decoction) and Asava (fermented infusion) are considered as a unique and valuable therapeutics in ayurveda, due to their medicinal value, sweet taste and easy availability. People are prone to consume higher dosage of these drugs for longer periods. The manufacturer and sell of arishtas and asavas occupies an important place in the ayurvedic pharmaceutical industry.

The Common Arishtas and Asavas described in Sahasra Yoga Test Book

1. Dasamoolarishtam
2. Amrutharishtam
3. Kutajarishtam
4. Draaksharishtam
5. Abhajarishtam
6. Balarishtam
7. Devadaarvarishtam

8. Asokaarishtam
9. Jeerakaarishtam
10. Khadirashtam
11. Karpoorasavam
12. Pippalyaaadi asavam
13. Punarnavaasavam
14. Usiraashtam
15. Aravindaarishtam
16. Patrangaasavam^[6]

METHODS USE FOR EXTRACTION OF HERBAL DRUG FOR PREPARATION OF ASAVARISHTA^[7]:

Extraction (as the term is pharmaceutically used) is the separation of medicinally active portions of plant (and animal) tissues using selective solvents through standard procedures. Such extraction techniques separate the soluble plant metabolites and leave behind the insoluble cellular marc. The purposes of standardized extraction procedures for crude drugs are to attain the therapeutically desired portion and to eliminate the inert material by treatment with a selective solvent known as menstrum. The extract thus obtained may be ready for use as a medicinal agent in the form of tinctures and fluid extracts, it may be further processed to be incorporated in any dosage form such as tablets or capsules.

Parameters for Selecting an Appropriate Extraction Method

- i) Authentication of plant material should be done before performing extraction. Any foreign matter should be completely eliminated.
- ii) Use the right plant part and, for quality control purposes, record the age of plant and the time, season and place of collection.
- iii) Conditions used for drying the plant material largely depend on the nature of its chemical constituents. Hot or cold blowing air flow for drying is generally preferred. If a crude drug with high moisture content is to be used for extraction, suitable weight corrections should be incorporated.
- iv) Grinding methods should be specified and techniques that generate heat should be avoided as much as possible.
- v) Powdered plant material should be passed through suitable sieves to get the required particles of uniform size.
- vi) Nature of constituents:
 - a) If the therapeutic value lies in non-polar constituents, a non-polar solvent may be used. For example, lupeol is the active constituent of *Crataeva nurvala* and, for its extraction, hexane is generally used. Likewise, for plants like *Bacopa*

monnieri and *Centella asiatica*, the active constituents are glycosides and hence a polar solvent like aqueous methanol may be used.

b) If the constituents are thermo labile, extraction methods like cold maceration, percolation and CCE are preferred. For thermo stable constituents, Soxhlet extraction (if nonaqueous solvents are used) and decoction (if water is the menstrum) are useful.

c) Suitable precautions should be taken when dealing with constituents that degrade while being kept in organic solvents, e.g: flavonoids and phenyl propanoids.

d) In case of hot extraction, higher than required temperature should be avoided. Some glycosides are likely to break upon continuous exposure to higher temperature.

e) Standardization of time of extraction is important, as:

- Insufficient time means incomplete extraction.
- If the extraction time is longer, unwanted constituents may also be extracted. For example, if tea is boiled for too long, tannins are extracted which impart astringency to the final preparation.

f) The number of extractions required for complete extraction is as important as the duration of each extraction.

vii) The quality of water or menstrum used should be specified and controlled.

viii) Concentration and drying procedures should ensure the safety and stability of the active constituents. Drying under reduced pressure (e.g. using a Rotavapor) is widely used. Lyophilization, although expensive, is increasingly employed.

ix) The design and material of fabrication of the extractor are also to be taken into consideration.

x) Analytical parameters of the final extract, such as TLC and HPLC fingerprints, should be documented to monitor the quality of different batches of the extracts.

Decoction

Of the traditional methods of extraction of medicinal plant material for making an aqueous extract, decoction is one of the most described. Decoction is a water-based preparation to extract active compounds from medicinal plant materials. In this process, the liquid preparation is made by boiling the plant material with water. Decoction differs from infusion in that the latter is not actively boiled. Decoction is the method of choice when working with tough and fibrous plants, barks and roots and with plants that have water-soluble chemicals. The plant material is generally broken into small pieces or powdered. Different

methods have been described for the preparation of decoctions. In the Ayurvedic method, traditionally known as kwatha, the crude drug in form of yavakuta (small pieces) is placed in earthen pots or tinned copper vessels with clay on the outside. Water is added and the pot is heated on a fire. If the material is soft, four times water is used per 1 part drug; if the drug is moderately hard, eight times water is used and if the drug is very hard, sixteen times water is recommended. The mixture is then boiled on low flame until it is reduced to one-fourth starting volume, in case of soft drugs, and one-eighth in case of moderately or very hard drugs. The extract is then cooled and strained, and the filtrate is collected in clean vessels.

Choice of Solvent ^[8]

The following factors should be considered in selecting a solvent for commercial use:

- *Solvent power (selectivity)*. Only the active, desired constituents should be extracted from the plant material, which means that a high selectivity is required.
- *Boiling temperature*. The boiling point of the solvent is as low as possible in order to facilitate removal of the solvent from the product.
- *Reactivity*. The solvent should not react chemically with the extract, nor should it readily decompose.
- *Viscosity*. A low viscosity of the solvent leads to low pressure drop and good heat and mass transfer.
- *Safety*. The solvent should be non-flammable and non-corrosive, and should not present a toxic hazard; its disposal should not imperil the environment.
- *Cost*. The solvent should be readily available at low cost.
- *Vapor pressure*. To prevent loss of solvent by evaporation, a low vapor pressure at operating temperature is required.
- *Recovery*. The solvent has to be separated easily from the extract to produce a solvent-free extract.

Maceration processes (steady-state extraction)

General Procedure -

The general process of maceration on a small scale consists of placing the suitably crushed plant material, or a moderately coarse powder made from it, in a closed vessel and adding the selected solvent called menstrum. The system is allowed to stand for seven days, with occasional shaking. The liquid is then strained off and the solid residue, called marc, is pressed to recover as much occluded solution as possible. The strained and

expressed liquid thus obtained is mixed and clarified by filtration. Plant material in fine powder form is never used, as it makes subsequent clarification of the extract difficult. In the case of vegetable drugs, sufficient time is allowed for the menstrum to diffuse through the cell wall to solubilize the constituents within the cells and for the resulting solution to diffuse out. As the system is static, except for occasional shaking, the process of extraction works by molecular diffusion, which is very slow. Occasional shaking assists diffusion and also ensures dispersal of the concentrated solution accumulating around the surface of the particles, thereby bringing fresh menstrum to the particle surface for further extraction. A closed vessel is used to prevent evaporation of the menstrum during the extraction period and thus avoids batch to batch variation.

At the end of the maceration process, when equilibrium has been reached, the solution is filtered through a cloth; the marc may be strained through a special press. The concentrations of active constituents in the strained and expressed liquids, sometimes called *miscella*, are the same and hence they can be combined. The expressed liquid may be cloudy with colloidal and small particles, and sufficient time (perhaps several weeks) is necessary for coagulation and settling. The settled matter is filtered through a filter press or any other suitable equipment.

METHOD OF PREPARATION OF ARISHTA

The basic equipment required for the preparation of Arishta are – earthen pot, sufficiently large and strong with a glazed exterior or glaze, porcelain jar of suitable size, a lid of correct size 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, a vessel for boil the drugs. The major components are divided into four types according to their specific role in the process. This includes – the main herb from which decoction is taken out as the case may be. They yield drugs which are pharmacologically and therapeutically much important in the given medicine and the name of these medicines is derived from these herbs denoting their importance. The flavoring agents are herbs besides contributing to the flavor of the medicine have their own pharmacological action too. The fermentation initiator provides inoculums for the fermentation to start. The medium of sugar is required for fermentation ^[9].

The basic drugs from which the extract is to be prepared are first clean and rinsed with water to get rid of dirt. In the case of fresh plant they are

cleaned, pulverized and pressed for collection of juice. If the drug is dry and is to be used in the preparation of asava, it is coarsely crushed and added to the water to which the prescribed quantities of honey, jaggery or sugar are added. If it is an Arishta, a decoction is obtained by boiling the drugs in the specified volume of water. The water used should be clean, clear and potable.

When the extract is obtained, the sugar, jaggery and or honey are added and completely dissolved. Sometimes any one or more of these sugary substances omitted if so directed in the recipe. In the case of sugar, it should be pure, white cane sugar. The jiggery should be of sweet taste and at least one year old. The honey should be genuine. The flavoring agents are coarsely powdered and added to the sweetened extract. Too fine a powdered of the flavoring agent is undesirable as it causes sedimentation in the prepared medicine and its filtration is difficult.

The earthen pot intended for keeping the medicine to ferment is tested for the weak spots and cracks and similarly a lid is also chosen. The internal surfaces of the pot and the lid are wiped with the clean dry cloth and cow's ghee is smeared to surface to prevent oozing out of the contents when poured and kept for fermentation. The pot should be perfectly before ghee is smeared and if it be moist ghee will not stick and penetrate the pours.

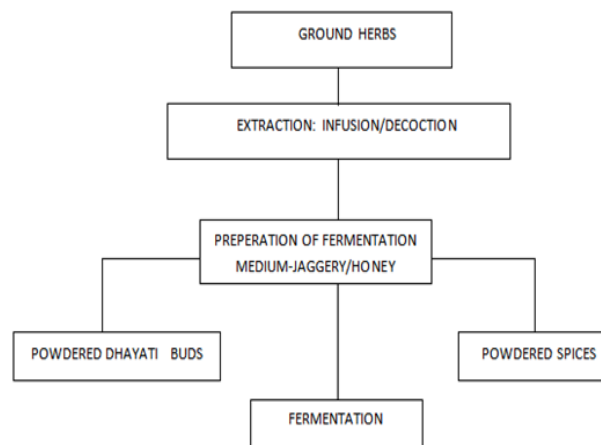
When the pot or the jar is ready, the sweetened and flavored drug extract is poured into it up to of the capacity. This unfilled space provides room for the fermenting liquid when it rises up frothing and evolving a large amount of gases. Otherwise the medium may damage the container and flow out.

Now the inoculum is to be added to initiate fermentation. As we know the process of fermentation necessitates the presence of fermenting microorganisms known as yeast. In the preparation of alcoholic medicaments in the ayurvedic systems, the inoculums of yeast come from the flowers which contain the wild species of yeast.

Finally the vessel is closed and sealed. Sealing is done by winding around a long ribbon of cloth smeared with clay on one surface. When sealing the blank surface of the ribbon should line the rim of the vessel and lid and the clay side should be external. After sealing, the vessel is placed in a dark place without much circulation of air.

The vessel is left undisturbed for a month and then opened. The medicine is filtered and taken for use^[10].

FERMENTATION METHOD^[11]:



THE FERMENTATION PROCESS^[12]:

During autumn and summer season, fermentation takes place in 6 days. In winter, it takes 8 days. The fermentation vessel is left undisturbed for a month and then opened. The medicine is filtered and takes for use. The medicine is then 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.

THE DESIGN OF FERMENTER^[13]:

Fermenters are designed to produce the best possible growth and biosynthesis conditions and should allow ease of manipulations for all operations associated with the use of fermenters. The large vessels called fermenters or bioreactors are used which have capacity to hold thousand liters of batch. These vessels must be strong enough to withstand the pressures of large volumes of aqueous medium. It should not get corroded by and nor deposit toxic ions in the product. Growth of containing microorganisms should be prevented or controlled.

There should be stirring arrangement in the fermentation tank as the carbon dioxide is expelled from the microbial metabolism from the product. There should be additional innoculum or seed tanks in which innoculum is produced and directly added to fermenters in order to avoid contamination problems. There must be a drain in the bottom of fermenter or some mechanism for removal of completed fermentation product from the tank. Head space plays an important role in foam control. The working volume must be reduced to facilitate better foam control. Due to large headspace volume, there is a tendency of

foam to collapse under its own weight. The actual operating volume in a fermenter should be always less than that of total volume as head space must be left at the top of fermenter above the liquid medium to allow for splashing, foaming and aeration of liquid. Usually one fourth volume of fermenter is left for the head space. The covers of fermenter should be dome shaped.

SHELF LIFE OF DOSAGE FORMS ^[14]

Sarngadhara Samhita gave the shelf life of various dosage forms. In ancient times, Ayurvedic physicians themselves prepared the recipes for patients. During the fourteenth century AD, they became aware of the problem of poor shelf life of the botanicals in some dosage forms, such as powder and decoction. This led to the discovery of novel dosage forms termed *asava* and *arishtas*, which are self-fermented preparations having approximately 10%-12% alcohol. These are similar to medicated wines. In the preparation of *asava* cold infusion of unprocessed plant material is used, whereas for the preparation of *arishta* decoction of the plant material is used for fermentation.

MERITS OF THE FERMENTATION PROCESS ^[15]

Prahst has mentioned some of the benefits of fermented herbal products which are reproduced 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 menstrum 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. Not only does fermentation remove 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 menstrum 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 menstrum.

DIFFERENT PARAMETERS OF STANDARDIZATION OF ASAVA ARISHTA

It generally involves the following parameters:

1. Organoleptic Parameters ^[16,17] – it generally includes
 - a) Colour of sample
 - b) Odor of sample
 - c) Taste of sample
 - d) Determination of pH of sample
2. Physical Parameters ^{[16,17]:} These parameters are for standardization of drug material
 - a) Determination of foreign organic matter
 - b) Determination of ash value
Total ash value
Acid insoluble ash
Water soluble ash
Sulphated ash
 - c) Determination of extractive value
Alcohol soluble extractive value
Water soluble extractive value
 - d) Determination of moisture content
 - e) Determination of physical constant
Melting point
Boiling point
Refractive index
Optical rotation
 - f) Determination of specific gravity
 - g) Determination of solid content
 - h) Determination of alcohol content
3. Chemical parameters ^[18] – following parameters involves in chemical evaluation like
 - a) Alkaloids – Dragandroffs test
 - b) Glycosides – Molish test
 - c) Flavonoids – Shinoda test
 - d) Phenolic – Lead acetate test
 - e) Tannins – Ferric chloride test
 - f) Steroids – Salkowski reaction
 - g) Amino acids – Ninhydrine test
 - h) Carbohydrates – Fehling's test, Benedict test
4. Toxicological parameters – It involves following parameters
 - a) Pesticides residue
 - b) Heavy metal
 - c) Microbial contamination

ASAVA AND ARISHTA FOR DIEBETIC PATIENT ^{[19]:}

The invention provides a synergistic oral liquid herbal composition falling under the category of “Asavas” and “Arishtas”, useful for management of diabetes, said composition comprising a therapeutically effective amount of plant extracts,

self-generated ethanol to the extent of 7 to 12% v/v and having not more than 1 to 3% w/w of sugar content. This invention also provides a novel method for the manufacture of herbal compositions in liquid oral dosage form containing a limited amount of self generated ethanol. This process facilitates the production of fermented liquid orals virtually free from sugar and hence provides benefits to the large segment of population suffering from Diabetes. The invention also relates to the unique herbal composition for reducing the blood sugar levels in the mammals especially humans suffering from diabetes.

CONCLUSION

Asava and Arishta are very popular forms of ayurvedic system of medicine because of certain special properties which make them more beneficial than other preparations. These are nothing but the fermented syrups. These are the oral ayurvedic formulations has been use as tonic since many decades. These formulations have been proved its importance and vitality as a tonic in many physiological conditions, so its standardization has its own importance to check many of its properties as an oral formulation for its stability prospective. From the present review, it has been concluded that, asava arishta are best formulations in ayurveda because they posses better keeping quality which is likely due to the contribution of fermentation to preservation.

REFERENCES

1. Sayyad S. F., Randive D. S., Jagtap S. M., Chaudhari S. R. and Panda B. P., Preparation and evaluation of fermented Ayurvedic formulation: Arjunarishta, Journal of Applied Pharmaceutical Science 02 (05); 2012: 122-124.
2. Kulkarni Omkar, Giramkar Shital, Ligade Gauri , Narkhede Aarti, Mukherjee Sourav, Takle Shrikant , Patil Sanjay , Jagtap Suresh, Effect of pre – sterilization on physicochemical parameters and *in vitro* free radical scavenging potential of *Saraswatarishta*, *Journal of Pharmacy Research* 2012,5(5),2657-2663.
3. Mishra AK, Gupta A, Gupta V, Sannd R, Bansal P, Asava and Arishta: An Ayurvedic Medicine – An Overview, International Journal of Pharmaceutical & Biological Archives 2010; 1(1): 24 –30.
4. Handa S. S; Kapoor V. K., Text book of pharmacognosy, second edition 2003, vallabh prakashan, page no. 335 – 336.
5. Sayyad S. F., Randive D. S., Jagtap S. M., Chaudhari S. R. and Panda B. P., Preparation and evaluation of fermented Ayurvedic formulation: Arjunarishta, Journal of Applied Pharmaceutical Science 02 (05); 2012: 122-124.
6. Indian institute of scientific heritage , Trivandrum 695 018, India (0471-2490149) www.iish.org , www.iishglobal.org
7. Sayyad S. F., Randive D. S., Jagtap S. M., Chaudhari S. R. and Panda B. P., Preparation and evaluation of fermented Ayurvedic formulation: Arjunarishta, Journal of Applied Pharmaceutical Science 02 (05); 2012: 122-124.
8. Sayyad S. F., Randive D. S., Jagtap S. M., Chaudhari S. R. and Panda B. P., Preparation and evaluation of fermented Ayurvedic formulation: Arjunarishta, Journal of Applied Pharmaceutical Science 02 (05); 2012: 122-124.
9. Sekhar S. and Mariappan S, Traditionally Fermented Biomedicines Asava and Arishta from Ayurveda, Indian journal of traditional knowledge, vol.7 (4), October 2008, pp.548-556.
10. Sekhar S. and Mariappan S., Traditionally Fermented Biomedicines Asava and Arishta from Ayurveda, Indian journal of traditional knowledge, vol.7 (4), October 2008, pp.548-556.
11. Mulay Sushruta and Khale Anubha, Asavarishtas Through Improved Fermentation Technology, IJPSR (2011), Vol. 2, Issue 6
12. Sekhar S. and Mariappan S., Traditionally Fermented Biomedicines Asava and Arishta from Ayurveda, Indian journal of traditional knowledge, vol.7 (4), October 2008, pp.548-556.
13. Prins A, Van't Riet K: Proteins and surface effects in fermentation: foam, antifoam and mass transfer. Trends in biotechnology.1987;5:296-301:
14. Extraction Technologies for Medicinal and Aromatic Plants, United Nations Industrial Development Organization and the International Centre for Science and High Technology, 2008
15. Extraction Technologies for Medicinal and Aromatic Plants, United Nations Industrial Development Organization and the

- International Centre for Science and High Technology, 2008.
16. Dr. Mukharji P. K., Quality control of herbal drugs, first edition, 2002, published by business horizon pharmaceutical publisher, page no – 183 – 190.
 17. Agrawal S. S; M. Paridhavi, Herbal drug technology, University press, page no – 625 -630.
 18. Khandelwal K. R., Practical Pharmacognosy, Nirali Prakasan, page no. 225 – 226.
 19. Novel herbal composition for diabetes patients and a process for producing the same United States Patent Application 20020025349 Kind Code: A1