

PHARMACEUTICAL STANDARDIZATION OF *TRIBHUVANKIRTI RASA*

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## ABSTRACT

*Rasaushadhis*, or herbo-mineral medicines, are classified into four main types: *Kharaliya Rasayana*, *Pottali Rasayana*, *Parpati Rasayana*, and *Kupipakwa Rasayana*. Among these, *Kharaliya Rasayana* is the most widely used, while *Kupipakwa* and *Pottali Rasayanas* are less common. *Kharaliya Rasayana* is prepared using a method called '*Sagandha Niragni Moorchana*.' *Tribhuvankirti Rasa* is a notable example of this type. It is a commonly used formulation for managing acute and chronic fevers, especially those linked to respiratory infections, such as flu, sore throat, and similar conditions. *Tribhuvankirti Rasa* has properties like reducing phlegm (*Kaphaghna*), alleviating fever (*Jwaraghna*), inducing sweat (*Swedala*), and relieving pain (*Vedanahara*). These qualities make it effective in treating fevers caused by Vata and Kapha imbalances (*Vatakaphaja Jwara*). Since it contains *Vatsanabha*, a potent ingredient, it must be used carefully with appropriate adjuvants based on the individual's constitution (*Prakriti*).

**KEYWORDS:** *Kharaliya Rasayana*, *Tribhuvankirti Rasa*, *Rasaushadhi*.

## INTRODUCTION

*Rasa Shastra* and *Bhaishajya Kalpana* focus on using proper pharmaceutical methods in drug preparation. Key principles like *Shodhana* (purification), *Jarana* (roasting), *Marana* (incineration), and *Bhavana* (trituration) play a vital role in the process. These principles not only improve the quality and effectiveness of the medicines but also ensure they are prepared and presented in a way that is safe, appealing, and easy for patients to consume.

Standardization involves setting consistent methods for manufacturing, testing, and calibrating equipment, or establishing specific conditions for a particular purpose. It is a crucial step in ensuring the quality of Ayurvedic medicines. The main goals of standardization are to verify the medicine's identity, quality, and purity, as well as to detect any adulteration.

In pharmaceutical studies, the primary goal is to establish a Standard Operating Procedure (S.O.P) to ensure the preparation of effective medicines. Consistency across different batches of the same drug is essential, which requires thorough documentation at every stage of drug production. This documentation, along with analytical studies, helps finalize the proper process for preparing each drug. Developing an S.O.P involves the following steps.

- 1). Selection of raw drugs from authenticated sources.
- 2). Different processes as per classical texts.

- 3). Finished product analysis as per standards described in API.

**In this context, the present study has been designed by manufacturing of three samples of *Tribhuvankirti Rasa***

These samples of *Tribhuvankirti Rasa* were prepared in the Department of *Rasa Shastra* and *Bhaishajya Kalpana* of Rajiv Gandhi Government Post Graduate Ayurvedic College, Paprola, Kangra, Himachal Pradesh (HP).

**Pharmaceutical Study Design**

**Pharmaceutical work of thesis consists of following**

1. Procurement of raw material.
2. Authentication of raw drugs.
3. Pharmaceutical processes of *Tribhuvankirti Rasa* done in details.

**Aim and Objectives of Pharmaceutical study**

- To prepare S.O.P of *Hingula Shodhana*
- To prepare S.O.P of *Vatsanabha Shodhana*
- To prepare S.O.P of *Tankana Shodhana*
- S.O.P for the preparation of *Tribhuvankirti Rasa*.

**1. Procurement of raw material**

- *Ashuddha Hingula*, *Ashuddha Vatsanabha*, *Pippali*, *Maricha*, *Sunthi*, *Pippalimula* were procured from the local market, i.e., from Paprola.
- *Ashuddha Tankana* was procured from Charaka Ayurvedic Pharmacy, Paprola.

- *Tulasi* was freshly collected from the Herbal Garden and Herbarium, Research Institute in ISM Joginder Nagar, Distt. Mandi.
- *Dhattura* and *Nirgundi* were collected locally.
- *Ardraka* and *Nimbu* were procured from the local market.
- *Gomutra* was collected from local farmers.

## 2. Authentication of raw drugs

The raw drugs were collected and identified by a committee comprised of expert members of *Dravyaguna*, *Rasa Shastra*, and *Bhaisajya Kalpana* Department.

## 3. Pharmaceutical Processes of *Tribhuvankirti Rasa* done in details

### Processes involved in the preparation of *Tribhuvankirti Rasa*

- *Shodhana* of *Hingula*
- *Shodhana* of *Vatsanabha*
- *Shodhana* of *Tankana*
- Powdering of ingredients of *Tribhuvankirti Rasa*.
- Preparation of *Swarasa* for *Bhavana*
- Preparation of *Kwatha* for *Bhavana*
- Preparation of *Tribhuvankirti Rasa* (Sample A)
- Preparation of *Tribhuvankirti Rasa* (Sample B)
- Preparation of *Tribhuvankirti Rasa* (Sample C)
- Preparation of *Vatis* of *Tribhuvankirti Rasa*.

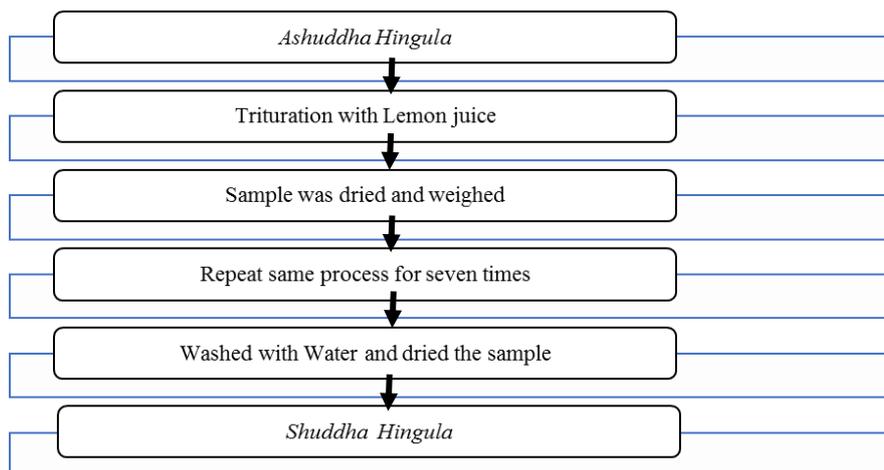
### Practical Number-1

**Name of the process:-** Extraction of Lemon Juice.

**Reference :** AFI Part I (*Sharangdhara Samhita Madhyama Khanda 1/2*)

### Procedure

#### Flow Chart of *Hingula Shodhana*



**Equipment :** Squeezer, measuring cylinder, S.S containers, knife, etc.

**Materials :** Fresh Lemon-5 kg

### Procedure

1. Fresh lemons were washed and halved.
2. Juice was extracted using a squeezer, filtered, and measured.

### Precautions

Care was taken to check that the Lemon used was in a non-contaminated state.

### OBSERVATIONS AND RESULTS

Color : Light yellow

Smell : Characteristic

Weight : 2.5 litre

### Practical Number-2

**Name of process :** *Shodhana* of *Hingula*

**Reference :** *Rasa Tarangini* 9/16-17

**Medium for *Shodhana* :** Lemon Juice

**Principle :** *Bhavana* (By *Mardana* or trituration method) and *Prakshalana*

**Equipments :** Pestle & mortar, spoon, brush, S.S tray, knife, enamel tray, etc.

**Material :** *Ashuddha Hingula* –250gm (per sample).

Lemon Juice : Q.S for seven *Bhavana*.

**Table 1: Showing results of *Hingula Shodhana* (Sample A, B & C)**

Sample	Initial Weight (gm.)	Total Nimbu Swarasa added (ml)	Weight of Shuddha Hingula after seven <i>Bhavana</i>	Weight of Shuddha Hingula after washing with water and drying completely
Sample A	250	530	284gm	245gm
Sample B	250	550	286gm	248gm
Sample C	250	470	283gm	247gm

**Results (Sample A, B & C)**

- **Total Time for Trituration:** 42 hours (average ~6 hours/day).
- **Weight Changes:** Small gain after each levigation due to retained juice but minimal overall loss (<2%).
- **Final Product:** Shuddha Hingula in a stable, brick-red form.

**Precautions**

- *Hingula* was powdered carefully to check the loss.

- The quantity of lemon juice taken for every *Bhavana* should be sufficient enough for the immersion of *Hingula* powder.
- *Mardana* should be done continuously and cautiously especially, when the *Swarasa* was added.
- Initially, when the powder becomes more wet, at that time, trituration should be done slowly so as to avoid the expulsion of material from the mortar.
- The levigation should be done with proper constant pressure and frequency.
- The pestle and mortar should cover with cotton cloth to prevent contamination from insects and dust.

**Table 2: Showing Physical examination of *Hingula* before and after *Shodhana* (Sample A, B & C)**

Tests	Before <i>Shodhana</i>	After <i>Shodhana</i>
<b>Color</b>	Dark Reddish Brown	Brick Red
<b>Consistency</b>	Shining blocks	Lusterless powder
<b>Smell</b>	No specific smell	Lemon smell
<b>Taste</b>	Not Done	Not done

**Practical Number – 3**

**Name of the process** : *Shodhana* of *Vatsanabha* (Sample A)

**Reference** : *Rasa Tarangini* - 24/20-22

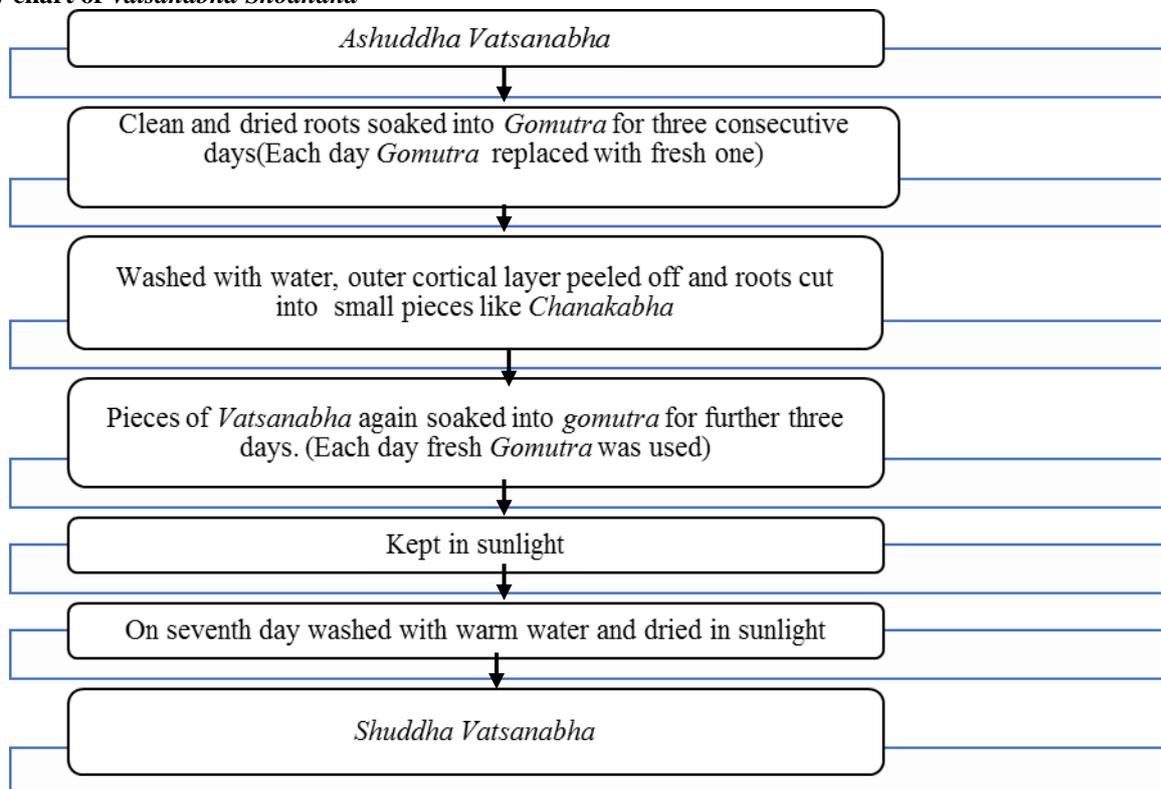
**Medium for *Shodhana*** : *Gomutra*

**Principle** : *Nimajjana* (Dipping)

**Equipments** : Stainless Steel container, knife, cotton cloth piece, S.S tray, weighing machine, etc.

**Material** : *Ashuddha Vatsanabha* – 200gm

*Gomutra* – 2 litres each time

**Procedure****Flow chart of *Vatsanabha Shodhana***

Same procedure was opted for two more times.

**OBSERVATIONS**

- Odour of *Vatsanabha* - *Gomutragandhi*.
- Colour of *Gomutra* - Changed from yellow to dark red.
- Colour of *Vatsanabha* - Creamish yellow
- Pieces of *Vatsanabha* became soft.
- On the fourth day, it became easier to peel off the outer, cortical layer of *Vatsanabha*.

**Precautions**

- *Vatsanabha* should be handled carefully as it is a highly poisonous drug.
- Raw *Vatsanabha* was examined carefully for decomposed variety (*Kitdanshta*) and dust, clay particles, etc. on the surface were cleaned.

- Everyday fresh *Gomutra* was used.
- After exposure to sunlight, the vessel was covered properly with cotton cloth till the next exposure.
- During removal of the outer, cortical layer of *Vatsanabha*, surgical gloves were used.

**RESULTS**

Final weight	-	110.4gm
Weight loss	-	89.6gm
Percentage yield	-	55.2%
Final colour of <i>Vatsanabha</i>	-	Light brown
Total quantity of <i>Gomutra</i> used	-	12 litre

In the similar manner *Vatsanabha Shodhana* was done two more times and results are shown in Table below.

**Table 3: Showing results of *Vatsanabha Shodhana* (Sample A, B & C)**

Sample of <i>Vatsanabha</i>	Date of starting	Date of completion	Initial weight (gm.)	<i>Gomutra</i> used (litres/ day)	Final Weight (gm.)	% Yield	Weight loss (gm)	Percentage of weight loss
Sample A	2.7.21	13.7.21	200	2 litre	110.4	55.2%	89.6	44.8
Sample B	19.7.21	01.8.21	200	1.5 litre	104	52%	96	48
Sample C	26.8.21	7.9.21	200	2 litre	112.2	56.1%	87.8	43.9

Average percentage of weight loss observed in the three samples of *Vatsanabha* after *Shodhana*–45.6%.

**Practical Number – 4**

**Name of Process:-** *Shodhana* of *Tankana* (Sample A)

**Reference** : A.F.I. Part I (*Ayurveda Prakasha* - 2/244)

**Principle** : *Nirjalikarana*

**Equipments** : Enamel container, spatula, gas-stove, Iron *Kadhayi*, mortar & pestle etc.

**Material** : *Ashuddha Tankana* - 200gm

**Procedure**

- 200gm *Ashuddha Tankana* powder was prepared by pounding it well in a clean and dry mortar and pestle.
- Each time, about 100gm of *Tankana* powder was taken in an Iron *Kadhayi* and heated on a low flame.
- Constant stirring was done with a spatula.
- On continuous heating, it turned into white opaque substance due to evaporation of water.
- The heating was continued until the crackling sound started to diminished which was an indication of crystalline water evaporation.
- The product thus obtained was powdered after cooling and preserved in an airtight container.

**OBSERVATIONS**

- During heating, it produced sound like crepitation because of the evaporation of water content.
- After ten minutes of heating *Tankana* was started to melt.
- During heating, small particles of *Tankana* fly into the air.
- Volume increases very rapidly.
- Over time, *Tankana* became lighter and whiter.

**Precautions**

- To avoid loss, wide Iron *Kadhayi* should be used.
- Each time, a small quantity of *Tankana* powder should be used to avoid spilling out.
- It should be done over a mild flame.
- Continuous heating should be recommended.

**RESULTS**

Final weight	-	110gm
Weight loss	-	90 gm
Percentage of weight loss	-	45%
Final color	-	white
Form	-	Fine Powder
Duration of heating	-	1 hr.45 min.

In the similar manner *Tankana Shodhana* was done two more times and results are shown in Table below.

## RESULTS

Table 4: Showing results of *Tankana Shodhana* (Sample A, B & C).

Samples of <i>Tankana</i>	Date of Starting	Date of Completion	Initial weight (gm)	Final Weight (gm)	Duration of heating (hrs)	% Yield	Weight loss (gm)	Percentage of weight loss (%)
Sample A	8.7.21	8.7.2021	200	110gm	1hr 45 min.	55%	90	45
Sample B	9.7.21	9.7.2021	200	100gm	2	50%	100	50
Sample C	11.7.21	11.7.2021	200	102gm	2	51%	98	49

Average percentage of weight loss observed in the three samples of *Tankana* (Sample A, B, C) – 48%

Table 5: Showing physical examination of *Tankana* before and after *Shodhana* (Sample A, B & C).

Tests	Before <i>Shodhana</i>	After <i>Shodhana</i>
Color	White	White
Form	Crystalline	Powder
Weight	Heavy	Light
Taste	Not Done	Kshara

## Practical Number – 5

**Name of the process:-** Powdering of Ingredients of *Tribhuvankirti Rasa*

**Reference** - *Sharangadhar Samhita Madhyama Khanda -6/1*

**Equipments** – Pestle & mortar, Mixer Grinder, S.S tray, Sieves of different sizes, weighing machine etc.

**Ingredients** : *Sunthi, Pippali, Maricha, Pippalimula* and *Shuddha Vatsanabha*

- All the raw drugs were screened, washed, and dried.
- After proper drying the drugs were powdered separately with the help of a mixer grinder.
- The powder was then passed through sieve no.85.

## Precautions

- Cap, surgical gloves and mask were worn during the whole procedure.
- Caution should be taken during sieving to check the loss.

## Procedure

- The procured raw drugs were identified by the raw drug approval committee.

Table 6: Showing observations and results of Powdering of drugs.

Sr.No.	Name of the raw drug	Weight of drug taken (gm.)	Weight after grinding and sieving (gm.)	Weight loss (gm.)	% yield	Color of Powders
1.	<i>Sunthi</i>	422gm	312gm	110gm.	73.9%	Whitish Creamy
2.	<i>Pippali</i>	390gm	267gm	123gm.	68.4%	Brownish black
3.	<i>Maricha</i>	394gm	277gm	117gm.	70.3%	Dark Brown
4.	<i>Pippalimula</i>	400gm	312gm	88gm.	78%	Brown
5.	<i>Shuddha Vatsanabha</i>	Sample A-110.4gm Sample B -104 gm Sample C-112.2gm	53.9gm 51.37gm 56 gm	56.5gm 52.63gm 56.2 gm	48.8% 49.3% 49.9%	Light Brown

## Practical Number – 6

**Name of the process** : **Preparation of *Swarasa for Bhavana***

**Reference** - *Sharangdhara Samhita Madhyama Khanda ½*

**Equipments** – Mortar and pestle, tray, mixer grinder, cloth pieces, stainless steel container, glass jar, measuring cylinder, etc.

**Materials** - Fresh leaves of *Tulasi, Dhatura* and *Nirgundi* and fresh rhizomes of *Ardra*.

## Procedure

- The material was pounded well with the help of a mortar and pestle.
- The pounded material was placed in a mixer grinder to make a smooth paste (*Kalka*).
- Then, the *Kalka* was manually expressed with a cotton cloth.
- After that, the filtered juice (*Swarasa*) was collected in a stainless steel container.

- Obtained *Swarasa* was measured by a measuring cylinder before being utilised in the *Bhavana* procedure.

#### Precautions

- The procedure should be done under hygienic conditions.
- Fresh and green leaves were taken.
- The *Nirgundi Patra*, *Dhattura Patra*, *Tulasi Patra* and *Ardra* were washed to eliminate impurities.

#### RESULTS

##### *Tulasi Patra Swarasa*

Taste – *Katu*, *Tikta*, *Kashaya*

Color - Light green

pH – 7

##### *Ardra Swarasa*

Taste – *Katu*

Color – Pale yellowish green

pH – 5.9

##### *Dhattura Patra Swarasa*

Taste – *Katu*, *Kashaya*, *Tikta*

Color – Dark green

pH – 7.3

##### *Nirgundi Patra Swarasa*

Taste – *Katu*, *Tikta*, *Kashaya*

Color – Brownish green

pH – 7.2

#### OBSERVATIONS AND RESULTS

Table 7: Showing the total material consumed and total *Swarasa* obtained for the *Bhavana* in the preparation of the Sample A and B of *Tribhuvankirti Rasa*.

S.No.	<i>Swarasa</i>	Color of <i>Swarasa</i>	Total material consumed (for Sample A)	Total <i>Swarasa</i> obtained (for Sample A)	Yield (in%) (for Sample A)	Total material consumed (for Sample B)	Total <i>Swarasa</i> obtained (for Sample B)	Yield (in %) (for Sample B)
1.	<i>Tulasi Patra Swarasa</i>	Light green	2 kg	1300 ml	65	1 Kg	560 ml	56
2.	<i>Ardra Swarasa</i>	Pale Yellowish Green	1 Kg	580 ml	58	3 Kg	1740 ml	58
3.	<i>Dhattura Patra Swarasa</i>	Dark green	1.8 kg	1340 ml	74.4	2.8 Kg	1780 ml	63.5
4.	<i>Nirgundi Patra Swarasa</i>	Brownish green	2 Kg	1100 ml	55	2.25 Kg	1100 ml	48.8

#### Practical Number – 7

Name of the process : Preparation of *Kwatha* for *Bhavana*

Reference - *Sharangdhara*

*Samhita Madhyama Khanda 2/2*

Equipments – LPG stove, Stainless Steel vessels, ladle, cotton cloth, measuring cylinder, mortar and pestle, tray, etc.

Materials - Fresh leaves of *Tulasi*, *Dhattura* and *Nirgundi*  
- Water

#### Procedure

- The material was pounded well with a mortar and pestle and mixed thoroughly with a sufficient amount of water in a stainless steel container and soaked overnight.
- Next day, the mixture was heated mildly by applying continuous heat on a gas stove until it was reduced to 1/8<sup>th</sup> of its initial quantity.
- During the heating process, continuous stirring was done to facilitate the evaporation and avoid any deterioration due to burning of material.

- The *Kwatha* was finally filtered through a single-folded cotton cloth and collected in a separate vessel.

#### Precautions

- The *Nirgundi Patra*, *Dhattura Patra*, *Tulasi Patra* were washed to eliminate impurities.
- The vessel was covered properly during overnight soaking to prevent contamination from external dust, insects, etc.
- Mild to moderate heat was given during the whole procedure to lessen the chances of degradation of some of the active constituents.
- A lid should not cover the vessel while heating.

#### RESULTS

##### *Tulasi Patra Kwatha*

- Taste – *Katu*, *Tikta*, *Kashaya*
- Color - Brownish

##### *Ardra Swarasa*

- Taste – *Katu*
- Color – Pale yellowish green

**Dhattura Patra Kwatha**

- Taste – *Katu, Kashaya, Tikta*
- Color – Brownish black

**Nirgundi Patra Kwatha**

- Taste – *Katu, Tikta, Kashaya*
- Color – Brownish

**OBSERVATIONS AND RESULTS****Table 8: Showing the total material consumed and total Kwatha obtained for the Bhavana in the preparation of the Sample C of Tribhuvankirti Rasa.**

S. No.	Material	Total material consumed (gms)	Water added	Total Kwatha / Swarasa obtained (ml)	Color of Kwatha / Swarasa	Duration (hours)
1.	<i>Tulasi Patra</i>	1400	8 times	1400 ml	Brownish	6
2.	<i>Ardraka</i>	2600		1550 ml	Pale yellowish green	
3.	<i>Dhattura Patra</i>	1500	8 times	1500 ml	Greenish black	6
4.	<i>Nirgundi Patra</i>	900	8 times	900ml	Brownish	5

**Practical Number – 8**

**Name of the process** : Preparation of *Tribhuvankirti Rasa* (Sample A)

**Reference** - A.F.I. Part I, 20:20 (*Rasamritam, Rasayoga Vigyaniam*, Cha. 9, 80-80 ½)

**Principle** - *Bhavana* (By *Mardana* or trituration method)

**Equipments** - Weighing machine, mortar and pestle, spatula, vessel, cotton cloth, measuring cylinder

**It includes five Sub processes**

1. Powdering and mixing of all ingredients.
2. Trituration with *Nirgundi Patra Swarasa*
3. Trituration with *Dhattura Patra Swarasa*
4. Trituration with *Ardraka Swarasa*
5. Trituration with *Tulasi Patra Swarasa*

**Sub Process – 1) Powdering and mixing of all ingredients****Material**

- *Shuddha Hingula Churana* 50 gm.
- *Shuddha Vatsanabha Churana* 50 gm.
- *Sunthi Churana* 50 gm.
- *Maricha Churana* 50 gm.
- *Pippali Churana* 50 gm.
- *Shuddha Tankana Churana* 50 gm.
- *Pippalimula Churana* 50 gm.
- *Nirgundi Patra Swarasa* 1100ml
- *Dattura Patra Swarasa* 620ml
- *Ardraka Swarasa* 580ml
- *Tulasi Patra Swarasa* 470ml

**Procedure**

The powder of *Shuddha Hingula* were taken and mardana was carried out in mortar and pestle. Then *Shuddha Vatsanabha* and *Shuddha Tankana* was added to this mixture and grounded until it became the fine powder and then other ingredients were added and mixed properly which was sieved again through 85 No. sieve resulting in 350gm of reddish brown powder was obtained.

**Sub process – 2) Trituration with Nirgundi Patra Swarasa**

350gm of powdered mixture was taken in a black stone mortar and pestle and 500ml of *Nirgundi Patra Swarasa* was added to it and then trituration was started. After levigation for six hours, when the trituration became difficult and in paste form and the material became comparatively dry, it was collected, dried and weighed. In a similar way, the same process was repeated for two more times. For the second and third *Bhavana*, 340ml and 260ml of *Swarasa* were used, respectively. The weight obtained after three *Bhavanas* was 430gm.

**Observations after three Bhavana of Nirgundi Patra Swarasa**

- Color on adding *Nirgundi Patra Swarasa* :- Greenish brown
- Color after completion of three *Bhavana* of *Nirgundi Patra Swarasa* :-Reddish brown
- Fragrance :- Characteristics smell of *Nirgundi Patra*.
- Total Time taken for the completion of three *Bhavanas* :-19hours

**RESULTS**

- Weight after three *Bhavana* of *Nirgundi Patra Swarasa* :- 430gm
- Weight gain :- 80gm
- Percentage of weight gain after completion of *Nirgundi Patra Swarasa Bhavana* – 22.8%
- Total *Nirgundi Patra Swarasa* in process used – 1100ml
- Total *Nirgundi Patra Swarasa* average used per process – 366.66ml

**Sub process – 3) Trituration with Dhattura Patra Swarasa**

The 430gm obtained weight of material was again taken in mortar and pestle and 240ml of *Dhattura Patra Swarasa* was added to it and then trituration was started. After levigation for six hours, when the trituration became difficult and in paste form and the material became comparatively dry, it was collected, dried and weighed. In a similar way, the same process was repeated for two more times. For the second and third *Bhavana*,

200ml and 180ml of *Swarasa* were used, respectively. The weight obtained after three *Bhavanas* was 450gm.

#### Observations after completion of three *Bhavana* of *Dhattura Patra Swarasa*

- Color on adding *Dhattura Patra Swarasa* :- Greenish red
- Color after completion of three *Bhavana* of *Dhattura Patra Swarasa* :-Reddish brown
- Fragrance :- characteristics smell of *Dhattura Patra*
- Total Time taken for the completion of three *Bhavanas* :-19.5 hours

#### RESULTS

- Weight after three *Bhavanas* of *Dhattura Patra Swarasa* :-450gm
- Weight gain :- 20gm
- Percentage of weight gain after completion of *Dhattura Patra Swarasa Bhavana* – 4.65%
- Total *Dhattura Patra Swarasa* in process used – 620ml
- Total *Dhattura Patra Swarasa* average used per process – 206ml

#### Sub process – 4) Trituration with *Ardraka Swarasa*

The 450gm obtained weight of material was again taken in mortar and pestle and and 250ml of *Ardraka Swarasa* was added to it and then trituration was started. After levigation for six hours, when the trituration became difficult and in paste form and the material became comparatively dry, it was collected, dried and weighed. In a similar way, the same process was repeated two times. For the second and third *Bhavana*, 200ml and 130ml of *Swarasa* were used, respectively. The weight obtained after three *Bhavanas* was 520gm.

#### Observations after completion of three *Bhavana* of *Ardraka swarasa*

- Color on adding *Ardraka Swarasa* :- brighter and whiter red
- Color after completion of three *Bhavana* of *Ardraka Swarasa* :-Reddish brown
- Fragrance :- Like *Ardraka*
- Total Time taken for the completion of three *Bhavanas* :-18 hours

#### RESULTS

- Weight after three *Bhavanas* of *Ardraka Swarasa* :- 520 gm
- Weight gain :- 70gm
- Percentage of weight gain after completion of *Ardraka Swarasa Bhavana* – 15.5%
- Total *Ardraka Swarasa* in process used – 580 ml
- Total *Ardraka Swarasa* average used per process – 193.3ml

#### Sub process – 5) Trituration with *Tulasi Patra Swarasa*

The 520gm obtained weight of material was again taken in mortar and pestle and and 150ml of *Tulasi Patra Swarasa* was added to it and then trituration was started. After levigation for six hours, when the trituration became difficult and in paste form and the material became comparatively dry, it was collected, dried and weighed. In a similar way, the same process was repeated for two more times. For the second and third *Bhavana*, 180ml and 140ml of *Swarasa* were used, respectively. The weight obtained after three *Bhavanas* was 550gm.

#### Observations after completion of three *Bhavana* of *Tulasi Patra Swarasa*

- Color on adding *Tulasi Patra Swarasa* :- Greenish Brown
- Color after completion of three *Bhavanas* of *Tulasi Patra Swarasa* :-Reddish brown
- Fragrance :- Like *Tulasi*
- Total Time taken for the completion of three *Bhavanas* :-20.5 hours

#### RESULTS

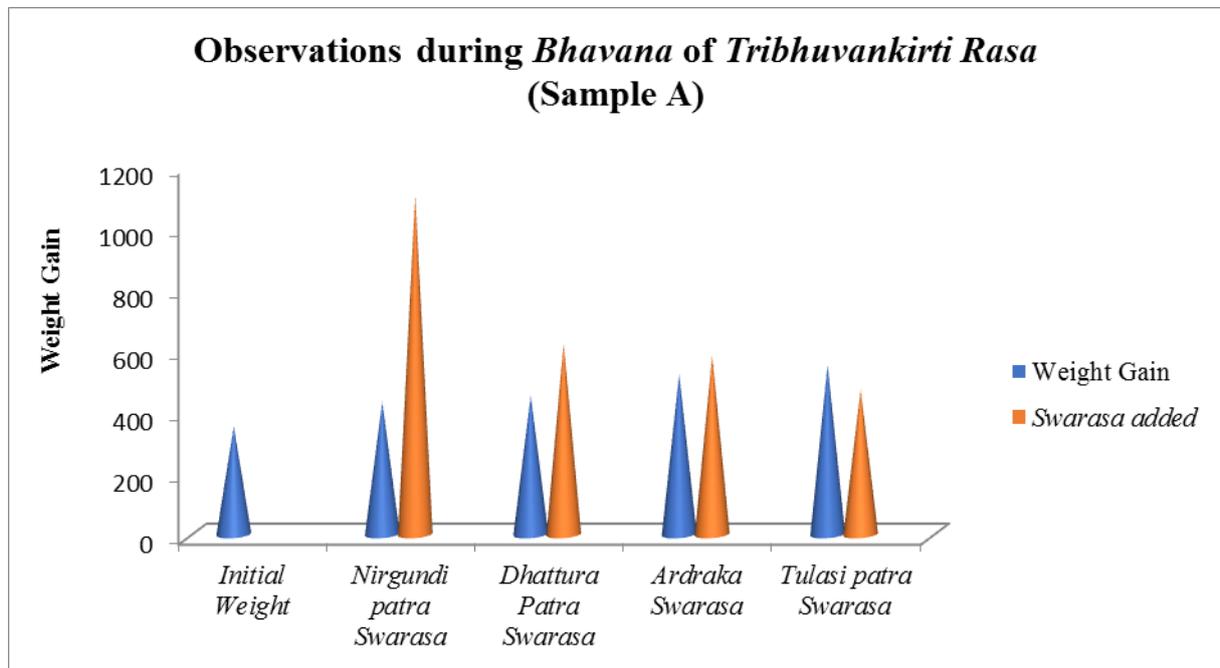
- Weight after three *Bhavanas* of *Tulasi Patra Swarasa* :-550 gm
- Weight gain :- 30gm
- Percentage of weight gain after completion of *Tulasi Patra Swarasa Bhavana* –5.7 %
- Total *Tulasi Patra Swarasa* in process used – 470ml
- Total *Tulasi Patra Swarasa* average used per process – 156.6ml

**Table 9: Showing observations and results of twelve *Bhavanas* of *Tribhuvankirti Rasa* (Sample A).**

No. of <i>Bhavana</i>	<i>Swarasa</i>	Weight before <i>Bhavana</i> (gms)	Quantity of <i>Swarasa</i> consumed for each <i>Bhavana</i>	Total quantity consumed	Duration of <i>Bhavana</i> (hrs)	Colour of mixture after 3 <i>Bhavanas</i> of each drug	Weight. after <i>Bhavanas</i> (gms)	Increased in weight
1.	<i>Nirgundi</i>	350	500 ml	1100 ml	6	Greenish Brown	375	80 gm
2.	<i>Patra</i>	375	340ml		6		400	
3.	<i>Swarasa</i>	400	260ml		7		430	
4.	<i>Dhattura</i>	430	240 ml	620 ml	6	Greenish Red	435	20 gm
5.	<i>Patra</i>	435	200 ml		6		440	
6.	<i>Swarasa</i>	440	180 ml		7.5		450	
7.	<i>Ardraka Swarasa</i>	450	250 ml	580 ml	6	Brighter & Whiter Red	472	70gm
8.		472	200 ml		6		495	
9.		495	130 ml		6		520	

10.	<i>Tulasi patra</i>	520	150ml	470ml	6	Greenish brown	530	30 gm
	<i>Swarasa</i>	538	180ml		7		538	
			140ml		7.5		550	

P.G.1: Graph showing weight gain of *Tribhuvankirti Rasa* with the addition of *Swarasa*.



#### Observations

- The color was changed after each bhavana according to the swarasa used and the end product was reddish brown in color.
- Trituration of the mixture was done till it became dry.
- For first *Bhavana* more *Swarasa* was needed to wet the whole drug powder as compared with subsequent bhavanas.
- As the number of *Bhavana* increases, the quantity of the required *Swarasa* decreases.

#### Precautions

- Trituration should be done continuously and cautiously.
- To prevent contamination from external dust, the mortar and pestle was properly covered over night.
- Only *Shodhita Dravya* are to be used.

#### RESULTS

##### Final Product obtained – *Tribhuvankirti Rasa* (Sample A)

- Final Weight – 550gm
- Weight Gain – 200gm
- Percentage of weight gain:-57.1%
- Total *Swarasa* in process used –2770 ml
- Total *Bhavana* given:- 12
- Total time taken for Trituration process – 77 hours
- Average duration of Trituration per day – 6 hours 41minutes/day
- Odour :- Potent smell as its Characteristics
- Final Color of *Tribhuvankirti Rasa* – Reddish brown

#### Practical Number – 9

##### Name of the process:- Preparation of *Tribhuvankirti Rasa* (Sample B)

**Reference** - A.F.I. Part I, 20:20 (*Rasamritam, Rasayoga Vigyaniam*, Cha. 9, 80-80 ½)

**Principle** - *Bhavana* (By *Mardana* or trituration method)

**Equipments** - Weighing machine, mortar and pestle, end runner spatula, vessel, cotton cloth, measuring cylinder etc.

##### It includes five Sub processes

1. Powdering and mixing of all ingredients.
2. Trituration with *Tulasi Patra Swarasa*
3. Trituration with *Ardraka Swarasa*
4. Trituration with *Dhattura Patra Swarasa*
5. Trituration with *Nirgundi Patra Swarasa*

##### Sub process -1) Powdering and mixing of all ingredients

###### Material

- |                                      |        |
|--------------------------------------|--------|
| 1. <i>Shuddha Hingula Churana</i>    | 50 gm. |
| 2. <i>Shuddha Vatsanabha Churana</i> | 50 gm. |
| 3. <i>Sunthi Churana</i>             | 50 gm. |
| 4. <i>Maricha Churana</i>            | 50 gm. |
| 5. <i>Pippali Churana</i>            | 50 gm. |
| 6. <i>Shuddha Tankana Churana</i>    | 50 gm. |
| 7. <i>Pippalimula Churana</i>        | 50 gm. |
| 8. <i>Tulasi Patra Swarasa</i>       | 1300ml |
| 9. <i>Ardraka Swarasa</i>            | 1200ml |
| 10. <i>Dhattura Patra Swarasa</i>    | 1050ml |
| 11. <i>Nirgundi Patra Swarasa</i>    | 1050ml |

**Procedure**

The powder of *Shuddha Hingula* were taken and mardan was carried out in mortar and pestle. Then *Shuddha Vatsanabha* and *Shuddha Tankana* was added to this mixture and grounded until it became the fine powder and then other ingredients were added and mixed properly which was sieved again resulting in 350gm of reddish brown powder was obtained.

**Sub process – 2) Trituration with Tulasi Patra Swarasa**

350gm of powdered mixture was taken in an end runner and 800ml of *Tulasi Patra Swarasa* was added to it and then trituration was started. After levigation for six hours, when the trituration became difficult and in paste form and the material became comparatively dry, it was collected, dried and weighed. In a similar way, the same process was repeated for two more times. For the second and third *Bhavana*, 300ml and 200ml of *Swarasa* were used, respectively. The weight obtained after three *Bhavanas* was 435gm.

**Observations after three Bhavana of Tulasi Patra Swarasa**

- Color on adding *Tulasi Patra Swarasa* :- Greenish Brown
- Color after completion of three *Bhavanas* of *Tulasi Patra Swarasa* :- light Brown
- Fragrance :- Like *Tulasi*
- Total Time taken for the completion of three *Bhavanas* :-18hours

**Results**

- Weight after three bhavanas of *Tulasi Patra Swarasa* :-435gm
- Weight gain :- 85gm
- Percentage of weight gain after completion of *Tulasi Patra Swarasa Bhavana* – 24.2%
- Total *Tulasi Patra Swarasa* in process used – 1300ml
- Total *Tulasi Patra Swarasa* average used per process –433.33ml

**Sub process – 3) Trituration with Ardraka Swarasa**

The 435gm obtained weight of material was again taken in an end runner and 500ml of *Ardraka Swarasa* was added to it and then trituration was started. After levigation for six hours, when the trituration became difficult and in paste form and the material became comparatively dry, it was collected, dried and weighed. In a similar way, the same process was repeated for two more times. For the second and third *Bhavana*, 400ml and 300ml of *Swarasa* were used, respectively. The weight obtained after three *Bhavanas* was 505gm.

**Observations after completion of three Bhavana of Ardraka Swarasa**

- Color on adding *Ardraka Swarasa* :- brighter and whiter red

- Color after completion of three *Bhavana* of *Ardraka Swarasa* :- Reddish brown
- Fragrance :- Like *Ardraka*
- Total Time taken for the completion of three *Bhavanas* :-19.5 hours

**Results**

- Weight after three *Bhavanas* of *Ardraka Swarasa* :- 505gm
- Weight gain :- 70gm
- Percentage of weight gain after completion of *Ardraka Swarasa Bhavana* – 16%
- Total *Ardraka Swarasa* in process used –1200 ml
- Total *Ardraka Swarasa* average used per process – 400ml

**Sub process – 4) Trituration with Dhattura Patra Swarasa**

The 505gm obtained weight of material was again taken in an end runner and 400ml of *Dhattura Patra Swarasa* was added to it and then trituration was started. After levigation for six hours, when the trituration became difficult and in paste form and the material became comparatively dry, it was collected, dried and weighed. In a similar way, the same process was repeated for two more times. For the second and third *Bhavana*, 350ml and 300ml of *Swarasa* were used, respectively. The weight obtained after three *Bhavanas* was 555gm.

**Observations after completion of three Bhavana of Dhattura Patra Swarasa**

- Color on adding *Dhattura Patra Swarasa* :- Greenish red
- Color after completion of three *Bhavana* of *Dhattura patra Swarasa* :-Reddish brown
- Fragrance :- Characteristics smell of *Dhattura Patra*
- Total Time taken for the completion of three *Bhavanas* :-20 hours

**RESULTS**

- Weight after three *Bhavanas* of *Dhattura Patra Swarasa* :-555 gm
- Weight gain :- 50gm
- Percentage of weight gain after completion of *Dhattura Patra Swarasa Bhavana* –9.9%
- Total *Dhattura Patra Swarasa* in process used – 1050 ml
- Total *Dhattura Patra Swarasa* average used per process – 350ml

**Sub process – 5) Trituration with Nirgundi Patra Swarasa**

The 555gm obtained weight of material was again taken in an end runner and 400ml of *Nirgundi Patra Swarasa* was added to it and then trituration was started. After levigation for six hours, when the trituration became difficult and in paste form and the material became comparatively dry, it was collected, dried and weighed. In a similar way, the same process was repeated for two

more times. For the second and third *Bhavana*, 400ml and 250ml of *Swarasa* were used, respectively. The weight obtained after three *Bhavanas* was 605gm.

#### Observations after completion of three *Bhavanas* of *Nirgundi Patra Swarasa*

- Color on adding *Nirgundi Patra Swarasa* :- Greenish brown
- Color after completion of three bhavana of *Nirgundi Patra Swarasa* :-Reddish brown
- Fragrance :- Characteristics smell of *Nirgundi Patra*.

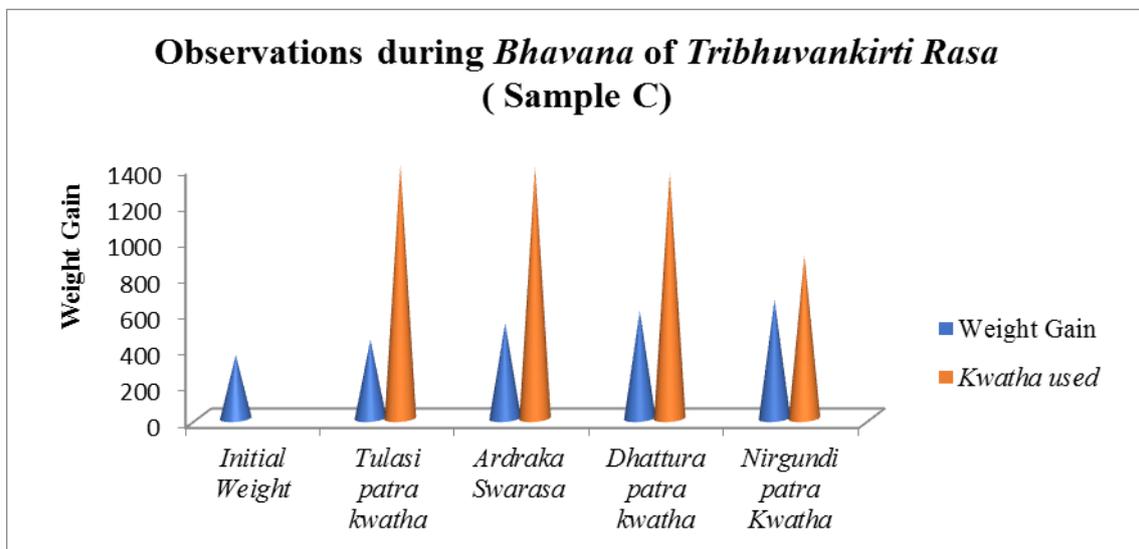
- Total Time taken for the completion of three *Bhavanas* :-20.5 hours

#### Results

- Weight after three *Bhavanas* of *Nirgundi Patra Swarasa* :-605 gm
- Weight gain :- 50gm
- Percentage of weight gain after completion of *Nirgundi patra swarasa Bhavana* – 9%
- Total *Nirgundi Patra Swarasa* in process used –1050
- Total *Nirgundi Patra Swarasa* average used per process – 350ml

**Table 10: Showing observations and results of twelve *Bhavanas* of *Tribhuvankirti Rasa* (Sample B)**

No. of <i>Bhavana</i>	<i>Swarasa</i>	Weight before <i>Bhavana</i> (gms)	Quantity of <i>Swarasa</i> consumed for each <i>Bhavana</i>	Total quantity of <i>Swarasa</i> consumed	Duration of <i>Bhavana</i> (hrs)	Colour of mixture after 3 <i>Bhavanas</i> of each drug	Weight after <i>Bhavanas</i> (gms)	Increased in weight (gms)
1.	<i>Tulasi</i>	350	800ml	1300ml	6	Greenish Brown	378	85
2.	<i>Patra</i>	378	300ml		6		403	
3.	<i>Swarasa</i>	403	200ml		6		435	
4.	<i>Ardraka Swarasa</i>	435	500ml	1200ml	6	Brighter & Whiter Red	458	70
5.		458	400ml		6		480	
6.		480	300ml		6		505	
7.	<i>Dhattura Patra Swarasa</i>	505	400ml	1050ml	6	Greenish red	521	50
8.		521	350ml		7		538	
9.		538	300ml		7		555	
10.	<i>Nirgundi Patra Swarasa</i>	555	400ml	1050ml	6	Greenish Brown	580	50
11.		580	400ml		7		595	
12.		595	250ml		7.5		605	



**P.G. 2: Graph Showing weight gain of *Tribhuvankirti Rasa* with the addition of *Swarasa*.**

#### Observations

- The color was changed after each *Bhavana* according to the *Swarasa* used and the end product was reddish brown in color.
- Trituration of the mixture was done till it became dry.

- For first *Bhavana* more *Swarasa* was needed to wet the whole drug powder as compared with subsequent *bhavanas*.
- As the number of *Bhavana* increases, the quantity of the required *Swarasa* decreases.

**Precautions**

- Trituration should be done continuously and cautiously.
- To prevent contamination from external dust, the end runner was properly covered over night.
- Only *Shodhita* dravya are to be used.

**Results**

- Final Product obtained – *Tribhuvankirti Rasa* (Sample B)
- Final Weight – 605gm
- Weight Gain – 255gm
- Percentage of weight gain:-72.8%
- Total *Swarasa* in process used – 4600 ml
- Total *Bhavana* given:- 12.
- Total time taken for Trituration process – 78 hours
- Average duration of Trituration per day – 6 hours 50 minutes/day
- Odour : potent smell as its characteristics
- Final Color of *Tribhuvankirti Rasa* – Reddish brown

**Practical Number – 10**

**Name of the process:-** Preparation of *Tribhuvankirti Rasa* (Sample C)

**Reference** - A.F.I. Part I, 20:20 (*Rasamritam, Rasayoga Vigyaniam*, Cha. 9, 80-80 ½)

**Principle** - *Bhavana* (By *Mardana* or trituration method)

**Equipments** - Weighing machine, mortar and pestle, end runner, spatula, vessel, cotton cloth, measuring cylinder

**It includes five Sub processes**

1. Powdering and mixing of all ingredients.
2. Trituration with *Tulasi Patra Kwatha*
3. Trituration with *Ardraka Swarasa*
4. Trituration with *Dhattura Patra Kwatha*
5. Trituration with *Nirgundi Patra Kwatha*

**Sub process – 1) Powdering and mixing of all ingredients****Material**

1. *Shuddha Hingula Churana* 50 gm.
2. *Shuddha Vatsanabha Churana* 50 gm.
3. *Sunthi Churana* 50 gm.
4. *Maricha Churana* 50 gm.
5. *Pippali Churana* 50 gm.
6. *Shuddha Tankana Churana* 50 gm.
7. *Pippalimula Churana* 50 gm.
8. *Tulasi patra Kwatha* 1400ml
9. *Ardraka Swarasa* 1390ml
10. *Dhattura patra Kwatha* 1360ml
11. *Nirgundi patra Kwatha* 900ml

**Procedure**

The powder of *Shuddha Hingula* were taken and *mardana* was carried out in mortar and pestle. Then *Shuddha Vatsanabha* and *Shuddha Tankana* was added to this mixture and grounded until it became the fine powder and then other ingredients were added and mixed

properly which was sieved again resulting in 350gm of reddish brown powder was obtained.

**Note:** Instead of *Swarasa*, *Bhavana* was given by *Kwatha* of *Tulasi Patra*, *Dhattura Patra*, and *Nirgundi Patra*, but *Kwatha* of *Ardraka* was not possible to make due to its juicy extract, hence *Swarasa* of *Ardraka* was used.

**Sub process – 2) Trituration with Tulasi Patra Kwatha**

350gm of powdered mixture was taken in an end runner and 500ml of *Tulasi Patra Kwatha* was added to it and then trituration was started. After levigation for six hours, when the trituration became difficult and in paste form and the material became comparatively dry, it was collected, dried and weighed. In a similar way, the same process was repeated for two more times. For the second and third *Bhavana*, 500ml and 400ml of *Kwatha* were used, respectively. The weight obtained after three *Bhavanas* was 435gm.

**Observations after three Bhavanas of Tulasi Patra Kwatha**

- Color on adding *Tulasi Patra Kwatha* :- Reddish brown
- Color after completion of three *Bhavana* of *Tulasi Patra Kwatha* :-Reddish brown
- Fragrance :- Characteristics smell of *Tulasi*
- Total Time taken for the completion of three *Bhavanas* :-18hours

**RESULTS**

- Weight after three *Bhavanas* of *Tulasi Patra Kwatha*:-435gm
- Weight gain :- 85gm
- Percentage of weight gain after completion of *Tulasi Patra Kwatha Bhavana* – 24.2%
- Total *Tulasi Patra Kwatha* in process used –1400ml
- Total *Tulasi Patra Kwatha* average used per process –466.66ml

**Sub process – 3) Trituration with Ardraka Swarasa**

The 435gm obtained weight of material was again taken in an end runner and 500ml of *Ardraka Swarasa* was added to it and then trituration was started. After levigation for six hours, when the trituration became difficult and in paste form and the material became comparatively dry, it was collected, dried and weighed. In a similar way, the same process was repeated for two more times. For the second and third *Bhavana*, 500ml and 390ml of *Swarasa* were used, respectively. The weight obtained after three *Bhavanas* was 525gm.

**Observations after completion of three Bhavanas of Ardraka swarasa**

- Color on adding *Ardraka Swarasa* :- Brighter and whiter red
- Color after completion of three *Bhavanas* of *Ardraka Swarasa* :- Reddish Brown
- Fragrance :- Characteristics smell of *Ardraka*

- Total Time taken for the completion of three *Bhavanas* :-19.5 hours

#### RESULTS

- Weight after three *Bhavanas* of *Ardraka Swarasa*:- 525gm
- Weight gain :- 90gm
- Percentage of weight gain after completion of *Ardraka Swarasa Bhavana* – 20.6%
- Total *Ardraka Swarasa* in process used –1390 ml
- Total *Ardraka Swarasa* average used per process – 463.33ml

#### Sub process – 4) Trituration with *Dhattura Patra Kwatha*

The 525gm obtained weight of material was again taken in an end runner and 500ml of *Dhattura Patra Kwatha* was added to it and then trituration was started. After levigation for six hours, when the trituration became difficult and in paste form and the material became comparatively dry, it was collected, dried and weighed. In a similar way, the same process was repeated for two more times. For the second and third *Bhavana*, 500ml and 360ml of *Kwatha* were used, respectively. The weight obtained after three *Bhavanas* was 595gm.

#### Observations after completion of three *Bhavanas* of *Dhattura Patra Kwatha*

- Color on adding *Dhattura Patra Kwatha*:- Reddish brown
- Color after completion of three *Bhavana* of *Dhattura Patra Kwatha* :- Reddish brown
- Fragrance :- Characteristics smell of *Dhattura*
- Total Time taken for the completion of three *Bhavanas* :-20 hours

#### RESULTS

- Weight after three *Bhavanas* of *Dhattura Patra Kwatha*:-595 gm
- Weight gain :- 70gm

- Percentage of weight gain after completion of *Dhattura Patra kwatha Bhavana* –13.3%
- Total *Dhattura Patra Kwatha* in process used –1360 ml
- Total *Dhattura Patra Kwatha* average used per process – 453.33ml

#### Sub process – 5) Trituration with *Nirgundi Patra Kwatha*

The 595gm obtained weight of material was again taken in an end runner and 300ml of *Nirgundi Patra Kwatha* was added to it and then trituration was started. After levigation for six hours, when the trituration became difficult and in paste form and the material became comparatively dry, it was collected, dried and weighed. In a similar way, the same process was repeated for two more times. 300ml of *Kwatha* was used for both second and third *Bhavana*, 300ml of each *Kwatha* were used. The weight obtained after three *Bhavanas* was 655gm.

#### Observations after completion of three *Bhavanas* of *Nirgundi Patra Kwatha*

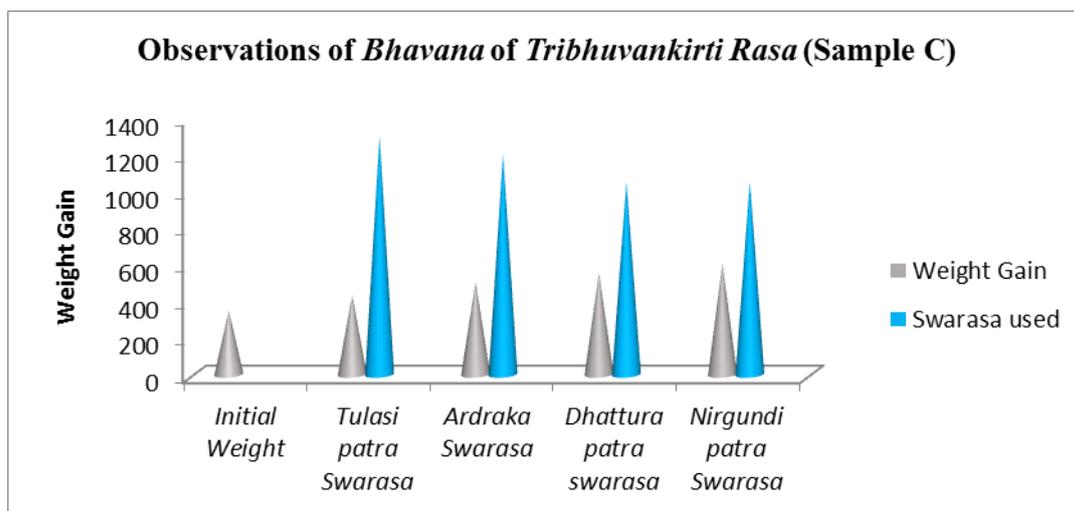
- Color on adding *Nirgundi Patra Kwatha* :- Reddish brown
- Color after completion of three *Bhavana* of *Nirgundi Patra Kwatha* :-Reddish brown
- Fragrance :- characteristics smell of *Nirgundi Patra*
- Total Time taken for the completion of three *Bhavanas* :-20.5 hours

#### RESULTS

- Weight after three *Bhavanas* of *Nirgundi Patra Kwatha* :-655 gm
- Weight gain :- 60gm
- Percentage of weight gain after completion of *Nirgundi Patra Kwatha Bhavana* – 10 %
- Total *Nirgundi Patra Kwatha* in process used –900ml
- Total *Nirgundi Patra Swarasa* average used per process – 300ml

**Table 11: Showing observations and results of twelve *Bhavanas* of *Tribhuvankirti Rasa* (Sample C).**

No. of <i>Bhavana</i>	<i>Kwatha</i> / <i>Swarasa</i>	Weight before <i>Bhavana</i> (gms)	Quantity of <i>Kwatha</i> consumed for each <i>Bhavana</i>	Total quantity of <i>Kwatha</i> consumed	Duration of <i>Bhavana</i> (hrs)	Colour of mixture after 3 <i>Bhavanas</i> of each drug	Wt. after <i>Bhavanas</i> (gms)	Increased in weight (gms)
1.	<i>Tulasi Patra Kwatha</i>	350	500 ml	1400 ml	6	Reddish Brown	380	85
2.		380	500ml		6		406	
3.		406	400ml		6		435	
4.	<i>Ardraka Swarasa</i>	435	500 ml	1390 ml	6	Brighter & Whiter Red	465	90
5.		465	500 ml		6		490	
6.		490	390 ml		7.5		525	
7.	<i>Dhattura Patra Kwatha</i>	525	500 ml	1360 ml	6	Reddish Brown	537	70
8.		537	500 ml		7		568	
9.		568	500 ml		7		595	
10.	<i>Nirgundi Patra Kwatha</i>	595	300ml	900ml	6	Reddish Brown	610	60
11.		610	300ml		7		628	
12.		628	300ml		7.5		655	



**P.G. 3: Graph Showing weight gain of *Tribhuvankirti Rasa* with the addition of liquid media.**

### OBSERVATIONS

- The initial color was dark reddish brown and gradually color changes into light reddish brown color after completion of twelve *Bhavanas*.
- Trituration of the mixture was done till it became dry.
- For first *Bhavana* more *Kwatha/Swarasa* was needed to wet the whole drug powder as compared with subsequent *Bhavanas*.
- As the number of *Bhavana* increases, the quantity of the required *Kwatha/Swarasa* decreases.

### Precautions

- Trituration should be done continuously and cautiously.
- To prevent contamination from external dust, the end runner was properly covered over night.
- Only *Shodhita* dravya are to be used.

### Final Product obtained – *Tribhuvankirti Rasa* (Sample C)

- Final Weight – 655gm
- Weight Gain – 305gm
- Percentage of weight gain:-87.1%
- Total *Swarasa/Kwatha* in process used –5050ml
- Total *Bhavana* given:- 12
- Total time taken for Trituration process – 78 hours
- Average duration of Trituration per day – 6 hours 50 minutes/day
- Odour:- potent smell as its characteristics
- Final Color of *Tribhuvankirti Rasa* – Reddish Brown

### Overall Summary and results of *Tribhuvankirti Rasa* (Sample A and B)

All the sample results of Sample A and B were collected and mean of total quantity were analyzed for results.

- Final product obtained : *Tribhuvankirti Rasa*
- Final weight:-1155gm
- Weight gain - 455gm
- Total *Tulasi Patra Swarasa* in processed used – 1770ml

- Total *Tulasi Patra Swarasa* average used per process – 294.965ml
- Average percentage of weight gain after completion of *Tulasi Patra Swarasa Bhavana*:- 14.95%
- Total *Ardraka Swarasa* in processed used – 1780ml
- Total *Ardraka Swarasa* average used per process – 296.65ml
- Average percentage of weight gain after completion of *Ardraka Swarasa* :- 15.75%
- Total *Dhattura Patra Swarasa* in processed used – 1670ml
- Total *Dhattura Patra Swarasa* average used per process – 278ml
- Average percentage of weight gain after completion of *Dhattura Patra Swarasa Bhavana*:- 7.275%
- Total *Nirgundi Patra Swarasa* in processed used – 2150ml
- Total *Nirgundi Patra Swarasa* average used per process – 358.3ml
- Average percentage of weight gain after completion of *Nirgundi Patra Swarasa Bhavana*:- 15.9%
- Total time taken for Trituration process 155 hours.
- Average duration of Trituration per day: 6 hours 45 minutes/day
- Final color of *Tribhuvankirti Rasa* : Reddish brown
- Odour of *Tribhuvankirti Rasa* : Potent smell as its Characteristics

### Practical Number -11

**Name of the process:-** Preparation of *Vatis* of *Tribhuvankirti Rasa* (Sample A, B, C)

**Equipments:** S.S.tray, hand gloves, *Ghrta* etc.

**Ingredients-** Paste like material of *Tribhuvankirti Rasa* (Sample A, B, C).

### Procedure

- The mixture was collected from the *Khalva Yantra* and end runner, dried and pills were manufactured.
- *Vati* weighing 125mg were rolled on flat surface and made into round pills by circular motion of palm or finger covered with gloves.

- Rounded *Vatis* were dried in a tray at 30-35°C in drying oven.
- *Vatis* were stored in an air tight container.

#### Observations

- **Appearance** - Pills
- **Color** - Reddish Brown
- **Odor** - Characteristics
- **Taste** - Pungent
- **Touch** - Fine, smooth

#### Precautions

- Cap and mask were worn during the whole procedure.
- Utensils and vessels were properly cleaned.
- The consistency of the paste was thick so that pills can be made easily.
- *Ghrita* should be applied on gloves so that stickiness of the paste can be avoided during *Vatis* formation.
- *Vatis* should be kept in an air tight container.

#### RESULTS

Samples	Date of Starting	Date of Completion	Total time taken for the preparation of <i>Vatis</i> (hours)	Average weight of <i>Vati</i> (mg)
Sample A	6.10.2021	7.10.21	12	125
Sample B	27.11.2021	28.11.2021	10	125
Sample C	6.2.2022	7.2.2021	10	125

#### Discussion on Pharmaceutical Study

In pharmaceutical study, three samples of the trial drug i.e. *Tribhuvankirti Rasa* (Sample A, B, C) were prepared to standardize the process. An attempt has been made here to prepare *Tribhuvankirti Rasa* as per the method mentioned in A.F.I Part I, 20:20 (*Rasamritam, Rasayoga Vigyaniam*, Cha. 9, 80-80 ½).

For the preparation of *Tribhuvankirti Rasa*, some of the raw drugs were procured from the local market. *Tankana* from *Charaka Ayurvedic Pharmacy*, Paprola. *Tulasi, Dhattura, Nirgundi, Ardraka* were freshly collected. Some raw drugs, such as *Ashuddha Hingula, Ashuddha Tankana*, and *Ashuddha Vatsanabha*, required *Shodhana* prior to the preparation of *Tribhuvankirti Rasa*.

Following processes were included under Pharmaceutical study after the procurement of the raw materials.

- *Shodhana* of *Hingula*
- *Shodhana* of *Vatsanabha*
- *Shodhana* of *Tankana*
- Preparation of *Swarasa* for *Bhavana*
- Preparation of *Kwatha* for *Bhavana*
- Preparation of *Tribhuvankirti Rasa* (sample A)
- Preparation of *Tribhuvankirti Rasa* (sample B)
- Preparation of *Tribhuvankirti Rasa* (sample C)

#### *Shodhana* of *Hingula*

In the drug review, a discussion has already been made on the methods of purification and necessity of *Shodhana* of *Hingula*. *Shodhana* was done as per method described in *Rasa Tarangini*. *Rasa Tarangini* has recommended the purification of *Hingula* by *Lemon Juice* (*Bhavana* for seven times) and after completion of *Bhavana*, it was washed thoroughly with water, then kept for stasis, and a decantation of the upper part was done.

*Hingula Shodhana* was done three times during the whole study.

**Sample A - *Hingula Shodhana*** was started with 250gm of *Ashuddha Hingula* powder and triturated with an

average time of 6 hours/day and the daily average addition of *Lemon Juice* was 75.7ml. The final colour of *Hingula* powder was brick red. It was reduced to 245gm after *Shodhana*, with a percentage loss of 2%. The weight loss is most likely due to the sticking of *Hingula* to the mortar and pestle, and some may have spilled out with water when it was washed after giving *Bhavana*.

**Sample B - *Hingula Shodhana*** was started with 250gm of *Ashuddha Hingula* powder and triturated with an average time of 5 hours and 90 minutes/day and the daily average addition of *Lemon Juice* was 78.5ml. The final colour of *Hingula* powder was brick red. It was reduced to 248gm after *Shodhana*, accounting for a percentage loss of 0.8%. The weight loss is most likely due to the sticking of *Hingula* to the mortar and pestle, and some may have spilled out with water when it was washed after giving *Bhavana*.

**Sample C - *Hingula Shodhana*** was started with 250gm of *Ashuddha Hingula* powder and triturated with an average time of 6 hours 40 minutes/day and the daily average addition of *Lemon Juice* was 67.10 ml. The final colour of *Hingula* powder was brick red. It was reduced to 247gm with a percentage loss of 1.2%. The weight loss is most likely due to the sticking of *Hingula* to the mortar and pestle, and some may have spilled out with water when it was washed after giving *Bhavana*.

Then all the sample results of A, B and C were collected and mean of total quantity were analyzed for results shows that.

- *Hingula* was in powder form, with a final weight of 740 gms and an average weight loss of 1.33 percent, which authenticates the earlier study as done by Dr. Meghna Vaidya *et.al.* 2011. The average *Lemon Juice* utilized for each levigation was 73.7ml, with an average trituration time of 6 hours 10 minutes/day.
- After adding *Lemon Juice*, the powder's colour brightened, but after completing all seven *Bhavana*

and drying, the final colour of *Hingula* powder was brick red.

#### **Shodhana of Vatsanabha**

After careful study of the various methods of *Shodhana* of *Vatsanabha* the process using *Gomutra* was adopted according to the method prescribed in *Rasa Tarangini*.

As *Vatsanabha* is an established toxic drug and *Gomutra* contains *Vishahara* properties. Simultaneously, *Gomutra* potentiates the *Vata Kaphahara* properties of *Vatsanabha* being a *Vata-Kaphahara Dravya* itself.

*Vatsanabha shodhana* was done three times for three samples during the whole study.

**Sample A:-** During the purification of *Vatsanabha*, the initial weight taken was 200gm. It was reduced to 110.4 g after *Shodhana*, accounting for a percentage loss of 44.8 %.

**Sample B:-** During the purification of *Vatsanabha*, the initial weight taken was 200gm. It was reduced to 104 g after *Shodhana*, accounting for a percentage loss of 48%

**Sample C:-** During the purification of *Vatsanabha*, the initial weight taken was 200gm. It was reduced to 112.2 g with a percentage loss of 43.9%.

The average percentage of weight loss was 45.6 percent. The loss could be attributed due to following reasons:

- Removal of external layer, while cutting the damaged and discoloured part of the raw drug.
- Washing out of soluble part of *Vatsanabha* while replacing *Gomutra* daily and also during washing it with hot water which was the last step during the process of *Shodhana*.

#### **Shodhana of Tankana**

**Sample A :-** During the *Shodhana* of *Tankana*, the initial wt taken was 200 gm which was reduced to 110gm after *Shodhana*, with the percentage loss of 45%.

**Sample B :-** During the *Shodhana* of *Tankana*, the initial wt taken was 200 gm which was reduced to 100gm after *Shodhana*, accounting for a percentage loss of 50%

**Sample C:-** During the *Shodhana* of *Tankana*, the initial wt taken was 200 gm which was reduced to 102gm with a percentage loss of 49%.

The average percentage of weight loss was 48 %. The weight of the *Tankana* was reduced after heating due to evaporation of water content.

#### **Preparation of Tribhuvankirti Rasa**

Ingredients of *Tribhuvankirti Rasa* were separately grinded in the grinding machine and pass through sieve no. 85.

**Table 12: Showing Percentage weight loss of powdering of drugs.**

Name of the raw drugs	Weight of drug taken (gm.)	Weight after grinding and sieving (gm.)	Weight loss (gm.)	% yield	Percentage weight loss
<i>Sunthi</i>	422gm	312gm	110gm.	73.9%	26.1%
<i>Pippali</i>	390gm	267gm	123gm.	68.4%	31.6%,
<i>Maricha</i>	394gm	277gm	117gm.	70.3%	29.7%
<i>Pippalimula</i>	400gm	312gm	88gm.	78%	22%

Weight loss was observed maximum (31.6 %) in *Pippali*, followed by *Maricha*, *Sunthi* may be due to the presence of more residual contents in *Maricha* and *Pippali* and more fibres contents present in *Sunthi* and minimum weight loss (22%) was observed in *Pippalimula* After that, the powder of each ingredient was mixed uniformly and was subjected to trituration.

#### **Preparation of Swarasa for Bhavana**

*Swarasa* was prepared with the general instructions given for preparing the *Swarasa*.

Total quantity of *Swarasa* obtained from *Tulasi Patra*, *Ardra*, *Dhattura Patra* and *Nirgundi Patra* was 62%, 58%, 67.8% and 51.9% respectively.

#### **Preparation of Kwatha for Bhavana**

*Kwatha* was prepared with the general instructions given for preparing the *Kwatha*.

Total quantity of *Kwatha* obtained from *Tulasi Patra*, *Dhattura patra* and *Nirgundi Patra* was 1400ml, 1500ml and 900ml respectively.

#### **Preparation of Tribhuvankirti Rasa (Sample A)**

The *Tribhuvankirti Rasa* was prepared according to the method prescribed in A.F.I. Part I, 20:20 (*Rasamritam*, *Rasayoga Vigyaniam*, Cha.9, 80-80 ½). *Tribhuvankirti Rasa* contains eleven ingredients i.e. *Shuddha Hingula*, *Shuddha Vatsanabha*, *Shuddha Tankana*, *Pippali*, *Maricha*, *Sunthi*, *Pippalimula* 50gm each and four *Bhavana Drava* i.e. *Nirgundi Patra Swarasa* 1100ml, *Dhattura Patra Swarasa* 620ml, *Ardra Swarasa* 580ml and *Tulasi Patra Swarasa* was 470 ml.

#### **Trituration with Nirgundi Patra Swarasa**

*Nirgundi Patra Swarasa* was prepared with the general instructions given for preparing the *Swarasa* starting with 350gm of mixture powder of the first seven ingredients triturated with average 366.66ml of *Nirgundi Patra Swarasa* for average duration of 6 hours 33minutes/day and resulting in weight gain of 22.8%. The color on adding *Nirgundi Patra Swarasa* was greenish brown and has *Nirgundi Patra* fragrance.

#### **Trituration with Dhattura Patra Swarasa**

*Dhattura Patra Swarasa* was also prepared as per the rule and average 206ml of *Dhattura Patra Swarasa* per

levigation used with average duration of 6.5 hours /day and resulting in weight gain of 4.65%. The color on adding *Dhattura Patra Swarasa* was greenish red and has *Dhattura Patra* fragrance.

**Trituration with *Ardraka Swarasa*** –*Ardraka Swarasa* was also prepared as per the rule and average 193.3ml of *Ardraka Swarasa* per levigation used with average duration of 6 hours /day and resulting in weight gain of 15.5 %. The color on adding *Ardraka Patra Swarasa* was brighter and whiter red and has *Ardraka* like fragrance.

#### **Trituration with *Tulasi Patra Swarasa***

*Tulasi Patra Swarasa* was also prepared with the general instructions given for preparing the *Swarasa* and average 156.6ml of *Tulasi Patra Swarasa* for average duration of 6 hours 80minutes/day and resulting in weight gain of 5.7 %. The color on adding *Tulasi Patra Swarasa* was greenish brown and has *Tulasi Patra* fragrance.

The color of *Tribhuvankirti Rasa* (Sample A) was changed after each *Bhavana*, according to the *Swarasa* used and the end product was reddish brown in color. The quantity of *Swarasa* required was also decreased after each *Bhavana* because of absorption capacity of the material was decreased but at the time of *Ardraka Swarasa Bhavana* weight was increased (15.5 %) because of starch part of *Ardraka*. 77 hours of levigation with all four *Swarasa* was required to attain end point of levigation.

#### **Preparation of *Tribhuvankirti Rasa* (Sample B)**

The *Tribhuvankirti Rasa* was prepared according to the method prescribed in A.F.I. Part I, 20:20 (*Rasamritam, Rasayoga Vigyaniam*, Cha.9, 80-80 ½). *Tribhuvankirti Rasa* contains eleven ingredients i.e, *Shuddha Hingula, Shuddha Vatsanabha, Shuddha Tankana, Pippali, Maricha, Shunthi, Pippalimula* 50gm each and four *Bhavana Drava* i.e, *Tulasi Patra Swarasa* 1300ml, *Ardraka Swarasa* 1200ml *Dhattura Patra Swarasa* 1050ml and *Nirgundi Patra Swarasa* 1050ml.

#### **Trituration with *Tulasi Patra Swarasa***

*Tulasi Patra Swarasa* was prepared with the general instructions given for preparing the *Swarasa* starting with 350gm of mixture powder of the first seven ingredients triturated with average 433.33ml of *Tulasi Patra Swarasa* for average duration of 6 hours/day and resulting in weight gain of 24.2%. The color on adding *Tulasi Patra Swarasa* was greenish brown and has *Tulasi Patra* fragrance.

#### **Trituration with *Ardraka Swarasa***

*Ardraka Swarasa* was also prepared as per the rule and average 400ml of *Ardraka Swarasa* per levigation used with average duration of 6 hours 50 minutes/day and resulting in weight gain of 16%. The color after adding *Ardraka Swarasa* was brighter and whiter red and has *Ardraka* like fragrance.

#### **Trituration with *Dhattura Patra Swarasa***

*Dhattura Patra Swarasa* was also prepared as per the rule and average 350ml of *Dhattura Patra Swarasa* per levigation used with average duration of 6 hours 66 minutes /day and resulting in weight gain of 9.9%. The color after adding *Dhattura Patra Swarasa* was greenish red and has *Dhattura Patra* fragrance.

#### **Trituration with *Nirgundi Patra Swarasa***

*Nirgundi Patra Swarasa* was also prepared with the general instructions given for preparing the *Swarasa* and average 350ml of *Nirgundi Patra Swarasa* for average duration of 6 hours 83minutes/day and resulting in weight gain of 9%. The color on adding *Nirgundi Patra Swarasa* was greenish brown and has *Nirgundi Patra* fragrance.

The color of *Tribhuvankirti Rasa* (Sample B) was changed after each *Bhavana*, according to the *Swarasa* used and the end product was reddish brown in color. The quantity of *Swarasa* required was also decreased after each *Bhavana* because of absorption capacity of the material was decreased but at the time of *Ardraka Swarasa Bhavana* weight was increased (16 %) because of starch part of *Ardraka*. 78 hours of levigation with all four *Swarasa* was required to attain end point of levigation.

#### **Preparation of *Tribhuvankirti Rasa* (Sample C)**

*Tribhuvankirti Rasa* contains eleven ingredients i.e, *Shuddha Hingula, Shuddha Vatsanabha, Shuddha Tankana, Pippali, Maricha, Sunthi, Tankana, Pippalimula* 50gm each and four *Bhavana Drava* i.e, *Kwatha of Tulasi Patra* 1400ml *Ardraka Swarasa* 1390ml and *Kwatha of Dhattura* 1360 and *Nirgundi Patra* 900ml. Instead of *Swarasa, Bhavana* was given by *Kwatha of Tulasi Patra, Dhattura Patra, and Nirgundi Patra*, but *Kwatha of Ardraka* was not possible to make due to its juicy extract, hence *Swarasa of Ardraka* was used.

#### **Trituration with *Tulasi Patra Kwatha***

*Tulasi Patra Kwatha* was prepared with the general instructions given for preparing the *Kwatha* starting with 350gm of mixture powder of the first seven ingredients triturated with average 466.66ml of *Tulasi Patra Kwatha* for average duration of 6 hours/day and resulting in weight gain of 24.2%. The color on adding *Tulasi Patra Kwatha* was reddish brown, and has *Tulasi Patra* fragrance.

#### **Trituration with *Ardraka Swarasa***

*Ardraka Swarasa* was also prepared as per the rule and average 463.33ml of *Ardraka Swarasa* per levigation used with average duration of 6 hours 50 minutes/day and resulting in weight gain of 20.6%. The color on adding *Ardraka Swarasa* was brighter and whiter red and has *Ardraka* like fragrance.

**Trituration with Dhatura Patra Kwatha**

*Dhatura Patra Kwatha* was also prepared as per the rule and average 453.33ml per levigation used with average duration of 6 hours 66 minutes /day and resulting in weight gain of 13.3%. The color on adding *Dhatura Patra Kwatha* was reddish brown and has *Dhatura Patra* fragrance.

**Trituration with Nirgundi Patra Kwatha**

*Nirgundi Patra Kwatha* was also prepared with the general instructions given for preparing the *Kwatha* and average 300ml of *Nirgundi Patra Kwatha* for average duration of 6 hours 83minutes/day and resulting in weight gain of 10%. The color after adding *Nirgundi Patra Kwatha* was reddish brown and has *Nirgundi Patra* fragrance.

The initial color was dark reddish brown and gradually color changes into like reddish brown color after completion of twelve *Bhavanas*. The quantity of *Swarasa/Kwatha* required was also decreased after each *Bhavana* because of absorption capacity of the material was decreased but at the time of *Ardraka Swarasa Bhavana* weight was increased (20.6%) because of starch part of *Ardraka*. 78 hours of levigation with all four *Swarasa* was required to attain end point of levigation.

Then all the sample results of A and B were collected and mean of total quantity were analyzed for results shows that.

Powder of ingredients with a final weight of 1155gm and the total weight gain was 455gm and 294.9ml average *Tulasi Patra Swarasa*, 296.65ml average *Ardraka Swarasa*, 278ml average *Dhatura Patra Swarasa* 358.3 ml average *Nirgundi Patra Swarasa* per levigation used with average duration of trituration of 6 hours 45 minutes per day.

Final color of *Tribhuvankirti Rasa* was Reddish brown have potent smell of its characteristics.

In all the samples, It was noted that after the first *Bhavana*, the quantity of the *Bhavana Dravya* decreased in the rest of the subsequent *Bhavanas*. It is because the dry ingredients absorb more amount of *Bhavana Dravya*. So, for first *Bhavana* more *Bhavana Dravya* was needed to wet the whole drug powder as compared with the subsequent *Bhavanas*.

**Table 12: Showing increased in weight after Bhavana.**

Sr. no.	Sample no.	Weight of ingredients (gm)	Media used for Bhavana	Weight of final product (gm)	Increase in weight (gm)	Percentage of increased weight
1.	<i>Tribhuvankirti Rasa</i> Sample A	350	<i>Swarasa</i>	550	200	57.1%
2.	<i>Tribhuvankirti Rasa</i> Sample B	350	<i>Swarasa</i>	605	255	72.8%
3.	<i>Tribhuvankirti Rasa</i> Sample C	350	<i>Kwatha</i>	655	305	87.1%

The average percentage of weight gain of all the three samples was 72.3%.

Increase in weight of final product was observed for all the three samples. Weight gain was observed maximum (87.1%) for the sample which was prepared by using *Kwatha (Bhavana Dravya)* in an end runner and minimum weight gain (57.1%) was observed for the sample prepared with *Swarasa* in the *Khalva Yantra*.

The enhancement weight may be due to organic binding of the *Swarasa* constituents with powdered ingredients of *Tribhuvankirti Rasa*.

**CONCLUSION**

The following conclusions were drawn from this research work.

**Pharmaceutical Study**

- ☉ Lemon Juice obtained was 2.5 litres from total 5 kg Lemon.

- ☉ The average percentage of weight loss observed in the three samples of *Hingula* after *Shodhana* was 1.33%.
- ☉ The average percentage of weight loss observed in the three samples of *Vatsanabha* after *Shodhana* was 45.6%.
- ☉ The average percentage of weight loss observed in the three samples of *Tankana* after *Shodhana* was 48%.
- ☉ The yield of *Swarasa* from *Tulasi Patra*, *Ardraka*, *Dhatura Patra* and *Nirgundi Patra* was 62%, 58%, 67.8% and 51.9% respectively.
- ☉ The yield of *Kwatha* from *Tulasi Patra*, *Dhatura Patra* and *Nirgundi Patra* was 1400ml, 1500ml and 900ml respectively.
- ☉ As the *Bhavana* number get enhanced, there is decreased in absorption of liquid in it.
- ☉ During *Tribhuvankirti Rasa* preparation, there is an average increased in weight of 72.3% of *Tribhuvankirti Rasa*.

IMAGS



RAW HINGULA



Hingula Powder



NimbuSwarasa



Washing with water



Trituration of Hingula



Bhavana with Nimbuswarasa



Raw vatsanabha



Vatsanabha dipped in gomutra



Washed with water



Cut into pieces



Again dipped in gomutra



Dried vatsanabha



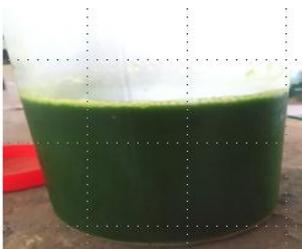
**Ashuddha Tankana**



**Heating on low flame**



**Shuddha Tankana**



**Swarasa for  
bhavana**



**Kwatha for bhavana**



**Powder of all  
ingredients**



**Pills of  
tribhuvankirti  
rasa**



**Trituration in end  
runner**



**Trituration in  
khalva yantra**

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