Available online through

www.jbsoweb.com

ISSN 2321 - 6328

Research Article

ANALYTICAL STUDY OF NIRGUNDI TAILA

C Padmakiran^{1*}, UN Prasad², KN Sunil Kumar³

¹Assistant Professor, PG Dept of Panchakarma, SDM College of Ayurveda, Kuthpady, Udupi, India

²Professor, PG Department of Kayachikitsa, SDM College of Ayurveda, Kuthpady, Udupi, India

³Senior Research Officer, Pharmacognosy, SDM Centre for Research in Ayurveda and Allied Sciences, Laxminarayana Nagar, Kuthpady, Udupi, India

*Corresponding Author Email: kiranasm@gmail.com

Article Received on: 01/05/15 Accepted on: 30/05/15

DOI: 10.7897/2321-6328.03326

ABSTRACT

Taila kalpanas (medicated oils) are the integral part of Ayurvedic treatment. Tailas are used in treatment of diseases explained in Astangas of Ayurveda for both bahya and abhyantara chikitsa (internal and external therapies). According to the condition of the disease, the processing of taila with the specific ingredients is the need in clinical practice. One such commonly used taila is nirgundi taila. Nirgundi taila prepared out of nirgundi patra (leaf) and moola (root) is explained in Charaka samhita for vata and shoolahara purposes. This is one of the akalka taila i.e. in taila preparation, kalka dravyas are not added. The only ingredient nirgundi (*Vitex negundo*) is one of the identified vaatahara and shoolahara drug used in the management of shoola pradhana vata vyadhis (pain dominant vata diseases). As nirgundi taila is proved to be a potent vata and shoola hara, the current study was undertaken to standardize the formulation.

Keywords: Akalka taila, shoolahara, standard operating procedures, standardization, vaatahara.

INTRODUCTION

Among the different kalpanas (Formulations) used in the treatment, taila kalpana is the most popular and effective one. Reference in different samhitas and its efficacy in the treatment of different conditions are the reason for its clinical popularity. The main aim of taila kalpana is to potentiate plain taila, and to convert taila to treat different doshas pacifying or vitiating different condition in different patients. Among the different tailas used in the management of vatavyadhi, nirgundi taila (NT) is mentioned to be the vatahara and shoolahana in Charaka samhita.¹ The only ingredient of this taila is nirgundi (*Vitex negundo* Linn. -Verbenaceae). The detail description about the preparation, ingredients of nirgundi taila is mentioned in Chakradatta.² As there is no reference for kalka dravya in the preparation, this is known as one of the akalka taila by Acharya Chakrapani.³ Effect on various oil parameters on preparation of nirgundi tail in 1, 2 and 3 days were studied earlier.⁴ In the present study taila was prepared and subjected for different standardization and analytical studies and the results of different parameters are discussed in the article.

MATERIALS AND METHODS

Preparation of nirgundi taila

The moola and patra of nirgundi (*V. negundo* Linn.) are collected from Udupi, Karnataka, washed under tap water to remove adhering soil and dust. Swarasa (Fresh juice) is extracted from fresh root and leaf by crushing. To the swarasa, equal amount of tila taila followed by 4 parts of water is added as per classical reference^{5,6}. This mixture is boiled for 2 nights till sneha siddhi lakshanas were observed. Oil was filtered

through a clean muslin cloth while warm and stored in air tight bottles.

Analytical standardization

To standardize NT prepared by above procedures it was subjected to different analytical studies like organoleptic characterization of colour, taste, odour and consistency; documentation of physico-chemical characters such as refractive index, acid value, saponification value, iodine value, specific gravity and viscosity as per standard methodology.⁷

TLC and HPTLC

Chromatography is an analytical technique dealing with the separation of closely related compounds from a mixture. High performance liquid chromatography (HPTLC) is an important analytical chromatographic techniques used for the analysis of herbal medicines. A fingerprint of the preparation was obtained by HPTLC for standardization purpose. The fingerprints by photodocumentation and densitometric scan show spots / peaks of different constituents present in NT. Unsaponifiable matter (UNT) and methanolic extract (MNT) of NT was performed using n-hexane : diethyl ether : acetic acid (8:2:0.2) as solvent system.^{8,9}

RESULTS AND DISCUSSION

The formulation nirgundi taila was found to be greenish viscous oil with greasy touch and characteristic odour of nirgundi (Table 1).

Refractive index indicates density of sample compared to air and liquid media; the value for NT was found to be 1.47171. Specific gravity indicates the presence of solute content in the solvent; in NT solvent being tila taila the solute refers to the active principles extracted from nirgundi to the oil medium; the value was found to be 0.913. The amount of alkali needed to saponify a given quantity of oil will depend upon number of COOH group present; the saponification value also indicates the average molecular weight /chain length of all fatty acids present. Longer the chains, fatty acids have low saponification value, and the shorter chain fatty acids have high saponification value. Shorter chain fatty acids (high saponification value) have faster rate of absorption than longer chain fatty acids; saponification value of NT was found to be 148.66. The acid value indicates the presence of free fatty acids in the oil which are responsible of rancidity of the compounds; higher the free fatty acid more is the rancidity. This helps to decide the shelf life of the oil; acid value for NT was found to be 11.98. Iodine value indicates the degree of unsaturation of oil; greater the degree of unsaturation, higher will be possibility of absorption and atmospheric oxidation leading to rancidity. The more iodine number, the more unsaturated fatty acid bonds are present; unsaturated fatty acid is better absorbed than saturated fatty acids, the value of NT was found to be 120.86. Viscosity is index of resistance offered by the surface to flow of a liquid; higher the viscosity of a liquid, the greater is the resistance to flow, if viscosity of the oil preparation is increases, the rate of absorption decreases. If the oil is less viscous this means rate of absorption is very high; the oil is better absorbed into the skin. Viscosity of NT is found to be 60.85 (Table 2). These constants can be used as standard values to derive quality parameters for NT.

On photo documentation at 254 nm UNT and MNT showed 3 and 4 spots respectively; the spot with R_f 0.39 was common to both the samples (Table 4). At 366 nm UNT and MNT showed 7 and 2 spots respectively; the spot with R_f 0.01 was present only in MNT (Table 3). Under white light, after derivatisation with vanillin sulphuric acid UNT and MNT showed 8 and 6 spots respectively; the spot with R_f 0.19 and 0.34 were common to both the samples (Table 5). The fingerprints showed significant differences in the samples, any of these extracts can be used as sample for fingerprinting of the formulation NT.

On densitometric scan at 254 nm UNT showed 5 peaks, peak with R_f 0.22 being the major spot contributing to 52.97% (Figure 2). MNT showed 8 peaks, peaks with R_f 0.06 and 0.27 being the two major peaks contributing to 30.50 and 36.45% respectively (Figure 3). At 366 nm UNT showed 9 peaks, peaks with R_f 0.40 and 0.80 being the major spots of 40.74 and 30.75% area (Figure 4). MNT showed 7 peaks, peak with R_f 0.05 being the major peak with 45.69% area (Figure 5). Both the wavelengths were found to be useful for fingerprinting the unsaponifiable matter as well as methanolic extract of NT.

Quality standards for nirgundi taila

Definition

Nirgundi taila is a medicated oil preparation made with the ingredients in the formulation composition given below with tila taila as the basic ingredient.

Formulation composition

1. Nirgundi svarasa (Nirgundi API)	<i>Vitex negundo</i>	Rt. and Lf.	960 ml
2. Taila (Tila taila API)	<i>Sesamum indicum</i>	Sd. Oil	3.072 l

Method of Preparation

- Take all ingredients of pharmacopoeial quality.
- Take Tila taila in a stainless steel vessel and heat it mildly.
- Add Nirgundi svarasa, stir thoroughly while adding.
- Heat for 3 h with constant stirring, maintaining the temperature. Stop heating and allow to stand overnight.
- Start the heating next day, stir and constantly check the subsidence of froth (phenodgama) over the taila. Expose the taila to flame and confirm the absence of crackling sound indicating absence of moisture.
- Filter while hot (about 80°) through a muslin cloth and allow to cool.
- Store it in glass containers and pack them air-tight to protect from light and moisture.

Description

Greenish viscous oil with greasy touch and characteristic odour of nirgundi.

Identification

Thin layer chromatography

Extract 5 g of the formulation in 75 ml of methanol (25 ml x 3) under reflux on a water bath for 30 min. Pool the extracts, filter and concentrate to 10 ml and carry out the thin layer chromatography. At 254 nm the plate shows 4 spots (0.1 – Light green, 0.06 – Dark green, 0.26 – Green and 0.33 – Green). At 366 nm plate shows 2 spots (0.03 – Fluorescent yellow and 0.39 – Light blue). After derivatisation with vanillin – sulphuric acid the plate shows 7 spots (0.05, 0.13, 0.19 – Blue, 0.25 – Brown, 0.34 – Pink, 0.39 and 0.82 – Blue).

Physico-chemical parameters

Refractive index at 40°: 1.47171; Weight per ml at 40°: 0.913; Saponification value: 148.66; Iodine value: 120.86; Acid value: 11.98; Unsaponifiable matter: 8.14%.

Other requirements

Microbial limits: Complies with API; Aflatoxins: Complies with API; Mineral oil: Complies with API.

Storage: Store in a cool place in tightly closed containers, protected from light and moisture.

Therapeutic uses: Pain dominant Vātaroga, Nadee vrūna

CONCLUSION

Nirgundi taila is one of the vata and shoolahara taila explained in Charaka samhita. The detailed method of preparation is available in Chakradatta. With that classical reference in backdrop, nirgundi taila was prepared in lines with standard operating procedures (SOP) and subjected for different analysis thereon. The result of analytical study with TLC and HPTLC fingerprints has been proposed as a monograph to identify and check quality of nirgundi taila.

Table 1. Organoleptic Characters

Parameter	Result
Colour	Greenish
Odour	Like nirgundi
Appearance	Oily viscous liquid
Touch	Greasy

Table 2. Analytical Parameters

Parameter	Result
Refractive index	1.47171
Weight per ml	0.913
Viscosity	60.85
Saponification value	148.66
Iodine value	120.86
Acid value	11.98
Unsaponifiable matter	8.14

Table 3: R_f values at 254 nm

Unsaponifiable matter NT	Methanolic extract NT
-	0.01 L Green
0.07 L Green	0.06 D Green
0.25 Green	0.26 Green
0.33 Green	0.33 Green

L - Light, D- Dark

Table 4: R_f values at 366 nm

Unsaponifiable matter NT	Methanolic extract NT
-	0.03 F Yellow
-	-
0.06 F L Blue	-
-	-
-	-
-	-
0.20 F L Blue	-
-	-
0.39 F M Blue	0.39 F L Blue
0.45 F L Blue	-
0.55 F L Blue	-
0.79 F Blue	-
0.97 F L Blue	-

L- Light, M- Medium, F- Fluorescent

Table 5: R_f values after derivatisation with vanillin sulphuric acid reagent

Unsaponifiable matter NT	Methanolic extract NT
-	-
-	0.05 Blue
0.06 Brown	-
-	0.13 Blue
0.19 Violet	0.19 Blue
0.22 Brown	-
-	0.25 Brown
0.30 Pink	-
0.34 Blue	0.34 Pink
-	0.39 Blue
0.43 Blue	-
0.51 Blue	-
-	0.82 Blue
0.94 L Blue	-

At 254 nm

At 366 nm

Post derivatisation

Track 1 - Unsaponifiable matter of nirgundi taila 5µl, Track 2 - Methanolic extract of nirgundi taila 10µl Solvent system – n-hexane : diethyl ether : acetic acid 8:2:0.2

Figure 1. TLC Photo documentation of unsaponifiable matter and Methanolic extract of Nirgundi taila

Figure 2. HPTLC Densitometric scan at 254 nm (Unsaponifiable matter nirgundi taila)

Figure 3. HPTLC Densitometric scan at 254 nm Methanolic extract of nirgundi taila

Figure 4. HPTLC Densitometric scan at 366 nm (unsaponifiable matter nirgundi taila)

Figure 5. HPTLC Densitometric scan at 254 nm methanolic extract of nirgundi taila

REFERENCES

1. Acharya Charaka, Charaka samhita, Ayurveda deepika of Charapanidatta – commentary, Vaidya Jaadavaji trikamji Acharya –editor, Chaukhambha orientalia, Varanasi; 2009. p-622.
2. Chakrapanidatta, Chakradatta, vaidyaprabha of Dr Indradeva Tripathi – commentary, Prof. Ramanath Dwivedi –editor, Chaukhambha Sanskrit Sansthan, Varanasi; 2005. p-269
3. Chakrapanidatta, Chakradatta, Tatwachandrika by shivadasa sena, Chaukhambha orientalia, Varanasi; 1992. p -517
4. Prashanth BK, Rao SK, Krishnamurthy MS, Rao R, Bhat S. Chemical analysis of nirgundi taila with special reference to preparation in different number of days. *Int. Res. J. Pharm.* 2012; 3 (1): 139-141.
5. Chakrapanidatta commentary on Acharya Charaka, Charaka samhita, Ayurveda deepika of Charapanidatta – commentary, Vaidya Jaadavaji trikamji Acharya –editor, Chaukhambha orientalia, Varanasi; 2009. p-622.
6. Sharngadharacharya, Sharngadhara Samhita, Deepika by adhamalla, Goodartha deepika by Kashirama- commentary, Chaukhambha orientalia, Varanasi; 2008. p-214.
7. Dept. of AYUSH, Ministry of Health and Family Welfare, Govt. of India. The Ayurvedic Pharmacopoeia of India. 1st ed., Part I, Vol VI. New Delhi; 2008. p-233-91.
8. Stahl I. Thin layer chromatography, A Laboratory Hand Book (student edition). Springer-Verlag, Berlin; 1969. p-52-86, 127-8.
9. Sethi P.D. High Performance Thin Layer Chromatography. 1st ed. CBS Publishers and Distributors, New Delhi; 1996. p-1–56.

Cite this article as:

C Padmakiran, UN Prasad, KN Sunil Kumar. Analytical study of nirgundi taila. *J Biol Sci Opin* 2015;3(3):122-127 <http://dx.doi.org/10.7897/2321-6328.03326>

Source of support: Nil; Conflict of interest: None Declared

Disclaimer: JBSO is solely owned by Moksha Publishing House - A non-profit publishing house, dedicated to publish quality research, while every effort has been taken to verify the accuracy of the contents published in our Journal. JBSO cannot accept any responsibility or liability for the site content and articles published. The views expressed in articles by our contributing authors are not necessarily those of JBSO editor or editorial board members.