

## A PHARMACEUTICAL AND PHARMACOGNOSTICAL STUDY OF TRISHNA NIGRAHANA MAHAKASHAYA GHANAVATI IN THE MANAGEMENT OF KLEDA W.S.R. TO MADHUMEHA (TYPE 2 DIABETES)

Priya Gupta<sup>1\*</sup>, A. S. Baghel<sup>2</sup> and Harisha C. R.<sup>3</sup>

<sup>1</sup>Ph.D. Scholar, Dept. of Basic Principles, I.P.G.T&R.A, GAU Department of Basic Principles, IPGT & RA, GAU, Jamnagar, Gujarat, India-361008.

<sup>2</sup>Prof. & HOD Dept. of Basic Principles, Department of Basic Principles, I.P.G.T & R.A, GAU, Jamnagar, Gujarat, India-361008.

<sup>3</sup>Head, Pharmacognosy lab. Department of Pharmacognosy, I.P.G.T& R.A, GAU, Jamnagar, Gujarat, India-361008.

Article Received on  
23 Dec. 2020,

Revised on 13 Jan. 2021,  
Accepted on 03 Feb. 2021

DOI: <https://doi.org/10.17605/OSF.IO/EUTKV>

### \*Corresponding Author

**Dr. Priya Gupta**

Ph.D. Scholar, Dept. of  
Basic Principles,  
I.P.G.T&R.A, GAU  
Department of Basic  
Principles, IPGT & RA,  
GAU, Jamnagar, Gujarat,  
India-361008.

### ABSTRACT

**Introduction:** Entire universe made up of five basic elements called *Panchamahabhuta*. Ayurveda emphasize the role of water (*Jala Mahabhuta*) in body as a most important element of body as well as treatment point of view. Ayurveda consider thirst as not only natural urge but also uses it as a treatment modality in some of the diseases. *Trishna Nigrahana Mahakashaya* (important decoctives for thirst-restraining) is such preparation which helps to get control over water consumption. **Material and Method:** This study has been conducted to evaluate the role of *Trishna Nigrahana Mahakashaya Ghanvati* for *Kleda* (body moisture) management. The drug is going to use in the form of *Ghanvati* and subjected to Pharmacognostical and physicochemical evaluation. **Observation and Results:** The Pharmacognostical results showed that the presence of Chollenchyma

cells of *Guduchi*, Starch grains of *Shunti*, Brown cantant of *Musta*, Prismatic crystal of *Dhanyvasa*, Starch grains of *Patola*, Fibres of *Parpataki*, Fibres of *Patola*, Fibres of *Guduchi*, Silica deposition of *Musta*, Clustar crystal of *Dhanyvayasa*, Brown cantant of *Chandana*, Brown cantant of *Kirattikta*, Starchgrain of *Musta*, Trichome of *Kirattikta*, Epicarp cells of *Dhanayak*, Starch grain and crystal of *Parpataki*, Lignified collenchymas

cells of *Guduchi*, Lignified fibres of *Chandana*, Stiated fibres of *Dhanyak*, Annular vessels of *Musta*, Bordered pitted vessels of *Guduchi*, Fragment of spiral vessel of *Patola*, Oil Globule of *Dhanyaka*, Stone cells of *Chandana*, Trichome of *Patola*. Physicochemical Parameters of the tablet like Uniformity (497.6 mg), Disintegration time (20 min), Hardness (2.2kg/cm<sup>2</sup>), Ash value (8.18%) and Loss on Drying (10.28%) were all found to be within the normal range. The water soluble extractive and methanol soluble extractive values were found to be 31.12 % w/w and 21.36 % w/w respectively.

**KEYWORDS:** *Trishna Nigrahana Mahakashaya*, Pharmacognosy, Physicochemical analysis, *Kleda* Management.

## INTRODUCTION

Beauty of Ayurveda resides in its comprehensive approach towards the humanity. From the treatment of major disease it also includes the rules and regulation regarding the small things like where not to spit. It is the well-known fact that Ayurveda emphasize on the importance of Agni (Digestive Power) and dietary articles as well as dietary regimen. Apart from this also emphasize the role of water in body and rules regarding water consumption. Though Modern science is highly promoting the benefits of drinking lots of water. On other hand Ayurveda never advice to consumption of excessive water. Ayurveda is not only accept the water as most important element of body but it also describe the uses of water as treatment point of view. *Pipasa* (Holding the urge of Thirst) is included under the ten types of *Langhana* (Fasting) therapy.<sup>[1]</sup> In present era due to sedentary lifestyle number of patients are increasing with lifestyle disorder. Most of the Lifestyle disorder are merely included in *Santarpanajanya Vikara* (Diseases due to satiating articles) and treatment of these disease are *Apatarpana* (non-satiation) therapy. *Pipasa* (Holding the urge of Thirst) is *Apatarpana* (non-satiation) type of therapy which can be used in such condition. *Trisha Nigrahana Mahakashaya* (important decoctives for thirst- restraining) is also given by Charaka in 4<sup>th</sup> chapter of *Sutra Sthana* to suppress the urge of *Pipasa* (Thirst) with the help of medicine as a treatment modality. *Trishna Nigrahana Mahakashaya* (important decoctives for thirst-restraining) consisting of *Nagar* (*Zingiber officinale* Roxb.), *Dhanvayasa* (*Fagonia cretica* Linn.), *Musta* (*Cyperus rotundus* Linn.), *Parpataka* (*Fumaria parviflora lam*), *Chandan* (*Santalum album* Linn.), *Kiratatikta* (*Swertia chirata* Bunch Ham. (Roxb.), *Guduchi* (*Tinospora cordifolia* Willd.), *Dhanyaka* (*Coriandrum sativum*. Linn.), *Patola* (*Trichosanthes dioica* Roxb)<sup>[2]</sup> Considering all above fact Pharmacognostical and

Pharmaceutical evaluation is the need of time for *Trishna Nigrahana Mahakashaya Ghan Vati*.

## MATERIALS AND METHODS

All the raw drug materials were collected from the pharmacy of IPGT & RA, Gujarat Ayurved University, Jamnagar. The ingredients are mentioned in table 1.

**Table 1: Ingredients of *Trishna Nigrahana Mahakashaya Ghan Vati*.<sup>[3]</sup>**

No.	Name of Drug	Latin Name	Part used	Quantity
1	<i>Nagar</i>	<i>Zingiber officinale</i> Roxb.	Rhizome	1 Part
2	<i>Dhanvayasaka</i>	<i>Fagonia cretica</i> Linn.	<i>Panchang</i>	1 Part
3	<i>Musta</i>	<i>Cyperus rotundus</i> Linn.	Root	1 Part
4	<i>Parpataka</i>	<i>Fumaria parviflora</i> Lam	<i>Panchang</i>	1 Part
5	<i>Chandana</i>	<i>Santalum album</i> Linn.	Heart wood	1 Part
6	<i>Kiratatikta</i>	<i>Swertia chirata</i> Bunch Ham (Roxb.)	<i>Panchang</i>	1 Part
7	<i>Guduchi</i>	<i>Tinospora cordifolia</i> Willd.	Dried Stem	1 Part
8	<i>Dhanyaka</i>	<i>Coriandrum sativum</i> Linn.	Seeds	1 Part
9	<i>Patola</i>	<i>Trichosanthes cucumerina</i> Roxb	Dried Leaves	1 Part

## Pharmacognostical evaluation

All the raw drugs were identified and authenticated by the Pharmacognosy department, IPGT & RA, Gujarat Ayurved University, Jamnagar. The identification were carried out on the basis of organoleptic features, morphological features and powder microscopy of prepared *Ghan Vati*. *Ghan Vati* dissolved in small quantity of distilled water, filtered through filter paper, filtrate studied with and without staining. Micro photographs of the slides were taken with Carl Zeiss microscope attached with camera.<sup>[4,5]</sup>

## Method of preparation of *Trishna Nigrahana Mahakashaya Ghan Vati*

All the authenticated drugs (table 1) taken in equal proportions were crushed to a coarse powder separately and mixed thoroughly with 16 times of water in a stainless steel container and then continuous mild heat was applied until it was reduced to one fourth of its initial quantity. During the heating process, continuous stirring was done to facilitate the evaporation and avoid any deterioration due to burning of materials. After a desirable reduction in volume was achieved, the *Kwatha* (Decoction) was filtered through single folded cotton cloth and collected in a separate vessel. Subsequently, the *Kwatha* (Decoction) was boiled again over slow fire on a gas stove, maintaining the temperature between 90°C and 95°C till a semisolid consistency was obtained. As the water evaporates, the viscosity of the

extract increases, resulting in *Ghana* (extract) form. *Ghana* was mixed with the powder of *Kwatha* (up to 10% of extract) further forming a solid mass. Finally *Vati* (Tablet) were formed (500mg each) from this solid mass, in Pharmacy of IPGT & RA, GAU, Jamnagar.

## Pharmaceutical evaluation

### Physico-Chemical parameter

*Trishna Nigrahana Mahakashaya Ghan Vati* was analyzed by using qualitative and quantitative parameters at Pharmaceutical Laboratory, IPGT & RA, Gujarat Ayurved University, Jamnagar. The common parameters mentioned for compressed tablets in Ayurvedic Pharmacopoeia of India<sup>[6]</sup> and CCRAS<sup>[7]</sup> guidelines are total ash, pH value and water and alcohol soluble extractives. On this basis these parameters were taken. Presence of more moisture content in a sample can create preservation problem. Hence loss on drying was also selected as one of the parameters<sup>[8]</sup> HPTLC were also performed.

### Method of preparation of methanolic extract

A solution was prepared by mixing 2.5 gm of powder of *Trishna Nigrahana Mahakashaya Ghan Vati* and 50 ml of 70% methanol and the solution was kept in a clean and dry place for 24 hr with intermittent shaking. Then extract was collected and filtered through Whatman no. 1 filter paper. From the above solution, 25 ml was taken and heated on thermostatic water bath till a dark greenish residue was obtained which yielded 21.36 % w/w.

### High performance thin layer chromatography study (HPTLC)

Methanol extract of *Trishna Nigrahana Mahakashaya Ghan Vati* were spotted on pre coated silica gel GF 60254 aluminum plate as 5mm bands, 5mm apart and 1 cm from the edge of the plates, by means of a Camag Linomate V sample applicator fitted with a 100 µL Hamilton syringe. Toluene (7 ml), Ethyl acetate (2 ml), Acetic acid (1 ml) was used as mobile phase. After Development, Densitometric scanning was performed with a Camag TLC scanner III in reflectance absorbance mode at 254 nm and 366 nm under control of win CATS software (V 1.2.1 Camag)<sup>[9,10]</sup> The slit dimensions were 6 mm x 0.45 mm and the scanning speed was 20 mm s<sup>-1</sup>.

## OBSERVATION AND RESULTS

### Pharmacognostical study

The initial purpose of the study was to confirm the authenticity of the drugs used in the preparation of *Trishna Nigrahana Mahakashaya Ghan Vati*. For that coarse powder of all the ingredients were subjected to organoleptic and microscopic evaluation.

### Organoleptic characters of *Trishna Nigrahana Mahakashaya Ghan Vati*

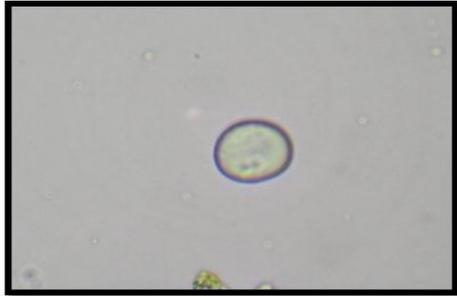
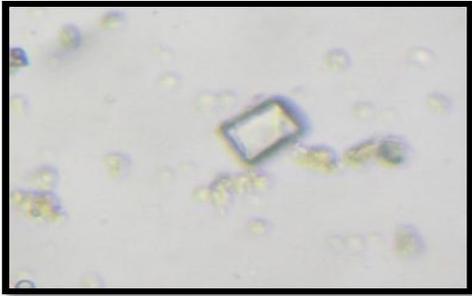
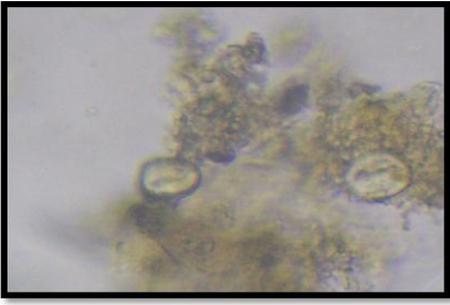
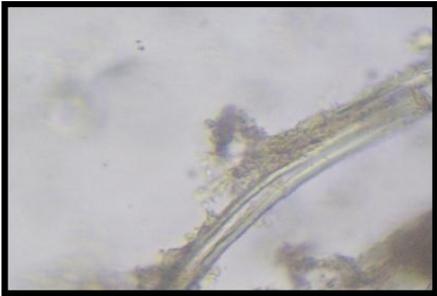
Organoleptic features like colour, odour and taste of *Trishna Nigrahana Mahakashaya Ghan Vati* were recorded and the result obtained are tabulated in table 2.

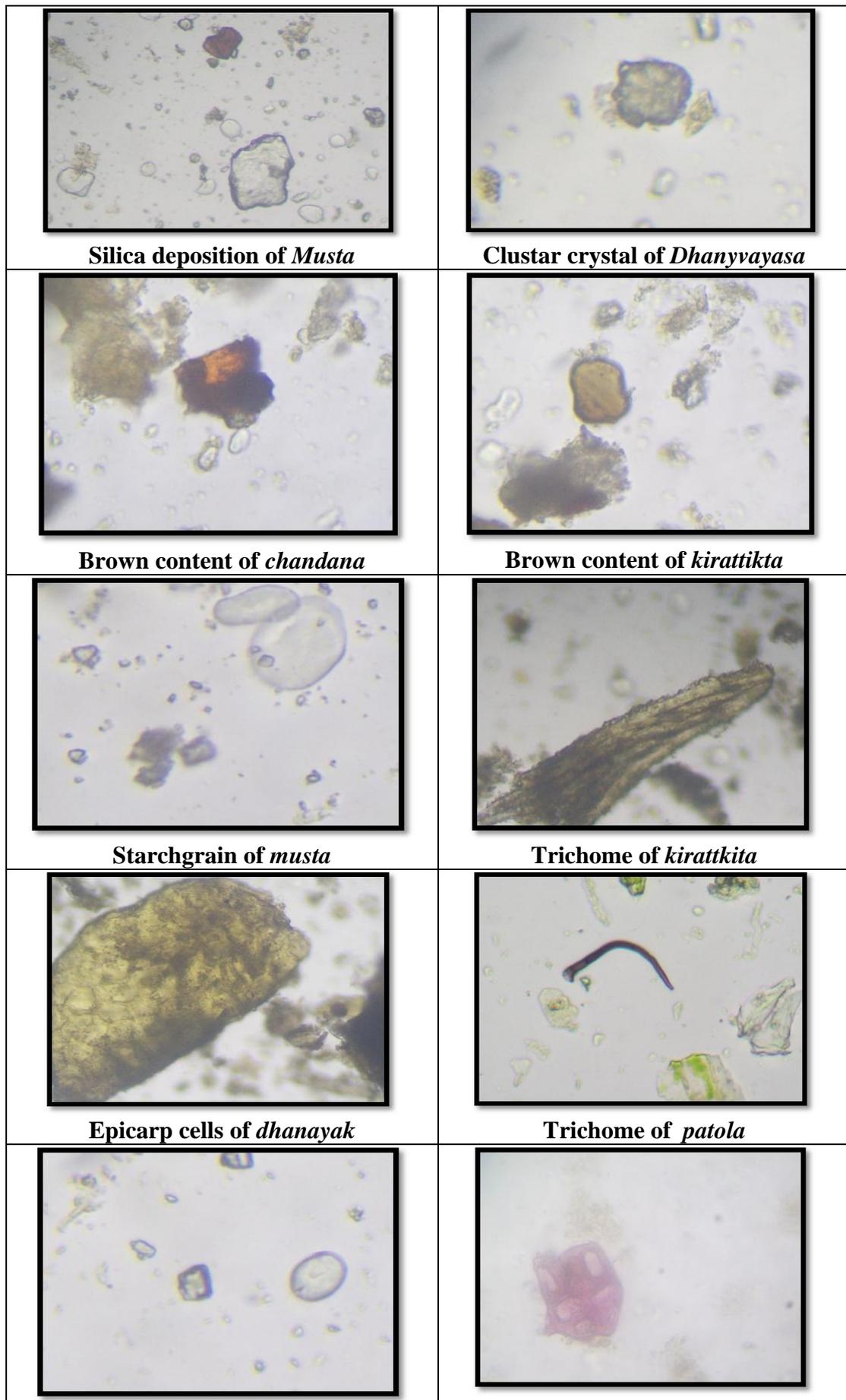
**Table 2: Organoleptic characters of *Trishna Nigrahana Mahakashaya Ghan Vati*.**

No.	Organoleptic parameter	Result
1	Texture	Smooth and Hard
2	Colour	Ash brown
3	Odour	Bitter
4	Taste	Bitter

### Microscopic evaluation

Microscopic evaluation was conducted by powdering the *Ghan Vati* and dissolving it in the distilled water and studied under microscope for the presence of the characteristics of the ingredient drug and for the probable changes in the features if any. The microphotographs were taken by using Carl Zeiss trinocular microscope. Characteristics of all the ingredient drugs were identified in *Ghan Vati* also. Microscopic characters of *Trishna Nigrahana Mahakashaya Ghan Vati* are Chollenchyma cells of *Guduchi*, Starch grains of *Shunti*, Brown cantant of *Musta*, Prismatic crystal of *Dhanyvasa*, Starch grains of *Patola*, Fibres of *Parpataki*, Fibres of *Patola*, Fibres of *Guduchi*, Silica deposition of *Musta*, Clustar crystal of *Dhanyvayasa*, Brown cantant of *Chandana*, Brown cantant of *Kirattikta*, Starchgrain of *Musta*, Trichome of *Kirattikta*, Epicarp cells of *Dhanayak*, Starch grain and crystal of *Parpataki*, Lignified collenchymas cells of *Guduchi*, Lignified fibres of *Chandana*, Stiated fibres of *Dhanyak*, Annular vessels of *Musta*, Bordered pitted vessels of *Guduchi*, Fragment of spiral vessel of *Patola*, Oil Globule of *Dhanyaka*, Stone cells of *Chandana*, Trichome of *Patola* Plate.1(Figure 1)

	
<p><i>Trishna Nigrahana Mahakashaya Ghan Vati</i></p>	<p>Chlorenchyma cells of <i>Guduchi</i></p>
	
<p>Starch grains of <i>Shunti</i></p>	<p>Oil Globule of <i>Dhanyaka</i></p>
	
<p>Brown content of <i>Musta</i></p>	<p>Prismatic crystal of <i>Dhanyvasa</i></p>
	
<p>Starch grains of <i>Patola</i></p>	<p>Fibres of <i>Parpataki</i></p>
	
<p>Fibres of <i>Patola</i></p>	<p>Fibres of <i>Guduchi</i></p>



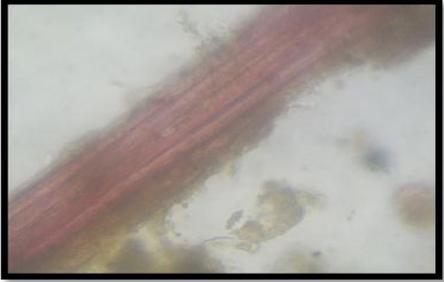
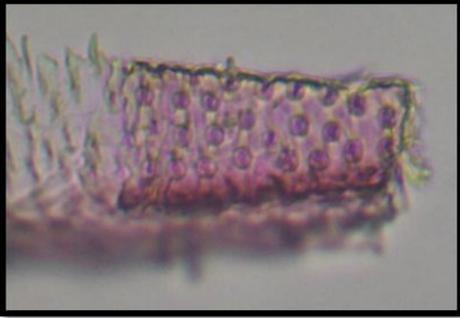
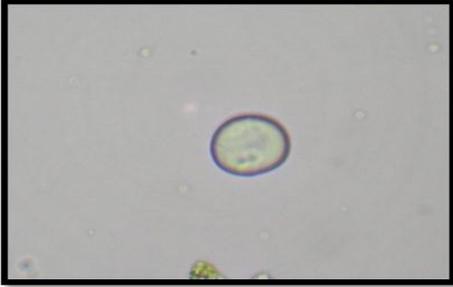
Starch Grain and Crystal of <i>parpataki</i>	Lignified collenchymas cells of <i>guduchi</i>
 <p data-bbox="363 577 679 616">Stone cells of <i>chandana</i></p>	 <p data-bbox="884 564 1270 602">Lignified fibres of <i>chandana</i></p>
 <p data-bbox="354 958 686 996">Stiated fibres of <i>dhanyak</i></p>	 <p data-bbox="909 958 1244 996">Annular vessels of <i>musta</i></p>
 <p data-bbox="255 1332 718 1368">Bordered pitted vessels of <i>guduchi</i></p>	 <p data-bbox="845 1321 1308 1357">Fragment of spiral vessel of <i>patola</i></p>
 <p data-bbox="360 1675 683 1711">Oil globule of <i>dhanyaka</i></p>	

Plate 1 (Figure 1)

### Pharmaceutical study

The results of Physico-chemical parameter of *Trishna Nigrahana Mahakashaya Ghan Vati* obtained are tabulated in table 3. Physicochemical Parameters of the tablet like Uniformity, Disintegration time, Hardness, Loss on Drying were all found to be within the normal range.

The water soluble extractive and methanol soluble extractive values were found to 31.12 % w/w and 21.36 % w/w respectively.

**Table 3: Physico-chemical parameter of TNG tablet.**

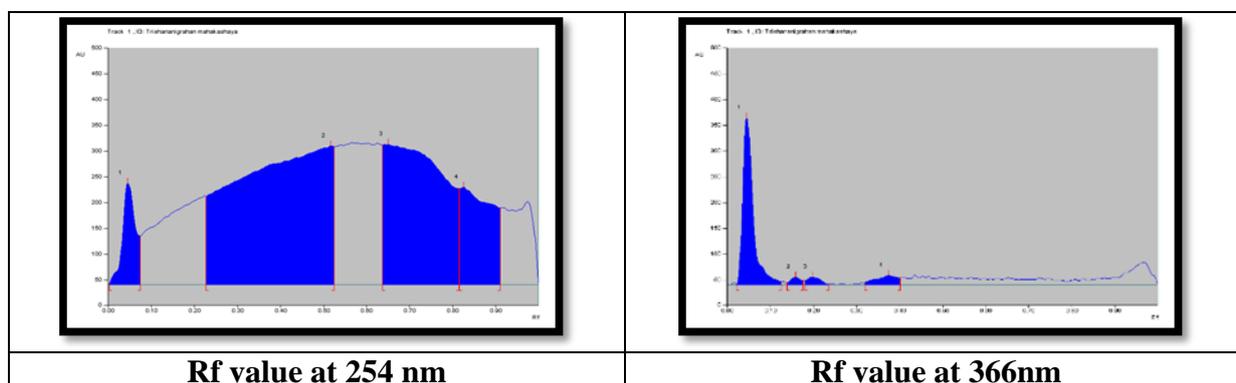
No.	Physico-chemical parameter	Result
1	Average weight of tablet	497.6 mg
2	Tablet Hardness	2.2 kg/cm <sup>2</sup>
3	Loss in drying	10.28%
4	Disintegration time	20 min
5	Ash value	8.18%
6	Water soluble extract	31.12%
7	Methanol soluble extract	21.36 %
8	pH value	6.5

### High performance thin layer chromatography

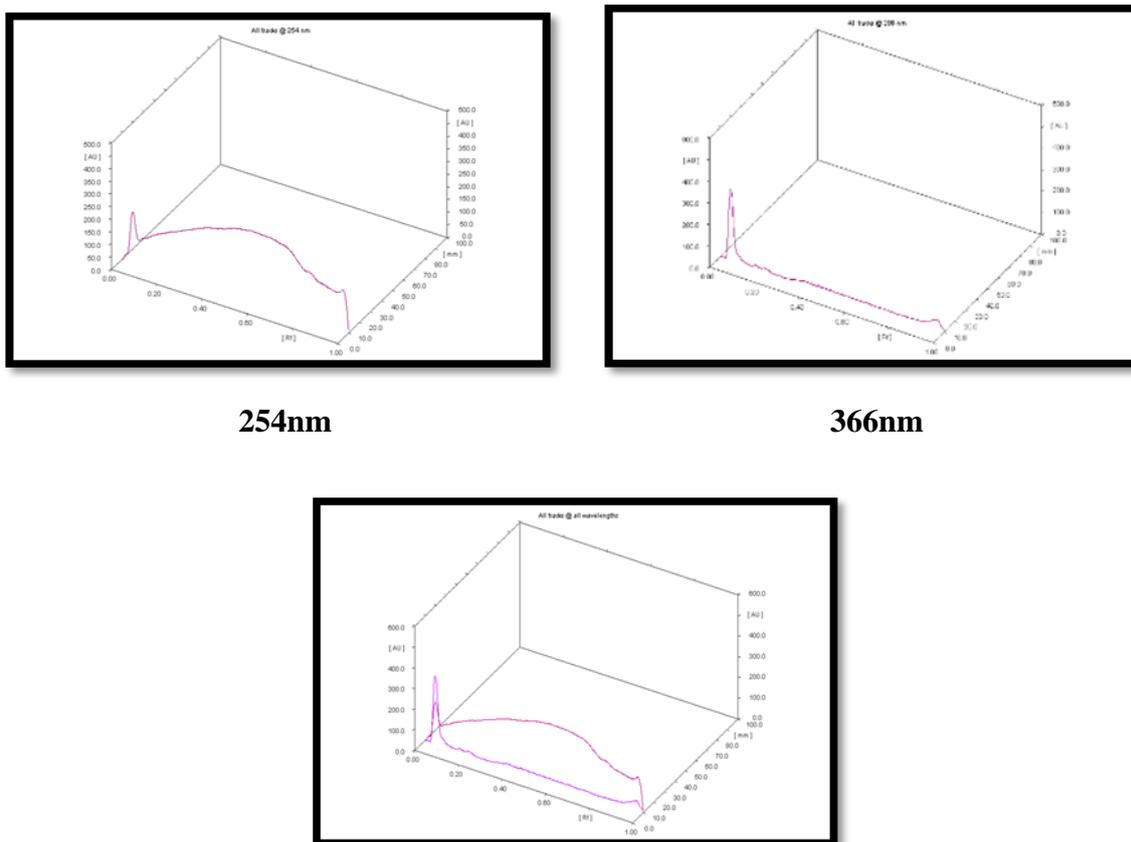
HPTLC under 254 nm showed four spots at 0.05, 0.52, 0.65 and 0.83R<sub>f</sub> values and under 366 nm showed four spots at 0.05, 0.16, 0.20 and 0.37 R<sub>f</sub> values.

**Table 4: High performance thin layer chromatography of Trishna Nigrahana Mahakashaya Ghan Vati.**

Spot	R <sub>f</sub> value at 254 nm	R <sub>f</sub> value at 366 nm
1	0.05	0.05
2	0.52	0.16
3	0.65	0.20
4	0.83	0.37



**Figure 2: Densitogram curve of Methanol extract of Trishna Nigrahana Mahakashaya Ghan Vati at 254 nm (2A) and 366 nm(2-B).**



254nm

366nm

**Figure 3:** 3 Dimensional graph of methanol extract of *Trishna Nigrahana Mahakashaya Ghan Vati*.

## DISCUSSION

All the ingredients are mostly having *Tikta* (bitter) and *Kashaya* (astringent) *Rasa* (taste) and due to this unpleasant taste oral intake is quite difficult for patients. Addition to that Decoction form takes more time and attention during preparation. It is difficult for everyone to prepare decoction every day. Decoction is such formulation which should be used freshly. So due to this lacunas, use of different formulation which is palatable, easy to take, less time and effort consuming is the need of hour. Potency period of *Ghan Vati* form is also very high in comparison to decoction form. It is also very easy to carry at anywhere and less space occupying. That is why *Ghan Vati* (Tablet of extract) form of *Trishna Nigrahana Mahakashaya* is prepared. *Madhumeha* is the disease condition in which *Kleda* (body moisture) is increase highly in body. Due to frequent urination patients feeling urge of thirst more than the normal and take more water which ultimately lead to increase of *Kleda* (body moisture) in body. This vicious cycle remain continue and causes more damage to body systems. To break this channel and to generate control over thirst is the most important part of treatment. *Trishna Nigrahana Mahakashaya* is the group of medicine which can help to

gain control over the urge of Thirst. Most of the drugs of this *Mahakashaya* are having *Katu* (pungent), *Tikta* (bitter) *rasa*, *Ruksha Guna* (dry property), *Ushna Virya* (Hot potency) which are the properties opposite from pathogenesis of *Madhumeha*. So these drugs are useful to gain control over thirst as well as it also work as treatment medicine for *Madhumeha* (Type 2 Diabetes).

As this formulation is tried for first time, so the pharmaceutical and pharmacognostical analysis is required for the authenticity of drug. Pharmacognostical study of *Trishna Nigrahana Mahakashaya* showed specific character Chollenchyma cells of *Guduchi*, Starch grains of *Shunti*, Brown cantant of *Musta*, Prismatic crystal of *Dhanyvasa*, Starch grains of *Patola*, Fibres of *Parpataki*, Fibres of *Patola*, Fibres of *Guduchi*, Silica deposition of *Musta*, Clustar crystal of *Dhanyvayasa*, Brown cantant of *Chandana*, Brown cantant of *Kirattikta*, Starchgrain of *Musta*, Trichome of *Kirattikita*, Epicarp cells of *Dhanayak*, Starch grain and crystal of *Parpataki*, Lignified collenchymas cells of *Guduchi*, Lignified fibers of *Chandana*, Stiated fibers of *Dhanyak*, Annular vessels of *Musta*, Bordered pitted vessels of *Guduchi*, Fragment of spiral vessel of *Patola*, Oil Globule of *Dhanyaka*, Stone cells of *Chandana*, Trichome of *Patola* (plate. 1) (Figure 1).

## CONCLUSION

Ayurvedic system of medicine is being relied upon more and more for the various health issues particularly lifestyle diseases. Management of *Kleda* (body moisture) is having very important role in treatment of *Madhumeha* (Diabetes Type 2). *Trishna Nigrahana Mahakashaya* is having such herbs which help us to control the intake of Water. Since *Kwatha* (Decoction) is bitter in taste and patient has to prepare *Kwatha* (Decoction) each time, which is very time taking and inconvenient too. Also it is tough to maintain the dose of *Kwatha* (Decoction) due to mode of preparation. So to overcome these problems along with the problems of palatability, feasibility and to increase the shelf life, *Kwatha* (Decoction) form is converted in to *Ghan Vati* (Tablet of extract) form. The ingredients were identified and authenticated pharmacognostically and were used for the preparation. The formulation was subjected to pharmacognostical, physicochemical, HPTLC studies. Further clinical evaluation of the compound is in progress.

**REFERENCES**

1. Acharya YT, editor. Charaka Samhita of Agnivesha, Sutra Sthana. Ayurveda Dipika Vyakya, Sanskrit Version. Reprint edition. Varanasi: Chaukhamba Orientalia, 2016; 121: 22-18.
2. Acharya YT, editor. Charaka Samhita of Agnivesha, Sutra Sthana. Ayurveda Dipika Vyakya, Sanskrit Version. Reprint edition. Varanasi: Chaukhamba Orientalia, 2016; 33: 4-14.
3. Acharya YT, editor. Charaka Samhita of Agnivesha, Sutra Sthana. Ayurveda Dipika Vyakya, Sanskrit Version. Reprint edition. Varanasi: Chaukhamba Orientalia, 2016; 33: 4-14.
4. Kumar V. Potential Medicinal Plants for CNS Disorders: an overview. *Phytother Res*, 2006; 1023-35.
5. Khandelwal KR, *Practical Pharmacognosy*. Pune: Nirali Prakashan, 2008; 13: 19-42.
6. Anonymous, Protocol for testing of Ayurveda, Siddha & Unani medicines, Pharmacopoeial laboratory for Indian medicines, Ghaziabad, Ministry of AYUSH, Government of India.
7. Anonymous, Parameters for qualitative assessment of Ayurveda, Siddha drugs, CCRAS, New Delhi, 2005.
8. Anonymous, *The Ayurvedic Pharmacopoeia of India, Part II (Formulation), Volume I*, First edition, Ministry of AYUSH, Government of India, New Delhi, 2007; 140-147.
9. Stahl E; *Thin layer chromatography*, Springer-Verlag New York, Inc. 175 5th Ave. New York, NY, 1969; 2: 125-133.
10. Reich E, Schibii A; *High Performance Thin Layer Chromatography for the analysis of medicinal plants*, Germany: Thieme medical publishers. Inc, 2007; 129-160, 206-210, 224-240.