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PHARMACEUTICAL STANDARDISATION OF *TAKRARISHTA* AND ITS PHYSICOCHEMICAL ANALYSIS

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ABSTRACT

Ayurveda is an ancient healing science and various medicines and formulations are described under this. *Sandhan Kalpana* (fermentation process) is a unique form in which acidic and alcoholic fermented drugs are prepared and is classified as *Madyajanan Sandhana* and *Amlajanan Sandhana*. These drugs were called *Asavarishta* and are used in various diseases related to gastrointestinal disorders and other diseases as mentioned in *Charak and Sushruta Samhitas*. *Sandhana kalpana* is also classified as *Madyajanan Sandhana* and *Amlajanan Sandhana*. *Takrarishta* is mentioned under *Amlajanan Sandhana Kalpana* which is having takra as its chief ingredient and is itself an acid fermented product along with Prakshepa Dravyas. The main indications of *Takrarishta* 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*. In the present study, *Takrarishta* that come under *Asavarishta kalpana*, has been prepared in the College teaching pharmacy and its physico-chemical properties are studied.

KEYWORDS: *Sandhana kalpana, Takrarishta*, standardisation, *Arista*, fermentation.

INTRODUCTION

Sandhana is the process in which liquids alone or along with medicines or food materials, are intermingled to produce *Madya* or such substances. In other words, *Sandhana* is defined as keeping the mixture of liquids like *Kashayas, Swarasas,* etc. and drugs or food substances like *Guda*, honey, etc. all together for a specific time period to facilitate the fermentation. Sandhan *Kalpana* is a particular dosage form described in Ayurveda, which contains self generated alcohol. Because of these characters, it facilitates longer shelf life, provides comparatively faster absorption and enhanced therapeutic efficacy and potency. A combination of different types of medicinal materials and their transformation make *Sandhana Kalpana,* a unique dosage form of Ayurveda.[1]

Takrarishta, a fermented medicament comes under *sandhan kalpana* (Asavarishta *Kalpana*), 1st mentioned in *Charak Samhita* in *Grahanidosha Chikitsadhyaya* (Cha chi 15/20-21) and in *Bhaishajyaratnavali* under *grahani rogadhikara (Bhaishajyaratnavali* 8/ 609-610), in *Ashtanghriday* (va chi, 8/45-47) also in Ayurvedic Formulary of India (AFI). It is extensively used in all types of *Udara Rogas* and especially in *Grahani Roga*, it also indicated against *Gulma, Arsha, Shotha, krimi, Medo roga* and *Udara rogas*, Worm infestation, loss of appetite, Irritable Bowel Syndrome. In AFI *Takrarishta* is mentioned as per reference of *Charaka Samhita Grahanidosha Chikitsa Adhikara* and dose have mentioned it as 12ml to 24ml BD. The ingredients of this formulation are easily available and it's easy to prepare and is cost effective in nature. The drugs used in this formulation are having identical properties like *deepana, Rochana, varnya* and *Vatanulomana*. All these properties remove obstruction in the passage and do *Sroto vishodhana* (cleansing the channel) and have good *Grahi swabhava* which is most commonly used in *Grahani roga* where *grahi swabhava* and *pachana* action is needed to increase assimilation ability. It is a great scope of Review and Research to find out safe, potent, cost effective remedy from Ayurveda for its management.[2]

MATERIALS AND METHODS

Aim- To perform pharmaceutical standardization of *Takrarishta* and physico chemical analysis.

OBJECTIVES

To standardrised of *Takrarishta* which are mentioned in Ayurvedic texts

1. To prepare *Takrarishta* as per the Standard Operating Procedures (SOP)
2. To carry out organoleptic testing of *Takrarishta*

3. To analyse *Takrarishta* in a designated NABL laboratory following GLPs.

Site of Preparation – Teaching Pharmacy, G.S. Ayurvedic College, Hapur, Uttar Pradesh.

***Takrarishta* preparation** (Reference - *Charak Samhita; grahini rogadhikar*)

Equipments

1. Wide mouthed vessels/ jars made up of glass (40 centimeter length, 15 centimeter diameter-mouth, 5 liters capacity).
2. Spatula with long handle.
3. A clean cloth(muslin cloth) for filtering
4. Clay and cotton cloth for covering.
5. Electric weighing machine for measuring weights.
6. Clean glass jars for storage of prepared medicine (samples)
7. Grinder

Table showing ingredients of *Takrarishta*

Sr. no.	Ingredients	Botanical name	Parts used	Quantity in grams
1	*Yavani*	Trachyspermum ammi	Fruit	144 grams
2	*Amlaki*	Phyllanthus emblica	Fruit	144 grams
3	*Haritaki*	Terminalia chebula	Fruit	144 grams
4	*Maricha*	Piper nigrum	Fruit	144 grams
5	*Saindhava Lavana*	Sodium chloride	Lavan	48 grams
6	*Vida Lavana*	ammonium chloride	Lavan	48 grams
7	*Samudra Lavana*	Sodi muris	Lavan	48 grams
8	*Sauvarchala Lavana*	Unaqua Sodium Chloride	Lavan	48 grams
9	*Romaka Lavana*	Sodium chloride	Lavan	48 grams
10	*Takra*	Eng. Name -Buttermilk	-	3 liters

Pharmaceutical process of preparation of *Takrarishta* divided in three steps:

1. *Purav karama* – Authenticated raw drugs Collected in mentioned quantity. *Takra* is prepared according to Susruta Samhita as mentioned in AFI Part[3] -1. It is the liquid obtained by adding equal quantity of water to curd *(dadhi*) and decanting the butter by churning.
2. *Pradhan karma* – Mix all ingredients into *takra* and poured the mixture in glass jar. Then covered the lid of the jar and left it undisturbed for fermentation.
3. *Pashchat Karma*: When fermentation gets complete and test get done, filter it and leave for few days to allow the sediments to settle down at the bottom and again filtered to separate the sediments and preserve it.

Procedure of Preparation

General procedure followed for the preparation of *Takrarishta* as mentioned in AFI[4] is as follows –

1. All ingredients are taken in above said quantity and made as fine powder individually. Preparation of takra is carried out by using *Dadhi* and Water quantity as mentioned in AFI. quantity. The *Dadhi* is prepared by traditional method. Cow's milk was procured from an authentic source, then it was boiled and cooled it to room temperature.
2. In 3 lt. of cow's milk, 15ml of starter culture of curd was used as inoculum for making of *Dadhi*, then It is left undisturbed for one night. Next morning dadhi is ready for making buttermilk.
3. Butter milk (*takra*) is prepared by mixing the curd and water in 1:1 proportion. Then it is kept in churner and churned it for three hours till the separation of butter from the curd. After removing the butter, it is strained from a muslin cloth (no particle of butter should be left in it). All ingredients are taken in above said quantity and made as fine powder individually
4. 3 liters of prepared *Takra* is taken in a vessel (glass container) and one fine powder of ingredients is taken along with stirring. After adding all ingredients that liquid of mixture is poured into fumigated glass jar, and closed properly. Then a clean cotton cloth with clay is wrapped around the mouth, for making it contamination free from the outside environment.
5. The container is placed in the dark room without direct contact of air.
6. Kept for Fermentation, Left it undisturbed, for few days.
7. Keep observing onset and completion of fermentation changes.
8. Once Fermentation gets complete open the seal and test get done, it is filtered and preserved.
9. Around after 18 days, when sound stopped coming from jar, It is then opened and performed the burning matchstick test, if the candle is blown-out it means fermentation process is still in process, packed it again and left it undisturbed for some more days and opened on the 21st day.
10. Again, performed burning matchstick test. This time matchstick was continued burn it means there is no presence of carbon dioxide and fermentation process is completed. and we got all chief desired characteristics then dug out the porcelain jar and filtered it to obtained liquid.

11. The liquid is filtered from the sediments presents in its bottom with muslin cloth folded in four layers. It is kept at a safe place for next few days under observation
12. Sediments were there when it was seen after two days form the first filtration. It is again filtered for the 2nd time with muslin cloth folded in four layers, left it undisturbed for next few days. After two days, checked it again this time sediments were less and now filtered again for the 3rd time with the muslin cloth folded in four layers.
13. After three filtrations, clear liquid is obtained. It is packed in transparent borosilicate jar and stored at cool and dark place, away from direct sunlight.

***Siddhi Lakshanas*[5]**

1) No any sound in vessel.
2) When we blow a matchstick above the opening of vessel, flame doesn't go off.
3) Formation of specific color, taste and smell.
4) No precipitation in lime water. Fermentation is done in 21 days.

Observations - Procedure is followed in all the batches in *Grishm Ritu*.

1. Bubbling sound was coming start from 4th day.
2. Change in colour started observed from 3th day.
3. After making powder each Ingredient was taken as mentioned quantity.
4. On 18th day the sound coming from jar was stopped.
5. After adding all powder drugs to *Takra* total weight was 3. 816 kg.

Precautions

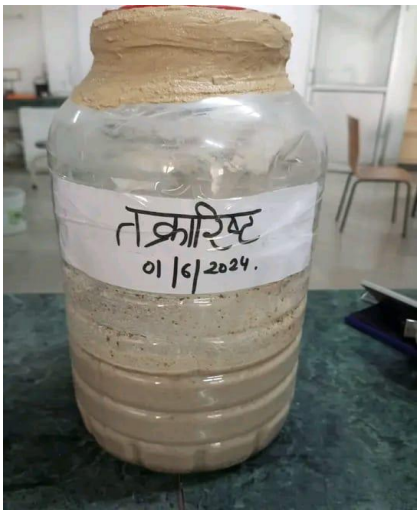
wide mouth vessel is needed to mix it well with spatula. Only 2/3 part of glass vessel filled with liquid mixture of all ingredients. The jar is left undisturbed during fermentation process and it was prepared.

Table showing the percentage of loss as per volume and weight are presented.

Sample	Initial amount of Takra	Initial amount of mixture	Obtained amount *Takrarishta*	Loss in the amount of Takra	% of loss
Takrarishta	3 lit.	3.816 kg	1.530	1.47	49%

Takrarishta prepared with the same method, *Siddhi lakshana* for fermentation of *Takrarishta* attained between 16 to 18 days. In three filtrations by muslin cloth folded in four layers

filtered *Takrarishta* obtained. Almost 49 % *Takra* is absorbed by raw material, so the yield obtained is 50% of the total *Takra* that was added.



Day one 1st June, 2024 Observation on 6th June, 2024

Observation on 10th June, 2024 Observation on 18th June, 2024

Observation on 18th June, 2024 Flame Test

Bubbles Disappered on 21st June

Ready for filtration Filtered *Takrarishta*

After filtration, total 1.530 liters of *Takrarishta* is prepared out of 3 liters of *Takra* (buttermilk). Based on the literature, it is prepared by fermentation and is useful in gastro-intestinal disorders and thus, presumed to contain probiotic properties.

RESULTS AND DISCUSSION

Physico-Chemical Analysis

- 3 Samples (I, II and III) were prepared with same method for standardization purpose of *Takrarishta* in GMP certified pharmacy of GS Ayurvedic College's Pharmacy, Hapur.
- For standardization of the prepared drug, physico-chemical analysis was done in GLP approved laboratory based on the following parameters prescribed in IP and API.

Organoleptic analysis

S.No.	Parameter	Description
1.	Color	Reddish brown
2.	Odor	Mild Alcoholic
3.	Taste	Astringent, Sour and salty
4.	Appearance	Clear liquid

Comparative Analysis of 3 samples.

S. no.	Name of parameter	Sample 1	Sample 1	Sample 1
1	Specific Gravity	1.0381	1.0382	1.0381
2	Refractive Index	1.360	1.363	1.360
3	Ph Value	3.17	3.18	3.17
4	Viscocity	1.10	1.12	1.11
5	Total Solids	7.67 %w/w	7.69 %w/w	7.67 %w/w
6	Acid Value	7.74 mg KOH/g	7.79 mg KOH/g	7.74 mg KOH/g
7	Total Sugar	NIL	NIL	NIL
8	Non-Redusing Sugar	NIL	NIL	NIL
9	Alcohol value	3.4 %v/v	3.45 % v/v	3.47 % v/v
10	Total acidity	.77 % v/v	.75 %v/v	.77 %v/v
11	TLC Thin Layer Chromatography Mobile Phase (Toluene:Ethyl Acetate:Formic Acid: 6:4:02)	**Rf Value** – 254nm- 0.03, 0.18, 0.34, 0.38, 0.43 White Light - 0.03, 0.06, 0.18, 0.24, 0.38 After Derivatizaton 366nm – 0.03, 0.18, 0.24, 0.38, 0.97	**Rf Value** – 254nm- 0.03, 0.18, 0.34, 0.38, 0.43 White Light - 0.03, 0.06, 0.18, 0.24, 0.38 After Derivatizaton 366nm – 0.03, 0.16, 0.24, 0.37, 0.99	**Rf Value** – 254nm- 0.03, 0.18, 0.34, 0.38, 0.43 White Light - 0.03, 0.06, 0.18, 0.24, 0.38 After Derivatizaton 366nm – 0.03, 0.17, 0.24, 0.38, 0.99

Pharmaceutical analysis of *Takrarishta* showed specific gravity of 1.0381 specifying denser than water, pH value of 3.17 makes it strongly acidic, mildly viscous (value 1.1) with total solids (dissolved and undissolved) value of 7.67%v/v signifying thicker liquid. Similarly, acid value of 7.74 mg KOH/g shows that the prepared drug rich in free fatty acids which helps in increasing drug absorption, with no sugars. Alcohol value of 0.77 % v/v shows smaller amount of alcohol compared to other *Asavarishtas*. TLC values at 254 nm of *Takrarishta* prepared showed values between 0.03 to 0.4 which is responsible for imparting light blue color of the prepared drug.

CONCLUSION

Takrarishta has been prepared using the method mentioned in AFI and the three samples prepared have been found to be pharmaceutically standardised. The prepared *Takrarishta* is reddish brown in color, clear, mildly alcoholic with sour and salty in taste. All the 3 samples, are physico-chemical analysis were found to contain close values and showed the nature of *Takrarishta* as denser than water, strongly acidic, mildly viscous with solid value signifying thicker liquid, rich in free fatty acids increasing drug absorption, with no sugars and smaller

amount of alcohol compared to other *Asavarishtas*. TLC values at 254 nm of *Takrarishta* prepared showed values between 0.03 to 0.4 which is responsible for detection of alkaloids at light blue color of the prepared drug.

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