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PRELIMINARY PHARMACEUTICAL AND PHYSICO-CHEMICAL ANALYSIS OF TALADI VARTI

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ABSTRACT

Introduction: Varti Kalpana (suppositories) are variants of Vati kalpana (tablet) mentioned under solid dosage forms of Ayurveda. Taladi varti is a netra varti(suppository for eye) indicated for pilla roga. Pilla roga are described as chronic eye disorders and are 18 in number. **Aim**: The present study was attempted to develop preliminary quality control and standard operating procedure for taladi varti. **Materials and Methods**: Taladi varti was prepared by bhavana (trituration) method. The samples were subjected for organoleptic and different physico chemical analysis. **Results**: Pharmaceutical study resulted in preparation of 50 varti of average weight of 833.5mg from 45gm of total ingredients taken in powder form. From analytical study it is observed that taladi varti had hardness 5kg, friability 0.1%, total ash 61.5%, water soluble ash 47.15% and acid insoluble ash 1.6 % **Conclusion**: The formulation contains haratala (orpiment) which is indicated in netra roga(eye diseases), would help in treating chronic eye diseases (pilla roga). The results of pharmaceutical study and physico-chemical parameters of the formulation can be considered as preliminary standard for study drug.

Keywords: Taladi varti, Haratala, pilla roga, physico- chemical analysis

INTRODUCTION

Bhaishajya kalpana is a pharmaceutical science of Ayurveda dealing with various primary dosage form like swarasa (expressed juice), kalka (paste), kwatha (decoction), hima (cold infusion), phanta (hot infusion) and secondary preparations like churna (powders), vati (tablet), varti (suppositories) **[1]**. Among them varti is a derivative of vati kalpana having same method of preparation but differs in size, shape and therapeutic usage. Varti are a solid and wick shaped (elongated with tapering ends) preparations meant for external administration other than the oral routes. Based on site of administration and action exerted by the varti, they are classified into different types like phala varti/ guda varti (rectal suppository), yoni varti (Vaginal suppository), sisna varti (Urethral suppository), vrana varti (suppository for insertion into wound), netra varti (for application to eyes), nasa varti (Nasal suppository), dhuma varti (medicated cigars) **[2]**.

Netra varti are a category of varti kalpana, which are usually in the shape of wick, elongated with tapering ends, rubbed over a surface area with a drop of water, paste is applied to the inner eyelids, either with finger or with a shalaka (an instrument) **[3]**. Taladi varti is a netra varti which is commonly not in use for clinical practice. Taladi varti contains haratala (*orpiment*), Vacha (*Acorus calamus*), Devadaru (*Cedrus deodara*) and Tulasi (*Ocimum sanctum*). It is indicated in pilla rogas **[4]**. Pilla roga are long standing (chronic) eye disorders which are eighteen in number **[5]**.

Now a day there is a requirement to establish the standardization parameters, to ensure safety, efficacy, and purity for the ayurvedic formulations. Analytical parameters such as hardness, friability etc helps in establishing that the formulation is fit for transportation and marketing. Taladi varti is a preparation which needs to be brought to lime light as it is not commonly used in clinical practice. Hence an attempt is made to generate pharmaceutical and analytical data of taladi varti (suppository for eye). Hence preliminary pharmaceutico-analytical study of the taladi varti is undertaken.

MATERIALS AND METHOD

Pharmaceutical Study

Drug collection and authentication:

Haratala, Devadaru, Vacha, Tulasi were collected and authentified from teaching pharmacy, Dept Rasashastra and Bhaishajya Kalpana. Pharmaceutical and physico-chemical analysis are also carried out in QC lab.

Table 1: Ingredients of taladi varti [6]

S. No.	Ingredients	Latin name/English name	Proportion	Parts used
1	Shodita Haratala	Orpiment	15gm	
2	Vacha	Acorus calamus	15gm	Kanda (rhizome)
3	Devadaru	Cedrus deodara	15gm	Saara (heart wood)
4	Tulasi	Ocimum sanctum	800gm	Patra

Haratala was subjected for shodhana (purification) before it is taken for varti preparation. Tulasi leaves were crushed to obtain swarasa (expressed juice).

Haratala Shodhana: [7]

200gm of Ashuddha haratala (impure) taken, made to pottali and hung in a dola yantra (vessel) containing 1000ml of kushmanda swarasa (pumpkin juice), kept on stove for boiling in madhyama agni (moderate fire). After two hours of boiling 500ml of kushmanda swarasa was added to maintain the pottali immersed in liquid. After three hours of boiling, the pottali is opened and haratala is dried and collected.

Tulasi swarasa preparation [8]: 800 g of fresh tulasi leaves taken, washed and pounded in clean mortar to fine paste and squeezed in clean filter cloth, to obtain swarasa.

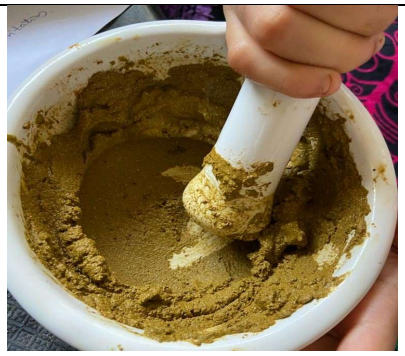
Preparation of Taladi Varti

Fine powders of haratala, devadaru and vacha are taken in clean mortar added with 200ml of tulasi swarasa, trituration was done for three hours, again 100ml of swarasa was added and trituration continued for 3 hours. When consistency was obtained, taladi varti of uniform size and shape were rolled and dried in shade for 5-6 days.

Vacha churna | Shodita haratala churna | Devadaru churna

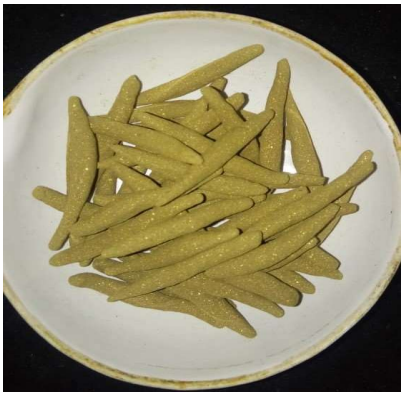
Figure 1: Ingredients of Taladi Varti

Adding tulasi swarasa to mixture of churna



Trituration

Rolling of varti



Dried varti

Figure 2: Steps of preparation

Analytical Study:

Taladi varti was analysed for following parameters as per the references available in protocol for testing ayurvedic medicines, published by CCRAS**.**

Morphological evaluation: Organoleptic parameters

Physico- chemical evaluation: Hardness, Average weight, PH, Friability, Loss on drying, Total Ash, Acid insoluble ash, Water soluble ash, Water soluble extractive, Alcohol soluble extractive

Organoleptic characters: Colour, odour and consistency of the taladi varti were analysed.

Physico-chemical parameters:

Hardness [9]:

The varti was held between a fixed and a moving jaw, reading of the indicator is adjusted to zero. The force applied to the edge of the varti was gradually increased by moving the screw knob forward until the varti breaks. The reading noted, indicates the pressure required in kg to break the varti.

Average weight:

The weight of the individual varti are added and divided by the total number of varti to get average weight.

pH: [10]

Calibration of pH meter was done. Tablets of pH 4, 9 were taken and dissolved in 100ml of distilled water to prepare buffer

solutions. Instrument was switched on, Buffer solution was taken in the beaker and electrode is dipped in it, the same procedure was carried for another buffer solution also, it was made sure that the electrode is washed with the distilled water after each usage. The test sample (for solid preparations: 10 % aqueous solution) was taken, electrode dipped in it, the value of ph was noted.

Friability: [11]

After dedusting 10 taladi varti, they were weighed accurately. Varti were placed in the drum of the friabilator and rotated for 100 times. The varti were removed, dusted them and weighed them accurately. The difference in the weight was measured, which indicates friability.

Loss on Drying: [12]

10gm of drug was weighed in a tarred evaporating dish. The weighed drug was kept in hot air oven, dried at 105 ^{0}C for 5 hours, and weighed again. Again the evaporating dish was dried for one hour in oven, till the difference between two successive weighing corresponds to not more than 0.25%.Constant weight was reached, after drying for 30 minutes and cooling in a desiccators.

Total ash: [13]

2gm of drug was accurately weighed in a tarred silica dish. The silica dish was kept in a muffle furnace at a temperature of 250-300 ^{o}C, for about 18 hours. Then silica dish was cooled in a vaccum and weighed. Percentage of ash was calculated.

Acid Insoluble Ash: **[14]**

Total ash was divided into 2 equal parts, one part was taken in 250ml beaker, and 100ml of dil.hydrochloric acid was added to it. The beaker was heated till the liquid boils. The solution was filtered through ash less filter paper (what man no.41), the insoluble matter on the ash less filter paper was taken in a crucible. The crucible is dried in a hot plate and ignited at 600 ^{o}C in a muffle furnace (till it becomes white), then crucible is kept in a dessicator for 30 minutes, and weighed without delay. The process was repeated for one more time, to obtain a constant weight.

Water soluble ash: [15]

The total ash was divided into two parts; one part was boiled for five minutes, with 25 ml of water in a beaker. The above mixture was filtered; the matter on the ash less filter paper was taken, washed with hot water and ignited for fifteen minutes, at a temperature not exceeding 600 ^{o}C. The weight of the insoluble matter is subtracted from the weight of the ash taken for the procedure; the difference in the weight was taken as water soluble ash. The percentage of water soluble ash is calculated with reference to air- dried drug.

Water soluble extractive: [16]

Five gram of drug was taken in coarse powder form, along with 100ml of distilled water in a closed flask. The flask was

subjected to shaking frequently for six hours, and then allowed to stand for eighteen hours. After completion of eighteen hour, the contents are filtered rapidly, and 25 ml of the filtrate was evaporated in a tarred flat bottom shallow dish at 105ºC in a hot water bath and weighed. The percentage of water-soluble extractive was calculated with reference to air dried drug.

Alcohol soluble extractive: [17]

Five gram of drug was taken in coarse powder form, along with 100ml of alcohol in a closed flask. The flask was subjected to shaking frequently for six hours, and then allowed to stand for eighteen hours. After completion of eighteen hour, the contents were filtered rapidly, and 25 ml of the filtrate is evaporated in a tarred flat bottom shallow dish at 105ºC and weighed. The percentage of alcohol-soluble extractive was calculated with reference to air dried drug.

Observations and Results:

Taladi varti was prepared as per the textual reference and was analysed as per the protocol specified. The results of both pharmaceutical and analytical study are shown below.

Results of pharmaceutical study (Table 1)

Haratala shodhana: 180 gm of haratala was obtained.

Tulasi swarasa: 300 ml of tulasi swarasa was obtained.

Results of Analytical Study (Table 2)

Table 1: Pharmaceutical results of Taladi Varti

S. No.	Parameters	Results
1	Quantity of fine churna taken	45 gm
2	Quantity of tulasi swarasa added	300ml
3	Total time taken for bhavana (trituration)	6 hours
4	Number of varti obtained	50
5	Average weight of varti before drying	2gm
6	Average Weight of varti after drying	833.5 mg

Table 2: Organoleptic characters

S. No.	Organoleptic characters	Taladi Varti
1	Colour	Greenish yellow
2	Odour	Characteristic odour
3	Consistency	Solid
4	Taste	-

Table 3: Results of Physico-chemical parameters of taladi varti

S. No.	Parameters	Results
1	Hardness	5
2	Average weight	833.5 mg
3	pH	5.26
4	Friability	0.1%
5	Loss on drying	1.6%
6	Total Ash	61.5%
7	Acid insoluble ash	1.6 %
8	Water soluble ash	47.15 %
9	Water soluble extractive	3%
10	Alcohol soluble extractive	1%

DISCUSSION:

Taladi Varti contains Haratala, Vacha, Devadaru in equal quantities and Tulasi swarasa as bhavana dravya. It is indicated in pilla roga an eye disorder. Haratala is indicated in netra roga **[18]**. Vacha, Devadaru and Tulasi are kapha vatahara. Vacha is having krimighna (vermifuge) **[19]**; devadaru is having anti bacterial action **[20]**. Tulasi is having anti bacterial, anti fungal, anti ulcer and anti inflammatory properties **[21]**. These pharmacological properties help in curing eye diseases. Rasa dravya (minerals) are known for their quick action, taladi varti containing haratala would helps in curing chronic eye diseases.

Data of previous shodhana of haratala showed that 2.2 L litre of kushmanda swarasa was used for carrying shodhana of 500gms of haratala along with 0.9% loss in the yield **[22]**. However in this study, a total of 1500 ml kushmanda swarasa was required for purification of 200 Gms of haratala and swedana was done for 3 hours. 180 gm of shuddha haratala was obtained leading to a loss of 20gm. This could be considered as an indication of dissolving the impurities of haratala into swedana dravya. During the preparation of taladi varti, bhavana of tulasi swarasa was given. It was seen that duration of 6 hours and an amount of 300 ml tulasi swarasa was required to get subhavita (suitable) consistency.

After getting proper consistency 2gm of drug mass was weighed and rolled into varti, after complete drying the average weight of varti was found to be 833.5 mg. The difference in the weight could be due to loss of moisture. The hardness of taladi varti was found to be 5kg, which is considered as minimum for a satisfactory solid dosage forms (ex: tablets). The hardness shows that the varti is resistant to chipping, abrasion, transportation and handling **[23]**. The pH of taladi varti was found to be 5.26; indicating acidic pH. And pH suitable for ophthalmic preparation is equal to that of tear fluid that is 7.4. However pilla roga include chronic inflammatory diseases like blepharitis etc, so the acidic pH may help in reducing the inflammation. Friability of taladi varti was found to be 0.1 %, within the limit of 2% for solid dosage forms, indicating physical strength of varti and also fit for transportation **[24]**. Loss on drying resulted in the value of 6.1 % which indicates the moisture content in the varti. The residue remaining after the incineration of the drug is the total ash content. It is used as a criterion for the identity and purity of the raw drugs as well as prepared medicines. The total ash content was found to be 61.5 %, indicates inorganic content of the ingredients. Acid insoluble ash is a part of total ash which is insoluble in dil HCL which was found to be 1.6 % for taladi varti. This could be due to haratala. Water soluble

ash of taladi varti was found to be 47.15 %. Total ash, acid insoluble ash and water-soluble ash all indicates the identity, purity of the raw drugs. Similarly, water soluble extractive was found to be 3%. And alcohol soluble extract value of taladi varti was found to be 1 %.

CONCLUSION

Taladi varti contains only 4 ingredients, easy for preparation. Since it contains haratala which is indicated in netra roga, helps in curing pilla roga (chronic eye diseases). Physico-chemical parameters like hardness 5, friability 0.1 %, would ensure that formulation is good for marketing and transportation. pH is 5.26 indicates acidic pH which would help in curing chronic inflammatory eye diseases. The present study would serve as a preliminary pharmaceutical and physico-chemical parameters reference for further study on taladi varti.

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