

Pharmacognostical and Physicochemical Evaluation of *Stanya Shodhan Gana Churna*- An Ayurvedic Formulation in the Management of PCOS

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Abstract

PCOS is a syndrome of ovarian dysfunction along with the cardinal features of hyperandrogenism and polycystic ovarian morphology. *Stanya Shodhan Gana* is effective in *Stanya Vikruti* in Ayurvedic treatises. *Stanya* and *Artav* both are *Updhatu* of *Rasa Dhatu* hence *Stanya Shodhan Gana* can be act on *Artav dusti* also which is the by-product of same Origin. Keeping this hypothesis in mind, the *Stanya Shodhana Gana* may be effective in the management of PCOS. The present study was aimed at setting up a standard profile of *Stanya Shodhan Gana* which was prepared using pharmacognostical authenticated drugs like *Patha*, *Shunthi*, *Devdaru*, *Nagarmotha*, *Murva*, *Guduchi*, *Vatsak*, *Kirattikta*, *Kutaki* and *Sariva* followed by subjecting it to Physico-chemical analysis as per standard protocol. The observations were systematically recorded. Pharmacognostical findings like Pitted Vessels of *Patha*, Oil Globules of *Devdaru*, Rhombidal Crystal of *Murva* confirm the presence of *Patha*, *Devdaru* and *Murva* etc drugs contain in *Stanya Shodhan Gana*. *Stanya Shodhan Gana Churna* was prepared as per API. HPTLC was carried out after organizing appropriate solvent system in which maximum 14 spots were distinguished at 254 nm and 12 spots at 366 nm.

Keywords *Artav dusti*, PCOS, *Stanya Shodhan Gana*, Pharmacognosy, Physico-chemical analysis



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INTRODUCTION

Polycystic Ovarian Syndrome (PCOS) is common syndrome among women of reproductive age. PCOS is a syndrome of ovarian dysfunction along with the cardinal features of hyper androgenism and polycystic ovarian morphology. The common features found in PCOS are menstrual disorders (Amenorrhoea or Oligo menorrhoea); Hirsutism, Obesity, Anovulation and Infertility. Though aetiology is unknown stress; depression, food habits, lack of exercise leading to obesity are the contributing factors.

In spite of the high prevalence of PCOS even among young adult females the pathophysiology is poorly understood. In *Ayurvedic* classics *Acharya's* have explained eight types of *Artava Dushti* resulting in *Beeja Dusti*² which is same as anovulation in PCOS leading to infertility. *Granthi bhuta artava dushti* is said to be *Krichrasadhya* in prognosis³. *Sushruta* has described *Artavam Sonitam* and both *Artava & Stanya* are *Updhatu* of *Rasa Dhatu*. In *Charak Samhita* *Charkacharya* mentioned *Stanya Shodhan Gana* under the heading of *Mahakashay's*. Therefore, *Stanya Shodhan Gana* may also be effective in management of *Artav dushti*.

During the past few decades there has been increasing acceptance of natural products and therapies in the world. Also increase in use of Ayurvedic remedies globally. So we have to assure that there is no quality decrement and adulterations in Ayurvedic remedies. Therefore, quality control for efficacy and safety of herbal products is of main concern^{4,5}. Main challenge is to maintain the quality of the formulation. The development of this traditional system of medicine with the perspective of safety, efficacy and quality will help not only to preserve the traditional heritage but also to rationalize the use of the natural products in healthcare^{6, 7}. Initial steps in quality standardization of compound formulation are to establish the presence of each ingredient in the finished product⁸, followed by the pharmaceutical analysis. In the present study, *Stanya Shodhan Gana Churna* compound was subjected to pharmacognostical (powder microscopy), HPTLC and pharmaceutical evaluation for various physicochemical parameters in order to prepare a preliminary profile of formulation for future.

MATERIAL AND METHODS

Collection of Raw Materials:

All the raw drug materials were collected from the pharmacy attached with Institute of Gujarat Ayurved University. The ingredients

and parts of the drugs used are given in Table-1.

Table 1 Ingredients of *Stanya Shodhan Gana Churna*

Sr.No	Drugs	Botanical Name	Part Used	Ratio	Form
1	<i>Patha</i>	<i>Cissampelos pareira</i> Linn.	Whole plant	1Part	<i>Churna</i>
2	<i>Sunthi</i>	<i>Zingiber officinale</i> Roxb.	Dry Rhizome	1Part	<i>Churna</i>
3	<i>Devdaru</i>	<i>Cedrus deodara</i> Roxb. Loud.	Bark	1Part	<i>Churna</i>
4	<i>Nagaremotha</i>	<i>Cyperus scariosus</i> R.Br.	Dry Rhizome	1Part	<i>Churna</i>
5	<i>Murva</i>	<i>Marsdenia tenacissima</i> W. & A.	Stem	1Part	<i>Churna</i>
6	<i>Guduchi</i>	<i>Tinospora cordifolia</i> Willd.	Stem	1Part	<i>Churna</i>
7	<i>Vatsake (Kutaj)</i>	<i>Holarrhena antidysenterica</i> Wall.	Bark	1Part	<i>Churna</i>
8	<i>Kirattikta</i>	<i>Swertia chirata</i> Roxb.	Whole plant	1Part	<i>Churna</i>
9	<i>Kutaki</i>	<i>Picrorhiza kurroa</i> Royle ex Benth.	Rhizome	1Part	<i>Churna</i>
10	<i>Sariva</i>	<i>Hemidesmus indicus</i> Linn. R. Br.	Root	1Part	<i>Churna</i>

Pharmacognostical Study:

In Pharmacognosy laboratory of I.P.G.T. & R.A., Jamnagar; analysis of *Stanya Shodhan Gana Churna* was carried out. The identification was carried out based on organoleptic characters of *Stanya Shodhan Gana Churna*⁹ and later pharmacognostical evaluation of the *Churna* was carried out. The powder (*Stanya Shodhan Gana Churna*) was dissolved in small quantity of distilled water, filtered through filter paper, studied under the Carl-Zeiss Trinocular microscope attached with camera, with stain and without stain. The microphotographs were also taken under the microscope^{10, 11}.

Preparation of *Stanya Shodhan Gana Churna*:

Drugs mentioned in *Stanya Shodhan Gana* i.e., *Patha*, *Shunthi*, *Devdaru*, *Nagarmotha*, *Murva*, *Guduchi*, *Vatsak*, *Kirattikta*, *Kutaki*

and *Sariva* were taken and made it into fine powder. Then all the powders were mixed to attain a homogenous mixture. It was then packed in air tight covers.

Pharmaceutical Evaluation:

By using quantitative and qualitative parameters at pharmaceutical laboratory *Stanya Shodhan Gana Churna* was analysed. The common parameters mentioned for *Churna* in Ayurved Pharmacopeia of India and C.C.R.A.S guidelines are total Ash value, pH value, water soluble and methanol soluble extracts¹². So these parameters were selected for this study. Presence of high moisture content in a sample can create preservation problems in *Churna*. Hence loss on drying was also selected as one of the parameter^{13, 14}.

High Performance Thin Layer Chromatography:

Methanolic extract of *Stanya Shodhan Gana Churna* compound was spotted on pre-coated silica gel GF CO254 Aluminium plate as 5 mm bands, 5 mm apart and 1 cm from the edge of the plates, by means of camage, linomate V sample applicator fitted with a 100 µL. Hamilton syringe was used as the mobile phase. After development, densitometry scanning was performed with a camage TLC scanner III reflectance absorbance mode at 254 nm and 366 nm under control of win CATS software (V 1.2.1 manufactured by CAMAGE Switzerland). The slit dimensions were 6.00 x 0.45 mm and the scanning speed was 20 mm per second¹⁵.

OBSERVATIONS AND RESULTS

The initial purpose of the study was to confirm the authenticity of the drugs used in the preparation of *Stanya Shodhan Gana Churna*. For this powder of all the ingredients were subjected to organoleptic and microscopic evaluation separately to confirm the genuineness of all the raw drugs. Later after the preparation of formulation, pharmacognostical evaluation was carried out.

Organoleptic Evaluation:

Organoleptic features like colour, odour and taste of the *Stanya Shodhan Gana Churna* were recorded and placed in Table 2.

Table 2 Organoleptic Characters of *Stanya Shodhan Gana Churna*

Sr. No.	Parameter	Results
1	Colour	Dull Green
2	Odour	Characteristic
3	Taste	Bitter
4	Consistency	Fine

Microscopic Evaluation:

Microscopic evaluation was conducted by dissolving powder of *Stanya Shodhan Gana Churna* in the distilled water and studied under microscope for the presence of characteristics of ingredient drugs. The diagnostic characters are pitted vessels of *Patha* (Image:01), compound starch grains of *Patha* (Image:02), prismatic crystal of *Patha* (Image:03), fragment of scalariform vessel of *Shunthi* (Image:04), simple starch grain of *Shunthi* (Image:05), oil globules of *Devdaru* (Image:06), cork cells with oil content of *Devdaru* (Image:07), stone cells with tanin content of *Devdaru* (Image:08), fibre of *Devdaru* (Image:09), fibres passing through medullary rays of *Devdaru* (Image:10), deposition of silica of *Nagarmotha* (Image:11), simple starch grain of *Nagarmotha* (Image:12), sclereids form

vessels of *Nagarmotha* (Image:13), sclereids of *Murva* (Image:14), prisum of *Murva* (Image:15), rhombidal crystal of *Murva* (Image:16), colenchyma cells of *Guduchi* (Image:17), cork cells in surface view of *Guduchi* (Image:18), border pitted vessels of *Guduchi* (Image:19), fragment of pitted vessels of *Guduchi* (Image:20), cork with dark brown content of *Kutaj* (Image:21), stone cells of *Kutaj* (Image:22), rhombidal cells of *Kutaj* (Image:23), simple and compound starch granules of *Kutaj* (Image:24), stone cells of *Kutaki* (Image:25), pitted vessels of *Kutaki* (Image:26), exaderm cells of *Kutaki* (Image:27), lignified pitted sclerids of *Kirattikta* (Image:28), rollen cells of *Kirattikta* (Image:29), spiral vessels of *Kirattikta* (Image:30), pitted sclereids of *Kirattikta* (Image:31), prismatic crystal of

1. Pitted Vessels of *Patha*

Sariva (Image:32), cork cells with stanin content of *Sariva* (Image:33).

Physico Chemical Parameters:

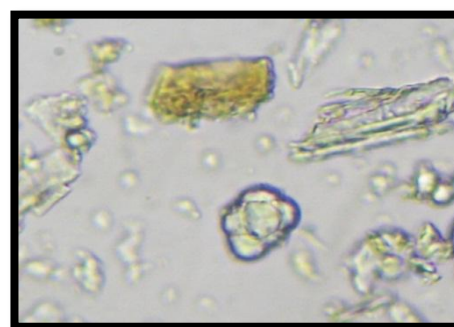
Physico chemical parameters of the *Churna* like loss on drying, pH values were found within the normal range. Methanol and water soluble extractive values were found to be 7.49% and 8.44% respectively. Details are shown in Table 3.

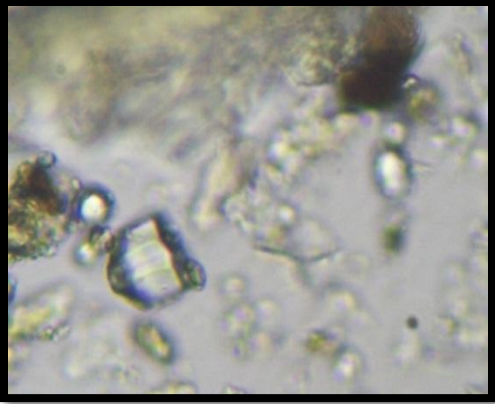
Table 3 Physico-chemical analysis of *Stanya Shodhan Gana Churna*

Sr. No.	Parameter	Value
1.	Loss on drying at 110 °C	3.8 % w/w
2.	Ash Value	10.76 % w/w
3.	Water soluble extract	8.44 % w/w
4.	Methanol Soluble extract	7.49 % w/w
5.	pH (5% Aqueous solution)	6.5

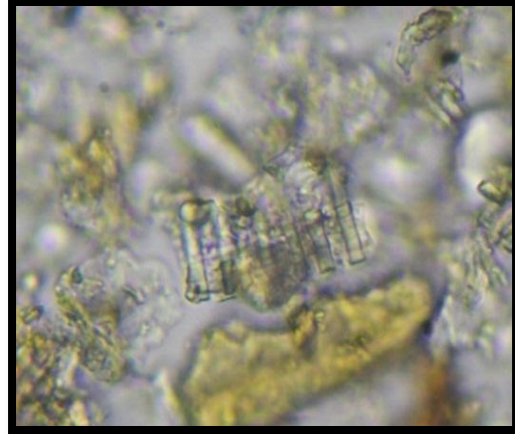
Table 4 Particle Size of *Stanya Shodhan Gana Churna*

Sr. No.	Size of Sieve of Mesh	% of Raw Drug
1.	Above 60 #	16.73 %
2.	Between 60-85 #	57.95 %
3.	Between 85-120 #	19.28 %
4.	Below 120 #	06.04 %

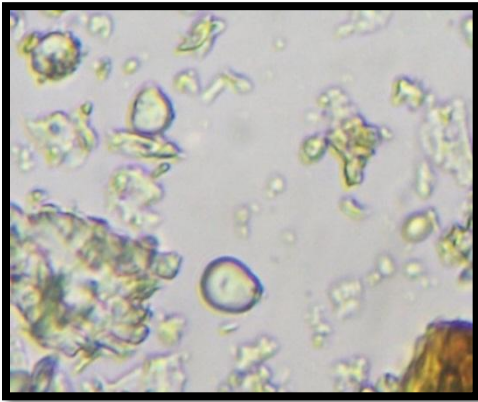
2. Compound Starch Grains of *Patha*



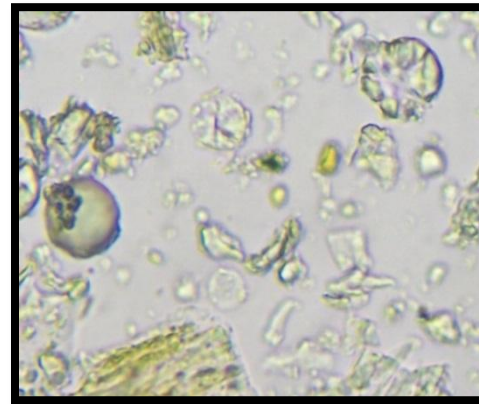
3. Prismatic Crystal of *Patha*



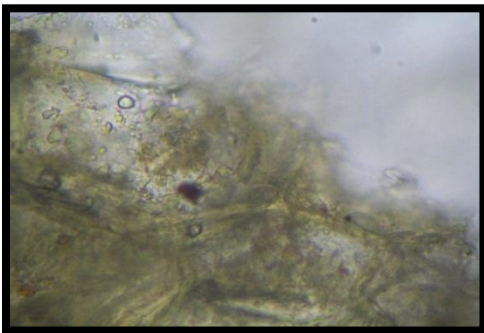
4. Fragment of Scalariform Vessel of *Shunthi*



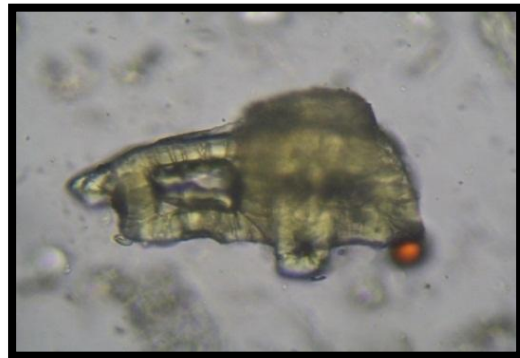
5. Simple Starch Grain of *Shunthi*



6. Oil Globules of *Devdaru*



7. Cork Cells with Oil Content of *Devdaru*



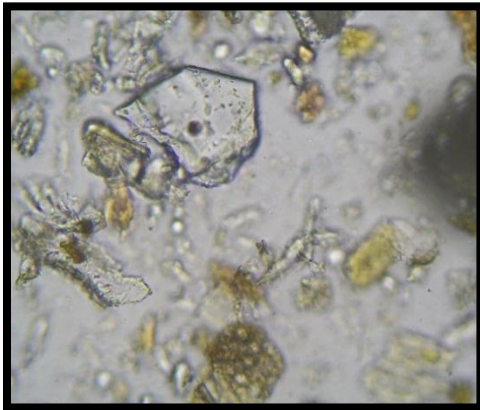
8. Stone Cells with Tanin Content of *Devdaru*



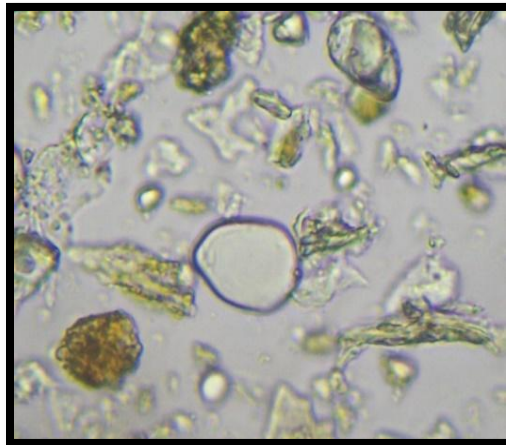
9. Fiber of *Devdaru*



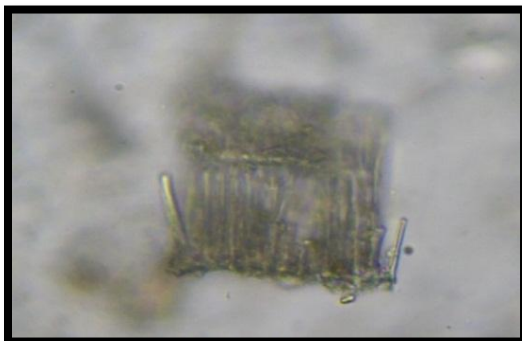
10. Fibers passing through Medullary Rays of *Devdaru*



11. Deposition of Silica of *Nagarmotha*



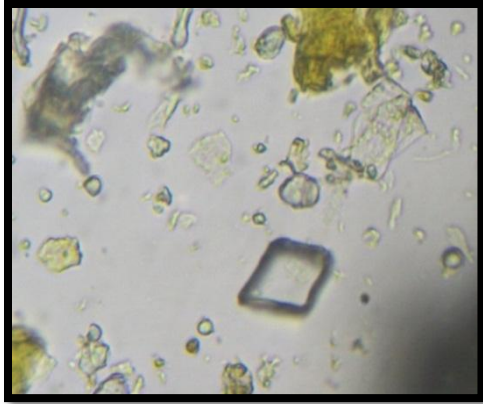
12. Simple Starch Grain of *Nagarmotha*



13. Sclereids Form Vessels of *Nagarmotha*



14. Sclereids of *Murva*



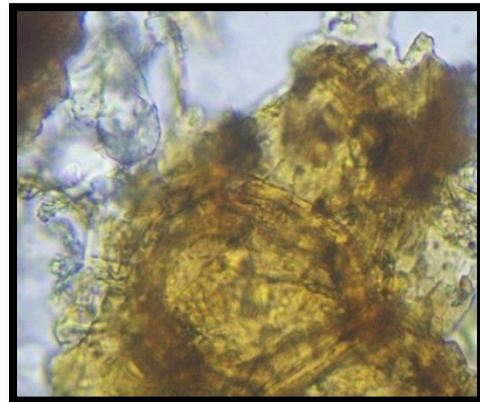
15. Prism of *Murva*



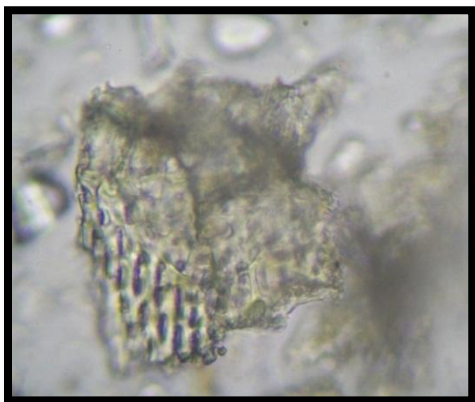
16. Rhombidal Crystal of *Murva*



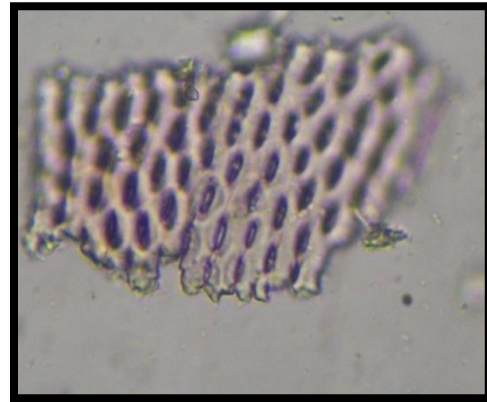
17. Colenchyma Cells of *Guduchi*



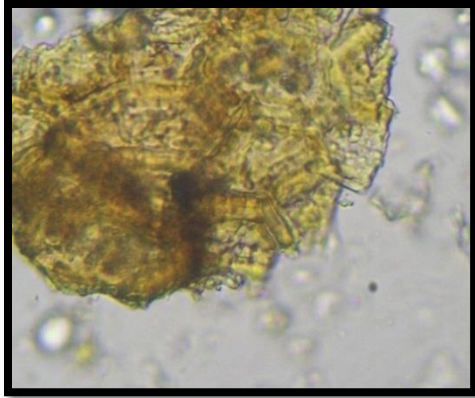
18. Cork Cells in Surface View of *Guduchi*



19. Border Pitted Vessels of *Guduchi*



20. Fragment of Pitted Vessels of *Guduchi*



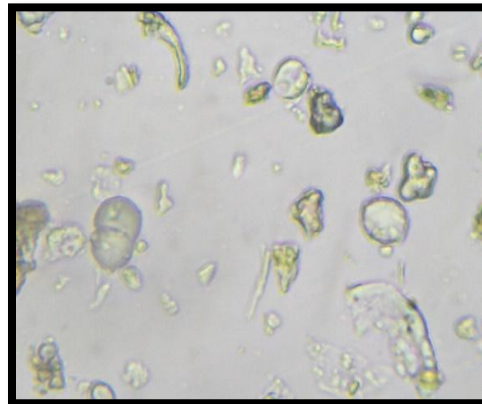
21. Cork with Dark Brown Content of *Kutai*



22. Stone Cells of *Kutaj*



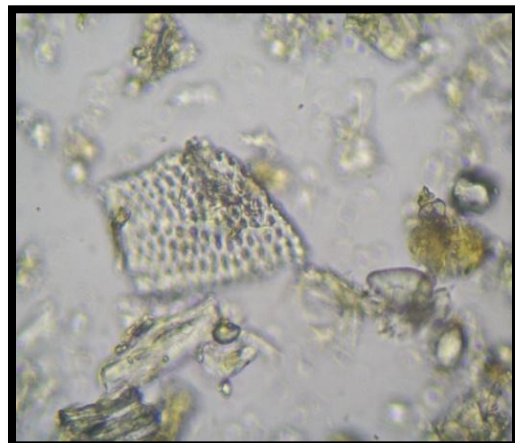
23. Rhombidal Cells of *Kutaj*



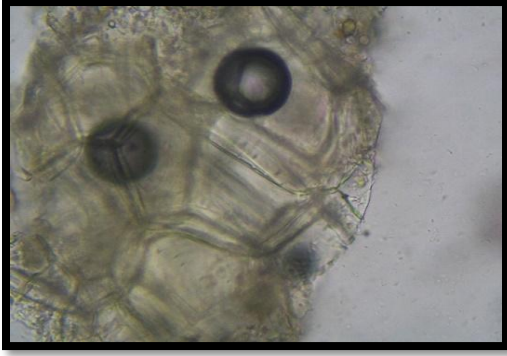
24. Simple and Compound Starch Granules of *Kutaj*



25. Stone Cells of *Kutaki*



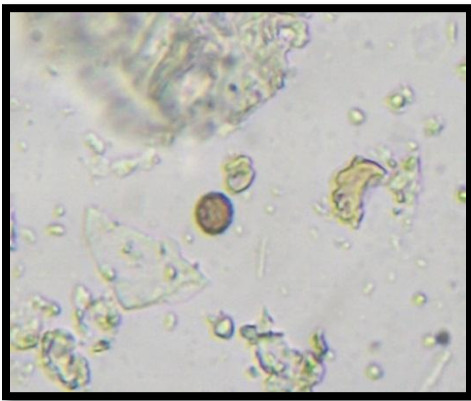
26. Pitted Vessels of *Kutaki*



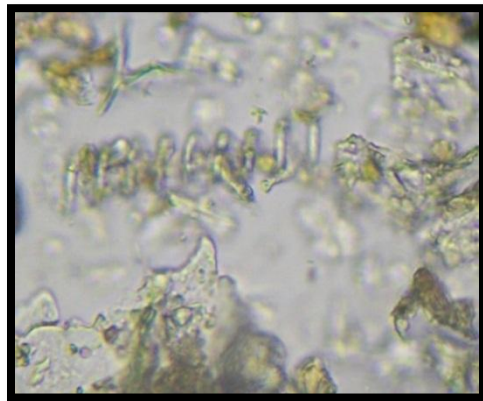
27. Exoderm Cells of *Kutaki*



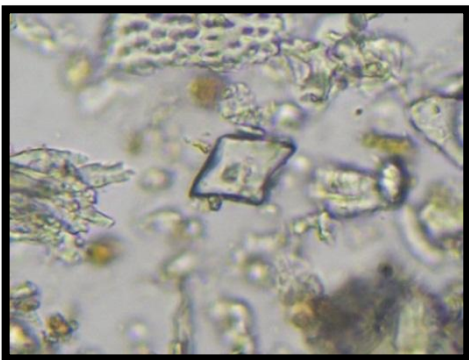
28. Lignified Pitted Sclerids of *Kirattikta*



29. Rollen Cells of *Kirattikta*



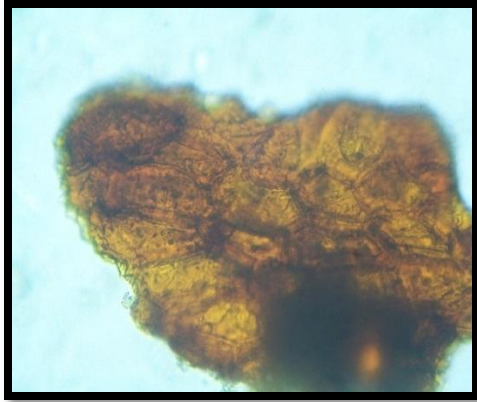
30. Spiral Vessels of *Kirattikta*



31. Pitted Sclereids of *Kirattikta*



32. Prismatic Crystal of *Sariva*



33. Cork Cells with Stanin Content of *Sariva*

High Performance Thin Layer Chromatography:

Densitometry scanning of the HPTLC pattern showed 14 spots at corresponding Rf values 0.00, 0.11, 0.16, 0.19, 0.22, 0.24, 0.35, 0.40, 0.44, 0.51, 0.62, 0.68, 0.78, 0.90 in short wave UV 254 nm and 12 spots at corresponding Rf values 0.00, 0.09, 0.16, 0.18, 0.22, 0.24, 0.31, 0.35, 0.42, 0.52, 0.70, 0.79 obtained in long wave UV 366 nm (Table No.5). Though it was not possible to identify particular chemical constituent from the spot obtained, the pattern may be used as a reference standard for further quality control researches. (Images: 34-36).

DISCUSSION

Powder microscopy of *Stanya Shodhan Gana Churna* revealed the diagnostic characters like pitted vessels, starch grains,

Table 5 Rf Values of *Stanya Shodhan Gana Churna*

	Rf Values (Under UV light) 254 nm	Rf Values (Under UV light) 366 nm
HPTLC	0.00, 0.11, 0.16, 0.19, 0.22, 0.24, 0.35, 0.40, 0.44, 0.51, 0.62, 0.68, 0.78, 0.90	0.00, 0.09, 0.16, 0.18, 0.22, 0.24, 0.31, 0.35, 0.42, 0.52, 0.70, 0.79

prismatic crystal of *Patha*; fragment of sceleriform vessel of *Shunthi*, cork cells with oil content of *Devdaru*, stone cells with tanin content of *Devdaru*; deposition of silica of *Nagarmotha*; sclereids form vessels of *Nagarmotha*, sclereids and prisum of *Murva*; rhombidal crystal of *Murva*; colenchyma cells of *Guduchi*, cork cells in surface view of *Guduchi*; border pitted vessels of *Guduchi*; cork with dark brown content of *Kutaj*; stone cells of *Kutaj*; rhombidal cells of *Kutaj*, simple and compaund starch granules of *Kutaj*; stone cells of *Kutaki*; pitted vessels of *Kutaki*; exaderm cells of *Kutaki*; lignified pitted sclerids of *Kirattikta*; rollen cells of *Kirattikta*; spiral vessels of *Kirattikta*; pitted sclereids of *Kirattikta*; prismatic crystal of *Sariva*; cork cells with stanin content of

Sariva which authenticate genuineness of the raw drugs of *Stanya Shodhan Gana Churna*.

Taste of *Stanya Shodhan Gana Churna* was *Tikta* (bitter) *Rasa* because *Katuki*, *Patha*, *Devdaru*, *Nagarmotha*, *Murva*, *Guduchi*, *Kutaj* and *Kirattikta* of *Tikta Rasa* are in maximum quantity in *Stanya Shodhan Gana Churna* having strong bitter taste results in bitterness of *Churna*. Odour of *Stanya Shodhan Gana Churna* is characteristic.

Moisture contents should be minimum to prevent degradation of product. Excess of water in formulation encourage microbial growth, presence of fungi or insects and deterioration following hydrolysis. *Stanya Shodhan Gana Churna* contains 3.8 % w/w moisture, showing that the *Churna* should be protected from humid atmosphere. Ash values are the criteria to judge the identity and purity of crude drugs were total ash, water soluble are considered. *Stanya Shodhan Gana Churna* contained 10.76 % w/w total ash. The results revealed that *Stanya Shodhan Gana Churna* is free from unwanted organic compounds and production site was good enough keeping sample free from dust and other solid matters. The 8.44 % w/w of water soluble extractives and 7.49 % w/w methanol

soluble extractives were present in *Stanya Shodhan Gana Churna* indicating that the drug is having good solubility in water.

In HPTLC study 14 spots at 254 nm and 12 spots at 366 nm were obtained, indicating its possible components of matrix which may possess its therapeutic effect.

CONCLUSION

In today's era most important is given to standardisation of drug for assurance of quality. Keeping this aim in mind current study was planned. The ingredients of *Stanya Shodhan Gana Churna* were identified and authenticated pharmacognostically. Pharmacognostical study reveal genuineness of drug; as all the characters of ingredients were observed microscopically. Physico-chemical and HPTLC studies inferred that the formulation meets the minimum quality standards as reported in the API at a preliminary level. Additional important analysis will be required for the identification of active chemical constituents of the test drug.

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