

PHARMACEUTICO-ANALYTICAL STUDY OF HARIDRADI VARTI

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ABSTRACT

Local therapeutic procedures of eyes are explained as *Netra Kriyakalpa* in Ayurveda classics. It includes treatment modalities like *Aschyotana*, *Anjana*, *Seka*, *Tarpana*, *Putapaka*, *Pindi* and *Bidalaka*. *Netra vartis* are applied as *Anjana* (collyrium) is a popular method of application of medicament into the lower eyelids. Numerous *Netravartis* are described in the classical texts having wide scope of their therapeutic potential. One such *netravarti* is *Haridradi varti* mentioned by *Acharya Chakradatta* under *netrarogadhikara*. It contains *Haridra*, *Daruharidra*, *Haritaki*, *Vibhitaki*, *Amalaki*, *Lodhra*, *Yashtimadhu* and *Raktachandana* in equal proportion. It is indicated in conditions like *timira*, *picchita*, *dhumadarshi* and said to be *sarvanetramayapaham* (effective in all eye diseases). Pharmaceutical procedure involves trituration of fine powder of these drugs with *Bhringaraj swarasa* in iron and copper vessel for 7 days each. The prepared *Haridradi varti* was undertaken for various physico-chemical and instrumental analyses for providing insights into different variables. Physio-analysis of *Haridradi varti* shows: pH-6.13, Total ash- 9.64%, Acid insoluble ash- 1.41%, Water soluble ash-2.49%, loss on drying- 6.28%, Water soluble extractive – 24.51%, Alcohol soluble extractive- 9.78%, uniformity of weight-0.305g, Disintegration time- 2 hr 45 mins, Hardness test- 9.72 kg. HPTLC report of *Haridradi varti* and its extracts showed different colour bands and their Rf values. FTIR analysis of *Haridradi varti* showed C-H stretch, C=C stretch and C-N stretch present in the formulation suggesting the presence of alkane, alkene and amines respectively.

KEYWORDS: *Netravarti*, *Haridradi varti*, *Anjana*, *Chakradatta*.

INTRODUCTION

Kriyakalpa are the procedures explained by *Acharya Sushruta* which is indicated in both physiological & pathological condition of the eye of which *Anjana varti* are important *kriyakalpas* having a vivid utility in many *netra rogas*.^[1]

Varti kalpana is derivative of *Vati kalpana*. The method of *Varti* preparation is same as that of *Vati*. But, *Varti* differs in its shape, use and indication. These are solid and wick shaped (elongated with tapering ends) medicated preparations, mainly meant for external use. Based, on their site of application and action they are of different types, like *Yoni varti*, *Guda varti*, *Netra varti*, *Dhumra varti* and *Vrana varti*.

The practice of *Anjana* was prevalent during Indus valley civilization for prevention of eye diseases as well as for cosmetic purposes. *Anjana* is also mentioned in Atharvaveda. Detailed description of *Anjana* is found in *Sushruta Samhita*, *Ashtanga Hridaya*, *Ashtanga*

Sangraha and *Sharangadhara Samhita*. It is one of the important line of management in *netra chikitsa*.^[2]

Haridradi Varti explained in *netrarogachikitsa* by *Acharya Chakrapannidatta*.^[3] It contains *Haridra* (*Curcuma longa*), *Daruharidra* (*Berberis aristata*), *Haritaki* (*Terminalia chebula*), *Vibhitaki* (*Terminalia bellerica*), *Amalaki* (*Emblica officinalis*), *Lodhra* (*Symplocos racemose*), *Yashtimadhu* (*Glycyrrhiza glabra*) and *Raktachandana* (*Pterocarpus santalinus*) in equal quantity. Fine powder of these *dravyas* is to be given *bhavana* (trituration with liquid media) with *bhringaraj swarasa* (juice of *Eclipta alba*) in iron and copper vessel for 7 days each. It is indicated in *picchita*, *dhumadarshi*, *timira*, and all types of eye diseases. The prepared *vartis* are rubbed over a clean surface area with a drop of clean water and the paste obtained is applied to the inner eye lids as '*anjana*' either with a finger or with a *shalaka* (an instrument) specially meant for it.^[4]

As there is no available data on pharmaceutical and analytical study of *Haridradi varti*. Hence, an attempt has been made to prepare and evaluate *Haridradi varti* for its various physio-chemical and instrumental analyses.

MATERIALS AND METHODS

Collection of raw drugs

Raw materials – All materials required for the preparation of *Haridradi Varti* were collected from the S P Kajarekar Pharmacy, Belgaum.

Materials required for the preparation of *Bhringaraj swarasa* were collected from ICAR- Indian Institute of Horticulture Research Science, Hessaragatta lake post, Bengaluru and Lal Bagh, Botanical Garden, Bangalore.

Major equipments – *Khalwa yantra*, Iron vessel, Copper vessel, Weighing machine, pulverizer, pH paper.

Minor equipments- Kora cloth, Knife, Spoon, Scissors, Stainless steel plates, Measuring jar.

Preparation of churna for Haridradi varti

Raw drugs – 100gm each of following drugs

- | | |
|-----------------------|-------------------------|
| 1. <i>Haridra</i> | 5. <i>Amalaki</i> |
| 2. <i>Daruharidra</i> | 6. <i>Lodhra</i> |
| 3. <i>Haritaki</i> | 7. <i>Madhuka</i> |
| 4. <i>Vibhitaki</i> | 8. <i>Raktachandana</i> |

Procedure

- All the drugs were cleaned properly and dried completely.

Bhavana of Haridradi varti in iron vessel

Ingredients

Table 01: Showing ingredients and quantity of Haridradi varti.

Sl.No.	Ingredient	Quantity	Sl. No.	Ingredient	Quantity
01.	<i>Haridra</i>	45 gm	05.	<i>Amalaki</i>	45 gm
02.	<i>Daruharidra</i>	45 gm	06.	<i>Lodhra</i>	45 gm
03.	<i>Haritaki</i>	45 gm	07.	<i>Madhuka</i>	45 gm
04.	<i>Vibhitaki</i>	45 gm	08.	<i>Raktachandana</i>	45 gm

Procedure

- Equal quantity of individual drugs was weighed and added one by one in an iron vessel.
- It was mixed properly with *pestle* to obtain homogenous mixture.
- Sufficient quantity of *Bhringaraj swarasa* was added to the mixture to immerse the contents of *Haridradi varti* completely.
- It was subjected to continuous and cautious trituration with *pestle* till *swarasa* dries up completely
- When it was completely dried up, it was considered as one *bhavana*. The same process was repeated for 6 more days and a total of 7 *bhavana* was done.
- Every time fresh *swarasa* was used.

Bhavana of Haridradi varti in copper vessel

- All the drugs were weighed accurately and taken in clean *khalwa yantra* separately and roughly pounded.
- It was pulverized in sieve size 120.
- These powders were filtered through *vastra* (clean white cloth) to get the fine powder of individual drugs.
- The *sookshma vastragalita churna* were collected and stored in air tight container.

Bhringaraj swarasa nirnama

Ingredients – Fresh *Bhringaraj* whole plant

Procedure

- Fresh whole plant of *Bhringaraj* was freshly collected, weighed in weighing machine.
- It was then cleaned and washed thoroughly with clean water to remove all the dirt from it.
- 590 gm of *Bhringaraj* whole plant was taken, chopped into small pieces and pounded with pestle in a mortar to make a fine paste.
- It was transferred to a clean cotton cloth and squeezed to obtain *swarasa* (juice).
- It was measured using measuring cylinder and further used for *Haridradi varti bhavana*.
- Each time, the same procedure was repeated for obtaining *swarasa*, required for *bhavana* in iron and copper vessel.

Ingredients- Iron vessel bhavita Haridradi Varti churna.

Procedure

- Fine churna of *Haridradi Varti* which was done *bhavana* in iron vessel was carefully transferred to copper vessel with the help of a spoon.
- Then required quantity of *Bhringaraj swarasa* was added to the mixture till it became completely soaked.
- It was triturated for sufficient time with *peshni* till it became completely dried.
- When it completely got dried up, it was considered as one *bhavana*. The same process was repeated for 6 more days and a total of 7 *bhavana* was done.
- Every time fresh *swarasa* was used.

- 50 gms of *Haridradi varti* in powder form was taken in a clean porcelain *khalwa* and *bhringaraj swarasa* was added to it till it gets completely soaked.
- It was then triturated for sufficient time till the paste like consistency which can be rolled between the fingers was obtained.
- When the mixture attained proper consistency, *vartis* were prepared of approximate 2 cm length as per AFI.^[5] It was then dried and stored in an air tight container.
- *Bhavana* was done with *Bhringaraj swarasa* media for 7 times each in iron and copper vessel. Hence a total of 14 *bhavana* has been done.

RESULTS

Table 01: Results of organoleptic characters of Haridradi Varti.

Parameters	Haridradi Varti churna	Haridradi varti
Color	Dark brown	Dark grey
Odor	Henna odor	Mild henna odour
Appearance	Powder	Wick shape
Taste	Bitter, Astringent	Bitter
Touch	Smooth	Hard

Table 02: Showing results of physicochemical parameters.

Analytical parameters	Results of Haridradi varti
Total ash	9.6425%
Acid insoluble ash	1.4146%
Water soluble ash	2.4995%
Loss on drying	6.2893%
Water soluble extractive	24.5160%
Alcohol soluble extractive	9.7830%
pH	6.13

Table 03: Results of analytical tests.

Analytical parameters	Haridradi Varti
Uniformity of weight	0.305 g
Hardness test	9.72 kg
Disintegration time	2 hr 45 mins

Table 04: Showing FTIR results of Haridradi varti.

Sample peak frequency cm-1	Specific type of bond	Bond	Functional group/compound
3285.27	Strong, broad	O-H stretching	Alcohol
2924.76	Medium	C-H stretching	Alkane
1515.17	Strong	N-O stretching	Nitro compound
1362.91	Strong	S=O stretching	Sulfonate
1317.94	Medium	O-H bending	Phenol
1024.87	Medium	C-N stretching	Amine
825.67	Medium	C=C bending	Alkene



Fig. No.01. Showing Bhringaraj swarasa nirmana.



Fig. 02: Showing trituration of Haridradi varti in iron vessel and copper vessel.



Fig. 03: Showing preparation of Haridradi varti.



Fig. No. 04. Showing FTIR peaks.

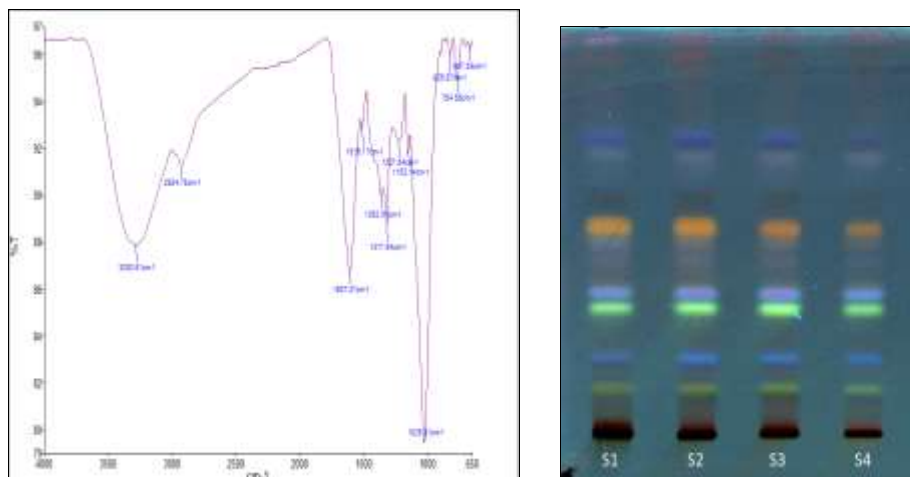


Fig. 05: Showing HPTLC bands after derivatization under 366 nm.

(S1 to S4 – samples taken at different intervals of bhavana)

DISCUSSION

- Numerous *varti* formulations have been explained in the Ayurvedic classics for the treatment of different eye diseases, *Haridradi varti* is one such preparation mentioned in *Chakradatta* termed as *sarvanetramayapaham* (effective in all eye diseases). Contents of which include *Haridra*, *Daruharidra*, *Haritaki*, *Vibhitaki*, *Amalaki*, *Lodhra*, *Yashtimadhu* and *Raktachandana* in equal proportion. Drugs were pounded in the *khalwa* (mortar and pestle) to smaller pieces before passing through sieve No.120. The powder was filtered through clean white cloth to obtain fine powder. Aromatic characteristic odor was appreciated during powdering of each drug. Loss in percentage during powdering and sieving was seen more in *daruharidra*, *yashtimadhu* and *vibhitaki* due to the hard and fibrous nature of the dug.
- Whole plant of *Bhringaraj* was used for the *swarasa nirmana*. Characteristic odour was appreciated and mild froth was seen during *swarasa nirmana*. Dark green colour of the *swarasa* with 80-90% of *swarasa* yield was noted during the procedure. pH of *swarasa* was towards base. (~14). When *swarasa* was added to the mixture of drugs, it gets properly mixed and helps to bring the fine powder of mixture in contact with each other. Quantity of *swarasa* required for *bhavana* decreased with each successive *bhavana*. Wedelolactone present in *Bhringaraj* is proved for Anti-oxidant activity and Immunomodulator activity. *Bhringaraja* mainly acts on *Rasavaha srothas* and can be used as *Rasayana dravya* which means it helps to delay aging, prevent diseases and restoring energy.^[6]
- Churnakriya* involves the levigation of juice/decoction of one drug to the other having similar attributes, which not only will yield a combined effect of all ingredients but can change the effect of the finished drug due to synergistic, antagonistic, or change in action or addition of new action.^[7] This may be explained by collision theory. It states that when suitable particles of the reactant hit each other, the successful collisions contain activation energy at the moment of impact, to break the pre-existing bonds and form all new bonds which helps in formation of new compound.^[8] The medication enriched new properties when it contacts with a particular metal. Here iron and copper vessels are used for the trituration. Indication of specific metal container for mixing of specific drug, increases the potency by chemical reaction between the metal and the drug.
- pH of *Haridradi varti* was 6.13 which shows alkaline nature of *bhringaraj swarasa* was incorporated in the drug content. The total ash was found to be 9.64%, this could be due to impregnation of inorganic material present in *bhringaraj* plant tissue to the drug content during each *bhavana*. It was noted that acid insoluble ash of *Haridradi varti* was 1.41% and the water -soluble ash was 2.49% which indicates that most of compounds are acid soluble and low percentage of insoluble minerals in the drug content.
- Loss on drying at 110° C of *Haridradi varti* was 6.28 % which shows less amount of moisture content or drug is having least hygroscopic activity. Water soluble extractive value was 24.51% and alcohol soluble extractive value was 9.78% which shows that constituents of the drug could be more extracted and soluble in water as compared to alcohol.
- Specific weight of *varti* is not mentioned in the classics, it was prepared according to AFI reference of approximate 2 cm in length. *Haridradi varti* did not completely disintegrate till 2 hour 45 mins, but it was able to press easily and turned soft. This indicates the strong binding between the drugs as *Bhringaraj swarasa* was used as the liquid media for *bhavana*. This also shows that it will not break so easily when it will be rubbed with water over a clean surface to form a paste and apply as *Anjana*. *Vartis* require a certain amount of strength or hardness to withstand mechanical shocks of handling in

manufacture, packaging and shipping. Hardness of *Haridradi varti* was 9.72 kg. This indicates the strong nature of *varti* which is difficult to break easily.

- FTIR provides information about molecular bonding, chemical structure and identifies organic functional groups. Peaks of *Haridradi varti* suggests the presence of alcohol, alkene, nitro compounds, sulfonate, phenol, amine and alkene groups in the formulation.^[9] HPTLC bands after derivatization under 366 nm showed bands color with approximate rf values - violet (0.76), grey (0.72), brown (0.62), orange (0.57), light blue (0.42), neon green (0.37), dark blue (0.25) and dark green (0.19).
- Probable mode of action of *Haridradi varti*.

By Virtue of its Rasa

Kashaya rasa: *Daruharidra, Haritaki, Vibhitaki and Lodhra* has *Kashaya rasa*.

It helps in allievation of *kapha dosha*, does *Shoshana* (dries up excessive discharge) and heals wound.

- **Tikta rasa:** *Hadridra, Daruharidra and Lodhra* has *tikta rasa*.

It is composed of *vayu* and *akasa mahabhutas* and possesses properties such as *ruksha, sheeta* and *laghu*. It acts as absorbent and cleans channels.

- **Madhura rasa:** *Yashtimadhu and raktachandana* has *Madhura rasa*.

Madhura Rasa promotes strength, keenness of sense organ, excretions, provides contentment, prolongs the life span and prevent aggravation of *vata* and *pitta*.

By virtue of its Guna

- *Laghu, ruksha guna:* *Haridra, daruharidra, haritaki, vibhitaki, amalaki, lodhra and bhringaraj* has *laghu, ruksha guna*.
- *Laghu ruksha guna* helps to clear the inflammation, congestion, and also inhibits the excessive secretions and discharges.

By virtue of its doshagnata

- *Haridra, Daruharidra, Vibhitaki, Lodhra and Raktachandana* has *Kapha-pitta hara* properties, whereas *Haritaki* and *amalaki* has *tridosha hara guna*.
- Signs of inflammation like *Lohit Netrata, Sangharsh, Nistoda, Daha* and *Paka* can be brought down by giving *pittahara* drugs.

By virtue of its karma

- **Vishahara** – *Haridra* is said to have *vishagna* property. It helps to counteract the infective pathogenesis of *abhishyanda*.
- **Chakshushya-** *Daruharidra, Haritaki, Vibhitaki, Amalaki, Lodhra, Yashtimadhu, Raktachandana* and *Bhringaraj* has the *chakshushya* property. These drugs are beneficial to the eyes and indicated in various eye diseases.

- **Rasayana** – *Haritaki, Amalaki, Yashtimadhu* and *Bhringaraj* are immunological stabilizer. Hence, these are *chakshushya rasayana* most useful is all treatable cases of *netra roga*.

CONCLUSION

Haridradi varti was prepared as per the reference of *Chakradatta*. It is indicated in *pichitta, dhumadarshi, timira* and termed as *sarvanetramapaham* (effective in all eye diseases). Equal quantity of fine powder of each drug was taken and triturated with *Bhringaraj swarasa* in iron and copper vessel for 7 days each. *Vartis* were prepared and evaluated for various physico-chemical and instrumental parameters to make drug serve their purpose. Results obtained were analysed with their significant values. Hence it can be concluded that *Haridradi varti* is one of important *Anjana varti* having remarkable role in many eye diseases.

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