



PHARMACOGNOSTICAL AND PHYSICO-CHEMICAL EVALUATION OF TUNGADRUMADI TAILA - AN AYURVEDIC POLYHERBAL FORMULATION

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ABSTRACT

There are plenty of simple and useful drug formulations scattered in different samhitas of Ayurveda. *Tungadrumadi Taila yoga* is one of such formulation explained in Sahasrayogam, indicated especially in eye and head disorders. Based on its pharmacological properties, it is used successfully in treatment of Background Diabetic Retinopathy (BDR). Standardization has become the need of the hour for Ayurvedic drugs and procedures to ensure quality, safety, efficacy of Ayurvedic drugs and procedures by using modern techniques, applying suitable standards. Thus the aim of Present study deals with the pharmacognostical identification of ingredients of *Tungadrumadi Taila*

and its physico-chemical analysis. Pharmacognostical study containing both macroscopic and powder microscopy of raw drug revealed the quality and genuineness of all the constituents of *Tungadrumadi Taila*. Organoleptic features of coarse powder made out of the crude drugs were within the standards prescribed. The Pharmaceutical analysis of *Tungadrumadi Taila* showed Loss on drying (LOD) value was 0.044 % w/w at room temperature, Refractive Index Value 1.504, Specific Gravity 0.916 mg at room temperature, Acid Value 3.97, Saponification Value 31.487 %, Iodine Value 90.04. High Performance Thin Layer Chromatography (HPTLC) showed a difference of results when the sample scanned at two

wavelengths i.e., 254nm and 366nm having 09 & 02 spots respectively. This shows presence of certain constituents in the oil and is helpful for the easy separation of these constituents.

KEYWORDS: Background Diabetic Retinopathy, Organoleptic features, Pharmacognostical, Physicochemical, Tungadrumadi Taila.

INTRODUCTION

There are plenty of simple and useful drug formulations scattered in different samhitas of Ayurveda. Likewise *Sahasrayogam*, a very popular *Ayurvedic* text in Malayalam language containing 1000 formulations for different diseases and the formulations are arranged in its dosage form like *Kwathas*, *Siddha Ghruta*, *Siddha Taila*, *Gutikas*, *Churnas*.^[1,2] *Tungadrumadi Taila Yoga* is one of such formulation explained in *Sahasrayogam*, indicated especially in eye and head disorders.^[3,4] Based on its pharmacological properties, it is used successfully in treatment of Background Diabetic Retinopathy (BDR).

Poor quality and adulteration drugs, inappropriate method of drug collection and improper process of drug formulation lead to effect on outcomes of clinical trials. Thus Standardization has become the need of the hour for *Ayurvedic* drugs and procedures to ensure quality, safety, efficacy of *Ayurvedic* drugs and procedures by using modern techniques, applying suitable standards.

Still no work has been done on *Tungadrumadi Taila* so here an attempt has been made to authenticity of all the ingredients of *Tungadrumadi Taila*, preparation of *Tungadrumadi Taila* according to *Ayurvedic* standards and presence of components as recommended in *Ayurvedic Pharmacopoeia of India (API)* through pharmacognostical study and physicochemical analysis of the *Taila yoga*.^[5,6]

MATERIAL AND METHODS

Collection of raw drug

Tila Taila and dried specimens of useful parts of herbal ingredients *Karchoor*, *Ushir*, *Yastimadhu*, *Utpal* and *Chandana* (Table-1) were procured from the Pharmacy, I.P.G.T. & R.A., G.A.U., Jamnagar. Tender coconut water was procured from local shop, Jamnagar and Cow milk was procured from the local Reliance Smart store, Gurudwara road, Jamnagar.

Identification and authentication of raw drugs

All the herbal drugs were confirmed to be authentic and of good quality by the Pharmacognosy Laboratory, IPGT & RA, GAU, Jamnagar.

Method of preparation - *Tungadrumadi Taila*.

The test drug *Tungadrumadi Taila* was prepared as per classical reference at Pharmacy, I.P.G.T. & R.A., G.A.U., Jamnagar.

Preparation of coarse powder: The herbal drugs enlisted from 1 to 5 in Table 1 were washed, dried and a stipulated quantity made into coarse powder.

Preparation of kalka (Paste)

The coarse powder raw drugs mixed with required quantity of Tender coconut water to convert into paste form.^[7,8]

Taila paka vidhi^[9,10]

This was carried out as per the method prescribed in the classics. Initially *Tila Taila* kept in iron vessel was subjected for *Moorchana*. After completion of *Tila Taila moorchana* (1 part), aforesaid *Kalka* (1/8) and cow milk (1 part), Tender coconut water (3 Part) were added with continuous stirring. To get final product, the contents were subjected to moderate heat till up to *Madhyama Paka Sneha Siddhi* (properly prepared medicated *Taila*) features were observed.

Organoleptic study

Pharmacognosy of the final product i.e. *Tungadrumadi Taila* was not possible under microscope; hence individual dry Powder of each raw drugs which was used in preparation of *Tungadrumadi Taila* were analyzed separately.

Powder microscopy

Coarse Powder of the each drug which was used in preparation of *Tungadrumadi Taila* has been used for this study. The powder was dissolved in small quantity of distilled water, first observed without stain then stained with phloroglucinol and concentrated HCL. Microphotographs were taken under Carl zeiss trinocular microscope attached with camera.

Physico-chemical study^[11]

Tungadrumadi Taila was analyzed using various standard physico-chemical parameters such as Acid value, iodine value, Saponification value, Refractive Index value, specific gravity and Loss on dry at Pharmaceutical chemistry laboratory, IPGT and RA, Jamnagar. TLC and HPTLC were carried out after preparing an appropriate solvent system with methanolic extract of *Tungadrumadi Taila*.

OBSERVATIONS AND RESULT

Pharmacognostical analysis

Organoleptic characters of powder form drugs were noted down and are depicted in Table 2. Powder microscopy of each ingredient of *Tungadrumadi Taila* was studied and microphotographs were placed at respective figures.

Table 1: Ingredients of *tungadrumadi taila*.

Drug	Botanical name/ chemical name	Part Used	Parts
Karchoor	<i>Curcuma zedoaria</i> Rosc	Rhizome	1 part
Ushir	<i>Vetiveria zizanioides</i> Linn.	Root	1 part
Yastimadhu	<i>Glycyrrhiza glabra</i> Linn.	Root	1 part
Utpal	<i>Nymphaea stellata</i> Willd	Stem	1 part
Chandana	<i>Santalum album</i> Linn.	Heart wood	1 part

Table 2: Organoleptic characters of ingredients of *tungadrumadi taila*.

Drug	Colour	Odour	Taste
Karchoor	Light Brown	Aromatic	Bitter
Ushir	Whitish Brown	Aromatic	Slightlyly Sweet
Yastimadhu	Yellow	Sweet	Sweet
Utpal	Dark Brownish	Aromatic	Sweetish Astringent
Chandana	Brown	Aromatic	Slightlyly Sweet

Microscopical characters

Individual powder microscopy characters were as follows

Karchoor (*Curcuma zedoaria* Rosc.): Trichome, Fragments of sclalariform vessel, Fibre with oil globules. (Plate 1; a-c)

Ushir (*Vetiveria zizanioides* Linn.): Oil globules, Septate fibre. (Plate 1; d-e)

Yastimadhu (*Glycyrrhiza glabra* Linn.): starch grains, Oil globules. (Plate 1; f-g)

Utpal (*Nymphaea stellata* Willd.): Oil Globules, fibres, Prismatic crystal. (Plate 1; h-j)

Chandana (*Santalum album* Linn.): Oil globules, Border pitted vessel. (Plate 1; k-l)

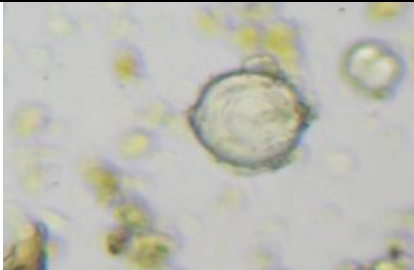
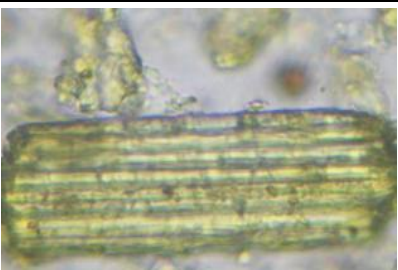
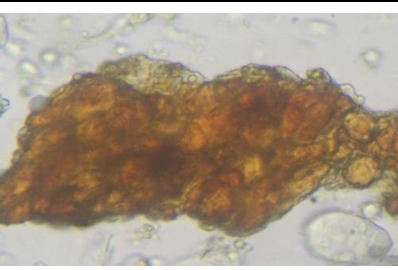
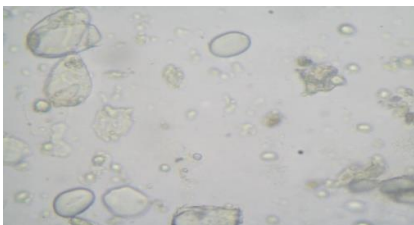
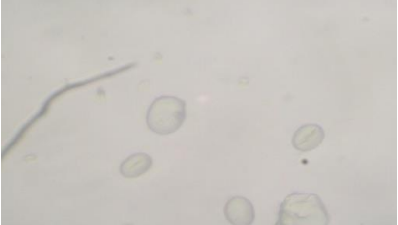
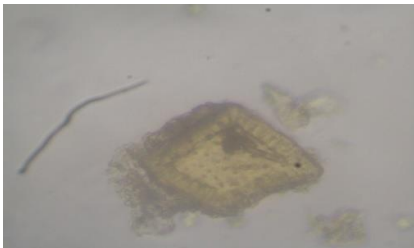
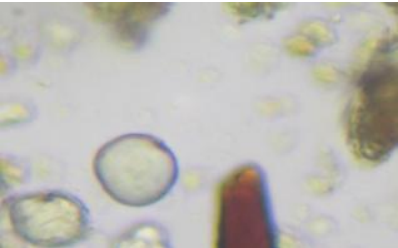
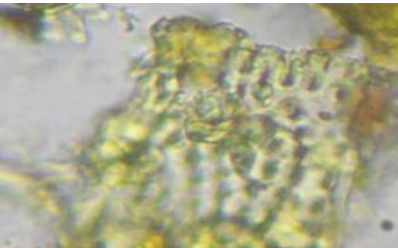
		
Trichome of <i>Karchoor</i>	Fragments of scleriform vessel of <i>Karchoor</i>	Fibre with oil globules of <i>Karchoor</i>
		
Oil globule of <i>Ushir</i>	Septate fibre of <i>Ushir</i>	Starch grains of <i>Yastimadhu</i>
		
Oil globule of <i>Yastimadhu</i>	Oil Globules of <i>Utpala</i>	Fibre of <i>Utpala</i>
		
Prismatic crystal of <i>Utpala</i>	Oil globule of <i>Chandana</i>	Border pitted vessel of <i>Chandana</i>

Plate 1: Photographs of microscopic features ingredients of *tungadrumadi taila*.

Organoleptic characters of *tungadrumadi taila*

Tungadrumadi Taila characterized as fine homogenous substantial liquid which was moderately sticky, dark yellow in colour, slightly sweet aromatic in odour, slightly sweetish astringent in taste and immiscible in water. (Table no. 3)

Table 3: Organoleptic Properties of *tungadrumadi taila*.

Rupa (colour)	Dark Yellow
Rasa (Taste)	Slightly Sweetish Astringent
Gandha (Odour)	Slightly Sweet
Sparsha (Consistency in Touch)	Moderately Sticky

Physico-chemical analysis

The results of physico-chemical parameters such as Acid value, Iodine value, Saponification value, Refractive Index value, Specific gravity and Loss on dry observed after experiment are mentioned in the Table 4.

Table 4: Physico-Chemical parameters of *tungadrumadi taila*.

Sr. no.	Analytical Parameter	<i>Tungadrumadi Taila</i>
1	Acid value	0.397 mg
2	Iodine value	90.046
3	Saponification value	31.4873
4	Refractive Index	1.5040
5	Specific gravity	0.916 mg
6	Loss On Dry at room temperature	0.04488 % w/w

The results of High Performance Thin Layer Chromatography (HPTLC) are mentioned in the Table 5.

Table 5: HPTLC value of *Tungadrumadi Taila*.

Sample	Visualize under short UV (254 nm)		Visualize under short UV (366 nm)	
	No. of spots	Max Rf value	No. of spots	Max Rf value
<i>Tungadrumadi Taila</i>	9	0.20, 0.23, 0.31, 0.46, 0.49, 0.70, 0.75, 0.86, 0.96	2	0.47, 0.72

The spots produced by HPTLC were observed in short UV (254 nm) and long UV (366 nm). Track showed 9 spots under short UV (254nm) with Rf 0.20, 0.23, 0.31, 0.46, 0.49, 0.70, 0.75, 0.86, 0.96 and 2 spots were seen under long UV (366nm) with Rf 0.47, 0.72. Details are noted in the Table 5 and Plate no 2. The result shows that active phytoconstituents are more sensitive for short UV (254 nm) when compared with long UV (366 nm).

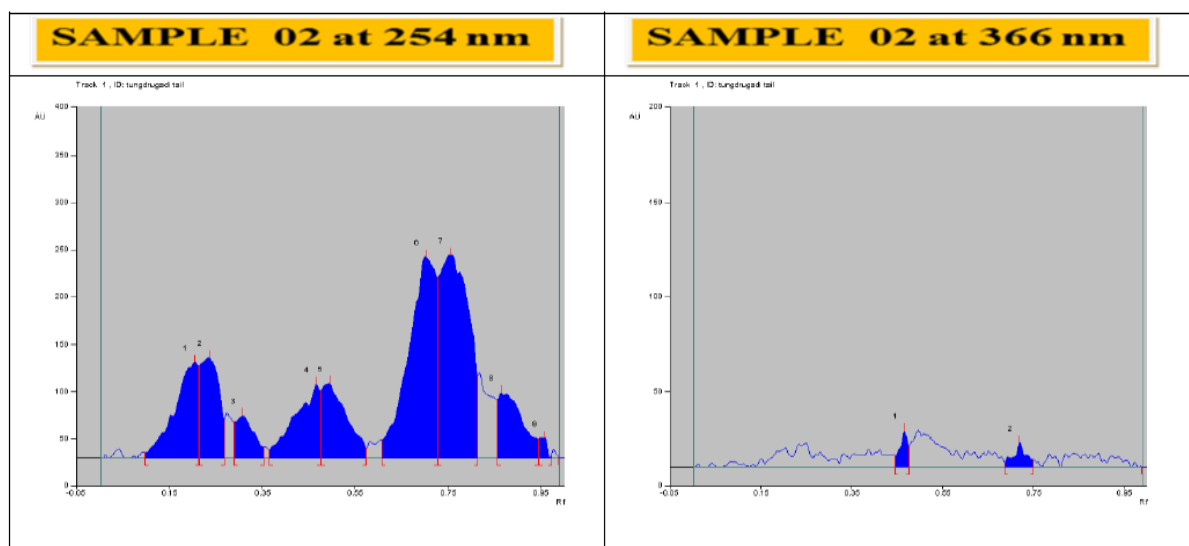


Plate 2: Densitogram - *Tungadrumadi Taila*.

DISCUSSION

Pharmacognostical study reveals authentication of individual raw drugs of *Tungadrumadi Taila* and is cross verified.^[11,12,13,14,15] The trichome, fragments of scleriform vessel, fibre with oil globules, oil globules, septate fibre, starch grains, prismatic crystal, border pitted vessel were observed in ingredients. Quality control parameters like specific gravity, saponification value are standard for any fat or oil. Similarly, when oil-fats become rancid, triglycerides are converted into fatty acids and glycerol,^[16] causing an increase in acid value, iodine value and refractive index suggestive of oxidation.^[17] The oxidation levels of vegetable oils are important quality criteria in food chemistry because oxidation increases their toxicity by the formation of products such as hydroperoxides, aldehydes, ketones.^[18] All the results show that the prepared *Tungadrumadi Taila* formulation is not rancid (after 1 months of preparation) and the quality of the *Tungadrumadi Taila* is standard.

CONCLUSION

Preliminary organoleptic features and results of microscopy were cross verified with individual raw drug of *Tungadrumadi Taila* with the parameters mentioned in Ayurvedic Pharmacopeia of India and all the ingredients were proved to be authentic.

Powder Microscopic evaluation of individual raw drug which were used in the preparation of *Tungadrumadi Taila* illustrated the specific characters. Physicochemical parameters of *Tungadrumadi Taila* inferred that the formulation meets maximum qualitative standards. So the pharmacognostical and phyto-chemical analysis of *Tungadrumadi Taila* provides

substantial information for the proper identification, authentication, and scientific evaluation of the final drug.

On the basis of observations made and results of studies, this study may be beneficial for future researchers and can be used as a reference standard in the further quality control researches. (no previous research work is available as standard reference for *Tungadrumadi Taila*)

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