International Journal of Applied Ayurved Research ISSN: 2347- 6362

PHARMACEUTICAL STUDY OF DIFFERENT SAMPLES OF *AGASTYA HARITAKI*

Agrawal Sachin[1]*, Prasad Anjali Baijnath[2], Mundhra Varsha[3], Rathi Rajesh[4], Rao. K Shankar[5]
[1*]Asst. Professor, Rasa Shastra & Bhaishajya Kalpana, SGAC& Hospital, Sriganganagar
[2]Research Officer, Central Ayurvedic Research Institute for Respiratory Disorders, Patiala
[3]Asst. Professor, Rasa Shastra & Bhaishajya Kalpana, KAMC, Kasganj, UP
[4]Family Physician, MD, BAMS, Rathi Clinic, Goregaon E. Mumbai
[5]HOD &Professor, Rasa Shastra & Bhaishajya Kalpana, NIA, Jaipur

ABSTRACT

Avaleha kalpana is in practice since ancient days. It has many benefits over basic Ayurvedic pharmaceutical dosage form viz. easy administration, pleasant and agreeable taste, palatable to all age groups, longer shelf life, higher efficacy, nutritive values and is safe in use. *Avaleha* is specifically indicated for disease of upper respiratory tract like *Kasa* (Cough), *Peenasa* (Sinusitis), *Kshaya* (Phthisis) *Krimi* (Worm infestation), *Arsha* (hemorrhoids), *Swasa* (Asthma/ dysponea) and *Agnimandya* (Digestive impairment). *Avaleha* is a secondary preparation (Semisolid preparation of drugs) also known as *leha Kalpana* generally contains aqueous media, of drug i.e. *Kwatha*, *Swarasa* etc; a sweet substance, oleaginous substances (*Sneha dravya*) and few adjuvant (*Prakshepa*).

Keywords: *Avaleha, Kwatha, Swarasa, Sneha dravya, Prakshepa*.

INTRODUCTION: The supply of essential drugs of good quality was identified as one of the prerequisites for the delivery of health care at the International Conference on Primary Health care in Alma-Ata in 1978[1].The Govt. of India (GOI) has issued gazette notification of G.M.P. (Good Manufacturing Practices) on 23-06-2000 where in aspects of quality control finds an important place in ensuring the quality of products[2].

The substances which are neither too thick nor too thin and which can be licked easily are called as *Leha*.[3] *Agastya Haritaki* is polyherbal formulation useful in the management of various types of Upper Respiratory Tract disorders like *Kasa* (cough), *Swasa* (asthma), *Hikka* (hiccough) etc. With the recognition of Ayurvedic medicines globally.[4]Maintaining the uniform standard of medicines has become challenging task. The present study was conducted with following objectives.

OBJECTIVE OF STUDY:

1. To prepare *Agastya Haritaki* as per classical and modified methods.
2. To compare the yield of different Pharmaceutical procedure in preparation of *Agastya Haritaki*.

MATERIALS AND METHODS: Classical Method of preparation of *Agastya Haritaki Rasayana* as per A.F.I. is followed. [5, 6] whereas slight modified procedures are also used for the practical convenience. Details of various samples are explained in Table No. 1.

Table No. 1: Showing the different sampling of *Agastya Haritaki*

Sample's Name	No. of *Haritaki*	Wt. of *Haritaki* Used (gm)	Form of *Haritaki*	Specification
AH_1	20	332	Wet	Wet *Haritaki* Pulp is used
AH_2	20	92	Dry	Dry powder is used
AH_3	-	166	Dry	*Haritaki* powder half the weight of wet *Haritaki* is used [7]
AH_4	20	335	Wet	Whole wet *Haritaki* is used (after removing seeds).

The ingredients of *Agastya Haritaki* are mentioned in the Table No. 2.

Table No. 2: Showing the ingredients of *Agastya Haritaki* [8]

S.No.	Ingredients	Latin name	Part Used	Quantity(gm)
***Pradhana Dravya* (Main Ingredients)**				
1.	*Haritaki*	*Terminalia chebula*	Fruit (Pulp)	As per samples
2.	Bilva	*Aegle marmelos*	Stem Bark	19.2
3.	Agnimantha	*Clerodandrum phlomidis*	Stem Bark	19.2
4.	Shyonaka	*Oroxylum indicum*	Stem Bark	19.2
5.	Kashmari	*Gmelina arborea*	Stem Bark	19.2
6.	Patala	*Stereo suaveolens*	Stem Bark	19.2
7.	Brhati	*Solanum indicum*	Whole Plant	19.2
8.	Shalaparni	*Desmodium gangeticum*	Whole Plant	19.2
9.	Prishniparni	*Uraria picta*	Whole Plant	19.2
10.	Kantakari	*Solanum virginianum*	Whole Plant	19.2
11.	Goksura	*Tribulus terrestris*	Whole Plant	19.2
12.	Bala	*Sida cordifolia*	Root	19.2
13.	Shankhpushpi	*Convolvulus pluricaulis*	Whole Plant	19.2
14.	Kapikachhu	*Mucuna pruriens*	Seed	19.2
15.	Sathi	*Hedychium spicatum*	Rhizome	19.2
16.	Hastipippali	*Scindapsus officinalis*	Dry Fruit	19.2
17.	Apamarg	*Achyranthes aspera*	Root	19.2
18.	Pippalimula	*Piper longum*	Root	19.2
19.	Chitraka	*Plumbago zeylanica*	Root	19.2
20.	Bharngi	*Clerodandrum serratum*	Root	19.2
21.	Puskarmula	*Inula racemosa*	Root	19.2
22.	Barley	*Hordeum vulgare*	Seed	614
23	Water	-		3.072 lt.
Sweetening Agent				
24.	Guda	Jaggery		960

***Sneha dravya* (oleaginous substances)**				
25.	*Go Ghirta*	Cow ghee		38.4
26.	*Tila Taila*	*Tila oil*	Oil	38.4
***Prakshepa* (adjuvant)**				
27.	*Pippali*	*Piper longum*	Fruit	38.4
28.	*Madhu*	Honey		38.4

MANUFACTURING PROCESS: All the four samples of *Agastya Haritaki* were prepared as per the classical conventional method. Whole procedure was carried out in three stages. Manufacturing operation involved in the preparation of *Agastya Haritaki* is enlisted in Table No. 3.

Table No. 3: Showing the operation was done under following objectives

S.No.	Pre-operative preparation (*Purva karma*)	Operative procedure (*Pradhana Karma*)	Post-operative procedure (*Paschata Karma*)
1.	Procurement of raw material	*Kwatha nirmana*	Precaution & Observation (during packaging and storage)
2.	Cleaning of raw material	Frying of *Haritaki* Pulp	Packaging & Labeling
3.	Apparatus collection	Preparation of *Avaleha*	Storage
4.	Preparation of fine and coarse powder	Mixing of *Prakshepa* (Adjuvant)	-

Pre-operative preparation (*Purva karma*): All the ingredients were procured from the pharmacy of N.I.A., Jaipur. Foreign matter like sand, soil and adulterants etc were thoroughly removed. Apparatus and equipment to be used in the preparation of formulation were collected which is listed under Table No. 4. Ingredients 2-22 of Table No. 2 were coarsely powdered with the help of disintegrator machine and sieved through mesh - 18 N. Ingredient 28 of Table No. 2 was finely powdered with the help of pounding machine and electric grinder and sieved through mesh - 80N.

Table No. 4 : Showing Various apparatus used in preparation of *Agastya Haritaki*

S.No.	Apparatus	Purpose
1.	Electrical weighing machine	Weighing
2.	Iron Imamdasta	Making coarse powder
3.	Mixer grinder	Powdering
4.	Sieve no. (18, 40, 80 and 120 mesh)	Obtaining fine powder
5.	Stainless steel tray and plate used	Removing foreign material
6.	Electrical weighing machine	Weighing drug & sample
7.	Gas cylinder with burner & Lighter	Heating

8.	Stainless steel vessels	Preparing *kwatha* &*avaleha*
9.	Glass beaker 100 ml, 500 ml	Measuring *kwatha*
10.	Long & short spatula	Stirrer
11.	Thermometer	Recording the temperature
12.	Cotton cloth	Filter
13.	P.E.T. (Poly ethylene terephthalate) jar	Packaging

Operative procedure (*Pradhana Karma*)

Preparation of sample AH_1

***Kwatha nirmana*:** The prepared coarse powder of ingredients listed under *Kwatha* group (2 – 21 of table No. 3) was kept in suitable container. Water was added and kept for over-night. Next day fresh *Haritaki* fruits were kept in a clean piece of cotton cloth in heap of barley and bundle (*pottali*) was made. This bundle was suspended in container where the mixture of *kwatha dravyas* and water was kept. This whole unit "*Dola-yantra*" was lay open to mild flame. Bundle was removed when the fruits of *Haritaki* were boiled. Rest of the liquid was boiled till the initial volume of water was reduced to $1/4^{th}$. Thereafter the decoction was strained through muslin cloth. The seeds of the boiled *Haritaki* were removed, the fruit was made into a pulp by gently pressing over sieve (40 No mesh to separate fibers. This is called '*Niskulikarana*' (removal of fibers).

Frying of *Haritaki* Pulp: The pulp was fried in mixture of *taila* & ghee (first *taila* was heated to 132° C then ghee was added and heated for some time till the froth disappears) and frying was continued till the fumes continues to appear, the color of the pulp changes to golden brown, the pulp leaves oil and pulp becomes stick like while rubbing between fingers.

Preparation of *Avaleha*: Con-currently the jaggery syrup (jaggery solution) was prepared in decoction. The fried *Haritaki* pulp was added and cooked on mild flame till the appearance of following characteristics:

- '*Pidite mudra'*- takes shape of finger crevices on pressing.
- '*Sukhasparshatawam'*- soft to touch.
- '*Apsumajjanatwam'* - the drop sinks to bottom of water container, doesn't spread.
- '*Sthiratwam'* - and can be easily picked with finger.
- '*PatitenaShiryate'* - stable into the vessel filled with water.
- '*Ishtagandha-varna-rasaotbhava'* - Appearance of odour, colour and taste confirmed the *Samayakpaka* (desired consistency).[9, 10, 11, 12]

Mixing of *Prakshepa* (Adjuvant): On achieving desired consistency the container was removed from flame. The pre- prepared fine powder of adjuvant was added separately and stirred continuously and vigorously till to form a homogenous mixture. When, the mixture was cooled, Honey was added and mixed well.

Preparation of sample AH_2: All the ingredients were same as used for preparation of AH_1. Procedure varies slightly given that initially same no of *Haritaki* was taken; seeds were removed and made into fine powder. Then fine *Haritaki*

was mixed with water for making *kalka* of *Haritaki.*

Preparation of sample AH_3: According to Sharangdhar *samhita Haritaki* powder was taken half the quantity of wet *Haritaki* of sample AH_1. It was then made in to *kalka* form by addition of water.

Preparation of sample AH_4 The seeds of the boiled *Haritaki* were removed .Whole fruit of *Haritaki* was used for purpose of frying was continued till the fumes continues to appear, the color of the pulp changes to golden brown and the pulp leaves oil. Con-currently the jaggery syrup (jaggery solution) was prepared in decoction. The fried *Haritaki* fruit was added and subjected to mild flame till the appearance of following characteristics:

- *Ishtagandha-varna-rasaotbhava'* - Appearance of odour, colour and taste confirmed the *Samayak paka* (desired consistency).
- *Haritaki* fruits were floating on the surface of jaggery solution. It appeared like a *murabba* of *Haritaki*.

Table No. 5: Showing the observation during *Kwatha* preparation.

Parameters	AH_1	AH_2	AH_3	AH_4
Coarse powder	384 gms	384 gms	384 gms	384 gms
Water	3.072litre	3.072litre	3.072litre	3.072litre
Mean temp	86-90° C	86-90° C	86-90° C	86-90° C
Reduced to	$1/8^{th}$	$1/8^{th}$	$1/8^{th}$	$1/8^{th}$
Total yield	768 ml	768 ml	768 ml	768 ml
Duration	4 hrs 20 min	2 hrs 35min	2 hrs 40 min	2 hrs10 min

Table No. 6:.Showing the observation during frying of pulp.

Material	AH_1	AH_2	AH_3	AH_4
Weight of *Haritaki* pulp	165 gms	92 gms	166 gms	335 gms
Weight of *Haritaki* seeds	42 gms	-	-	42 gm
Weight of *Haritaki* fibers	55gms	-	-	-
Ghee	38.4 ml	38.4 ml	38.4 ml	38.4 ml
Tila taila	38.4 ml	38.4 ml	38.4 ml	38.4 ml
After fry *pihsti* of *Haritaki*	194 gm	108 gm	171 gm	302 gm
Temp recorded	76-98 0c	76-98 0c	76-98 0c	76-98 0c
Time taken	75 min	55 min	35 min	45 min

Table No. 7:.Showing the observation during preparation of *Avaleha*.

Material	AH_1	AH_2	AH_3	AH_4
Decoction	768 ml	768 ml	768 ml	768 ml
Pishti of *Haritaki*	194 gms	108 gms	171 gms	302 gms
Ghee	38.4 ml	38.4 ml	38.4 ml	38.4 ml

Taila	*38.4 ml*	*38.4 ml*	*38.4 ml*	*38.4 ml*
Jaggery	*960 gms*	*960 gms*	*960 gms*	*960 gms*
Honey	*38.4 gms*	*38.4 gms*	*38.4 gms*	*38.4 gms*
Prakshepa Dravya	*38.4gms*	*38.4gms*	*38.4gms*	*38.4gms*
Mean Temp	*70-85° C*	*70-85° C*	*70-85° C*	*70-85° C*
Total duration	*2 hr 30 min*	*2 hr10 min*	*2 hr20 min*	*2 hr20 min*
Total yield	*1087 gm*	*1126 gm*	*1198 gm*	*1229 gm*

Post-operative procedure (*Paschata Karma*)

Precautions: The pulp was added slowly and in small quantity to the '*Yamaka'* (a mixture of ghee and *taila*), after removing the container from flame and stirred regularly. The pulp was fried on mild flame to avoid carbonization. Proper *paka lakshana* of *Haritaki pisti* and *Avaleha* was taken care of. *Prakshepa dravyas* were fine powdered and mixed well in warm condition. Honey was added after cooling the *Avaleha*. Continuous and vigorous mixing was done after addition of *Prakhepa dravyas* and Honey to make it good homogenous mixture. Proper sanitations were maintained during the whole manufacturing operation.

Observation: The colour of the *kwatha* was blackish brown with pleasant smell. Jaggery syrup (made with decoction) was sweet in smell and the taste was sweet astringent. When the *taila* was heated to 120℃ the *Amagandha* was markedly abolished. Froth appeared when the *Ghee* was added to *taila*. But, after heating for some time, it disappeared and clear transparent mixture '*Yamaka'* was seen in the container with color of light honey. *Haritaki* Pulp was sticky in nature. When the pulp was added into the '*Yamaka'*, froth started to come out and after some time with continuous mixing, the froth subsided. The pulp was yellowish brown before frying and changed to golden brown after frying. After completion of *avaleha* preparation, it was blackish brown in colour. Just after completion of *Avaleha*, the particles of *Prakshepa dravyas* were seen inside the *avaleha* from a particular distance but after 15 days, it was not visible from the same distance.

Packaging & Labeling: All the prepared samples were packed in clean, moisture free plastic containers. Details of packing are mentioned in Table No. 8.

Table No. 8: Showing the Details of packing & labeling.

S.No.	Traits	Details
1.	Quality	Thermo-plastic polymer (high density)
2.	Quantity	1500 gm
3.	Colour	Transparent with cream cap
4.	Seal	Proper sealed with aluminum foil
5.	Filling	Operated manually
6.	Storage	At room temperature, prevented from direct light and dust

DISCUSSION: Acharya Shrangadhara has used *Rasakriya*, *Leha* and *Avaleha* as a synonym due to the similarity of Pharmaceutical procedure. Here the aqueous solutions of drugs (*Kwatha* etc.) are concentrated till they achieve thick consistency (*Ghana*) serving two main aim of (a) Preservation (b) Reduction in weight and bulk. These preparations generally contains aqueous media, of drug i.e. *kwatha*, *Swarasa* etc; a sweet substance, oleaginous substances (*Sneha dravya*) and few adjuvant (*Prakshepa*).

Role of *Madhura Dravya* (Sweetening Agents): It helps in masking the unpleasant tastes of herbal drugs, making the dosage form more palatable. It also provide a high concentration of sugar, which acts as preservative and contain nutritional values.

Effect of Jaggery Solution: Large quantities of Jaggery are soluble in water with increasing temperature. As the *Kwatha* is heated gradually, concentration of Jaggery increases. The *Siddhi Lakshanas* indicate the consistency of *Avaleha*. Application of heat imparts kinetic movement to the molecules, whereas when it is cooled loss of kinetic movement makes the molecules to coalesce. This explains the reasoning behind thickening of jaggery solution on cooling.

Role of *Prakshepa Dravya*: It serves specific functions of like bioavailability enhancers &anti-microbial like *Pippali* etc. It also acts as flavoring agents, which provides an acceptable aroma to the end product.

Properties of *Avaleha*: Although there are some *Samskaras* in the preparation of *Avaleha* but the qualities of *Avaleha* depends upon the raw material taken for the preparation.

***Haritaki* Swedana:** The range of maximum and minimum temperature during the preparation of *Kwatha* was 80 - 100^{0}C and total time taken for the process is 2-3 hr.

***Bharjana*:** Acharya Charaka Samhita did not specify the desirable status of frying. To clarify this conceal *Cakrapanidutta* exhorted, a gentle frying is to be maintained. *Śharangadhara Samhita* and *Brihat Yogatarangini* clarifies '*Bharjana'* should be done in mild flame. *Vrndamadhava* and *Vangasena* describe "*Mrdyu kalka Sama*". So taking all the views in account, in the present study the pulp was fried in mild temperature till it alters to golden brown. The range of maximum and minimum temperature during the frying of *Haritaki* pulp in 4 samples was 70-98° C and total time taken for the process is 30 min. -1 hr.

***Avaleha Nirmana*:** The fried pulp was mixed with Jaggery solution (syrup). The mean temperature range during the preparation of samples was 70 - 98 ^{0}C and total time taken for the process is 2 hr.

CONCLUSION: Though all the four samples were kept uniform in respect of amount of rest of the ingredients except quantity of *Haritaki*, Time taken for the preparation of AH_2 (2 hr and 10 min) is minimum. The yield was maximum in AH_3 (52.59%) i.e. where *Haritaki* powder half the weight of wet *Haritaki* is used, followed by AH_2 (51.09%), AH_4 (50.23%) and AH_1 (44.48%) respectively.

REFERENCE:

1. Q.A.P. – A compendium of guidelines and related materials, Vol-2 W.H.O., Geneva, 1999, p-01

2. Proceedings of WHO training-cum-workshop on production of ISM & H drugs with current good manufacturing practices", 2002, GO.I., ISM & H (Ayush) : p-121,154 & 181
3. Sharangdhara Acharya, Adhamalla, Kashirama, Sharangdhara Samhita Madyama Khanda, Awaleha Kalpana 8/1 edited by Pt. Parasuram Shastri, 6th Edition Chaukhamba Orientalia, Varanasi, 2005; P 206
4. Sharangdhara Acharya, Adhamalla, Kashirama, Sharangdhara Samhita Madyama Khanda, Awaleha Kalpana 8/30-37 edited by Pt. Parasuram Shastri, 6th Edition Chaukhamba Orientalia, Varanasi, 2005; P. 209
5. The Ayurvedic Formulary of India Part 1 Ed 2ndGovernment of India, Ministry of health and family welfare; Dept of Indian system of Medicine & Homeopathy; 2003 P.33
6. Vagbhata, Ashtanga Hridaya, Chikitsa Sthana, Kasachiktsitam Adhyaya, 3/127-132, edited by Atridev Gupt, Reprint Edition, Chaukhamba Prakashan, Varanasi, 2011; 426.
7. Sharangdhara Acharya, Adhamalla, Kashirama, Sharangdhara Samhita Prathama khanda 1/34, edited by Pt. Prasuram Shastri, 6th Edition; Chaukhamba Orientalia, Varanasi, 2005; P.9
8. Agnivesha, Charaka, Dridhabala, Charaka Samhita, Chikitsa Sthana, Kasachikitsa Adhyaya, 18/57-62, edited by Priya Vrata Sharma, 8th Edition, Chaukhamba Orientalia, Varanasi, 2007; 306.
9. Sharangdhara Acharya, Adhamalla, Kashirama, Sharangdhara Samhita Madyama Khanda, Awaleha Kalpana8/3 edited by Pt. Parasuram Shastri, 6th Edition Chaukhamba Orientalia, Varanasi, 2005; P 207
10. Agnivesha, Charaka, Dridhabala, Charaka Samhita, Chikitsa Sthana, Abhaya-amalki Rasayanadhyaya, 1:1/ 41-57, edited by Priya Vrata Sharma, 8th Edition, Chaukhamba Orientalia, Varanasi, 2007; 7.
11. Agnivesha, Charaka, Dridhabala, Charaka Samhita, Chikitsa Sthana, Pranakamiya Rasayanadhyaya, 1:2/7 edited by Priya Vrata Sharma, 8th Edition, Chaukhamba Orientalia, Varanasi, 2007; 15
12. Agnivesha, Charaka, Dridhabala, Charaka Samhita, Chikitsa Sthana, Abhaya-amalki rasayanadhyaya, 1:1/ 62-69, edited by Priya Vrata Sharma, 8th Edition, Chaukhamba Orientalia, Varanasi, 2007; 7.

Corresponding Author:
Dr. Agrawal Sachin, Asst. Professor, Rasa Shastra & Bhaishajya Kalpana, SGAC& Hospital, Sriganganagar
Email: drsachin29@gmail.com

Source of support: Nil
Conflict of interest: None Declared

Cite this Article as : *[Agrawal Sachin et al: Pharmaceutical Study of Different Samples of Agastya Haritaki] www.ijaar.in : IJAAR VOLUME III ISSUE VI JAN-FEB 2018 Page No:1021-1028*