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Pharmacognostical and preliminary physico-chemical evaluation of *Rasayanakalpa Vati*

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Abstract

Menopause is an inevitable physiological stage in women's life comes between late forties and early fifties when characterized with multisystem assortment known as menopausal syndrome. Women are suffering more from menopausal syndrome due to sedentary modern lifestyle and seeking for its remedies. The present study had been planned to evaluate a standard pharmacognostical and pharmaceutical profile of *Rasayanakalpa Vati*. Study included preparation of *Rasayanakalpa Vati* following all SOPs using raw drugs which were previously authenticated and then *Rasayanakalpa Vati* was subjected for pharmacognostical, physicochemical and high performance thin layer chromatography (HPTLC) as per standard protocols. Pharmacognostical findings were matched with that of individual raw drugs with no major changes in the microscopic structures of the raw drugs during preparation of *Vati*. The quality of *Rasayanakalpa Vati* can be tested by series of pharmacognostical and physicochemical screening for the observation of the present study.

Keywords: *Rasayanakalpa Vati*, Menopause, HPTLC, Pharmacognosy

1. Introduction

Menopause is an inevitable physiological stage in women's life comes between late forties and early fifties when characterized with multisystem assortment known as menopausal syndrome. It is an estrogen deficient phase of woman's life which accelerates the ageing process resulting greater vulnerability to psychosomatic problems and makes her life dependent. Women are suffering more from menopausal syndrome due to sedentary modern lifestyle and seeking for its remedies. Ayurveda is one of the Ancient Medical sciences, described ample of anti-aging drugs under umbrella of *Rasayana* (Rejuvenation) therapy. Characteristic features of menopausal syndrome are hot flushes, bouts of rapid heartbeat, sleep disturbances, mood swings, night sweating, disturbing memory lapses, developing senile vaginitis due to dry vagina, loss of libido and osteoporosis etc^[1]. Variation in premenopausal phase leads to mood swing, psychic-disorders including depression, anxiety, obesity with change in B.M.I. (Body Mass Index) are more prone^[2, 3] in menopausal women that needs medical help. In modern science hormone replacement therapy is the only treatment for menopause which has many side effects^[4].

Though there is no direct reference found in *Ayurveda* regarding menopausal syndrome but we can correlate it with *Rajoniviritiavastha* or *Jarapakvastha*^[5] in female. *Rasayana* drugs promote the regeneration of *Dhatu*s and thus help to slow the aging process and ultimately fulfill the goals of old age care. It also increases intelligence, immunity, mental wellbeing and longevity of the body^[6]. So *Rasayanakalpa Vati* may effective in menopausal syndrome. In the present study, *Rasayanakalpa Vati* (tablet) was subjected to Pharmacognostical and pharmaceutical evaluation in order to prepare a preliminary profile of the formulation for future references.

2. Material and methods

1. The test drug *Rasayanakalpa Vati* consists of 7 ingredients. (Table 1) All of the raw drugs were collected from the pharmacy of Gujarat Ayurved University, Jamnagar.
2. All the raw drugs were indentified and authenticated in pharmacognosy laboratory of IPGT & RA, GAU, Jamnagar followed by size reduction in mixture grinder and obtained fine powder.

2.1 Method of preparation of *Rasayanakalpa Vati*

All the drugs in table 1 were changed into *Churna* form and mixed well to form a homogenous mixture. Then seven *Bhavanas* (Levitation) of *Amalaki Svarasa* (Juice) were given (Table 2),

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then by adding binding agent i.e. *Guggulu*, *Rasayanakalpa Vati* was prepared by making *Vati* of 500mg each in the pharmacy.

2.2 Pharmacognostical Analysis

Pharmacognostical analysis of *Rasayanakalpa Vati* based of organoleptic characters i.e. color, odor, taste, consistency were reordered. Microscopic studies i.e. dissolving *Rasayanakalpa Vati* in small quantity of distilled water, filtering through filter paper and the precipitate treated with or without stain to find out the lignified materials along with other cellular constituents and later compare with the findings of individual ingredients of the *Rasayanakalpa Vati*. The micro photographs were taken under Carl Zeiss Trinocular microscope attached with camera^[7].

2.3 Pharmaceutical Analysis

Rasayanakalpa Vati was analyzed with appropriate protocols for the standard physicochemical parameters^[8, 9] i.e. Loss on drying, Ash Value, Acid soluble extractive, Water soluble extractive, Methanol soluble extractive, pH value by pH paper, Weight variation as per Ayurvedic Pharmacopeia of India at the Pharmaceutical chemistry lab, IPGT& RA.

2.3 HPTLC

Sample: - Acid hydrolysis of methanol extract and coarse powder of mixture of *Rasayanakalpa Vati* was taken.

Stationary Phase: - Silica Gel G pre-coated plates (E-Merck)

Mobile Phase: - Toluene: Ethyl acetate: Ethyl acetate = 7: 2: 0.5

Mixture of *Rasayanakalpa Vati* weighing 2gms was taken in 50 ml of methanol and kept for 24 hours. Filtrate was prepared and evaporated till it gets dried in a flat bottomed shallow dish and concentrated into methanol to volume of requirement. Alkaloid fraction was used for the spotting of the TLC^[10] plate. Then the spotted TLC was run with the solvent **Systems Toluene:** Ethyl acetate: Ethyl acetate = 7: 2: 0.5 and the resulting TLC pattern was viewed under long waved ultra violet light at 366 nm (Fig 1) and short waved ultra violet light at 254 nm (Fig 2), results are noted in Table 5.

3 Observation and Results

3.1 Pharmacognostical

Organoleptic characters

The sample (Powdered *Rasayanakalpa Vati*) was blackish brown solid texture with predominant *Tikta* (Bitter) and *Kashaya* (Astringent) and characteristic smell was slightly aromatic.

Microscopic characters

The diagnostic characters of *Rasayanakalpa Vati* compound formulation showed Border pitted vessels, Collenchyma, Cork cells, Simple starch grain of *Guduchi* (Fig 3-6), stone cell of *Haritaki* (Fig 7, 8), Group of Scleroid, Silica deposition of *Amalaki* (Fig 9, 10), Epidermal cells, pollen grains of *Mandukaparni* (Fig 11-12), Fibers, oil globule, Pitted vessels, Starch grain with hilum and Tannin contain of *Jatamansi* (Fig 13-16).

3.2 Pharmaceutical

Rasayanakalpa Vati was analyzed by using various standard physicochemical parameters at the pharmaceutical chemistry lab. The pharmaceutical parameters such as loss on drying, ash value, acid soluble extractive, water soluble extractive, methanol soluble extractive, pH value by pH paper, weight variation were found within permissible limit for the tablet (Table 4).

HPTLC

On performing HPTLC, the chromatography showed 2 spots with R_f values 0.03, 0.11 at 254nm and 0.03, 0.10 at 366nm (Table 5).

4. Discussion

Taste of the final product was *Tikta* (Bitter) and *Kashaya* (Astringent) as majority of the ingredients have *Tikta* and *Kashaya* taste. Study on *Rasayanakalpa Vati* is a step towards pharmacognostical and physico-chemical standardization of herbal and animal origin drugs in the tablet form. Powder microscopy showed striking characters of all individual 7 drugs of *Rasayanakalpa Vati*. In the present study, the finding specific for the particular herbs are consider as its marker, such as Border pitted vessels of *Guduchi*, stone cell of *Haritaki*, Silica deposition of *Amalaki*, pollen grains of *Mandukaparni*, Tannin contain of *Jatamansi* etc. This confirms that there is no major change in microscopic structures of the raw drugs during the pharmaceutical process of preparation of *Vati*. It was found that the formulation meet required qualitative pharmaceutical standards for a *Vati*.

5. Conclusion

Rasayanakalpa Vati is an *Anubhuta Yoga* (experienced based formulation) which is effective and proved *Ayurvedic* drug for menopausal syndrome. The present work was carried out with an aim to study Pharmacognostical and Physico-chemical parameters. The quality of *Rasayanakalpa Vati* was tested by series of pharmacognostical, physicochemical screening for the observations of the present study. The result of this study may be used as reference in similar research work in future.

Table 1: Ingredients of *Rasayanakalpa Vati*

No	Name of drug	Botanical name(Latin name)	Part used	Part
1	<i>Guduchi</i>	<i>Tinospora cordifolia</i> Willd	Stem	1
2	<i>Haritaki</i>	<i>Terminalia chebula</i> Retz.	Dried fruit	1
3	<i>Amalaki</i>	<i>Emblica officinalis</i> Gaertn.	Dried fruit	1
4	<i>Mandukaparni</i>	<i>Centella asiatica</i> Linn.	<i>Panchaga</i>	1
5	<i>Jatamansi</i>	<i>Nardostachys jatamansi</i> DC	Root	1
6	<i>Suddha Guggulu</i>	<i>Commiphora mukul</i> Engl.	Resin	1
7	<i>Praval Bhasma</i>	<i>Corallium rubrum</i>	<i>Pravala Moola & Shakha</i>	1

Table 2: *Bhavana Dravya*

Name of drug	Botanical name (Latin name)	<i>Bhavana</i>
<i>Amalaki</i>	<i>Emblica officinalis</i> Gaertn.	7 times

Table 3: Organoleptic Features of *Rasayanakalpa Vati*

Characters	Observed
Texture	Rough
Colour	Blackish brown
Odor	Slightly aromatic
Taste	<i>Tikta, Kashaya</i>
Consistency	Solid

Table 4: Physico-Chemical Parameters of *Rasayanakalpa Vati*

Name of the Test	Value
Loss on drying (at 110 °C)	8.666 % w/w
Ash Value	20.15% w/w
Water soluble extractive	28.7 %w/w
Methanol soluble extractive	14.32 %w/w
pH value by pH paper	6
Average wt. of <i>Vati</i>	0.509gm
Highest wt. of <i>Vati</i>	0.550gm
Lowest wt. of <i>Vati</i>	0.464gm

Table 5: *Rasayanakalpa Vati*

Extract	Solvent System	Wave length	Number of spot	Max R _f value
Methanol extract	Toluene: Ethyl acetate: Ethyl acetate (7:2:0.5)v/v	254nm	2	0.03, 0.11
		366nm	2	0.03, 0.10

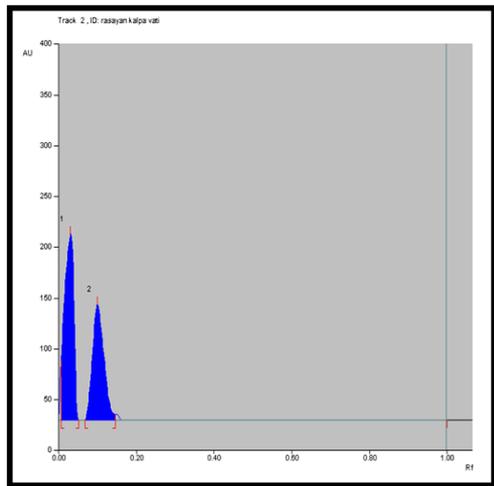


Fig 1: Peak table 366

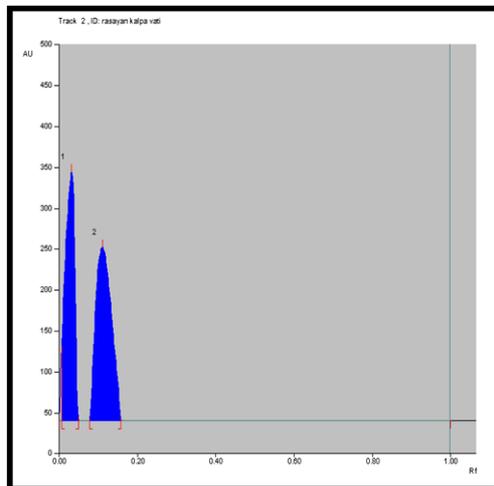


Fig 2: Peak table 254

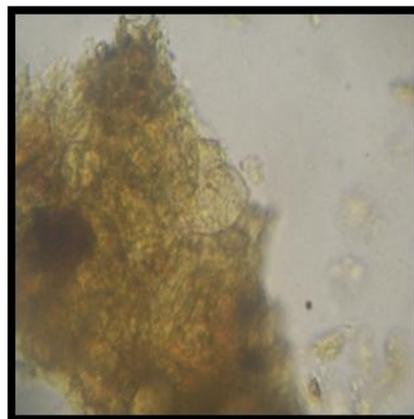


Fig 3: Cork cells of *Guduchi*

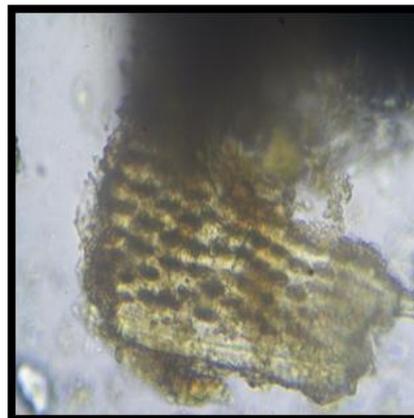


Fig 4: Border pitted vessels of *Guduchi*



Fig 5: Collenchyma of *Guduchi*

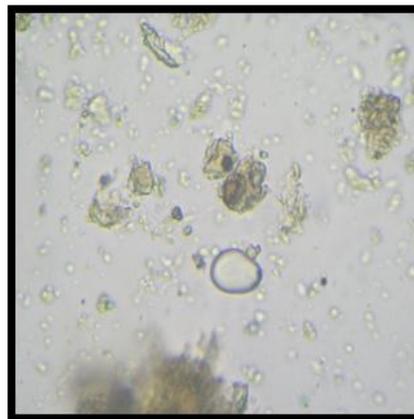


Fig 6: Simple starch grain of *Guduchi*



Fig 7: Stone cell of *Haritaki*

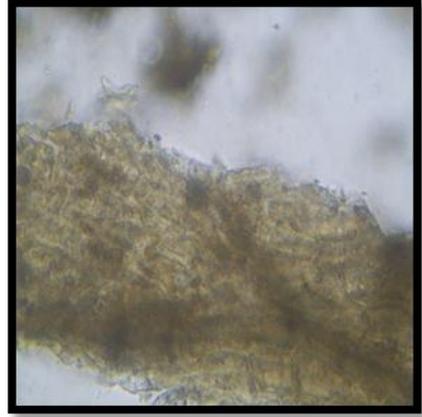


Fig 11: Epidermal cells of *Mandukaparni*



Fig 8: Stone cells of *Haritaki*

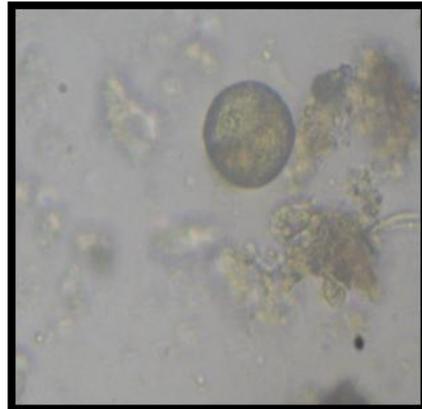


Fig 12: Pollen grains of *Mandukaparni*

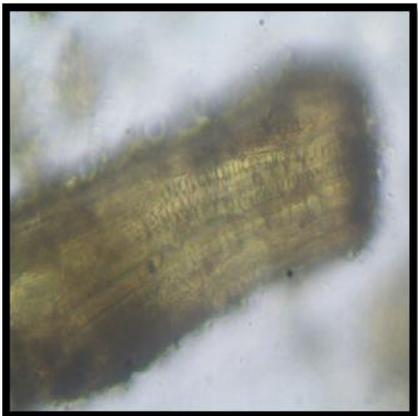


Fig 9: Group of Scleroid of *Amalaki*

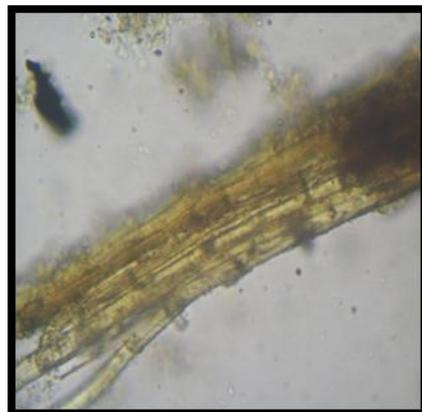


Fig 13: Fibers of *Jatamansi*

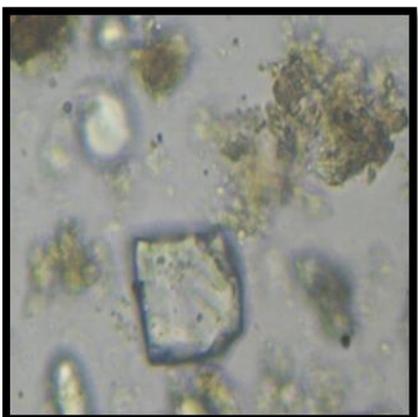


Fig 10: Silica deposition of *Amlaki*

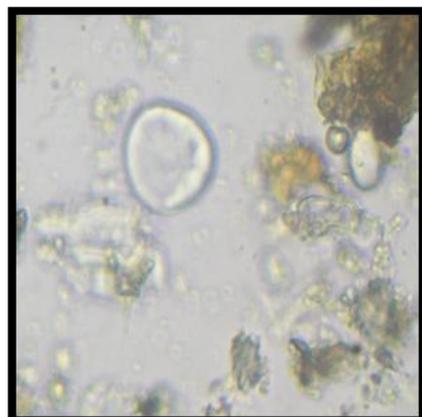


Fig 14: Oil globule of *Jatamansi*

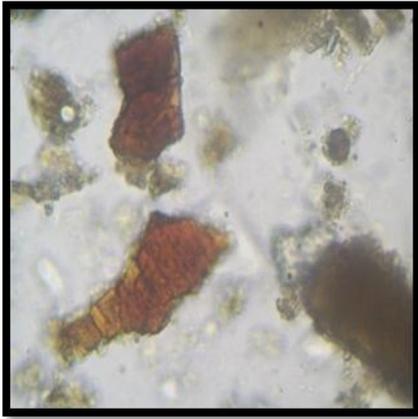


Fig 15: Tennin contain of *Jatamansi*



Fig 16: Starch grain with hilum of *Jatamansi*

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