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## Development of a standard Preparation Procedure and Physicochemical Analysis of *Simhanad Guggulu*

Nalini Ramesh Rao Hedao<sup>1\*</sup>, Ujwala Ashokrao Jadhao<sup>2</sup>, Chatragun Eknathrao Lagad<sup>3</sup> and Rajesh Kundalikrao Ingole<sup>4</sup>

<sup>1-4</sup>Dept. of Rasa Shastra Bhaishajya Kalpana, Govt. Ayurved College, Vajirabad, Nanded, MS, India

### ABSTRACT

*Simhanad Guggulu* is a drug of choice for *Amavata* and according to today's scenario *Amavata* is very common joint disorder worldwide. Preparation of *Simhanad guggulu* is not so critical but the common & efficacious pharmaceutical procedure which is described in Bhaishajya Ratnavali & Ayurvedic Formulary of India is not palatable. Therefore, present study is completed with the aim of developing standard operating procedure of *Simhanad Guggulu* which will be more efficacious and palatable. In Bhaishajya ratnavali patha quantity of oil is more which make it semisolid doses form. In *Amavata* proper dose of Castrol oil facilitate purgation and amapachana. So in the present study, it was a challenge to develop S.O.P. which will fulfill objectives of this work.

**Aims & Objectives:** To develop standard operative procedure for preparation of *Simhanad Guggulu*, to improve palatability and simultaneously improving efficacy. **Materials and methods:** *Simhanad Guggulu* was prepared by three different methods given in Ayurveda classics i.e., Bhaishajya Ratnavali, Ayurved Sara Sangraha and Rasatantrasara and Siddhapravog Sangrah. Physicochemical analysis carried out of only one patha i.e. Ayurvedsar sangraha patha in three samples. Sample I handmade tablet, Sample II Granulation and compression tablet, Sample III marketed formulation. **Results:** For efficacious and palatable formulation we can modify bhaishajya ratnavali sample in soft gelatin capsule. We can prepare *simhanad Guggulu* in tablet form only by following Ayurved sar sangraha patha which is available in market.

### KEYWORDS

*Simhanad Guggulu, Standard Operative Procedure, Efficacy*



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## INTRODUCTION

At present in the Ayurveda Pharmaceutics, raw material standardization and quality parameters for finished compound formulations are followed to keep a check on the quality standards. What is not found is uniformity in the operating procedures i.e., in the method of preparations. This sometimes leads to different qualities of the finished products and not having reproducibility, in the same formulation. An effort has been made now to optimize the method of preparation, so that such differences between manufacturer's products in the market are not beyond reasonable limits. So in the present study great effort had been taken to develop standard operating procedure for one specific drug *Simhanad guggulu*.

*Guggulu* has been used in treating many kinds of diseases and it has a wide range of action when compared to other drugs, the main action being to lower the cholesterol and triglycerides level and in treating joint diseases. *Simhanad Guggulu* is a drug of choice for *Amavata* and according to today's scenario *Amavata* is very common joint disorder in world wide.

*Simhanad Guggulu* is unique *guggulu* preparation in which concentration of *guggulu* and its ingredients like *Sh.*

*Gandhak*, concentration of Castrol oil make it unique in *guggulu* preparation. Preparation of *Simhanad guggulu* is not so critical. But the common & efficacious pharmaceutical procedure which is described in *Bhaishajya Ratnavali*<sup>1</sup> & Ayurvedic Farmulary of India<sup>2</sup> is an effective formulation but not palatable. Therefore, present study is done with the aim of developing standard procedure of *Simhanad Guggulu* which will be more efficacious and palatable.

*Triphala quath or triphala churna*, *Sh.Guggulu*, *Sh Gandhak* and Castrol oil are common ingredients of *Simhanad Guggulu* in different Ayurveda classics. In *Bhaishajya ratnavali patha* percentage of Castrol is approximately 61% of all content which makes it semisolid form. According to *Ayurved Sar Sangrah* Patha Castrol oil concentration is very less i.e. 5.8% of all contents. *Simhanad Guggulu* is a drug of choice for *Amavata*. Proper dose of Castrol oil in *simhanad guggulu* facilitate purgation. On this ground present study carried out with the aim of development of pharmaceutical procedure of *Simhanad Guggulu* with maximum concentration of Castrol oil.

## AIM

To develop standard preparation procedure for *Simhanad Guggulu*.



## OBJECTIVES

1. To review the literature of *Simhanad Guggulu* in Ayurveda classics.
2. To prepare *Simhanad Guggulu* by Kuttan Vidhi and Granulation and compression method.
3. To prepare *Simhanad Guggulu* by Paka Vidhi.
4. To do physicochemical analysis in three samples.

## MATERIALS AND METHODS

Raw materials were procured from Govt Ayurved College Nanded. Pharmaceutical and analytical studies were carried out at pharmaceutical lab of Rasa Shastra and Bhaishajya Kalpana Govt Ayurved College, Nanded with following steps:

Procurement and authentication of raw materials

Pharmaceutical study was done in four steps

A)Preparation of *Simhanad Guggulu* according to *Bhaishajya Ratnavali* method called as Agnitapi vidhi with high percentage of Castrol oil. ( AFI)

B)Preparation of *Simhanad Guggulu* by following *Ayurved Sar sangrah*<sup>3</sup> method in two samples, first called as Kuttan vidhi and another was granulated and compression tablet method.

C)Preparation of *Simhanad Guggulu* according to *Rasatantrasar Evum Siddhaprayug Sangrah*<sup>4</sup> method called as Agnitapi vidhi with low percentage of Castrol oil.

D)Physiochemical Analysis of *Simhanad Guggulu* in three samples. Sample I Handmade tablets, Sample II Granulation and compressed tablets, Sample III Marketed Sample

### Literature Review

In Ayurveda classics *Simhanad Guggulu* recognized with two nomenclatures i.e., *Simhanad Guggulu* and *Bruhat Simhanad Guggulu*. Basic difference in *Simhanad Guggulu* and *Bruhat Simhanad Guggulu* is in their ingredients and pharmaceutical procedure. Common ingredients of *Simhanad Guggulu* are *Triphala Quath or Churna, Sh.Guggulu, Sh. Gandhak and Casrol oil*. In *Bruhat Simhanad Guggulu* extra ingredients appear which are *Jaipal, Kutaki Churna, katutaila etc.*(see in Table no 1)

### Literary Review of pharmaceutical Procedure

Pharmaceutical procedure of *Simhanad Guggulu* can be classified into two group i.e., *Paka Vidhi & Kuttan Vidhi* (See in Table2). Literary review see in Table 3.In the present study, pharmaceutical study was

**Table 1** References of *Simhanad Guggulu* & *Bruhat Simhanad Guggulu* with their variations

Sr.No.	<i>Simhanad Guggulu- 4 patha</i>	<i>Bruhat Simhanad Guggulu – 2 patha</i>
1.	<i>Simhanad Guggulu (1)</i> <i>Bhaishajya Ratnavali (Amavata)</i> <sup>5</sup> <i>Chakradatta (Amavata)</i> <sup>6</sup> <i>Bhavprakash M. K.(Vatrakta)</i> <sup>7</sup> (Basic ingredients, Prepared with paka vidhi)	<i>Bruhat Simhanad Guggulu (1)</i> <i>Bhaishajya Ratnavali ( Amavata)</i> <sup>8</sup> <i>Bhavprakash M.K. (Vatrakta)</i> <sup>9</sup> <i>Chakradatta ( Amavata)</i> <sup>10</sup> (Extra drugs:- Jaipal, Katutaila instead of Castrol oil & prepare by Paka Vidhi)
2.	<i>Simhanad Guggulu(2)</i> <i>Ayurveda Sara Sangrah</i> <sup>11</sup> <i>Mulapatha – Vangasen</i> ( Basic Ingredients with advance changes i.e., reduction in Castrol oil quantity upto one forth/ prepared by kuttan vidhi.)	<i>Bruhat Simhanad Guggulu (2)</i> <i>Bruhat Yogtarangini ( Amavata)</i> <sup>12</sup> (extra drugs – Jaipal, Kajjali,kutakiyukta)
3	<i>Simhanad Guggulu (3)</i> <i>Rastantrasar Evum Siddhaprayog Sangrah</i> <sup>13</sup> (Basic ingredients with increase in dose of guggulu and triphala quath upto three times)	
4.	<i>Simhanad Guggulu (4)</i> <i>Yogchintamani M.A.</i> <sup>14</sup> (Gandhak, Castrol oil are not given in ingredients and variation found in pharmaceutical procedure)	

**Table 2** Pharmaceutical procedures

Steps	<i>Guggulu Vidhi</i> <sup>15</sup>	<i>Paka</i>	<i>Kuttan Vidhi</i> <sup>16</sup>
Step 1	Triphala Nirman	Kwath	Mixing of Triphala churna & Gandhak
Step 2	Mixing of Castrol oil & Sh. Guggulu by giving mild heat		Add Castrol oil in above mixture
Step 3	Add triphala quath in above mixture and give heat upto appearing awaleha consistency.		Add sh. Guggulu and mix it properly
Step 4	Add Gandhak and Prepare vati		Preparation of vati

**Table 3** Literary review of dose

Sr. No.	References	Dose
1.	<i>Bhaishajya Ratnavali (A.F.I.)</i>	3 gm
2.	<i>Ayurved sara Sangrah</i>	3 Ratti
3.	<i>Rasatantrasar Evum siddhaprayog sangrah</i>	4 Ratti

done in four groups Sample 1-Agnitapy vidhi with high percentage of Castrol, Sample 2- Kuttan vidhi, Sample3- Granulation and compression tablet method,

Sample 4 –Agnitapy vidhi with low percentage of Castrol.

**Anupana :-** Koshna Jala

Quantity of each ingredient in Simhanad Guggulu according to different Authors (See in Table no 4)

### *Pharmaceutical Study*

**Practical No 1 ( Sample 1 ) See fig. I**

**A)Preparation of Simhanad Guggulu by Bhaishajya Ratnavali method (Agnipaki Vidhi with high percentage of Castrol oil)**

### *Materials*

1) Kwathadravya

- Haritaki yavakuta churna – 24 gm
- Bibhitak yavakuta churna – 24 gm
- Amalaki yavakuta churna - 24 gm
- Kwatharth Jala – 288 ml  
(4 times)



- Avashesh Jala – 72 ml
- (1/4 th shesh)
- 2) Prakshep Dravya
- Sh. Gandhak – 24 gm
  - Sh Guggulu - 24 gm
  - Castrol oil - 96 gm

**Table 4** Quantity of each ingredient in Simhanad Guggulu according to different authors

Sr.No.	Ingredients	<i>Bhaishajya Ratnavali</i>	<i>Ayurved Sar Sangrah</i>	<i>Rasa Ratnakar Evum Siddhaprayog Sangraha</i>
1.	<i>Triphala Kashay/ Churna</i>	Triphala Kashay 3 Pala (144 ml)	Triphala Churna (135 gm)	Triphala kashay 36 Tola ( 9 Pala) 432 ml
2.	<i>Sh. Guggulu</i>	1Pala (48 gm)	45 gm	12 tola ( 3 Pala) 144 ml
3.	<i>Sh. Gandhak</i>	1 Pala (48 gm)	15 gm	4 Tola ( 1 Pala)
4.	<i>Castrol oil</i>	4 Pala (192 gm)	12 gm	16 Tola ( 4 Pala) 192 gm

**Type of Procedure** :- Vati nirmana by *Guggulu Paka Vidhi*

**Equipments** :- Stainless steel vessels, Gas stove, Khalva yantra, Cotton cloth, S.S. tray

#### **Procedure**

Step 1 –Triphala quath nirman

Amalaki, haritaki and bibhitaki coarse powders were weighted in equal amount and mixed. The powdered mixture treated as one part and 16 parts of distilled water were added to it. The mixture was boiled till the volume is reduced to one eighth of its original volume. It was filtered through cotton cloth. The filtrate, resumed as Triphala quath, was used for shodhana of guggulu and preparation of simhanad guggulu.

Step 2 – Guggulu Shodhan

Guggulu was break into small pieces and physical impurities removed manually as possible as. In stainless steel container

guggulu and warm Triphala quath were mixed vigorously and allow to mixed it properly. The mixture was filtered through cotton cloth.

The filtrate was collected and evaporated at a temperature 60degree celcius, in hot plate,to obtained shodhit guggulu. The yield of shodhit guggulu was 78%.

Step 3:- Dry shodhita guggulu and Castrol oil were mixed in another stainless steel vessel by giving mild heat and continuous stirring.

Step 4 – Triphala quath was added in above mixture and heated it on mild flam and when its consistency appeared like avaleha heating was stopped.

Step 5 – Shuddha gandhak was poured in above mixture and mixed it properly.

#### **Observation**

Total weight obtained in Sample 1:-  
147 gm



Total loss observed in Sample 1 :-  
10.32 gm

Total weight of all contents :-  
157.32 gm

- Final product remained in semisolid form; product couldn't be changed into tablet form without any modifications because of extra amount of Castrol oil present in formulation.

### **Practical no 2 ( Sample 2 )**

**A)Preparation of Simhanad Guggulu by Ayurved Sar Sangraha method(kuttan Vidhi) See fig. II**

#### **Materials**

- 1) Triphala Fine Powder :- 135 gm
- 2) Sh. Gandhak :- 15 gm
- 3) Sh. Guggulu :- 45 gm
- 4) Castrol oil :- 12 gm

**Type of Procedure** :- Vati nirmana by Guggulu Kuttan Vidhi

**Equipments** :- Stainless steel vessels, Gas stove, Khalva yantra, Cotton cloth, S.S. tray, Iron Vessel

#### **Procedure**

Step 1 –Guggulu shodhan was done as according to sample1.

Step 2 - Triphala Churna and Sh. Gandhak were mixed in khalva yantra properly at first.

Step 2 – Castrol oil was poured in above mixture.

Step 3 – Shuddha guggulu was added in the last mixture and then that mixture poured in iron khalvayantra. For softness and proper mixing kuttan withi was carried out up to 3 hr.

Step 4 – Handmade tablets were prepared with the help of Castrol.

#### **Observation**

Total Wight obtained in Sample 2 :-  
192 gm

Total Loss observed in Sample 2 :-  
15 gm

Total wt of all contains :-  
207 gm

- Final product easily converted into tablet form because of less amount of Castrol oil present in the formulation.

**Practical no 3 ( Sample 2A-granulated and compression tablet method )See Fig IV**

**A)Preparation of Simhanad Guggulu followed by Ayurved Sar Sangraha method with the help of tableting machine**

#### **Materials**

- 5) Triphala Fine Powder :- 1000 gm
- 6) Sh. Gandhak :- 111 gm
- 7) Sh. Guggulu :- 333 gm
- 8) Castrol oil :- 89 ml

**Type of Procedure** :- Vati nirmana by Guggulu Kuttan Vidhi



**Equipments** :- Stainless steel vessels, Gas stove, Khalva yantra, Cotton cloth, S.S. tray, Iron Vessel

### **Procedure**

Step 1 - Triphala Churna and Sh. Gandhak were mixed in khalva yantra properly at first.

Step 2 – Castrol oil was poured in above mixture.

Step 3 – Shuddha guggulu and triphala quath were added in the last mixture and then that mixture was poured in weight grinder. Mixing was carried out up to 4 hr for softness and proper mixing. Extra triphala quath was added in above mixture while grinding to avoid dryness.

Step 4 – Tablets were prepared with the help of tab letting machine.

### **Observation**

Total Wight obtained in Sample 2 :-  
1450 gm

Total Loss observed in Sample 2 :-  
83 gm

Total wt of all contains :- 1533 gm

- Final product easily converted into tablet form because of less amount of Castrol present in the formulation.

### **Practicle no 4 ( Sample 3)**

#### **A)Preparation of Simhanad Guggulu by Rasa Tantrasara Evum Siddhaprayog**

**Sangrah method (Agnitapi vidhi with low percentage of Castrol) See Fig III**

### **Materials**

1) Kwathadravya

- Haritaki yavakuta churna – 18 gm
- Bibhitak yavakuta churna – 18 gm
- Amalaki yavakuta churna - 18 gm
- Kwatharth Jala – 864 ml  
(16 times)

Avashesh Jala – 54 ml  
(1/ 16th shesh)

2) Prakshep Dravya

- Sh. Gandhak – 6 gm
- Sh Guggulu - 18 gm
- Castrol oil - 24 gm

**Type of Procedure** :- Vati nirmana by Guggulu Paka Vidhi

**Equipments** :- Stainless steel vessels, Gas stove, Khalva yantra, Cotton cloth,S.S. tray

### **Procedure**

Step 1 – Triphala quath nirman

Amalaki, haritaki and bibhitaki coarse powders were weighted in equal amount and mixed. The powdered mixture treated as one part and 16 parts of distilled water were added to it. The mixture was boiled till the volume is reduced to one sixteenth of its original volume. It was filtered through cotton cloth. The filtrate, resumed as Triphala quath, was used for shodhana of





guggulu and preparation of simhanad guggulu.

Step 2 –Triphala quath and shuddha guggulu were mixed in another Stainless steel vessel by giving mild heat and continuous stirring. When consistency appeared like avaleha it was poured in khalva yantra.

Step 3 –Shodhit gandhak and Castrol oil were poured in above mixture and mixing was done properly in khalvayantra.

• **Table 5** Physical Analysis

<i>Sr. No.</i>	<i>Panchavidha Pariksha</i>	<i>Bhaishajya Method ( Sample 1)</i>	<i>Ratnavali</i>	<i>AyurvedSar method ( Sample 2)</i>	<i>Sangrah</i>	<i>Rasatantrasar siddhapravog Sangrah ( sample 3)</i>	<i>Evum</i>
1.	<i>Shabda</i>	Absent		Present		Absent	
2.	<i>Sparsha</i>	Snigdha		Mrudu		Snigdha	
3.	<i>Rupa</i>	Pitabha Krishna		Krishnabha		Pitabha Krishna	
4.	<i>Rasa</i>	Tikta katu kashay		Tikta kashay katu		Tikta katu kashay	
5.	<i>Gandha</i>	Erand triphala gandha		Triphala Erand gandha		Triphala errand gandha	

• In final product guggulu and Triphala extract were remained separated from Castrol. It remained semisolid form.

**Table 6** Weight Analysis

<i>Sr. No.</i>	<i>Weight</i>	<i>Bhaishajya method Sample 1</i>	<i>ratnavali</i>	<i>Ayurved sar Sangrah Method Sample 2</i>	<i>Rasa tantrasar Evum Siddhaprayog Sangrah Sample 3</i>
1.	<b>Before</b>	157.32 gm		207 gm	57.99 gm
2.	<b>After</b>	147 gm		192 gm	49.55 gm
3.	<b>Loss</b>	10.32 gm		15 gm	08.44 gm

**ANALYTICAL STUDY**

Analytical study was performed only for Ayurved Sar Sangrah patha because we can prepare Simhanad guggulu in tablet form only by following this method. According to Bhaishajya Ratnavali, Rasatantra sar evum

**Observation**

Total Wight obtained in Sample 3 :-

49.55 gm

Total Loss observed in Sample 3 :-

8.44 gm

Total wt of all contains :-

57.99 gm

**Observation and Result**

**Physical Analysis see in Table 5**

**Weight Analysis see in Table 6**

Sidhhaprayog sangraha Simhanad Guggulu remained in semisolid dose form. For analytical study we prepared two samples of Simhanad guggulu. Sample I was prepared by handmade tab letting, Sample II prepared by tablet by machine and third sample



(Dhootpapeshwar Company) was procured from market. (See in Table7).

**Table 7** Analytical Study

Sr. No.	Analytical Study	Sample I (Handmade tablet)	SampleII (Tabletting)	Sample III (Market sample)
1.	Friability Test	0.1 %	23.4 %	0.0005 %
2.	Disintegration Time	3 hr	30 min	46 min
3.	Hardness	3.13	0.8	1
4.	pH Value	3.95	2.07	4.40
5.	Moisture Content	3.87	4.04	3.30
6.	Ash Value	0.0424 mg	0.0396 mg	0.1727 mg
7.	Acid Insoluble Ash	0.0119 mg	0.0052 mg	0.0378 mg
8.	Extract Value	0.7366 mg	0.7777 mg	0.8315 mg
9.	Alcohol Soluble Extract	0.8470 mg	0.8141 mg	0.3929 mg
10.	Average weight of tablet	0.3258 mg	0.2763 mg	0.3592 mg

Following Analytical test done in the present study

1. Friability Test
2. Disintegration Time
3. Hardness Test
4. pH Value
5. Average weight of Tablet
6. Ash Value
7. Acid Insoluble Ash
8. Water Soluble Extract
9. Alcohol Soluble Extract
10. Moisture Content

For Analytical testing procedure and Standard followed according to Ayurvedic Pharmacopeia of India.

## DISCUSSION

Present study was carried out with the aim of developing standard preparation procedure, for simhanad guggulu. After evaluation of Ayurveda classics simhanad guggulu recognized with two nomenclature

simhanad Guggulu & Bruhat Simhanad Guggulu. In the present atudy Simhanad Guggulu was prepared by four different methods and differentiated as Sample 1- Agnipaki method with high percentage of Castrol oil, Sample 2 – Kuttan vidhi, Sample 3- Granulation and compression Sample 3 – Agnipaki vidhi with low percentage of Castrol oil. In each sample ingredients were common but variations predicted in quantity. In the present work triphala was used for shodhana of guggulu since simhanad guggulu tablets contains triphala quath or powder. In agnipaki method triphala quath was utilized. For granulation and compression method and Kuttan vidhi triphala churna was utilized for preparation. After preparation of simhanad guggulu in four samples it was observed that tablets could be prepared by following kuttan vidhi and granulation and compression method which was referred from Ayurved Sar Sangraha. It may be because of less



percentage of Castrol oil i.e. only 5.8 %. For agnipaki vidhi , final product remained semisolid form which could not be converted into tablet form. It may be because of higher percentage of Castrol oil i.e. 61% in Bhaishajya ratnavali and 41.4% refered from rasatantrasar Evum Siddhaprayog sangraha.

The Agnipaki method resulted in the semisolid form which is not palatable without modification. Simhanad guggulu tablets were prepared by kuttan vidhi and granulation and compression method. Hence the tablets prepared by using kuttan vidhi and granulation and compression method were used for further evaluation in three samples, described as sample 1 Handmade tablets, Sample2- Granulation and compression tablets Sample 3 – marketed sample of Dhootpapeshwar pharmaceuticals. Granulation and compression tablets were exhibited more friability i.e. 23.4%.Marketed sample was less friable, It indicates that for tab letting of *simhanad guggulu* binding agent must be add to avoid loss during transporting and dispensing. Disintegration i.e. 30 min and hardness i.e. 0.8 of granulation and compression tablets were found to be satisfactory. In case of handmade tablets, disintegration time and hardness both were not satisfactory.

Marketed sample was taken 16 min extra to disintegrate it may be because of presence of binding agent. pH of granulation and compressed tablet was more acidic due to addition of extra *triphala quath* during grinding for softness during tab letting procedure. Moisture content was appeared maximum in granulated and compression tablet, It may be because of improper drying of tablets .Ash Value, Acid Insoluble Ash were obtained maximum in Market sample, It may be because of presence of binding agent in market sample. Alcohol Soluble Extract observed maximum in handmade and machine made Samples. Manually prepared tablet exhibit more weight variations.

As it is proved that *Simhanad Guggulu* is a choice of drug for *Amavata* due to it's *amapachak, vatshamak* and Purgative action. Castrol oil plays active role in purgative action. After comparing efficacy of three methods, it was observed that (Agnipaki vidhi)*Bhaishajya Ratnavali* formulation is much more efficient than both other method but it is not palatable due to this it fails to use in Ayurveda pharmaceuticals. On other hands *Ayurveda sar sangrah* formulation is not more efficient but more palatable. Its palatability makes it Standard formulation. But administration of



extra Castrol oil in the form of *anupana* will be complete effective therapy for *Amavata*. For efficacious and palatable formulation we can modify *bhaishajya ratnavali* sample in soft gelatin capsule.

### CONCLUSION

- The present study, Bhaishajya ratnavali (Agnipaki Vidhi) formulation contrived more efficacious in amavata but it was quit impossible to prepared it in tablet form without any modification because of higher percentage of Castrol oil in it. Hence It failed to use in Ayurveda pharmaceuticals.
- Ayurved sar sangraha formulation prepared by kuttan vidhi and compression and granulation tab letting method were easily converted into tablets form . This formulation contrived as palatable but not so

effective in amavata. Hence administration of Castrol oil with Simhanad Guggulu in the form of anupana makes complete effective therapy for Amavata.

- Granulated and compressed tablets and marketed tables exhibited satisfactory hardness and disintegration time. Handmade tablets were failed to disintegrate in satisfactory time.

Friability of granulated and compressed tablets were not satisfactory due to this we assumed that binding agent must have to be add in this sample.

- This study was concluded for efficacious and palatable formulation of simhanad guggulu we can modify Bhaishajya ratnavali sample (Agnitapi Vidhi) which was remained in semisolid form finally into soft gelatin capsule.

<b>Bhaishajya Ratnavali Figure I</b> <b>Raw material for sample I</b>	<b>Ayurvedsar Sangraha</b> <b>Figure II</b>	<b>RasatantantrasarEvum</b> <b>Figure III Raw Material</b> <b>Sam.III</b>

Processing of sample I	Processing of Sample II	Processing of Sample III
		
Final Product of Sample I	Final product sample II	Final product Sample III
		
<p><b>Granulated and compression tablet method Figure IV</b></p>		



**Processing of sample IV**



**Final Product of Sample IV**



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