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PHARMACEUTICAL DEVELOPMENT AND STANDARDIZATION OF ASRAHARARISHTA

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ABSTRACT

Of all the dosage forms, *Sandhana Kalpana* are widely used therapeutically as they contain self-generated alcohol which acts as a preservative and this also helps in faster absorption and action of the drug. It stimulates the digestive enzymes thereby increasing the bio availability & therapeutic efficacy of the drug.[1] ***Asrahararishta***[2] is unique *Sandhana Kalpana* mentioned in *Bhaishjaya Ratnavali, Rajayakshma chikitsa prakarana*. It is prepared by subjecting fermentation of *Mritasanjeevini Sura* and *Vishalyakarni Swarasa* for a duration of 7 days. It is named *Asrahararishta* since it is used in bleeding disorders to arrest bleeding. which is indicated in *Kasa, Rajayakshma, Urakshata, Dhatukshaya, Raktapitta, Raktatisara, Raktapradara*. It also has a unique dosage of *10 Bindu*, every *Yama* with *Sheetajala* as *Anupana*. As no studies were done on this unique formulation and due to non- availability of this in the market, pharmaceutical development and standardization of *Asrahararishta* was chosen with an intent to make a valuable contribution in the field and to develop knowledge on the same.

KEYWORDS: *Asrahrarishta, Mritasanjeevini Sura, Sandhana Kalpana, Distillation.*

INTRODUCTION

The aim of Ayurveda is to prevent diseases in a healthy individual and cure the diseases in diseased individual, and in turn attain the *Purusharthas i.e Dharma, Artha, Kama, & Mokhsa.*

Aushada has a prime role in helping achieve this pursuit. The quest for health and longevity has been prime concern and this has led to different innovations by man. This quest for health led man to explore every existent substance from a therapeutic point of view. During the course, the drugs found couldn't be administered as it is, they had to be converted into palatable dosage form and be preserved for a longer time. All possible means were tried to make the drugs more palatable and increase shelf life.[3]

As a result, dosage form with highest therapeutic and pharmaceutical value among the others came into existence and were called *Sandhana Kalpana*.

Sandhana Kalpana:[4] *Sandhana* is the process where *dravadravya* along with other *aushadha dravya* is kept in selected vessel for a stiplated duration to facilitate the process of fermentation. The medicament obtained after fermentation of specific drugs for a specific duration are grouped under *Sandhana Kalpana.*

Sandhana Kalpana is classified into *Madhya* and *Shukta Kalpana*[4], based on the type of product obtained after fermentation. *Madhya Kalpana* are the alcoholic prepartions whereas *Shukta Kalpana* are the acidic prepartions. *Madhya Kalpana* includes *Sura, Sidhu, Varuni, Asava, Arishta.* Shukta kalpana includes *Shukta, Tushambu, Sauvira, Kanjika, Sandaki.*

Madhya kalpana is used for therapuetic purposes, of which *Asava* and *Arishta* are extensively used in Clinical practice. There are several *Asava- Arishtas* mentioned for various ailments in *Brihat taryi, Ashtanga sangraha, Laghutrayi, Bhaishjya ratnavali, Gada nigraha* and other classical text books. One such unique *Arishta* mentioned in *Bhaishjaya Ratnavli,* which is unexplored is ***Asrahararishta***

OBJECTIVES OF THE STUDY

1. To pharmaceutically develop *Asrahararishta*
2. To prepare different batches of *Asrahararishta* according to above mentioned reference.
3. To do comparative Pharmaceutical Analytical study of all three batches.
4. To standardize the method of preparation of *Asrahararishta*

MATERIALS AND METHODS

Literary Source: Information regarding the study was collected from Ayurvedic classical literature, relevant contemporary literature works and research works.

Drug Source: The drugs required for the preparation of *Asrahararishta* was procured from Amruth Kesari Depot Bengaluru, Anaamaya Herbals Udupi. Purana Guda was procured from Sri Satyamev Store, Delhi. Saplings of *Vishalyakarni* was procured from FRLHT, Bengaluru; which were identified and approved from the Department of Dravya Guna, Sri Sri College of Ayurvedic Science and Research, Bangalore.

Pharmaceutical Source: The preparation of *Mritasanjeevini Sura*, *Extraction of Vishalayakarni Swarasa* and three batches *Asraharishta* was done in the teaching pharmacy of Department of Rasashastra and Bhaishajya Kalpana, Sri Sri College of Ayurvedic Science and Research, Bangalore.

PHARMACEUTICAL STUDY

1. Dhatura Beeja Shodhana[5]

Reference: Rasamaritam

Equipments required: Vessels, Plates, Dolya yantra, Spoon, Weighing machine, Gauze cloth

Ingredients

Dhatura Beeja – 100 g

Gomutra - 250 ml

Goksheera – 750 ml

Procedure

- The foreign particles from *Dhatura beeja* were removed, 100 g of it was weighed and soaked in 250ml of *Gomutra* for 4 Yama (12 hours)
- *Gomutra* was decanted and *Dhatura beeja* was washed with warm water and dried.
- 750 ml of Ksheera was taken in *Dolayantra*, Dried *Dhatura beeja* was tied in a *Pottali* and suspended in *Ksheera*. It was subjeted to *Swedana* on *Mandagni* for a duration of 1 *Yama* (3 Hours).
- *Dhatura beeja* was washed with warm water and dried. It was pounded lightly to remove the outer covering and stored as *Shuddha Dhatura beeja*

Observations

- On soaking *Dhatura beeja* in *Gomutra*, there was change in colour of *Gomutra* from straw to dark brown
- During *Swedana* of *Dhatura beeja* in *Goksheera*, there was change in colour of milk to slight yellowish colour

- After *Swedana, Dhatura beeja* had become brittle and on pounding the outer covering could be removed easily

Precautions

- Foreign particles were removed from *Dhatura beeja*
- After *Nimajjana* of *Dhatura beeja* in *Gomutra,* it was thoroughly washed with warm water and dried
- During *Swedana,* constant *Mandagni* was maintained
- After *Swedana* of *Dhatura beeja* in *Goksheera,* it was thoroughly washed with warm water and dried

Result: *Dhatura beeja* obtained after *Shodhana*: 91.5 gms.

2. Preparation Of Mritasanjeevini Sura[6]

Reference: *Bhaishajya Ratnavali, Jwara chikitsa prakarana*

Equipments required: Steel vessels, Ladle, Strainer, Gauze cloth, Sandhana Patra (Plastic container)

Ingredients

Table No. 1: Ingredients of *Mritasanjeevini Sura* and its quantity.

SL No.	Dravya	Botanical Name	Part Used	Quantity
1	Purana Guda	*Saccharum officinarum* Linn.	Extract	768 g
2	Babbula	*Acacia arabica* Willd.	Bark	60 g
3	Dadima	*Punica granatum* Linn.	Rind	30 g
4	Vasa	*Adhatoda vasica* Nees.	Whole plant	30 g
5	Varahakrantha	*Mimosa pudica* Linn.	Whole Plant	30 g
6	Ativisha	*Aconitum Heterophyllum* Linn.	Root	30 g
7	Ashwagandha	*Withania somnifera* Dunal.	Root	30 g
8	Devadaru	Cedrus deodara (Roxb.) Loud.	Heart Wood	30 g
9	Bilva	*Aegle marmelos* Corr.	Bark	30 g
10	Shyonaka	*Oroxylum indicum* Vent.	Bark	30 g
11	Patala	*Stereospermum suaveolens* Dc.	Bark	30 g
12	Shalaparni	*Desmodium gangaticum* Dc.	Root	30 g
13	Prishnaparni	*Uraria picta*	Root	30 g
14	Bruhati	*Solanum indicum* Linn.	Root	30 g
15	Kantakari	*Solanum xanthocarpum* Schard and Wendl.	Whole Plant	30 g
16	Gokshura	*Tribulus terrestris* Linn.	Fruit	30 g
17	Badara	*Zizyphus Jujuba* Lam.	Bark	30 g
18	Indravaruni	*Citrullus Colocynthis* Schrad.	Root	30 g
19	Chitraka	*Plumbago zeylanica* Linn.	Root	30 g
20	Kapikacchu	*Mucuna prureins* Baker.	Seed	30 g

21	Punarnava	*Boerhaavia diffusa* Linn.	Root	30 g
22	Puga	*Areca catechu* Linn.	Fruit	96 g
23	Krishna Dhattura	*Datura metel* Linn.	Seed	6 g
24	Lavanga	*Syzygium aromaticim* Linn.	Flower Bud	6 g
25	Padmaka	*Prunus cerasoides*	Bark	6 g
26	Usheera	*Vetiveria zizaniodies* (Linn.) Nash.	Root	6 g
27	Chandana	*Santalum album* Linn.	Heart Wood	6 g
28	Shatapushpa	*Anethum graveolens* Linn.	Seed	6 g
29	Yavani	*Trachyspermum ammi* (Linn.) Sprague Seed	Seed	6 g
30	Maricha	*Piper nigrum* Linn.	Seed	6 g
31	Shwetha Jeeraka	*Cuminum cyminum* Linn.	Seed	6 g
32	Krishna Jeeraka	*Carum carvi* Linn.	Seed	6 g
33	Kachura	*Curcuma zedoaria* (Christm.) Roscoe.	Rhizome	6 g
34	Jatamamsi	*Nardostachys jatamansi* Dc.	Root	6 g
35	Twak	*Cinnamomum zeylanicum* Blume.	Bark	6 g
36	Ela	*Elettaria cardamomum* Maton	Seed	6 g
37	Jatiphala	*Myristica fragrans* Houtt.	Fruit	6 g
38	Musta	*Cyperus rotundus* Linn.	Root	6 g
39	Granthiparni	*Leonotis nepetifolia* R.Br.	Root	6 g
40	Shunti	*Zingiber officinalis* Roscoe.	Root	6 g
41	Methika	*Trigonella foenumgraecum* Linn.	Seed	6 g
42	Meshashrungi	*Gymnema sylvestre* R.Br.	Leaves	6 g
43	Rakthachandana	*Pterocarpus santalinus* Linn.f.	Heart Wood	6 g
44	Jala			6.144 kg

Method of Preparation

- 6.144 kg of RO Water was heated till it came to a boil, it was cooled.
- To boiled and cooled water, 768g of scrapped *Purana guda* was added and heated until *Purana guda* completely dissolved in it and was allowed to cool.
- Once it cooled, coarse *powders* of *Babbula twak, Dadima, Vasa, Varahakrantha, Ativisha, Ashwagandha, Devadaru, Bilwa, Shyonaka, Patala, Shalaparni, Prshnaparni, Kshurdra kantakari, Kantakari, Gokshura, Indravaruni, Chitraka, Kapikacchu, Punaranava* were added and mixed well
- This mixture was transferred in *Sandhana patra* (Plastic container) which was subjected to *Patra samsakara* i.e *Ghrita lepana* and *Dhupana.*
- The *Sandhana patra* was kept in a carton box filled with *Tusha*
- *Alodana* was done twice a day till the onset of fermentation.
- On the 8th day, the onset of fermentation was observed.
- The *Sandhana patra* was sealed on the 9th day and left undisturbed.
- On the 16th day, *Churna of Puga, Krishna Dhattura, Lavanga, Padmaka, Usheera, Chandana, Shatapushpa, Yavani, Maricha, Shwetha Jeeraka, Krishna Jeeraka, Kachura,*

Jatamamsi, Twak, Ela, Jatiphala, Musta, Granthiparni, Shunthi, Methika, Meshashrungi, Raktachandana were added and mixed well

- It was sealed, left undisturbed till the fermentation completed.
- The mixture was filtered to obtain *Mritasanjeevini Sura* in *Asava* form

OBSERVATIONS

1. There was slight sour smell on the second day
2. On the third day, the consistency of the mixture became more liquidy
3. The sour smell was gradually increased
4. There was presence of mild effervescence, Mild alcoholic odour and hissing sound on 7th day
5. On the 8th day, presence of effervescence and hissing sound, extinguishing of burning match stick when kept at the mouth of container were noted
6. Fermentation was completed on 25th day

- There was absence of effervescence, hissing sound and strong alcoholic odour could be appreciated
- All the *Prakshepaka dravyas* were sunk in the bottom

Table No. 2: Temperature readings.

Day	Temperature
1	30.1^{O} C
2	31.2^{O} C
3	30.5^{O} C
4	29.5^{O} C
5	29.2^{O} C
6	31.8^{O} C
7	33.7^{O} C
8	34.2^{O} C
9	32.3^{O} C
10	32.6^{O} C
11	30.7^{O} C
12	29.7^{O} C
13	29.5^{O} C
14	28.7^{O} C
15	29.2 ^{O} C
16	30^{O} C
17	30.2^{O} C
18	28.9^{O} C
19	29.4^{O} C
20	29.7^{O} C
21	28.8^{O} C

22	28.8^{O}C
23	28.9^{O}C
24	28.9^{O}C
25	28.6^{O}C

Precautions

- RO water was boiled, cooled and used
- The mixture was homogenously mixed
- *Sandhana patra* was subjected to *Ghrita lepana* and *Dhupana* before
- The *Sandhanapatra* was keep in Tusha to maintain optimal temperature
- *Alodana* was done with a sterile ladle, *Alodana* was done twice a day till there was onset of fermentation
- The *Sandhanapatra* was keep in Tusha to maintain optimal temperature
- The room where *Sandhanapatra* was kept was subjected to *Dhupana* every day, till there was onset of fermentation
- *Dhupana* was done on alternative days till the completion of fermentation

Results: Fermentation was completed on 25th day.

3. Distillation Of Mritasanjeevini Sura

Equipments required: Distillation apparatus, Strainer, Gauze cloth, Measuring jar, Glass container.

Procedure

- 1 Litre of *Mritasanjeevini Sura* was filtered through strainer and gauze cloth
- The still of distillation apparatus was filled with 1 Litre *Mritasanjeevini sura*
- The regulator was set to 60 – 70^{o}C. The mixture started boiling at 25 minutes and distillate started collecting after 37 minutes
- 642 ml of *Mritasanjeevini Sura* (Distillate) as obtained and stored in air tight glass container

Observations

- Colourless *Mritasanjeevini Sura* with strong alcoholic odour was collected
- Gradually the distillate became turbid
- From 1 liter of *Mritasanjeevin Sura* (Asava), 642 ml of *Mritsanajeevini sura* (Distillate) was obtained

Precautions

- The distillation apparatus was thoroughly washed and dried before the procedure
- Constant temperature was maintained
- The opening receiver was closed with aluminium foil

Results: 1 Liter of *Mritasanjeevin Sura* (Asava) gave yield 642 ml of *Mritsanajeevini sura* (Distillate)

4. Extraction Of Vishalyakarni Swarasa

Name of Practical: Extraction of Vishalyakarni Swara

Equipments required: Khlava yantra, Gauze cloth, Sieve, Cloth, weighing machine, Measuring glass

Ingredients: *Vishalyakarni* Patra and Kanda (Leaves and Stem) – 400 gms

Procedure

- *Vishlayakarni* plant was cut, it was washed thoroughly to remove mud and other impurities.
- It was wiped to remove water content
- *Vishlayakarni patra* and *kanda* was pounded in *Khalva yantra* its *Kalka* was prepared and it squeezed using gauze cloth to extract *Swarasa*
- 100 ml of *Swarasa* was obtained.

Observations

- *Vishalyakarni* was very fibrous, hence very little *swarasa* could be extracted
- The colour of *swarasa* changed from dark green to greenish brown

Precautions

- *Vishlayakarni* plant was washed to removed mud and other impurities
- Khalva yantra was washed and wiped

Result: Quantity of *Vishalyakarni swarsa* obtained: 100 ml

5. Preparation of Asrahararishta

Reference: *Bhaishajya Ratnavali, Rajayakshma Chikitsa parakarana*

Equipments required: Measuring glass, Sandhana Patra, Gauze cloth

Ingredients

1. *Mritasanjeevini Sura* - 100 ml
2. *Vishalyakarini Swarasa* – 100 ml

Procedure

- The *Sandhana patra* was subjected to *Dhupana.*
- To *Sandhana patra* 100 ml of *Mritasanjeevini Sura* and 100 ml of *Vishalyakarni swarasa* was added, stirred well and kept undisturbed for 7 days
- On the 8th day, it was filtered and stored in glass dropper bottle as *Asrahararishta*

Observations

- Gradual change in colour and odour could be appreciated
- The thick greenish brown liquid with less alcoholic odour turned into translucent liquid with thick sediment in the bottom and sour alcoholic odour after 7 days
- Sour alcoholic taste and fragrant smell of *Vishalyakarni* could be appreciated

Precautions

- The mixture was homogenously mixed
- *Sandhana patra* was subjected to *Ghrita lepana* and *Dhupana* before

The *Sandhanapatra* was keep in *Tusha* to maintain optimal temperature

The same procedure was repeated other 2 Batches

RESULTS

Organoleptic evaluation

a) Colour
b) Odour
c) Taste
d) Consistency

Table No. 3: Organoleptic evaluation of Mritasanjeevini Sura (Asava), Mritsanjeevini Sura (Distillate) & Vishalyakarini Swarasa.

	Mritasanjeevini Sura Asava	**Mritsanjeevini Sura Distillate**	**Vishalyakarini Swarasa**
Colour	Brown	Colourless	Greenish Brown
Odour	Sour – alcoholic	Strong alcoholic	Pleasant
Taste	Kashaya Tikta	Kashaya Tikta	Kashaya Tikta
Consistency	Liquid	Liquid	Liquid

Table No. 4: Organoleptic evaluation of three batches of Asrahararishta.

	Asrahararishta Batch 1	Asrahararishta Batch 2	Asrahararishta Batch 3
Colour	Brown	Brown	Brown
Odour	Sour – mild alcoholic	Sour –mild alcoholic	Sour – mild alcoholic
Taste	Amla – Kashaya	Amla – Kashaya	Amla - Kashaya
Consistency	Liquid	Liquid	Liquid

Physico – Chemical analysis

a) Alcohol percentage

b) pH value

c) Total Solids

d) Reducing and non- reducing sugars

e) Specific gravity

f) Total acidity

g) Microbial contamination

h) Test for specific pathogen

Table No. 5: Physico – Chemical analysis of Mritasanjeevini Sura (Asava), Mritsanjeevini Sura (Distillate) & Vishalyakarini Swarasa.

	Mritasanjeevini Sura Asava	Mritsanjeevini Sura Distillate	Vishalyakarini Swarasa
Alcohol percentage (%)	3.95	0.37	-
pH value	3.854	3.297	5.009
Total Solid Content (%)	0.18	0.17	-
Reducing sugars	Absent	Absent	-
Non- reducing sugars	Absent	Absent	-
Specific gravity @25^{O}C (g/cm^{3})	1.013	0.995	1.030
Viscosity (cp)	45	35	75
Total acidity (%)	0.8	0.96	-
Microbial contamination	31 x 10^{4}	Nil	-

Table No. 6: Physico – Chemical analysis of three batches of Asrahararishta.

	Asrahararishta Batch 1	Asrahararishta Batch 2	Asrahararishta Batch 3
Alcohol percentage (%)	5.81	5.58	5.15
pH value	3.677	4.018	3.903
Total Solid Content (%)	4.82	3.84	4.04
Reducing sugars	Absent	Absent	Absent
Non- reducing sugars	Absent	Absent	Absent
Specific gravity @25^{O}C (g/cm^{3})	1.014	1.009	1.007
Viscosity (cp)	50	35	40
Total acidity (%)	0.84	0.64	0.72
Microbial contamination	3 x 10^{3}	23 x 10^{4}	11 x 10^{5}
Test for specific pathogen	Absent	Absent	Absent

DISCUSSION

- **SELECTION OF THE TOPIC**

- *Asrahararishta* is one of the unique *Sandhna kalpana*, mentioned in *Bhaishajya Ratnavali, Rajyakshma chikitsa prakarana.*
- As no studies were done on this unique formulation and due to non- availability of this in the market, pharmaceutical development and standardization of *Asrahararishta* was chosen with an intent to make a valuable contribution in the field and to develop knowledge on the same

CONCEPTUAL DISCUSSION

- Sandhana Kalpana

- *Sandhana* is the process where *Dravadravy*a along with other *Ashadha dravya* is kept in selected vessel for a stipulated duration to facilitate the process of fermentation.
- The medicament obtained after fermentation are grouped under *Sandhana Kalpana*
- The term *Sandhana* denotes the process of acceleration of chemical & biochemical reactions.
- Fermented preparations contain self-generated alcohol which acts as a preservative and this also helps in faster absorption and action of the drug. It stimulates the digestive enzymes thereby increasing the bio availability & therapeutic efficacy of the drug.

- **Fermentation**

-Fermentation is an enzyme catalysed, metabolic process that converts sugars into ethanol, carbon dioxide, acids and other compounds. It occurs in absence of oxygen and is carried out by micro-organisms like yeast and bacteria

- **Distillation of Alcohol**

- Distillation of alcohol is a process of separating ethanol from a mixture water and other substances by evaporation and condensation. This process helps purifies and concentrates the alcohol.

- **Collection of Drugs**

- *Asrahararishta* contains two main constituents i.e *Mritasanjeevini Sura* and *Vishalyakarini Swarasa*
- *Mritasanjeevini Sura* is a polyherbal formulation containing 44 drugs.
- Of which the following were difficult to procure

1. ***Purana Guda*** – Jaggery was made and kept for a duration of 13 months at SriSatymev store, New Delhi.
2. ***Ativisha*** – Good quality was *Ativisha* was not easily available and was very expensive
3. ***Granthiparni*** – It was not available in the market and it was seasonal so had be to collected from Nettigere, Bengaluru
4. ***Vishalyakarni*** – It is a tropical plant, which was not easily available. Saplings of Vishalyakarni was collected from FRLHT and cultivated in the college premises.

PHARAMCEUTICAL DISCUSSION

- ***Proportion of Water***

- In preparation of *Mritasanjeevini Sura*, the proportion of *Dravya* and water mentioned in *Bhaishajya Ratnavali* failed initially as it could not be subjected to distillation. The mixture was very thick and concentrated as the quantity was water was less.
- Later, the proportion mentioned in *Bhaishajya Ratnavali by* Prof. Siddhinandan Mishra was taken to prepare *Mritasanjeevini Sura.*

- ***Water used for Preparation***

- RO water was boiled, cooled and then other drugs were added to prevent microbial contamination.
- In the previous batch, filter water was used directly which could be one of the causes of fungal growth.

- ***Sandhana Patra and its Samaskara***

- Food grade plastic container was taken instead to classically mentioned *Mritpatra*, for the following reasons:

1. As it is inert and prevents chemical reactions
2. Transparency - to observe changes
3. To maintain constant temperature

- The container was thoroughly washed, wiped, dried and subjected to *Patra samaskara*
- ***Patra samaskara- Ghrita lepana*** and ***Dhupana*** was done with *Dhupa churna* prepared with *Krimighna dravyas like Nimba, Sarshapa, Vidanga, Tulsi, Guggulu, Vacha* etc.

- ***Prevention of contamination***

- To prevent fungal growth, *Alodana* was done twice a day and *Dhupana* was done every day till the onset of fermentation.

- *Dhupana* was done on alternate days till the completion of fermentation.

- ***Alodana***

- *Mritasanjeevini sura* was stirred twice a day, until there was onset of fermentation.
- Stirring helps in homogenization and aeration leading to acceleration of fermentation.
- Aeration supplies oxygen and removes carbon di oxide from microbial cells.
- The rate of aeration often controls the rate cell growth and fermentation.

- ***Sandhibandhana***

- The reference of *Mritasanjeevini sura* states *Sandhibandhana* to be done after adding all ingredients. When this is was followed in the previous batch, there was fungal growth within 2 days. This could be because of the moisture content due to droplets formed.
- To prevent microbial contamination, *Sandhibandhan*a was not done until there was onset of fermentation
- The opening of the container was tied with a gauze cloth, which helped in absorbing moisture and in tight closure of the container
- After the onset of fermentation, the container was sealed with cellophane tape.

- ***Onset of fermentation:*** The onset of fermentation was observed on the 8th day

- The onset of fermentation was assessed by the following parameters:

1. Floating of *Prakshepaka dravyas*
2. Presence of effervescence
3. Presence of hissing sound
4. Presence of mild alcoholic odour and mild sour taste
5. Extinguishing of burning match stick when kept at the mouth of container

- ***Completion of Fermentation***

- The completion of fermentation was observed on 25th day
- The onset of fermentation was assessed by the following tests:

1. Sinking of *Prakshepeka dravyas*
2. Absence of effervescence
3. Absence of hissing sound
4. Presence of strong alcoholic odour and sour taste
5. Burning match stick continued burning when kept at the mouth of container

- ***Distillation of Mritasanjeevini Sura***

- *Mritasanjeevini sura (Asava)* was subjected to distillation in a distillation apparatus
- The regulator was set to 60 -70. It took 37 minutes for the mixture to start boiling and the vapours started collecting and condensing from 52 minutes
- Colourless, slightly turbid *Mritasanjeevini Sura* with strong alcoholic odour was collected
- From 1 litre of *Mritasanjeevin sura* (Asava), 642 ml of *Mritsanjeevini sura (Distillate)* was obtained

- ***Extraction of Vishalyakarini Swarasa***

- The leaves, stalk and stem of *Vishalyakarni* plant was thoroughly washed, dried and pounded.
- The *Kalka* was squeezed through gauze cloth and filtered to extract *Swarasa*
- Since *Vishalyakarni* was fibrous, very little *Swarasa* could be extracted.
- 400 gms of *Vishalyakarni* gave yield of 100ml.

- ***Preparation of Asrahararishta***

- Equal quantity (100 ml) of *Mritasanjeevini sura* and *Vishalyakarni swarasa* was added in a food grade plastic container after subjecting it *to Dhupana.*
- Gradual change in colour and odour could be appreciated
- The thick greenish brown liquid with less alcoholic odour turned into translucent liquid with thick sediment in the bottom and sour mild alcoholic odour after 7 days
- There was no mentioning of *Lakshanas* which suggest the completion of fermentation, only the duration was mentioned (i.e 7 Days)

- ***Enhancing shelf life of Swarasa***

- In this study, *Vishalyakaini Swarasa* was mixed with *Mritasanjeevini sura* and allowed for fermentation for duration 7 days.
- *Swarasa* whose general shelf life is 24 hours, when mixed with alcoholic/ fermented formulation could be retained for over longer period (Over 3 Months)
- This method could be adopted in enhancing shelf life of *Swarasa.*

Discussion on Ingredients

- The dravyas used have predominately *Kashaya, Tikta rasa; Laghu, ruksha guna; Sheeta veerya*

- Most of the drugs exhibit *Sthambana, Krimighna, Kasaghna, Shwasaghna, Shulaghna, Jwaraghna* properties

▪ ***Vishalyakarni***

- Vishalyakarni is rich in terpenoids and coumarin derivatives.
- It is reported to possess analgesic, anti- inflammatory, anti- microbial, anti-histamine, Anti-tumorous properties
- ***Ayapanin*** and ***Ayapin*** exhibit haemostatic properties which is why it is predominantly used to arrest bleeding and wound healing.

ANALYTICAL DISCUSSION

Organoleptic evaluation

1. Colour

Colour of the samples were as following:

Table No. 7: Colour of the samples.

MSA	MSS	VS	AHR1	AHR2	AHR3
Brown	Colourless	Greenish Brown	Brown	Brown	Brown

2. Odour

Colour of the samples were as following:

Table No. 8: Odour of the samples.

MSA	MSS	VS	AHR1	AHR2	AHR3
Sour alcoholic	Strong alcoholic	Pleasant	Sour – mild alcoholic	Sour – mild alcoholic	Sour – mild alcoholic

3. Taste

Taste of the samples were as following:

Table No 9: Taste of the samples.

MSA	MSS	VS	AHR1	AHR2	AHR3
Kashaya – Tikta	Kashaya – Tikta	Kashaya – Tikta, Amla	Amla – Kashaya	Amla – Kashaya	Amla – Kashaya

3. Consistency

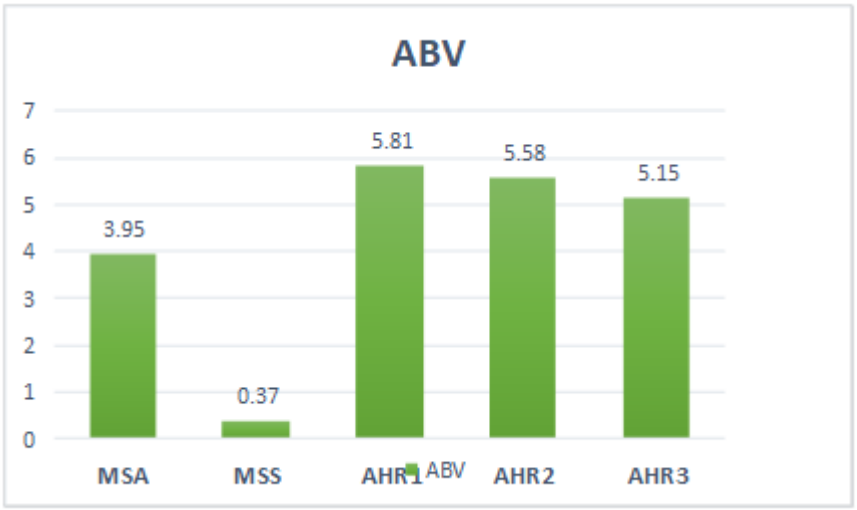
All the samples were liquid.

Physico – Chemical analysis

1. Alcohol percentage: (ABV)

Alcohol percentage denotes the strength/potency of the formulation. It also influences taste, flavour and the shelf life.

- Alcohol percentage of MSS was low



Graph 1: Alcohol percentage.

2. pH

- pH measures the acidity and basicity of the solution. All the samples are acidic

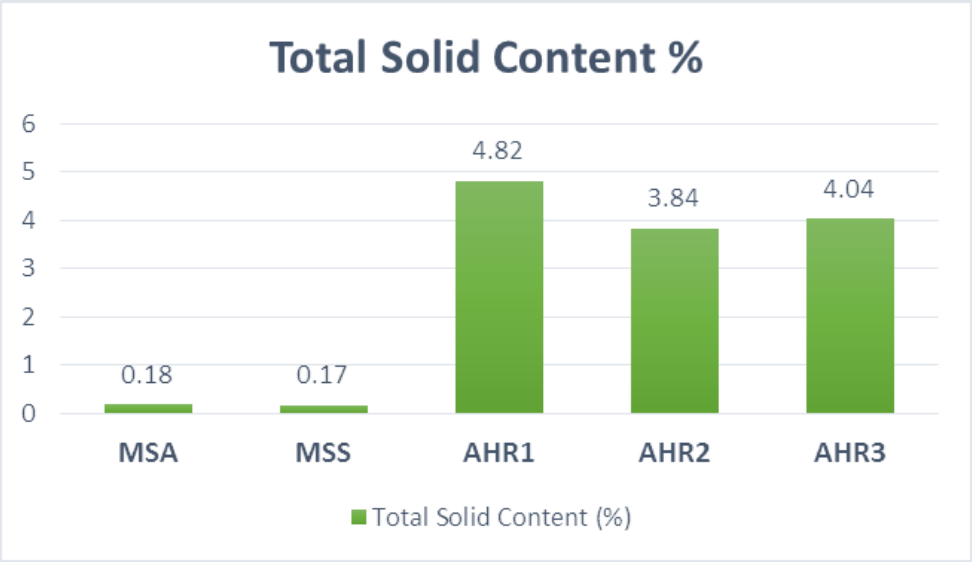
- Indicating that the formulation is an alcoholic preparation which can be appreciated by dominant Amla Rasa.

Graph 2: Ph.

3. Total solid content

- The total solid content gives the residue obtained when a specific amount of formulation is dried to constant weight under specific conditions.

- Total solid content in three batches of *Asrahararishta* was more, which could be due to *Swarasa.*



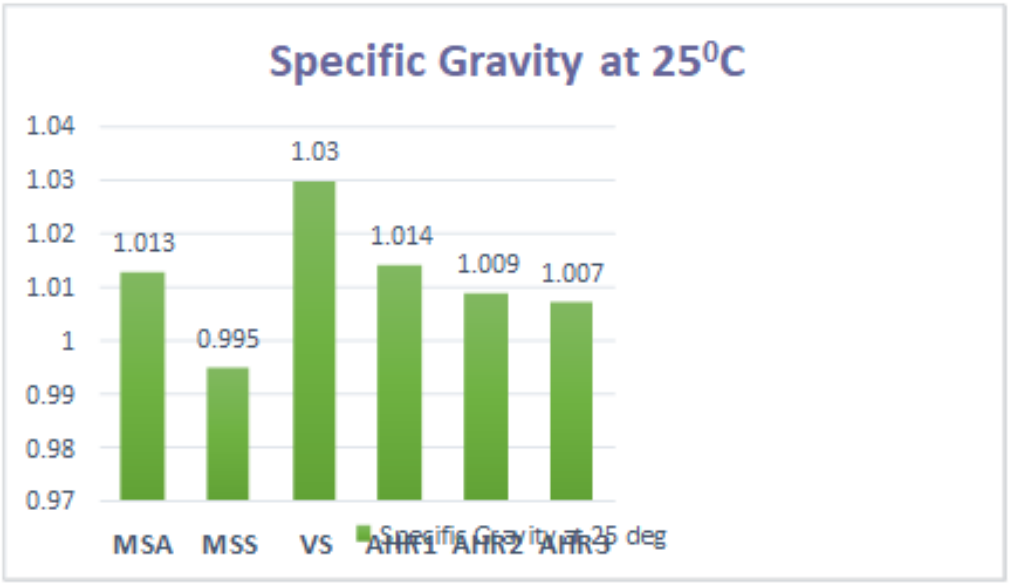
Graph 3: Total Solid Content.

4. Reducing and non-reducing sugars

- Reducing and non-reducing sugars were absent in all the samples

5. Specific gravity @25^{O} C

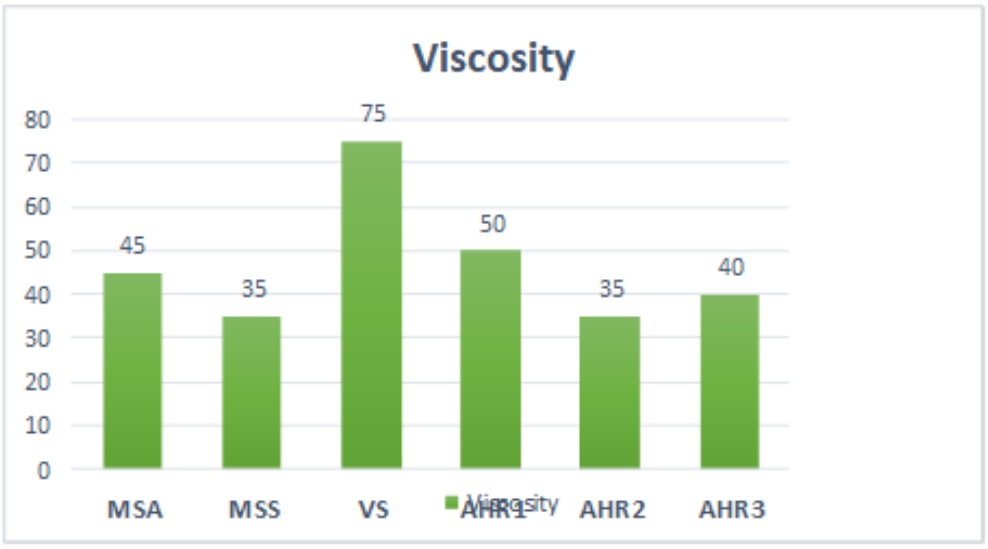
- Specific gravity is the ratio of a sample's density to the density of water at a specific temperature.



Graph 4: Specific Gravity at 25^{O}C.

6. Viscosity

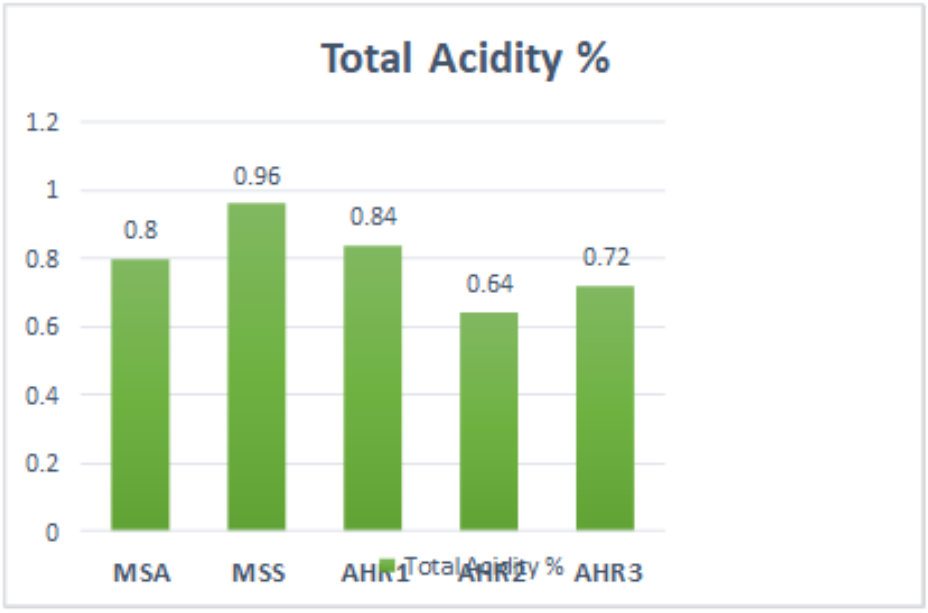
Viscosity is the measure of a fluid's resistance to flow



Graph 5: Viscosity

***7.* Total acidity**

- Total acidity is a measure of the total concentration of acids in a solution
- Total acidity influences the stability, efficacy and safety



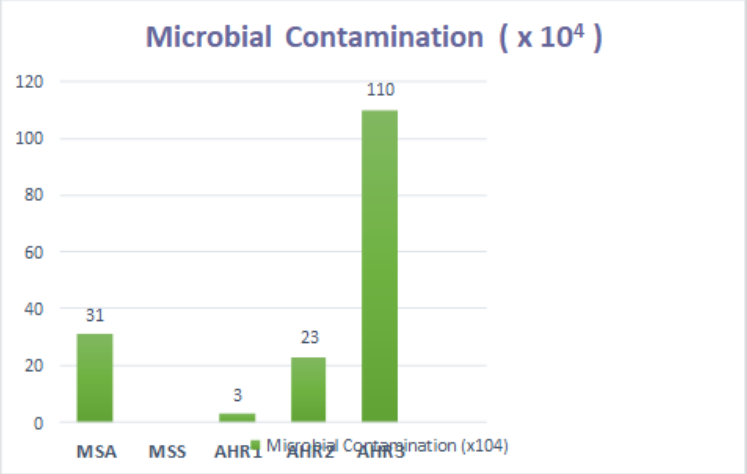
Graph 6: Total Acidity.

8. Test for specific Pathogen

- Test for E.Coli was done. The result was negative in all the samples

9. Microbial Contamination

- Microbial contamination refers to the presence of unwanted microorganisms in a sample. This can compromise efficacy and quality of product.



Graph 7: Microbial Contamination.

IMAGES

PREPARATION OF MRITASANJEEVINI SURA

Ingredients of Mritasanjeevini Sura

Adding of mixture Storage of Mritasanjeevini Sura

Onset of fermentation Layers of Mritasanjeevini Sura

Distillation of Mritasanjeevini Sura

Collection of Mritasanjeevini Sura

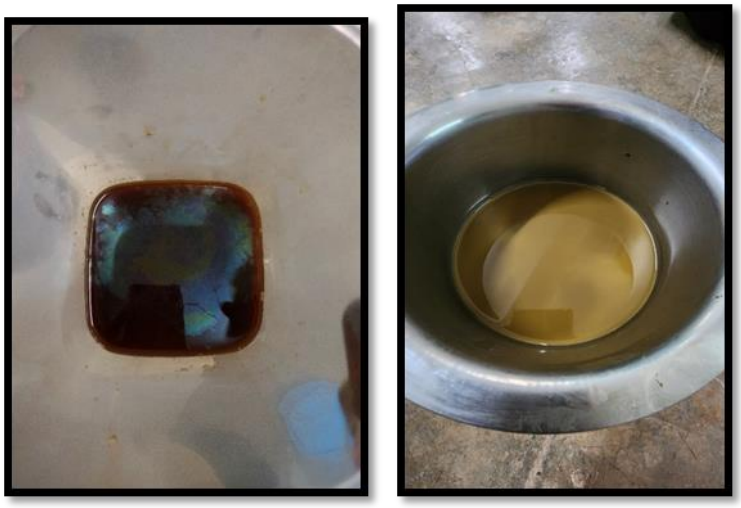
PREPARATION OF ASRAHARARISHTA

Collection of *Vishalyakarni*

Pounding of Vishalyakarni Vishalyakarni Swarasa

Ingredients of Asrahararishta

Mixing Ingredients of Asrahararishta



Asrahararishta

Filtration of Asrahararishta Collection of Asrahararishta

CONCLUSION

- *Asrahararishta* is one the formulation mentioned in *Rajayakshma chikitsa prakarana* of *Bhaishajya Ratnavali*. It is indicated in *Kasa, Rajayakshma, Urakshata, Dhatukshaya, Raktapitta, Raktatisara, Raktapradara.*

- Due to *Vishalyakarni* which exhibits Haemostatic action, this formulation can help in arresting bleeding and hence named *Asrahararishta.*

- This is a unique formulation which involves fermentation of *Mritasanjeevini sura* and *Vishalayakarni/ Asraghni swarasa*, wherein distillate of fermented product is subjected to fermentation with freshly extracted *Swarasa*

- The dosage of *Asrahararishta* is ***Dashabindu,*** administered *once in 3 hours* ***(Pratiyama)*** with ***Sheetajala.*** Which is lesser than the general dose of *Asava – Arishta*

- The drugs used in the formulation, can be used in the management of *Shadrupa* and *Ekadasha rupa* of *Rajayakshma.*

- *Asrahararishta* could have been mentioned in management of *Rakta sthivana* which is one of the *Lakshanas* of *Rajayakshma*

- The first two trials of *Mritasanjeevini Sura* failed

- When the method and proportion mentioned in the reference was adopted in preparation of *Mritasanjeevini Sura,* there was fungal growth and the whole batch was discarded.

- When the proportion of water was taken as per the reference and stirred regularly, the consistency was very thick and could not be subjected to distillation.

- For preparation of *Mritasanjeevini Sura* the following steps were adopted:

1. The proportion mentioned by Prof. Siddhinanadan Mishra sir was taken
2. RO water, which was boiled and cooled was used.
3. After adding jaggery, the syrup was heated again
4. Food grade plastic container was used instead to *Mritpatra*
5. The solution was stirred regularly (2 times a day) till the onset of fermentation
6. The room where Sandhana patra was kept was Fumigated everyday till the onset of fermentation, later was fumigated once in two days till the completion of fermentation

- All the three batches of *Asrahararishta* had all analytical parameters mentioned for Standardization of *Asava-arishta* within the permissible limits
- This formulation can be developed on a large scale, after carrying out toxicity studies, stability studies and clinical trials

LIMITATIONS OF THE STUDY

- Due to time constraint, the study was limited to pharmaceutical development and standardization
- Clinical trials, Toxicity studies, Stability tests could not be done

SCOPE FOR FURTHER STUDIES

- To analyse the clinical efficacy of *Asrhararishta*, animal studies and clinical studies can be taken up.
- The efficacy of *Asrahararishta* can be explored on various indications mentioned.
- *Swarasa* whose shelf life is 24 hours, when mixed with alcoholic/ fermented formulation could be retained for over longer period (Over 3 Months)
- This method could be adopted in enhancing shelf life of Swarasa by using alcoholic media as preservative
- Stability tests to evaluate shelf life and storage conditions can be done
- Toxicity and safety studies to assess potential adverse effects can be done

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