

# Pharmaceutical standardization of *Kantakari Avaleha* and *Kantakari Avaleha* granules

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*Kantakari Avaleha* is predominantly using medicine for *Shwasa*, *Kasa* and *Hikka* since Vrinda madava period. Though, *Avaleha* is an acceptable form of medicament by all age groups; but, granules have an added advantage over *Avaleha*; like good palatability, less moisture content and easily handling. For this purpose, *Kantakari Avaleha* (KA) was modified in to *Kantakari Avaleha* granules (KAG). **Aim:** To convert *Kantakari Avaleha* into granule form and develop standard manufacturing procedure. **Materials and Methods:** 08 pilot batches were prepared to fix the ratio of formulation composition. The procedure was repeated for 03 times to ensure the process validation. **Results:** Converting into granules with same quantity of oil and following same the procedure of *Avaleha* was difficult. By reducing the oil content in to 3/4<sup>th</sup> and process modification was yielded desired characteristics of granules. **Conclusion:** This Modified percentage of ingredients and modified process can be considered as standard in preparing *Kantakari Avaleha* granules. As no manufacturing and physicochemical properties are available for *Kantakari Avaleha* granules; the current findings can be considered as standard for future studies.

**Key words:** Granules, *Kantakari Avaleha*, *Khanda Paka*, standardization

## Introduction

*Kantakari Avaleha* (KA)<sup>1</sup> is a purely herbal product which popularized for the management of respiratory disease like *Kasa*, *Shwasa* etc. The main drug of the medicine is whole plant of *Kantakari* as used as the decoction for the reason that named “*Kantakari Avaleha*”. There is less work published regarding the standardization of the compound formulation *Kantakari Avaleha*. Thus the process of implementing and developing technical standards based on the consensus of text is essential work.

Quality, safety, efficacy, non-toxicity as well as palatability, acceptance, appearance, shelf life etc. also has important role in to meet marketing trend in the present era. Hence

conversion of *Kantakari Avaleha* into *Kantakari Granule* dosage form with minimum change to the formula and develop SMP (Standard Manufacturing Procedure) is the aim of this study.

### **Aims and Objectives:**

- To develop the SMP (Standard Manufacturing Process) and quality standards of *Kantakari Avaleha* (KA) and *Kantakari Avaleha Granules* (KAG).

### **Materials and methods:**

#### **Collection of raw drugs:**

The fresh *Kantakari* was collected from periphery area of Jamnagar. Dry raw material of were procured from the pharmacy, Gujarat Ayurved University, Jamnagar. *Sita* (Sugar Candy) was purchased from local market of Jamnagar. *Madhu* (Bee honey) was purchased from the outlet of Forest Department Jamnagar. All the drugs were authenticated by the Pharmacognocny Laboratory, IPGT & RA, Jamnagar.

*Kantakari Avaleha* and *Kantakari Avaleha Granules* were prepared at Department of *Rasashastra* and *Bhaishajya Kalpana*, I.P.G.T & R.A, Jamnagar. The whole pharmaceutical study was carried as mentioned below.

Formulation composition of KA and KAG granules is placed at Table 1.

### **Pharmaceutical procedure**

#### **Preparation of *Churna* (powder)<sup>2</sup>**

- *Guduchi, Chavya, Chitraka, Musta, Karkatashringi, Shunthi, Maricha, Pippali, Dhanvayasaka, Rasna, Shati, Tugaksiri (Vamshalochana)* are the raw materials should be used as fine powder in this formulations. Each raw material was separately taken and removed physical impurities and dried under sunlight. They were Grinded by using Mini Pulverizer and sieved through # 72. The powder which not passing through #72 it was again grinded using Mixture grinder and sieved again through #72. Packed each powder separately in airtight polyethylene containers. Results of the *Prakshepa* is mentioned in table 2.

#### **Preparation of *Kantakari Kwatha* (decoction)**

Fresh *Kantakari Panchanga* was taken, and removed physical impurities, washed with potable water and then cut with cutter and crushed by using wet grinder. Crushed *Kantakari*

*Panchanga* was taken in a stainless steel vessel. Then water was added it and subjected to heating process and reduced water into 1/4<sup>th</sup> of its initial volume. Then filtered through a clean cotton cloth to obtain *Kwata*. Results is mentioned in table 3.

### **Preparation of *Kantakari Avaleha*<sup>3, 4</sup>.**

The specific classical method mentioned for *Kantakari Avaleha* in Sarangadhara Samhita was followed for the preparation of *Kantakari Avaleha*. According to that; added *Sita* (sugar candy) in *Kantakari Kwatha* and stirred over heating until dissolve the sugar well for 10 minutes. Temperature of the homogenous mixture was around 80<sup>0</sup>C. Then the mixture of sugar and *Kwatha* was filtered through double cloth to remove physical impurities of sugar candy. Add the powdered ingredients named as *Churna Dravya* (Sr.no.2-13 in Table 4) with *Ghrita* and *Taila* to the filtrate. Heating process was carried out at between 90- 95<sup>0</sup>C temperature with stirring, till it attains the consistency of *Leha* confirmed by the formation of soft bolus, which does not disperse in water. Then stop heating process and allow for self-cooling up to around 60<sup>0</sup>C temperature. After that added fine powders of *Vamsalochana*, *Pippali* and stirred properly till uniform mixing and allow them for cool in room temperature. *Madhu* was added at 30<sup>0</sup>C temperature and mix thoroughly to obtain homogeneous blend. Final product was store in airtight containers.(Plate 1)

### ***Kantakari Avaleha* granules**

There is no specific method available for conversion of *Kantakari Avaleha* in to Granules. In present pharmaceutical study, total four pilot batches *Kantakari Avaleha* Granules was prepared by changing the process and proportion of oily materials to obtain desired granule consistency. The effort was carried out to prepare the *Kantakari Avaleha* granules with doing minimum alteration to the formula and process.

*Kantakari Avaleha* Granules preparation, general method of *Avaleha* preparation was adopted. After adding Sugar candy in *Kantakari Kwatha*, heating process was carried out till achieved three thread consistency of sugar syrup. In pilot batch KAGP-1, *Churna Dravyas* and *Ghrita* & *Taila* were added to the filtrate and again heating process was done till achieved semisolid stage. Then added *Prakshapa dravya* like *Vamshalochana*, & *Pippali* at 80<sup>0</sup>C temperature and *Madhu* was added at 30<sup>0</sup>C. Final product does not converted into Granules. In KAGP-2 preparation, *Churna Dravya* (Sr.no.2-13 in Table 5) and *Ghrita* & *Taila* were added in sugar syrup and processed as classical *Kantakari Avaleha* procedure.

This batch also does not convert into Granules. In 3<sup>rd</sup> batch (KAGP-3) the *Churna Dravya* (Sr.no.2-13 in Table 5) was stir fried with *Ghrita* and *Tila Taila* to obtained oily mass. Oily mass of *Churna dravya* was added in earlier prepared sugar candy syrup and heating process was carried out again for 20 minutes. After self-cooling (60<sup>0</sup>C) added fine powders of *Vamshalochana*, & *Pippali*. *Madhu* was added at 30<sup>0</sup>C temperature and mix thoroughly to obtain a homogeneous hard mass. It was slight oily material but that was passed rubbing through sieve no # 10. Final product was convert into Granules but more oily in nature.

Therefore looking to oily in nature in 3<sup>rd</sup> pilot batch, slight modification was done in the proportion of oily materials **were reduced up to 25% of quantity** (Table no 5) in which mentioned in basic formula. After reduced the quantity of *Ghrita* and *Taila* all final batches were fulfilled the desired characteristic features of granules. This ratio of ingredients and process was adopted in further 3 batches of granules to ensure the process validation of KAG.(Table 6 , Plate 2).

### Observations and Results

During preparation of *Churna Dravya* (Sr.no.2-13 in Table 2), maximum (13.5%) and minimum (3.2%) loss was observed in *Musta* and *Rasna* respectively. The more loss in *Musta* may be due to more content of fibrous material. During *Prakshepa dravya churna* preparation, 4.7 % & 8 % loss was noted in *Vamshalochana* and *Pippali* (Table 2).

Method of Preparation of *Kantakari Kwatha* was same for all the batchers. Fresh *Kantakari Panchanga* was used for the preparation of *Kwatha* in the ratio of drugs & water 1: 2.56. After reduced to 1/4<sup>th</sup>, colour of the *Kwatha* was changed from greenish colour to dark brown colour with characteristic odor of *Kantakari* and its taste was *Tikta* and *Kashaya Rasa*.

In KA, after addition of *Churna Dravya* with *Ghrita* and *Taila* to the filtrate temperature was noted 80- 85<sup>0</sup>C. During *paka*, *Tantumtva Lakshana* was not found in this process, but *Darvi Pralepatva*, *Apsumajjati* with *Sthiratwa Lakshana* was observed. *Piditha mudra*, *Gandha*, *Varna*, *Rasodbhava* were observed in final product. Colour of the final product of KA was blackish brown colour, semisolid to solid paste with bitter, sweet and astringent taste. In final stage of *Kantakari Avaleha*, oil was observed in outer surface. All the batchers had shown similar characteristics. Average weight loss of KA was 1.12% from the initial weight.(Table 7).

In KAG, *Tantumatva* and all the other *Asanna Paka Lakshana* was observed. While stir frying *Churna dravya* in *Ghee & Tila Taila*, it was obtained good consistency and mild oily portion observed in outer surface. While adding fried *Churna dravya* in earlier cooked sugar candy syrup, mild oily portion was separated out, but while adding Pippali and Vamsalochana, oil portion was absorbed to the component and it had become solid mass. The material was easily converted into granules by rubbing over 10 # sieve. KAG was dark brown color, bitter, pungent and sweet tasted dry granules with characteristic odor. Average weight loss was observed as 4.95% from the initial weight (Table 8).

## Discussion

Condition of *Kantakari* (whether raw or fresh) to be used for *Kantakari Kwatha* was not in specified in the text. Considering ratio of *Kantakari* to water is est. 1: 2.56; it was decided to use fresh *Kantakari*. Special attention should be given to not contaminate the *Kwatha* with its thorny parts.

While preparing KA, Temperature must be maintain throughout the process for preventing the sticking constituent over bottom of the vessel. Heating process should be continue until moisture evaporated and till oil layer start separating (Figure 01).

All the physico-chemical parameters were compared with physicochemical parameters of plant origin ingredients of formulation mentioned in API. Range of API values of total ash is not more than 7.0 per cent, range of Alcohol-soluble extractive of ingredients are mentioned to be not less than 30 percent and Water soluble extractive should not be less than 30.0 percent. All the 03 groups showed values as per the limits (Ash value) and minimum values of extractives mentioned in API.

pH shows that the aqueous solution of all the 6 samples were mild acidic in nature i.e. between 6 and 5.5. This acidic pH complies with absorption of maximum formulation ingredients in view of significant water soluble extractive from oral cavity and stomach i.e. both in the presence of acidic environment and chances of change of nature of drug due to alteration in pH shall be nullified. Total of Sugar content (%) of KA and KAG were 12.63 & 13.06; Reducing sugar (mg) was 2.23 & 2.75; Non-reducing sugar (mg) 10.36 & 11.17 respectively. More sugar percentage in KAG than that of KA is probably due to less moisture content in KAG.

Tannin content of two groups KA and KAG were 7.32 & 6.57 correspondingly (Table 4.10). The results of pH and all the sugar content parameters (Total, Reducing & Non-reducing sugar content) of both the samples were within the limit same as API. Tannin content, total Fatty content and loss on drying for KA is not mentioned in the API. (Table 9).

HPTLC fingerprinting of each one sample of two groups KA and KAG were developed. Eight spots in track KA & Ten spots in track KAG were found in short wave uv 254 nm. In long wave uv 366 nm, five spots in track KA and 11 spots in track KAG were obtained.

Out of total 16 Rf values of both the formulations, only one is similar in among them and rest 15 are different. Changed mobility of constituents of KA and KAG may not be change in formulation ingredients. Spectral analysis may reveal similarity of chemical constitution of both the formulations at different Rf. (Table 10).

Microbial Limit Test of *Kantakari Avaleha* (KA) and *Kantakari Avaleha* Granules (KAG) were done at Vasu Research Centre, Vadodara. *E. coli*, *Salmonella*, *S. aureus* and *P. aeruginosa* were absent in both the samples. Total Plate Count was 4164 cfu/gm in KA and it was 2886 cfu/g in KAG. Total Yeast & Mould Count were 324 cfu/gm for KA and it was 295 cfu/g for KAG samples (Table 11).

### **Conclusion**

Converting *Avaleha* into granules help in fixing the dose, easy to administer, and also increases the shelf life. The results obtained from KA are within the standard data mentioned in API. While comparison to KA and KAG; there is no considerable difference between both the drugs in analytically. Thus KAG can be recommend as alternative medicine for KA. And since there is no standard published data on KAG, the current observations may be referred for KAG in future studies.

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### **Conflicts of interest**

There are no conflicts of interest

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### Table 1 : Composition of *Kantakari Avaleha* and *Kantakari Avaleha* Granules;

No	Ingredient	Botanical Name	Parts used	Qty.inClas.c	metric
1	<i>Kantakari</i>	<i>Solanum xanthocarpum</i> Schrad. & Wendl.	Whole plant	<i>Tula</i>	4800 g
2	Water	-	-	<i>Drona</i>	12288 ml
3	<i>Guduchi</i>	<i>Tinospora cordifolia</i> Miers	Stem	1 <i>Pala</i>	48 g
4	<i>Chavya</i>	<i>Piper chaba</i> Trel. & Yunck.	Stem	1 <i>Pala</i>	48 g
5	<i>Chitraka</i>	<i>Plumbago zeylanica</i> Linn.	Root	1 <i>Pala</i>	48 g
6	<i>Musta</i>	<i>Cyperus rotundus</i> Linn.	Rhizome	1 <i>Pala</i>	48 g
7	<i>Karkatahringi</i>	<i>Pistacia integerrima</i> J.L. Stewart ex Brandis	Gall	1 <i>Pala</i>	48 g
8	<i>Shunthi</i>	<i>Zingiber officinale</i> Roscoe.	Rhizome	1 <i>Pala</i>	48 g
9	<i>Maricha</i>	<i>Piper nigrum</i> Linn.	Fruit	1 <i>Pala</i>	48 g
10	<i>Pippali</i>	<i>Piper longum</i> Linn.	Fruit	1 <i>Pala</i>	48 g
11	<i>Dhanvayasaka</i>	<i>Alhagi camelorum</i> Fisch	Whole plant	1 <i>Pala</i>	48 g
12	<i>Bharangi</i>	<i>Clerodendrum serratum indicum</i> Moon	Root	1 <i>Pala</i>	48 g

13	<i>Rasna</i>	<i>Alpinia galangal</i> Willd.	Rhizome	1 <i>Pala</i>	48 g
14	<i>Shati</i>	<i>Hedyciumspecatium</i> Ham ex smith	Rhizome	1 <i>Pala</i>	48 g
15	<i>Sita</i>	Sugar Candy	-	20 <i>Pala</i>	960 g
16	<i>Madhu</i>	Bee honey	-	8 <i>Pala</i>	384 g
17	<i>Ghrita</i>	<i>Ghee</i>	-	8 <i>Pala</i>	348 g
18	<i>Taila Tila</i>	<i>Sesame oil</i>	-	8 <i>Pala</i>	384 g
19	<i>Vamsha lochana</i>	<i>Bambusa arundinacea</i> (Retz.)	-	4 <i>Pala</i>	192 g
20	<i>Pippali</i>	<i>Piper longum</i> Linn.	Fruit	4 <i>Pala</i>	192 g

**Table 2: Details of results of *Prakshepa Dravya churna*;**

S. N	Ingredients	Qty. of initial raw material	Qty. of fine powder after passed through #72	Qty. of materials not passed through 72#	Total loss (%)	Total yield (%)
1	<i>Guduchi</i>	1100 g	1040 g	60 g	5.45	94.54
2	<i>Chavya</i>	1100 g	1050 g	50 g	4.54	95.45
3	<i>Chitraka</i>	1100 g	1055 g	45 g	4.09	95.90
4	<i>Musta</i>	1200 g	1038 g	162 g	13.5	86.5
5	<i>Karkatashringi</i>	1100 g	1036 g	64 g	5.8	94.19
6	<i>Shunthi</i>	1200 g	1060 g	140 g	11.7	88.34
7	<i>Maricha</i>	1100 g	1045 g	55 g	5.0	95
8	<i>Pippali</i>	5500 g	5062 g	438 g	8.0	92.1
9	<i>Dhanvayasaka</i>	1200 g	1080 g	120 g	10.0	90.0
10	<i>Bharangi</i>	1100 g	1055 g	45 g	4.1	96
11	<i>Rasna</i>	1100 g	1065 g	35 g	3.2	96.9
12	<i>Shati</i>	1200 g	1040 g	60 g	5.0	86.67
13	<i>Tugaksiri</i>	4 250 g	4054 g	196 g	4.7	95.39

**Table 3 : Results of Kantakari Kwatha**

Sl. No.	Ingredient	Quantity of ingredient	Quantity of water
01.	Fresh <i>Kantakari</i> <i>Panchanga</i>	10 400 g	26 624 ml



**Table 4: Ingredients and their quantity of *Kantakari Avaleha*;**

No	Ingredients	Quantity		
		KAM-3	KAM-4	KAM-5
1.	<i>Kantakari Kwatha</i>	6640	6660	6660
2.	<i>Guduchi</i>	104g	104 g	104g
3.	<i>Chavya</i>	104g	104 g	104g
4.	<i>Chitraka</i>	104g	104 g	104g
5.	<i>Musta</i>	104g	104g	104g
6.	<i>Karkatashringi</i>	104g	104 g	104g
7.	<i>Shunthi</i>	104g	104 g	104g
8.	<i>Maricha</i>	104g	104 g	104g
9.	<i>Pippali</i>	104g	104 g	104g
10.	<i>Dhanvayasaka</i>	104g	104 g	104g
11.	<i>Bharangi</i>	104g	104 g	104g
12.	<i>Rasna</i>	104g	104 g	104g
13.	<i>Shati</i>	104g	104 g	104g
14.	<i>Ghrita</i>	2074g	2074g	2074g
15.	<i>Taila Tila</i>	830ml	830ml	830ml
16.	Sugar Candy	830 g	830 g	830gl
17.	<i>Madhu</i>	830 g	830 g	830 g
18.	<i>Vamshalochana</i>	415g	415g	415g
19.	<i>Pippali</i>	415g	415g	415g

**Table 5: Ingredients and their quantity of *Kantakari Avaleha Granules* (Pilot batches)**

SN	Ingredients	Quantity			
		KAGP-1	KAGP-2	KAGP-3	KAGP-4
1.	<i>KantakariKwatha</i>	1530 ml	1540 ml	1535 ml	1535 ml
2.	<i>Guduchi</i>	24 g	24 g	24 g	24 g
3.	<i>Chavya</i>	24 g	24 g	24 g	24 g
4.	<i>Chitraka</i>	24 g	24 g	24 g	24 g
5.	<i>Musta</i>	24 g	24 g	24 g	24 g
6.	<i>Karkatashringi</i>	24 g	24 g	24 g	24 g
7.	<i>Shunthi</i>	24 g	24 g	24 g	24 g

8.	<i>Maricha</i>	24 g	24 g	24 g	24 g
9.	<i>Pippali</i>	24 g	24 g	24 g	24 g
10.	<i>Dhanvayasaka</i>	24 g	24 g	24 g	24 g
11.	<i>Bharangi</i>	24 g	24 g	24 g	24 g
12.	<i>Rasna</i>	24 g	24 g	24 g	24 g
13.	<i>Shati</i>	24 g	24 g	24 g	24 g
14.	<i>Ghrita</i>	192 ml	192 ml	192 ml	144 ml
15.	<i>Taila Tila</i>	192 ml	192 ml	192 ml	144 ml
16.	Sugar Candy	480 g	480 g	480 g	480 g
17.	<i>Madhu</i>	192 g	192 g	192 g	192 g
18.	<i>Vamshalochana</i>	96 g	96 g	96 g	96 g
19.	<i>Pippali</i>	96 g	96 g	96 g	96 g

**Table 6: Ingredients and their quantity of *Kantakari Avaleha* Granules (Main batches);**

Sl. No.	Ingredients	Quantity		
		KAGM-5	KAGM-6	KAGM-7
1.	<i>Kantakari Kwatha</i>	6645	6640	6665
2.	<i>Guduchi</i>	104 g	104 g	104 g
3.	<i>Chavya</i>	104 g	104 g	104 g
4.	<i>Chitraka</i>	104 g	104 g	104 g
5.	<i>Musta</i>	104 g	104 g	104 g
6.	<i>Karkatashringi</i>	104 g	104 g	104 g
7.	<i>Sunthi</i>	104 g	104 g	104 g
8.	<i>Maricha</i>	104 g	104 g	104 g
9.	<i>Pippali</i>	104 g	104 g	104 g
10.	<i>Dhanvayasaka</i>	104 g	104 g	104 g
11.	<i>Bharangi</i>	104 g	104 g	104 g
12.	<i>Rasna</i>	104 g	104 g	104 g
13.	<i>Shati</i>	104 g	104 g	104 g
14.	<i>Ghrita</i>	622.5ml	622.5ml	622.5ml
15.	<i>Taila Tila</i>	622.5ml	622.5ml	622.5ml
16.	Sugar Candy	2074g	2074g	2074g
17.	<i>Madhu</i>	830g	830g	830g

18.	<i>Vamshalochana</i>	415g	415g	415g
19.	<i>Pippali</i>	415g	415g	415g

**Table 7: Results obtained during preparation *Kantakari Avaleha* (Main batches);**

Batch	Initial Qty. (g)	Obtained Qty. (g)	Weight loss (g)	Weight Loss %
KAM-3	6927	6860	67	0.96
KAM-4	6928	6850	78	1.12
KAM-5	6928	6840	88	1.27
<b>Average</b>	<b>6928</b>	<b>6850</b>	<b>78</b>	<b>1.12</b>

**Table 8: Results obtained during preparation *Kantakari Avaleha Granule* (Main batches);**

Batch	Initial Qty. (g)	Obtained Qty. (g)	Weight loss (g)	Weight Loss %
KAGM-5	6513	6210	300	4.65
KAGM-6	6512	6170	342	5.25
KAGM-7	6513	6190	323	4.95
<b>Average</b>	<b>6513</b>	<b>6190</b>	<b>322</b>	<b>4.95</b>

**Table 9: Comparison of average values of various quantitative parameters of KA and KAG**

Physio-chemical Parameters	KA	KAG
L.O.D. at 110 <sup>0</sup> C ( % w/w)	9.5	6.0
Total ash value	3.2	4.5
Water soluble extractive ( % w/w)	53.46	63.74
Methanol Soluble extractive( % w/w)	33.34	51.0
pH of 5% aqueous sol.	6.0	5.5
Acid insoluble Ash ( % w/w)	1.25	2.33
Total Fatty content	11.86	10.50
Tanin content	7.32	6.57
Sugar content		
Total	12.63 mg	13.06 mg
Reducing	2.23 mg	2.75 mg
Non-reducing	10.36 mg	11.17 mg

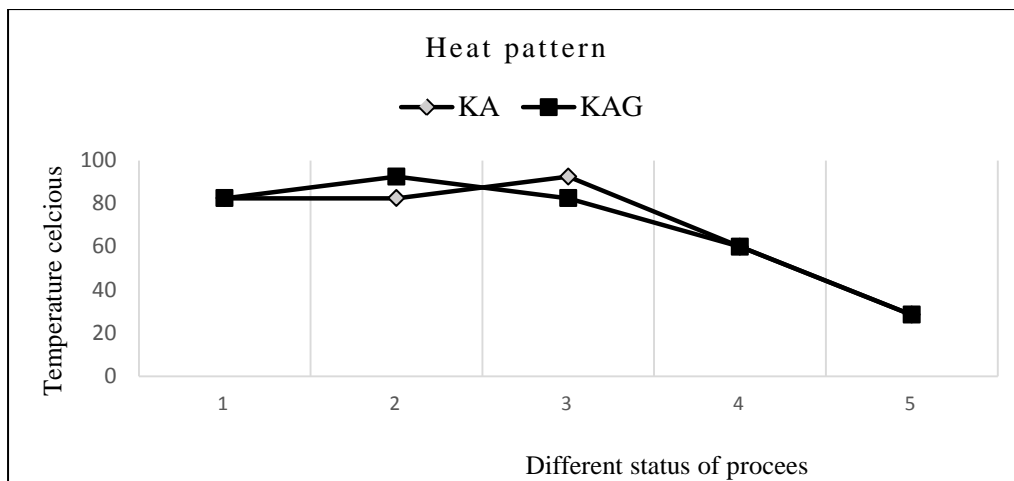
**Table 10: HPTLC profile of KA & KAG**

@254nm		@366nm		@ 540nm	
KA	KAG	KA	KAG	KA	KAG
0.19	0.14	0.19	0.14	0.16	0.14
0.35	0.21	0.35	0.34	0.19	0.21
0.42	0.34	0.47	0.48	0.24	0.34
0.47	0.42	0.57	0.57	0.35	0.42
0.57	0.48	0.69	0.62	0.47	0.48
0.69	0.57		0.71	0.57	0.57
0.78	0.71		0.77	0.69	0.62
0.88	0.77			0.78	0.71
				0.88	0.77

**Table 11: Microbial limit test results of KA & KAG**

	Microbial limit test	KA	KAG
1	Total Plate Count	4164 cfu/g	2886 cfu/g
2	Total Yeast & Mould Count	324 cfu/g	2955 cfu/g
3	<i>E. coli</i>	Absent	Absent
4	<i>Salmonella</i>	Absent	Absent
5	<i>S. aureus</i>	Absent	Absent
6	<i>P. aeruginosa</i>	Absent	Absent

**Figure 1: Temperature pattern used for different stages of KA and KAG;**



**Plate 1 : Plate -Kantakari Avaleha (KA)**

**Plate 2 : Plate -Kantakari Avaleha granule (KAG)**

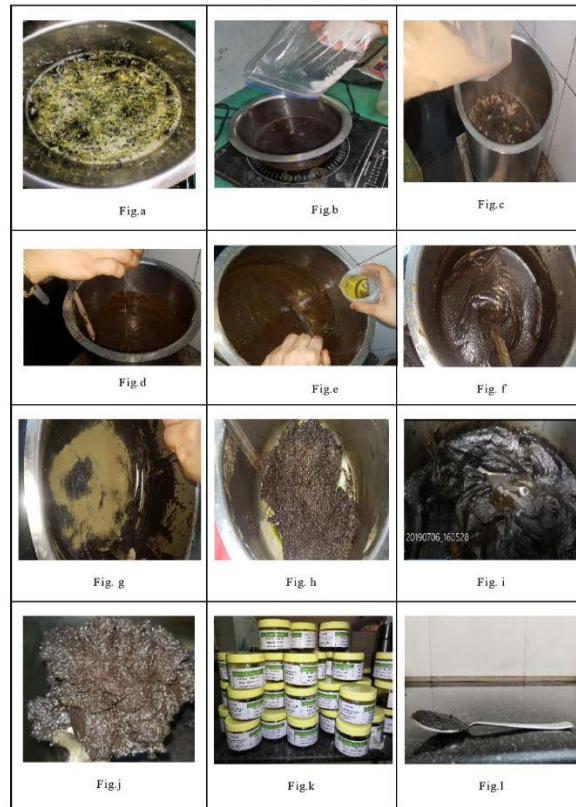
**Legends 3.1 and 3.2****Plate no.-3.1*****Kantakari Avaleha (KA)***

- Fig. a:** *Kantakari Kwatha* Preparation
- Fig. b:** Added sugar candy to the filtered *Kwatha*
- Fig. c:** Added *Prakshepa Dravya* after filtered again
- Fig. d:** Added *Gritha*
- Fig. e:** Added *Tila Tail*
- Fig. f:** Heated over mild fire
- Fig. g:** Added *Pippali* and *Vamsalochana* at 60 °C
- Fig. h:** Mixed well
- Fig. i:** Added honey after *Shwangasheeta*
- Fig. j:** Mixed well to obtained homogeneous mixture
- Fig. k:** Stored in airtight container.
- Fig. l:** Dose of 6g

**Plate no.-3.2*****Kantakari Avaleha granules*****(KAG)**

- Fig. a:** *Kantakari Kwatha* Preparation
- Fig. b:** Added sugar candy to the filtered *Kwatha*
- Fig. c:** *Kwatha* is filtered again
- Fig. d:** Heated until 2-3 *Tantumavta* stage.
- Fig. e:** *Asanna Paka Pariksha*
- Fig. f:** Mean while stir-frying *Prakshepa Dravya* in *Ghritha* and Oil.
- Fig. g:** Added stir-fried *Prakshepa Kalka* to sugar syrup
- Fig. h:** Mixed well while heating.
- Fig. i:** Added *Pippali* and *Vamsalochana* at 60 °C.
- Fig. j:** Added honey with stirring, after *Shwangasheeta*
- Fig. k:** Prepared granules by using 10 # sieve
- Fig. l:** Stored in airtight container.

**Plate No.3.1**  
*Kantakari Avaleha*



**Plate 3.2**  
*Kantakari Avaleha Granule*



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- <sup>1</sup> Jha CB, Edited with footnotes by Pt. Parashuram Shastri Vidyasagar, Sharangadhara Samhita of Sri Sarangadharaacharya with the commentaries Adhamalla's Dipika' and Kasirama's Gudhartha-dipika, Sanskarana. Madya Khanda(Section ii), *Avaleha Kalpana*(Confections) Chap.8 Ver. 5-9. Varanasi: Chaukhamba Surbharati Prakashan, 2013.p.207.
- <sup>2</sup> Parsurama shastri, editor. Sharangadhara Samhita of Sharangadhara, Madhyam Khanda, Chap.6 ver.1. Varanasi: Chaukhambha Sanskrit Sansthan; 2013, p.178.
- <sup>3</sup> Jha CB, Edited with footnotes by Pt. Parashuram Shastri Vidyasagar, Sharangadhara Samhita of Sri Sarangadharaacharya with the commentaries Adhamalla's Dipika' and Kasirama's Gudhartha-dipika, Sanskarana. Madya Khanda (Section ii), *Avaleha Kalpana* (Confections) Chap.8 Ver. 5-9. Varanasi: Chaukhamba Surbharati Prakashan, 2013.p.207.
- <sup>4</sup> Anonymous, the Ayurvedic Pharmacopoeia of India, 1st Ed. Govt. of India. Ministry of Health and Family Welfare, Dept. of I.S.M. and H, New Delhi, Part-I. Vol.IV, 2004. p.05.