WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 14, Issue 1, 361-374. Review Article ISSN 2277–7105

A CRITICAL REVIEW ON THE ROLE OF SANDHANA DRAVYA IN THE PREPARATION OF ASAVA-ARISHTA WITH SPECIAL REFERENCE TO TAKRARISHTA

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Article Received on
07 November 2024,

Revised on 28 Nov. 2024,
Accepted on 17 Dec. 2024

DOI: 10.20959/wjpr20251-35060

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ABSTRACT

Sandhana Kalpana is a unique fermented formulation of *Ayurveda.* If the liquid substances *like sugarcane juice, kashaya* are mixed with *anna, guda, kinva* and kept for some time then this procedure is called *sandhana. Asava* and *Arishtas* are the types of *Sandhana Kalpana, Sandhana kalpana* is also classified as *Madyajanan Sandhana* and *Amlajanan Sandhana*. *Takrarista* mentioned under *Amlajanan Sandhana Kalapna* which is having *takra* as its chief ingredient. It is itself an acid fermented product along with *Prakshepa Dravyas.* The main indications of *Takrarishta* as per the reference are *Grahani Roga, Gulma, Arsha, Shotha, Krumi, Prameha* and *Udara Roga*. This *Anagni Siddha Kalpana* is having properties like *Deepana, Rochona, Varnya, Triptikara* and *Vatanulomana*. However, market samples of *Takrarishta* shows variation in ingredients. Some formulations are found to be containing *Sandhan Dravya* and *Madhura Dravya* while some not. So, in the present study, critical review on the role of *Sandhana Dravya(Dhataki Pushpa)* and *Madhur Dravya*(jaggery and honey) in the preparation of *Takrarista* has been done from various texts and research works.

KEYWORDS: *Sandhana Dravya, Sandhan, Takrarishta, Grahani Roga, Arista.*

INTRODUCTION

Among the basic *Kalpana* described in the science of *Bhaishajya Kalpana, 'Sandhan Kalpana'* is the one. *Sandhan Kalpana* gains significance on the base of its Novel, Oral, Liquid herbal preparation.[1] The liquid dosage form is easier for ingestion and absorption for all the age group patients. When only *Drava Dravya* (liquid)or *Drava Dravya* with *Bheshaj* (Medicinal drugs) or *Anna*(food item) are mixed and put together for sometime to achieve fermentation, are known as *Sandhana.*[20] *Asava* and *Arishtas* are the types of *Sandhan Kalpana. Asava* is prepared without boiling the drug in water. It may be prepared by *Hima Kalpana or Swarasa Kalpana* whereas, *Arishta* is prepared by making use of *Kwath*(decoction). *Arishta* are *Samyog* (Combination) of many *Dravyas* and due to *Samskara* these are having many properties than that of *Asava. Sandhana Kalpana* is also classified as *Madyajanan Sandhan*a and *Shuktajanan Sandhan*a.[3] *Takrarista* is *Shuktajanan*(*Amlajanan) Sandhan Kalpana* which is having *Takra* itself acid fermented product. By the name *'Takrarishta'* it appears as a type of *Arishta Kalpana*. But in the reference, no mention of *Agni sanskara* is found. *Acharya Charaka* was the first person who mentioned *Takrarishta* during this period, as there was no any discrimination between *Asavas* and *Arishtas. Charaka* considered it under *Arishta Kalpana* itself, though it is the fermentation where boiling is not carried out unlike other *Arishtas.* Probably, wider acceptance or consideration of all fermented products with the *Asava* or *Aristha* name would have made them to consider this product also as a kind of *Aristha.* Secondly, possible knowledge of *Takra* itself as a *Sandhita Dravya* (Fermented Product) intended the scholars to call it as *Takrarishta*, as here refermentation of *Takra* was carried along with some other drugs[6] *Shargandhara Acharya* has standardized *Asava-Arista* and classified the formulations accordingly.[2] *Aushadi Drava Dravya, Madhur Dravya*(sweeteners) and *Kaal*(time period, season) are essential factors in the preparation of a *Asava-Arista*. *Sandhan Dravya*(Fermenting agents) and *Praksepa Dravya* are helpful factors for fermentation. Fermentation process can take place even without these substances. However, *Sandhan Dravya* start and accelerate the fermentation process quickly, so they are used exclusively for fermentation.[7]

In the classical reference of *Takrarishta* there is no mention to add *Sandhan Dravya* and *Madhur Dravya*. In market, different brands of *Takrarishta* containing *Sandhan Dravya*(dhataki) and *Madhur Dravya* (jaggery) are found. After adding *Sandhan Dravya(*Dhataaki puspa) and *Madhur Dravya* (jaggery) in the classical takraristha, it would be considered as *Madyajanan sandhan.*[7] It is essential to discover the therapeutic properties

of this formulation for wellbeing of mankind. And also important to find the role of *Sandhan Dravya* and *Madhura Dravya* in *Takrarista.* So in present study, a critical study has been conducted regarded role of *Sandhan Dravya* in *Takrarishta*, Also the necessary physiochemical test for *Asava-Arishta* are also reviewed.

MATERIAL AND METHODS

Definition Of *Sandhana*

When only *Drava Dravya*(liquid) or *Drava Dravya* with *Bheshaj* (Medicinal drugs) or *Anna*(food item) are kept for long time, it is termed as *'Sandhan'*.[20]

Types Of *Sandhan Kalpana*

1. According to *Acharya Sharangdhara - Asavas* and *Aristas.*[2]
2. According to *Dravyagunavigyana Yadavaji –Madyajanan* and *Shuktajanan(Amlajanan)*[3]

Definition Of *Asava*

Asava is prepared in cold water without boiling the drugs.[8]

Defination Of *Arista*

Without spoiling, the formulation which can stay for long period that is called *Arishta.*[14]

Properties Of *Arishta*

1. *Arishta* are *Samyog*(Combination) of many *Dravyas* and due to *Samskara* these are having many properties than that of *Asava*. These are *Doshahara* and having properties like *Deepana, Kapha-Vataghna, Pittarodhaka, Mrudu, Virechana, Shula, Adhmana, Udarroga, Pliha, Jwar, Ajirna, Arsha.*[13]
2. *Arishta* are useful in *Shosha, Arsha, Grahani, Pandu, Aruchi, Jwar, Kaphagna, Deepana* and *Pachana.*[16]

Preparation Of *Asava* And *Arista*[9]

The Basic Equipments Are

1. *Sandhana Patra - Asavariştas* are advised to prepare in earthen pot, and this earthen pot should be sufficiently large and strong with glazed exterior and the lid of correct size to close it. These equipments are usually constructed by mud, metal (*Loha, Tamra, Swarna*), wood, porcelain etc. materials.
2. A paddle like stirrer

3. A cloth ribbon to seal the vessel
4. A clean cloth of fine and strong texture for filtering
5. A vessel to keep the liquid or to boil the drugs

Required Drugs

1. The Main Drugs - The main drugs from which the extract or *Kashaya* is taken as the case may be. These are the drugs which are pharmacologically and therapeutically much important in the given medicine and the name of the medicine is derived from these drugs denoting their importance. For preparing *Asavarishta* references of usage of herbal, mineral and animal origin drugs are freely available. In addition to the usage of roots, fruits, flowers, seeds, barks, leaves, hard woods, resins etc, even the ash *(Palasha, Bhasma, Tilanala Bhasma)* of certain plants have also been recommended by *Acharya Shushruta.*
2. *Drava Dravyas* - The *Drava Dravyas* used for preparation of *Asavarishta* are *Swarasa, Kwatha,* Water, *Takra, Dadhi, Gomütra, Kanji, Dhanyamla* etc. In some instances two or three liquids are found used together.
3. *Madhura Dravya*(sweetening substances) - As a sweetening agent *Guda* (jaggery), *Sarkara* (sugar), *Phanita, Sitopala, Matsyandika* and *Khanda Sita* (types of jaggery and sugar) are found to be used. In addition to these, honey is also used either alone or along with *Guda* Or *Sarkara*. In the case of sugar, it should be pure white cane sugar. The jaggery should be of sweet taste and at least an year old. The honey should be genuine and preferably old one.
4. *Sandhana Dravya*- These are the drugs which provides the inoculum for the fermentation to start. The process of fermentation necessitates the presence of fermenting micro-organisms known as yeasts. Dried *Dhataki Pushpa* is considered as one of the *Sandhana Dravyas*. *Dhataki* flowers are nectariferous and higly tanniniferous. The flowers of the *Dhataki* serve the purpose of fermentation. The presence of tannin in these flowers produces a conducive environment for yeast growth when *Dhataki Puspa* are not used in some preparations, the inoculum of yeasts either from *Madhuka Puspa*, the honey or resins are suffice for initiating the process of fermentation.

Dhataki Pushpa

Latin Name - Woodfordia fruticosa

Pharmacological actions

Rasa- Kashaya, Katu

Guna – Laghu, Ruksa

Vipaka – Katu

Virya – Sheeta

Upayoga – Trushna, Atisara, Visarpa, Garbhasthapni, Raktaja Karmi, Raktatisara And *Vrana*

Madhuka Puspa

Latin Name – Madhuka indica

Pharmacological actions

Rasa- Madhura, Kashaya

Guna - Guru, snigdha

Vipaka – Madhura

Virya – Sita, Dry Flowers are of *Usna Virya*

Upayoga – Swasa, Kasa, Rajayakshma, Trishna, Daha Raktapitta, Grahani

5. *Praksepa Dravyas* - Some special medicinal and aromatic powders are mixed in the *Sandhana Drava* called as *Praksepa Dravya*. These are added in *Asavarista* for enhancement of the properties or to achieve a specific purpose. Precipitation of medicinal substances, ash, metal flakes, powders are added to the distillates prior to the fermentation process. While the aromatics are added after the fermentation process.

Place, Season And Duration Of Fermentation[9]

Variation in temperature effects the fermentation process. Hence ancient *Acharyas* have mentioned that, to maintain the uniformity of temperature throught the fermentation process. The containers were said to be kept inside the heap of paddy, barley, husk, dry grass or inside the ground etc. Now a days some of the pharmacies are using air conditioned rooms where temperature could be controlled to a desired range. The principle being that there should not be much wind or light which would delay or other wise effect the process of fermentation. The time required for completion of fermentation is said to vary from season to season, as well as from preparation to preparation. According to ancient classics minimum time limit is of seven days and maximum is six months. In usual practice, 7 to 10 days are enough in the hot tropical climate and the long period of 30 days is allowed in cool temperature climate where biological activity is at its low.

Anukta Maan* In *Arishta

Where not specified, the quantity of water to be taken for the preparation of *Arista* is one *Drona*(10.24 lit.), that of jagggery (*Guda*) is one *Tula*(4 kg), honey half the measure of jaggery(2 kg) and powder of drugs (*Praksepa Dravya*) one tenth(400 Gm).[17]

Asava-Arista Nirmaan Vidhi

Kwath and crushed powder of medicinal drugs, sugar, honey or jaggery are taken in suitable quantity and are kept for fermentation. Mixture of above ingredients is kept in a new earthen pot which is sealed and kept stable. After fermentation, this mixture is filtered by cloth and stored in another container. This alcohol-based mixture is known as *Asava-Arishta*.[15]

Method Of Preparation[11]

1. For the preparation of the *Asavarista,* a suitable *Sandhana* vessel of the above mentioned qualities should be selected, which is not affected by the *sandhana* liquid. (Inert), anti-acidity etc.
2. This *Sandhana* vessel should be treated with *Ushnajal Dhavana, Dhupana, Lepanadi* (coating etc) *Sanskara.* Care should be taken to dry the coating completely before applying the *Sandhana* liquid.
3. The *Sandhana* vessel should be kept in a suitable place with grains, ashes, and dew. If there is no such mention, the *Sandhana* vessel should be installed in a place where the temperature is fixed and permenant.
4. From the potent, rich medicinal substances, their proper *Swaras, Kwath*, and *Kalkadi* form should be created. For *Sandhana*, *Aushadi Dravya* should be prepared in the appropriate quantity as mentioned. If the *Aushadi Dravya* is in the form of *kalka* with water or powdered with water, it should be stirred well.
5. After that, *Madhur Dravya* should be mixed in the *Aushadi Dravya* and dissolved completely and the *Aushadi Dravya* should be filtered once again through the cloth.
6. In this *Sandhana* liquid, *Dhataki* flower should be mixed in a suitable form.
7. This *Sandhana* liquid should be added to the *Sandhana* vessel and a base should be placed on its mouth and the joint should be made.
8. The *Sandhana* vessel should be kept in a cool place and safe.
9. After the fermentation process, *Sandhana Drava* has acquired the characteristic taste (specific taste, smell and color), and after the signs of *Sandhana Siddhi* are felt, *Sandhan*

Siddhi tests should be conducted. The best quality *Asavarishta* should then be filtered through a cloth. And kept safe in a suitable container.

Takrarista Nirman

1. Fine powder of *Yavani, Aamalaki, Haritaki, Marich* each 3-3*pal* (120 gm each) and *panchalavan* 1-1 *pal* each(40 gm each) are taken. This fine powder is added to 1 *kans* (2.560 lit) of *takra.* and *takrarishta* is prepared. *Takrarishta* is used in *Deepana, Shoth, Gulma, Arsha, Krumi, Prameha* and *Udarroga*.[5]
2. Crushed powder of *Hapusha, Shahajeera, Dhanyak, Jeera, Kapurkachori, Pimpali, Pimaplimula, Chitraka, Gajpimpali, Yavani,* and *Ajmoda* are taken with *Manda amla, katu Takra* in *Ghrutlipta* claypot. Clear *amla* and *katu rasa* of *takra* is formed with good taste. It should be consumed thrice a day during meal and if felt thirsty. *Takrarishta* is used in *Deepana, Rochana, varnya, Kaphavatanulomana, gud shoth, kandu* and pain.[10]

Definition Of *Takra*

1. *Takra* is one from which fat is extracted after *Manthan,* then Half amount of water is added into curd. This mixture is neither too thick nor too thin and is *Madhur, Amla,* and *Kashay* in *Rasa.*[19]
2. There are four type of *Takra, Udashrita, Mathith, Ghol* and *Takra.* Among these, *Takra* is prepared using 1 part of curd and 1/4th part of water.[18]

Method Of Preparation Of Classical *Takrarishta*

Instrument

China clay pot, stainless steel vessel, cloth, weighing machine, ladle, spoon, cotton, etc.

Procedure

1. *Takra* can be prepared by adding 1/2 of water in curd (without fat) and can be churned.
2. Fine powder of ingredients can be taken and added to *Takra.*
3. *Dhupana* and coating with *Goghrut* of China Clay Pot can be done. and above mixture can be poured in this claypot.
4. Mouth of Claypot can be sealed with cloth. It can be left untouched for 3-4 week.
5. After checking for *Siddhi Lakshnas, Takrarishta* can be filtered and stored in a glass jar.

Method Of Preparation Of *Takrarishta* By Adding *Sandhan Dravya* And *Madhur Dravya*

Procedure

Procedure can be followed same as above method only in this type Crushred *Gul*(Jaggery*)*, *Madhu*(honey) and Dried *Dhataki Pushpa* are added in this mixture.

Analytical Methods For Standardization Of *Asavas* And *Arishtas*[23]

1. Pharmacognostical Evaluation.

Macroscopical evaluation – Colour, Odour, Taste, Texture

Microscopical evaluation – transverse section of drug and powder microscopy

2. Physico-Chemical Evaluation

Ash Value, Extractive Value, Moisture Content, Foreign Matter, Ph Value, Total Solid Content, Alcohol Content, Viscosity, Refreactive Index, Acid Value, Density, Surface Tension, Specific Gravity, Boiling Range, Weight Per Ml, Congealing Point, Freezing Point.

3. Phytochemical Evaluation

Total Phenolics, Total Alkaloids, Total Flavonoids, Total Saponins, Total Free Sugar Content, Reducing and Non Reducing Sugar.

4. Analytical evaluation

UV-Visible, HPTLC, HPLC, HPLC-PDA, RP-LC, FTIR, GC-MS, LC-MS, AAS, Flame Photometry.

5. Microbiological Evaluation

Microbial count, Pesticide residue

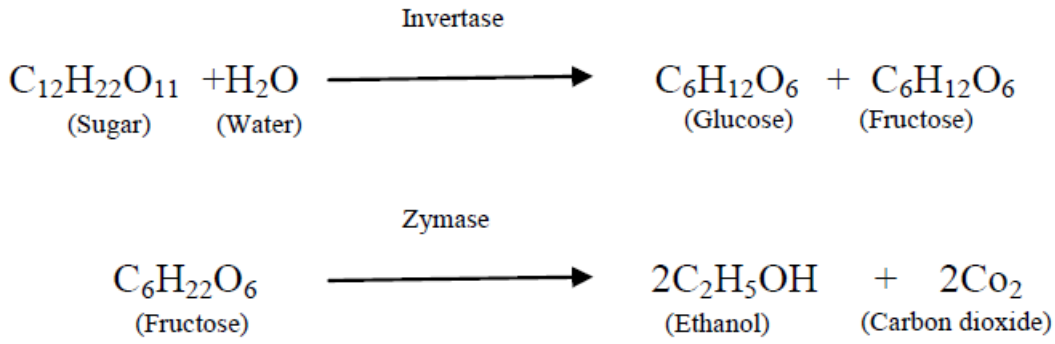
6. Pharmacological Evaluation

Fermentation Process[12]

Ethyl alcohol is produced by the fermentation of any substance that contains sugar or starch that can be converted into sugar. The starch content in grains, potatoes, maca, rice, starchy tubers and roots is first converted into fermentable sugars and then such sugars are converted into ethyl alcohol. The microorganisms Sacromysis cerivesis and Sacromysis Carls burgersis in yeast cells are responsible for this conversion. When these microorganisms grow in the fermentation process in the solution, some important substances useful to humans are

produced in their body or outside the body. These are ethyl alcohol, ethanol, glycerol, acetic acid, carbon dioxide, ethanol, glycerol, acetic acid. CO_2, etc. In the fermentation process, ethanol and Co, gas are produced by incomplete oxidation of sugar.

Yeast cells are multicellular unicellular, nucleus-nucleated, fungal microorganisms of the genus Fungi, whose reproduction and growth occur through budding. This transformation process of alcohol production is anaerobic in the absence of oxygen. After the introduction of the transforming liquid, fermentation begins gradually in the fermentation broth. After 40 to 60 hours, the foamy part on the solution increases. In this way, by adding the transforming liquid to the sweet and medicinal liquid, the growth of the microorganisms Sacromysis Cerivesis and Sacromysis Carls burgersis in the yeast cells is increased to a large extent. As these microorganisms grow and develop, the temperature of the mixture gradually increases due to their metabolic activity. The temperature of the fermentation broth must be between 30° to 35° c for the fermentation process to begin. This temperature increases to 36° to 38% during the growth of the microorganisms and stabilizes at 32° c after the fermentation process is complete. Enzymes secreted by microbial cells process the sweet substances in the solution. Enzymes are a type of yeast cell secretion that helps in chemical transformation. Invertase enzyme converts sucrose into glucose and fructose. Then, the fructose is converted into ethanol (ethyl alcohol) and CO2 gas by the Zymase enzyme.



As a result of the fermentation process, the CO2 gas produced is combined with the external environment and ethyl alcohol remains in the liquor. After more than 5% alcohol is produced in the liquor, the microorganisms Sacromysis Cerivesis and Sacromysis carls burgensis cannot survive and the process does not continue. Gradually, these microorganisms start to die and settle at the bottom of the liquor. As a result, the foam on the liquor starts to decrease, its temperature decreases. A period of seven to fifteen days is usually required for the completion of the fermentation process. After that, the liquor is filtered. The amount of ethyl

alcohol in the yeast is only 5% to 13%. They are not fermented. However, in other types of liquor, after the fermentation process is completed, the liquor is filtered and then its flow is distilled and the alcohol is separated and a suitable plan is made for the use of such pure liquor.

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DISCUSSION

Ayurvedic formulations known as *sandhana kalpana* are frequently used for various medicinal purposes. *Asava-Arista Kalpanas* are the outcome of *Sandhana* process.

The term *Sandhana* denotes the process of acceleration of chemical and biochemical reactions. Due to the process of *Sandhan*, *Asavarista* are grouped as *Madhyavarga*. These preparations are more popular and appreciated because of their quick action, high preserving qualities. Usually herbal remedies loose their potency after some time period, hence ancient *Ayurvedic* scholars has mentioned these *Kalpanas*, by which active principles of the medicinal drugs will be preserved for prolong period in alcoholic media. These preparations made by soaking the drugs, either in powder form or in the form of *Kaşaya*, in a solution of sugar or jaggery, as the case may be, for a specified period of time, during which it undergoes a process of fermentation. The alcohol, so generated, also serves as a preservative for the formuleae. These preparations on account of their very long shelf-life, quick absorption property are considered highly effective in therapeutic uses.[21]

Flowers of *Dhataki* contain 20-25% of tannins which are susceptible to conversion to simple phenols and alcohols in the presence of enzymes during the anaerobic fermentation in preparation of *Aasavas* and *Arishtas*. Fermentation is a metabolic process which is catalysed by enzymes where organisms convert starch or sugar to alcohol. An endogeneous invertase named Fructofuranosidase is found in the *Dhataki* flowers which help in the hydrolysis of sucrose to alcohol which is the final product of *Sandhaan Kalpana*. *Madhura Dravya* like jaggery acts as the source of carbohydrate for initiation of fermentation process. Rate of fermentation and the quality of final product depends upon the nature and concentration of carbohydrates. *Acharya Charak*a and *Acharya Sharangdhar* have mentioned 39-40% of carbohydrate as the best percentage for fermentation process. Hence, the alcohol thus produced is self generated and has longer shelf life and better therapeutic effects.[22]

Takrarishta is a *Sandhan Kalpana*, mentioned in *'Charaka samhita Grahani Rog Adhikara'* and *'Charaka samhita Arsha Rog Adhikara'*. *Takrarishta* is *'Amlajanan Sandhan Kalpana'* which is having *Takra* as a chief ingredient.

In this work, an effort has been made to evaluate the preparation process of *Takrarishta* which is one of the *Arista Kalpana*. In classical method of preparation of *Takrarishta* no *Sandhan Dravya* and *Madhur Dravya* are added. Some *Takrarishta* available in market were found with added *Sandhan Dravya* and *Madhur Dravya* which contradicts with the process mentioned in the classical references of *Takrarishta.* So preparation and process required to make *Takrarishta* using *Sandhan Dravya* and *Madhur Dravya* are studied in present study. Also the finding of analytical study of both of these *Takrarishta* could be studied.

CONCLUSION

Sandhana Kalpana is a liquid dosage form easier for ingestion and absorption for all the age group of patients. *Takrarishta* is found in various *ayurvedic* texts which is a *Amlajanan Sandhan Kalpana. Takrarishta* is widely used for *Grahani, Arsha, Krumi, Prameha, Gulma, Udarroga*, etc. There is need to standardize classical *Takrarishta* and *Takrarishta* by adding *Sandhana Dravya* and *Madhur Dravya.* However, to standardize the method of preparation, effectiveness, various studies and trials should be conducted.

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