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ORIGINAL RESEARCH ARTICLE

Pharmacognostical and Physico-Chemical Evaluation of Jeevantyadi Taila-In the Management Primary Open Angle Glaucoma

Adoor Veeranagowda. S[*1], Dhiman K. S[2], Prajapathi P K[3], Harisha C. R[4], V J Shukla[5]

[1] *Ph.D Scholar, Department of Shalakya Tantra, IPGT & RA, GAU, Jamnagar, Gujarat, India*
[2] *Head, Department of Shalakya Tantra, IPGT & RA, GAU, Jamnagar, Gujarat, India*
[3] *I/C Director of Pharmacy & Head of Department, Department of Rasashastra and Bhaisajya Kalpana, GAU, Jamnagar, Gujarat, India*
[4] *Head, Pharmacognosy Laboratory, IPGT&RA, GAU, Jamnagar, Gujarat, India*
[5] *Head, Department of Pharmaceutical Chemistry, IPGT & RA, GAU, Jamnagar, Gujarat, India*

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ABSTRACT

Primary Open Angle Glaucoma (POAG) is one of the leading causes for blindness worldwide. POAG is characterised by the enlarged optic disc cupping and optic neuropathy resulting in visual field defects. Careful analysis of pathogenesis POAG reveals that Vata is one of the main Dosha which is affected. *Jeevantyadi Taila* (Modified) is told for *Nasya karma* in the management of *Vataja Timira* (Diminution of Vision) by *Acharya vagbhata* and is said to be best *Timirapahara* (cures the diminution of vision). Pharmacognosy of the *Jeevantyadi Taila* (JT) containing *Leptadenia reticulate W. & A.*, *Abutilon indicum Linn*, *Asparagus racemosus Willd*, *Glycyrrizha glabra Linn*, base as oil of *Sesamum indicum Linn* and Cow Milk, exposed the quality and genuiness of all the constituents. Organoleptic features of coarse powder made out of crude drugs were within the standard range. The Pharmaceutical analysis of JT showed Loss on drying (LOD) value was 9.6% w/w, Refractive Index Value 1.474, Specific Gravity 0.9142, Acid Value 5.1, Saponification Value 169.680, Iodine Value 75.29. Qualitative scrutiny demonstrated the presence of flavonoids, tannins, alkaloids, saponin, isoflavones, carbohydrates and glycosides. Thin layer chromatography (TLC) was done to assess the appropriate solvent. High Performance Thin Layer Chromatography (HPTLC) showed a difference of results when the sample scanned at two wavelengths i.e., 254nm and 366nm having 06 & 02 spots respectively. This shows presence of certain constituents in the oil and is helpful for the easy separation of these constituents.

Key words: Jeevantyadi Taila, Neuro protection, HPTLC.

INTRODUCTION

Today's high tech modern society which is unfortunately going away from its traditional roots of healthy harmonious life style is suffering from many early manifestation of neurodegenerative disorders as a gift to their newly embraced improper, unhealthy, stressful life style. *Ayurveda* way of life emphasizes on to live hundred years of healthy life with all the senses including vision working to its optimum level and our *Veda's* and *Upanishat's* stress on the same by saying- "*Jeeveyma Sharadah Shatam*" and *Pashyem Sharadah Shatam*. Attaining healthy life by means of proper incorporation of Rasayana therapy and healthy vision by Chakshusya Rasayana therapy is the need of the hour. As the efforts of the modern human population are succeeding in increasing their life expectancy, but their efforts in combating the development of neurodegenerative diseases has been unsuccessful. POAG is one of this conditions affecting Optic Nerve leading to Progressive Vision Loss and ultimately blindness if not treated in time. Modern science which is still in search of Neuroprotective drugs independent of Intra ocular pressure, is looking towards other system of medicine to find out an effective management in this blinding eye disease either by preventing, heralding and by reversing the progression of optic neuropathy.

"*Chakshusya Rasayana*" (Neuro protective property) is an important mode of management of

***Corresponding Author:** Adoor Veeranagowda. S, **Email:** drveereshsa@gmail.com, **Phone No:** +91-9574887879

such optic neuropathies. Such drugs are not only having *rasayana* property but also *chakshusya* in nature i.e. good for vision. Their action believed to be not only in maintaining the structural integrity of the eye but also enhancing the normal physiological function of eye i.e. vision and bringing back the degenerative pathology into normalcy [1]. It is well known that *Nasya Karma* is a *Netra Laghutakara* and *Drikbalakar.* [2]. All the ingredients of the *Jeevantyadi Taila (Astanga Hridaya Utt 13/51-53. Modified)* (Table 1) possess this potent *Chakshusya-Rasayana* property.

MATERIALS AND METHODS

Collection, Identification and authentication of raw drugs

Dried specimens of useful parts of herbal ingredients viz., *Jeevanti, Bala, Shatavari, Yashtimadhu*,(Table-1) were procured from the AYU Medical Stores, Patel Colony. The base, *Tila taila* was procured from *Khadi Gramodyoga Pharmacy*, Jamnagar. Cow milk was procured from the local Bhavani Milk Centre, Patel Colony. All the herbal drugs were confirmed to be authentic and of good quality by the Pharmacognosy Laboratory, IPGT & RA, GAU, Jamnagar. The test drug *Jeevantyadi Taila* was prepared in as per classical reference in the department of *Rasashastra & Bhaisajya Kalpana* and physicochemical and qualitative analysis of the final product was carried out in pharmaceutical chemistry laboratory of, Institute for Post Graduate Training & Research In *Ayurveda*, Gujarata *Ayurveda* University, Jamnagar.

Preparation of the Drug

Preparation of Coarse Powder:

The herbal drugs enlisted from 1 to 4 (**Table 1**) were washed, dried and a stipulated quantity made into coarse powder and divided into two parts. Out of this major part ($3/4^{th}$) was used for *kwatha* preparation and smaller portion ($1/4^{th}$) used for preparing *Kalka*.

Preparation of *Kwatha* (Decoction):

Decoction was prepared based on *Sharangadhara Samhitas* general rule by mixing above said coarse powder of the drugs with water in the ratio of 1:8, which was there after heated at medium temperature, till it reduced to one fourth of its original quantity and filtered multiple fold thoroughly to avoid fine particles in the final filterate (decoction) [3].

Preparation of *Kalka* (Paste):

The second part of the raw drug was taken and mixed with required quantity of water to convert into paste form.

Taila Paka Vidhi:

This was carried out as per the method prescribed in the classics [4]. Initially *Tila Taila* kept in iron vessel was subjected for *Moorchana*. After completion of *moorchana* temperature raised to 70^0 C. At this moment *Kalka* was added with continues stirring. To this decoction, cow milk was added with continues stirring. After proper mixing of all the ingredients, temperature was maintained between 65^0 C to 100^0 C, heating was carried out for two days, on second day after attaining *Madhyama Paka Taila sidda laxanas*, final product of *Jeevantyadi taila* was collected, filtered thoroughly and stored in a iron vessel for one month before subjecting for usage.

Powder Microscopy

Powder microscopy of each raw drug was made with powder of dried samples by studying under the Carl Zeiss Microscope before and after staining with Phluroglucinol and concentrated HCl to study the characters of the drug (**Table 3**). The microphotographs were taken and attached with the microscope.

Physicochemical Parameters and Qualitative Analysis

Jeevantyadi Taila was analyzed by using qualitative and quantitative parameters at Pharmaceutical Chemistry Laboratory, Institute of Post Graduate Teaching & Research in Ayurveda, Gujarat Ayurved University, Jamnagar. All Physico-chemical parameters such as Loss on Drying, Acid value, PH, Refractive Index, specific Gravity, Saponification Value, iodine Value were determined(**Table 4**). The water and methanol extract of the sample was analyzed qualitatively for different functional groups. In qualitative method, presence of flavonoids, Phytosterons, Isoflavones tannins, saponin, alkaloids, glycosides and carbohydrates were assessed (**Table 5**) [5]. TLC and HPTLC were carried out after preparing an appropriate solvent system with methanolic extract of *Jeevantyadi Taila* [6].

High Performance Thin Layer Chromatography

HPTLC were performed for the normal phase separation of components of methanol extracts of *JT*. HPTLC study of the methanol extract was also carried out by using the solvent system of Toulene: Ethyle Acetate: Acetic Acid:: 7:2:1.5 ratios. After completion of HPTLC; post

chromatographic derivatization was done with vanilline sulphuric acid [7].

OBSERVATIONS AND RESULTS

The initial purpose of the study was to confirm the authenticity of the drugs used in the preparation of JT. For that, detailed organoleptic evaluation was carried out for the course powder of all the herbal ingredients of JT.

The powder microscopy of the *Jeevanti* revealed presence of Lignified Parenchyma, Pitted Sclerides, Trichome with base, Pitted vessels, Prismatic crystals, Tannin contents (**Fig 1-5**). *Yashtimadhu* showed Fragment of annular vessels, Crystal fibres, and Cork in surface view (**Fig 6-8**). *Atibala* showed Cork in tangential view, Fragment of border pitted vessels, Prismatic crystals, Stone Cells, Trichomes (**Fig 9-13**). *Shatavari* showed Annular vessels, Stained starch grains with acicular crystals, Raphides and Parenchyma cells (**Fig 14-17**). The diagnostic features obtained by powder microscopy were compared with the standards mentioned in Ayurvedic Pharmacopeia of India (API). The details of Pharmacognostical study are enlisted in the (Table 3) [8,9].

Organoleptic parameters:

Jeevantyadi Taila was prepared out of all the ingredients as per the Taila preparation method. Coarse Powder of all the herbal drugs was subjected for organoleptic characters which are enlisted in (Table 2). The prepared test drug *Jeevantyadi Taila* (**Fig 18**) is in a liquid form, oily in touch, greenish-black in colour with pleasant odor and astringent in taste [8].

Physicochemical parameters and Qualitative Test:

Qualitative tests indicated presence of alkaloids, tannins, glycosides, saponin, flavonoids, protein, carbohydrates and steroid. Details are shown in the (Table 5).

Table 1: Ingredients of Jeevantyadi Taila in detail

S. No	Drug Name	Botanical Name	Part Used	Parts
1	Jeevanti	Leptaedinia reticulate W & A.	Samoola Panchanga	2 Parts
2	Atibala	*Abutilon indicum Linn,*	Samoola Panchanga	1 Part
3	Shatavari	*Asparagus racemosus Willd,*	Root	1 Part
4	Yashtimadhu	Glycerrizha glabra Linn.	Root	4 Part
5	Tila Taila	*Sesamum indicum Linn*	Prepared Oil	1 Prastha
6	Cow Milk	--	--	1 Prastha

Table 2: Macroscopic Features

Drug Name	Part Used	Nature of Powder	Colour	Taste	Odour
Jeevanti	Samoola Panchanga	Fine Powder	Yellowish Grey	Sweet	Characteristics
Atibala	Samoola Panchanga	Fine Powder	Whitish Grey	Sweet	Charecteristics
Shatavari	Root	Fine Powder	Whitsh	Sweet	Charecteristics
Yashtimadhu	Root	Fine Powder	Yellowish Grey	Sweet	Characteristics
Tila Taila	Prepared Oil	Liquid (Oil)	Greenish black	Astringent	Charecteristics
Cow Milk	Milk	Liquid	White	Sweet	Charecteristics

Table 3: Results of Powder Microscopy

Features Identified	Jeevanti	Atibala	Shatavari	Yashtimadhu
Prismatic calcium oxalate crystals	++	++	--	++
Rosette crystals	++	--	--	--
Lignified parenchyma cells	++	--	--	++
Pitted vessels	++	++	++	++
Starch grains	--	++	++	--
Lignified fibres	++	--	--	--
Pitted stone cells	++	++	--	++
Phloem fibres	++	--	--	--
Brownish Tannin	++	++	--	--
Sclerides	++	++	--	--
Annular vessels	--	--	--	++
Fibres with wide lumen	--	--	--	++

++ Seen/Present, -- Not Seen/Absent

Table 4: Physico-Chemical Parameters

TEST	RESULTS
Refractive Index at Room Temperature	1.474
Loss on Drying	0.011%w/w
Acid value	5.1%w/w
Saponification Value	169.680
Iodine Value	75.29
Specific Gravity	0.9142

Table 5: Qualitative Analysis

FUNCTIONAL GROUP	SAMPLE
Flavonoids	Positive
Tannins	Positive
Alkaloids	Positive
Saponin	Positive
Carbohydrates	Positive
Glycosides	Positive

Table 6: Results of HPTLC

Extract	Solvent system	Wavelengths	Spots	Rf value
Methanol	Toluene+Ethylacetate+Acetic Acid in 7:2:1.5 ratio	254 nm	06	0.03,0.07,0.61,0.73, 0.80,0.94
		366 nm	02	0.06 & 0.91

JEEVANTI

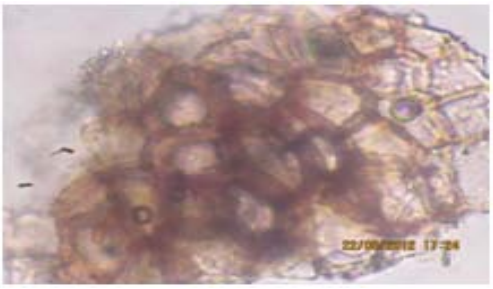

Fig 1: Cork in Surface View

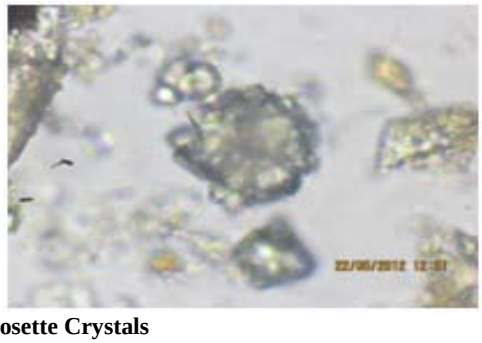

Fig 2: Rosette Crystals

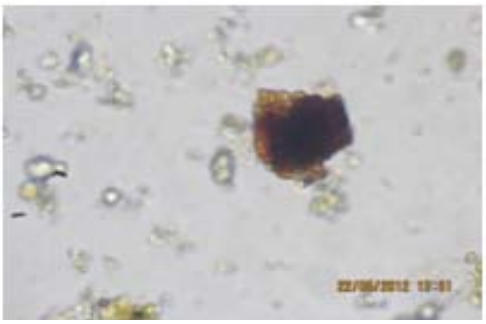

Fig 3: Tannin

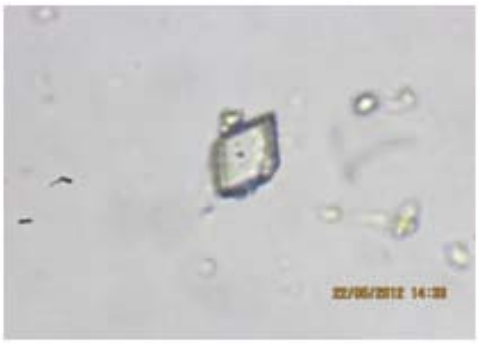

Fig 4: Prismatic Crystal

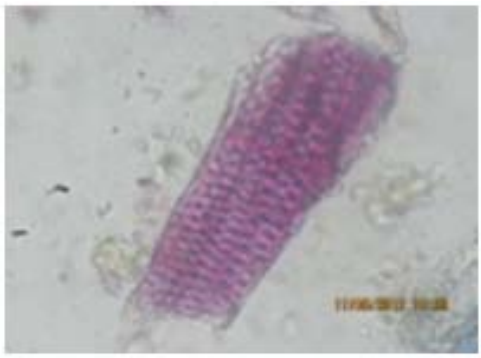

Fig 5: Pitted Vessels

YASHTIMADHU

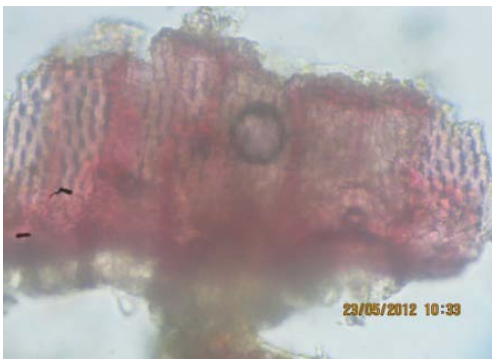

Fig 6:Pitted Vessels

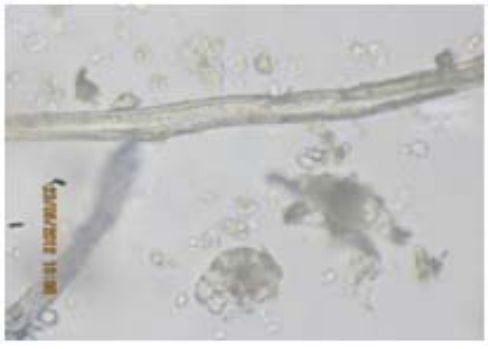

Fig 7:Simple Fibre

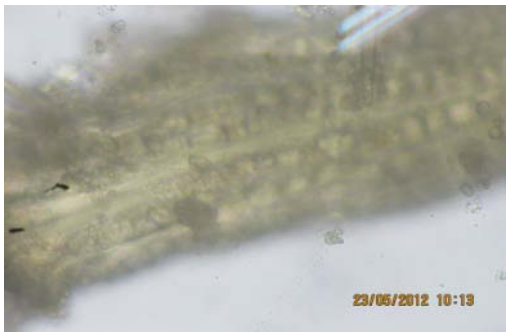

Fig 8:Crystal Fibre

ATIBALA

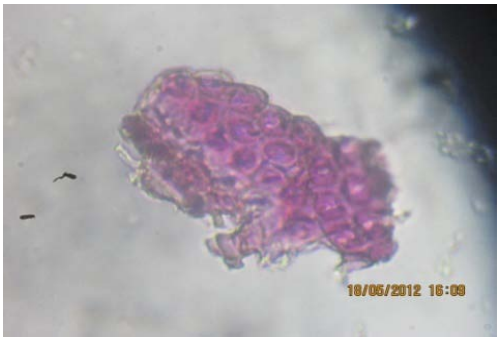

Fig 9: Fragment of border pitted vessels

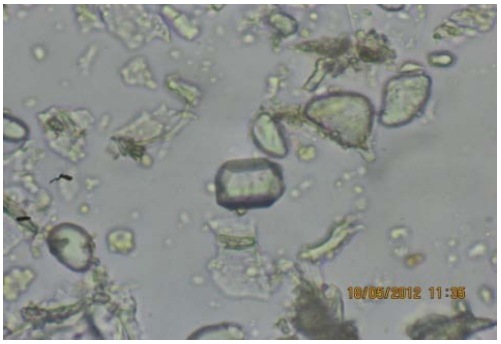

Fig 10: Prismatic crystals

Fig 11: Stone Cells

Fig 12: Trichomes

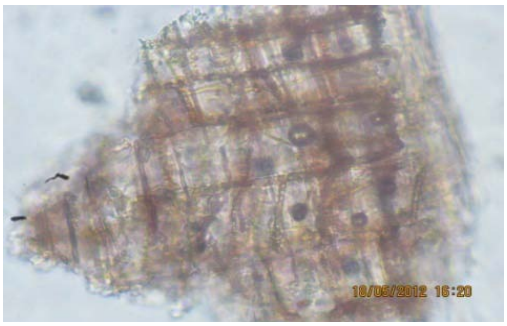

Fig 13: Cork in tangential view

SHATAVARI

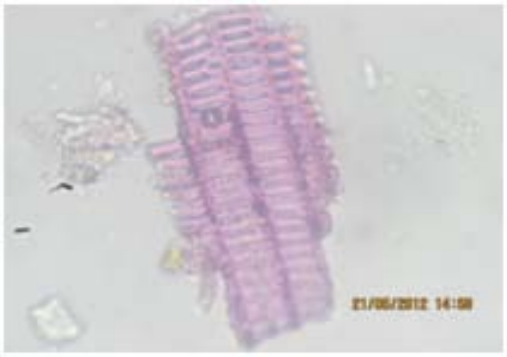

Fig 14: Annular vessels

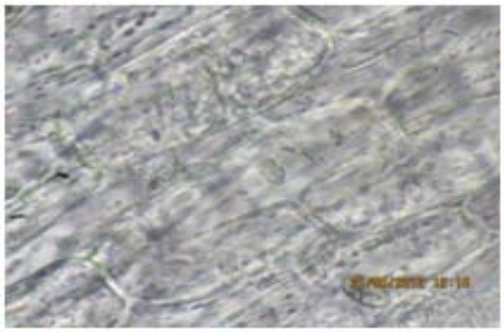

Fig 15: Parenchyma cells

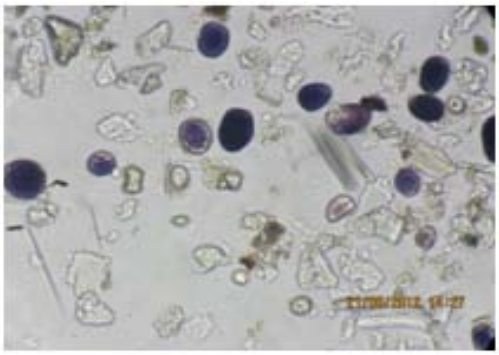

Fig 16: Stained starch grains with acicular crystals

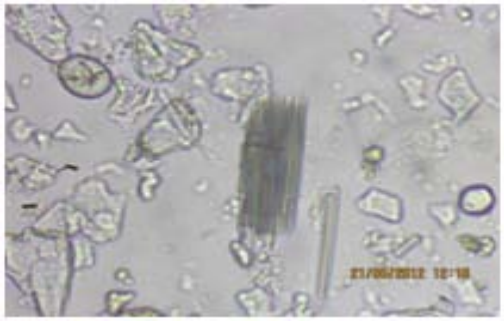

Fig 17: Raphides

Fig 18: Jeevantyadi Taila

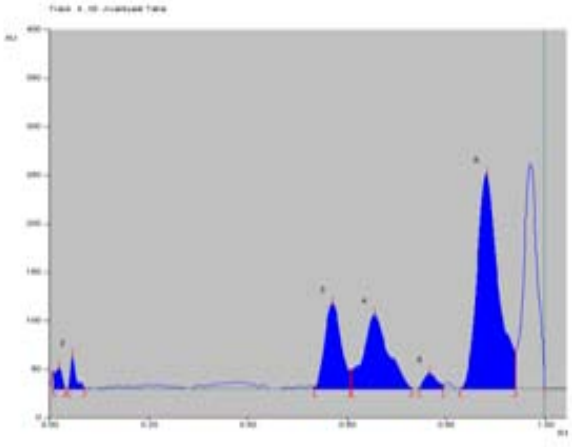

Fig 19: Densitogram of Methanol Extract of JT at 254 nm

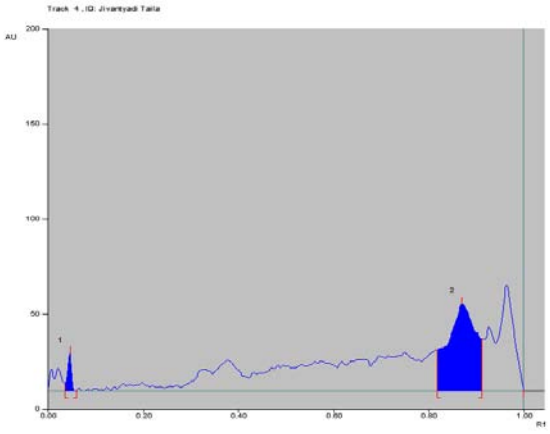

Fig 20: Densitogram of Methanol Extract of JT at 366 nm

DISCUSSION

Pharmacognosy study helps in authentication of commonly used drugs through morphological, histological and Physico-chemical parameters. This can prevent the accidental misuse of drugs and adulteration to a greater extent. In the present study the formulation consist of 4 herbal ingredients which were proved to be genuine by assessing the Pharmacognostical parameters. The presence of flavonoids, tannins, alkaloids, saponin, isoflavones, carbohydrates and glycosides etc., are the commonest features seen in all the ingredients.

Evaluation of Physico-chemical parameters and qualitative analysis helps to assess the quality and

identify the presence of specific ingredients in a formulation and application of chromatographic techniques which aid in recognition of number of ingredients and also to assess the purity by comparing with the standard ones. Loss on drying method is applied to determine the amount of water, all or a part of water for crystallization, or volatile matter in the sample. Loss on drying (LOD) value of test drug was 0.011 w/w, Refractive Index Value 1.474, Specific Gravity 0.9142, Acid Value 5.1, Saponification Value 169.680, Iodine Value 75.29, all the parameters were within the standard limit. HPTLC is the most common form of chromatographic method used by Ayurvedic research workers to detect the number of compounds present in a product. It also helps to determine the purity of the sample. Identification of a compound is also possible by comparing it with the Rf value of a known compound. Here for the purpose of conducting HPTLC of JT tracks was made having the sample methanol extract. After careful analysis and discussion with experts the mobile phase was fixed to be Toluene:Ethyl acetate:Acetic Acid(7:2:1.5 V/V).

The sample tracks and mobile phase remained the same for all the experiments related to HPTLC. The spots produced by HPTLC were observed in short UV(254nm) and long UV(366nm) and Rf value was calculated.Track showed 06 spots under 254nm with Rf 0.03,0.07,0.61,0.73,0.80,0.94 and 2 spots were seen under 366 nm with Rf 0.06,0.91 values. Details are noted in the *Table 6* and Fig 19&20. The results shows that the active phytoconstituents are more sensitive for short UV radiation that is 254 nm when compared with 366 nm long UV wavelength.

CONCLUSION

Preliminary Organoleptic features and results of powder microscopy were compared with the parameters mentioned in API and all the ingredients were proved to be authentic. In Phytochemical analysis, RI, Acid Value, Saponification value, Iodine Value, Specific Gravity were assessed and all the values were in the normal range as per the standard values mentioned in API. Qualitative analysis revealed the presence of Tannins, Saponins, alkaloids, Glycosides, Carbohydrates and Flavonoids in the Taila. Though the base work requisites for the standardization of *JT* are covered in the current study, however additional analysis and investigations are required for the identification of all the active chemical constituents of the test drug to substantiate the clinical efficacy.

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