Journal of Advanced Scientific Research

Available online through https://sciensage.info

ISSN

0976-9595

Research Article

Pharmaceutico-analytical Study on *Nisha Manasila Taila*

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Received: 20-11-2023; Accepted: 31-01-2024; Published: 29-02-2024

https://doi.org/10.55218/JASR.2024150204

ABSTRACT

Nisha Manasila Taila is a unique formulation described in *Chakradatta Kushta-Chikitsaadhyaya*. It is a herbo-mineral preparation containing *Manasila* (realgar), with *Kandu* (itching) and *Puma* (scabies) as its primary indication. Itching is the most common symptom seen in the majority of microbial infections of the skin. In Ayurveda, skin diseases fall under the broad category of *Kushta* (skin disorders). The preparation of *Nisha Manasila Taila* follows the Samanya *Tailapakavidhi* (general method of preparation of oil-based formulations). This process involves combining three main components in specific ratios: *Kalkadravya* (paste of drugs-1 part), *Snehadravya* (lipid media-4 parts), and *Dravadravya* (liquid media-16 parts). The ratio may vary depending on the specific *Kalka* and *Dravadravya* used. *Nisha Manasila Taila* contains *Haridra* (*Curcuma longa*) and *Shodhita Manasila (*purified realgar) as *Kalka* (paste), *Arkapatrarasa* (juice of *Calotropis gigantea*) as *Dravadravya* (liquid media) and *Sarshapatail a* (mustard oil) as *Snehadravya* (lipid media) in specific proportions. This study aims to highlight the physico-chemical changes that occur in *Nisha Manasila Taila* during the *Tailapaka* (oil preparation) process, using analytical parameters. In the pharmaceutical part of the study, the purification of *Manasila* (realgar) was performed, followed by the preparation of three samples using the general method of preparation of oil-based formulations. In the analytical part, three samples of *Taila* were analyzed using physicochemical parameters and chromatographic methods. The physicochemical parameters of the prepared samples fell within the normal range and are compared with the values of *Sarshapataila* (Mustard oil) used in sample preparation. Significant differences were observed in the organoleptic and physicochemical parameters between *Sarshapataila* (mustard oil) and the prepared sample, resulting from the pharmaceutical procedure carried out.

Keywords: *Chakradatta, Nisha Manasila Taila*, Skin infection, Physico-chemical analysis.

INTRODUCTION

Bhaishajya Kalpana is an important branch of Ayurveda which deals with the preparation of medicinal formulations. In this field, *Panchavidha Kashaya Kalpana* forms the primary or fundamental dosage form. It forms the basis of secondary dosage forms like *Choorna* (powder), *Vati* (tablet), *Sneha Kalpana* (lipid-based dosage form), *Sandhana Kalpana* (fermented preparations). Among these, *Sneha Kalpana* (lipid-based dosage form) is a unique dosage form in *Ayurveda*, which includes both *Taila Kalpana* and *Ghrita Kalpana*.

Nowadays, superficial skin infections comprise a large proportion of patients approaching hospitals and clinics. Description about skin diseases is available in *Ayurveda* classics under the broad heading of *Kushta* (skin disorders). There are different formulations mentioned for the treatment of *Kushta* (skin disorders). Among that, *Taila* (oil) preparations were used in the treatment of skin disorders depending upon the *Dosha* predominance. *Nisha Manasila Taila* is a unique formulation mentioned in *Chakradatta Kushta Chikitsa Adhyaya* [1]. The ingredients of this formulation are Haridra (*Curcuma longa)* and *Manasila* (realgar) as *Kalka* (paste), *Sarshapa taila* (mustard oil) as *Snehadravya* (lipid media) and *Arkapatrarasa* (juice of *Calotropis gigantea* leaves) as *Dravadravya* (liquid media). In this present study, *Nisha Manasila Taila* was prepared following thegeneral method for the preparation of medicated oils, i.e., *Kalka* (paste)*: Sneha* (lipid)*: Drava* (liquid)= 1:4:16 [2], after performing the *Shodhana* (purification) of *Manasila* according to *Rasa Taranginir*eference. So, this study aims to highlight the physico-chemical changes of *Nisha Manasila Taila* during the process *Tailapaka* (oil preparation) by analytical parameters.

MATERIAL AND METHODS

Pharmaceutical Study

Collection of raw materials and quality evaluation

All the raw drugs were procured from an authentic source and examined by the subject expert to confirm the identity, purity, and strength. Procedures were carried out in Rasashala of MVR Ayurveda Medical College, Kannur, Kerala.

Purification of Manasila [3]

Khalwa yantra (mortar and pestle), spoon, measuring jar and weighing machine were used. The purification was performed using *Bhavana* (levigation) process.

Table 1: Ingredients and quantity for *Manasila Shodhana* (purification of realgar)

Sl. No.	*Drugs*	*Quantity (gram)*
1.	*Ashodhita Manasila* (impure realgar)	500
2.	*Ardraka Swarasa* (juice of *Z. officianale*)	QS

Equipment

Khalwa yantra (mortar and pestle), spoon, measuring jar, weighing machine.

Method of Shodhana (purification)

Bhavana (levigation)

Ingredients

Ingredients and quantity for *Manasila Shodhana* (purification of realgar) is shown in Table 1.

Preparation of Ardraka Swarasa (juice of Zingiber officianale)

Fresh *Ardraka (Z. officianale)* were collected, cleaned and dried. Outer skin was removed and ground well using a clean mixer grinder. The paste obtained was squeezed using a clean cloth. Obtained juice was measured using a measuring jar (Figs 1-2).

Purification of realgar

Ashodhita Manasila (impure realgar) was powdered using a clean *Khalwa yantra* (mortar and pestle). In 500 gm of it was ground to fine powder, followed by addition of sufficient quantity of juice of *Z. officianale* so that the powder is completely immersed. The mixture was triturated till it turned dry completely. Repeated the procedure six more times and collected the purified realgar, which was dried under sunlight. Dried product was powdered and packed in air tight container for further use (Figs 2-5).

For the first levigation, a larger quantity of *Ardraka Swarasa* is required compared tosubsequent levigations. The quantity of juice decreases during subsequent levigations. The duration of levigation also decreases in subsequent steps. The color of *Ashuddha Manasila* was reddish orange initially, changing with each levigation, and finally, the purified *Manasila* obtained at the end of levigation is dark orange in color.

Fig. 1: Preparation of *Ardraka swarasa* (juice of *Z. officianale*)

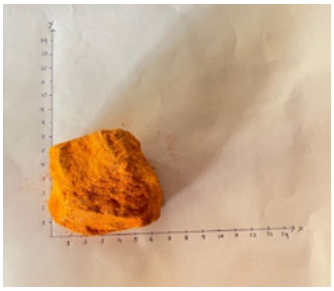


Fig. 2: Raw realgar

Fig. 3: Different stages of purification of realgar

Fig. 4: Purified realgar

A total of 480 grams of raw *Ardraka (Z. officianale)* was used to prepare 263 mL of juice. By the end of the levigation process, *Manasila* becomes very fine and soft, and the smell of *Ardraka* is observed in the compound.

Results and observations of Manasila Shodhana(Purification of realgar)

Observations of *Manasila Shodhana* (purification of realgar) is shown in Tables 2 and 3.

Preparation of Nisha Manasila Taila

The preparation of *Nisha Manasila Taila* was done according to the reference in *Chakradatta Kushta Chikitsa* [4]. Three samples of *Nisha Manasila Taila* were prepared.

Preparation of Arkapatra Swarasa (juice of C. gigantea leaves)

Fresh *Arkapatra* (*C. gigantea* leaves) were washed and wiped with a clean cloth. Cut it into small pieces and juice was extracted using juice extractor. The juice was collected by filtering the contents through a clean cloth. The juice was used as the *Dravadravya* (liquid media) for Taila Paka (oil preparation) (Fig. 6).

Preparation of Nisha-Manasila Kalka (paste of C. longa and realgar)

Fresh rhizomes of *Haridra (C. longa*) were peeled, cut the rhizome into small pieces, placed on roller stone and ground well to paste like consistency (Fig. 7). Required quantity of *Shodhita Manasila Choorna* (purified and powdered) was taken (Fig. 8) and added to the prepared *Haridra Kalka* (paste of *C. longa*) followed by grinding in mortar and pestle to obtain *Kalka* (paste).

Preparation of Nisha Manasila Taila

Samanya Tailapaka Vidhi (general method of preparation of oil based formulations) was adopted in preparation of *Nisha Manasila Taila*. In a wide mouthed vessel, specified quantity of *Sarshapa Taila* (mustard oil)

Table 2: Observations of *Manasila Shodhana* (purification of realgar)

Bhavana (Levigation)	*Amount of Ardraka Swarasa (millilitre)*	*Duration of levigation* (hours)	*Findings*
1	85	5	Reddish orange color with characteristic Odor.
2	50	3 hours 45 min	Color-orange. Odor of *Ardraka* (*Z. officianale*) noticed.
3	40	3 hours 25 min	Light orange color.
4	28	3	*Manasila* became finer.
5	22	2 hours 40 min	Slight color change noticed. *Manasila* (realgar) became very fine.
6	20	2 hours 25 min	Yellow colored *Manasila* (realgar) with characteristic Odor of *Ardraka* (*Z. officianale*).
7	18	2	Dark orange colored very fine powder of Manasila (realgar).

Table 3: Results of *Manasila Shodhana* (purification of realgar)

Sl. No	*Particulars*	*Sample*
1	Amount of *Manasila* (realgar) taken (gram)	500
2	Type of *Manasila* (realgar) taken	Khantakhya
3	Amount of *Shodhita Manasila* (Purified realgar**)** obtained(gram)	540
4	Amount of *Ardraka Swarasa (*juice of *Z. officianale*) used (mL)	263 mL
5	Time to complete one *Shodhana* (Purification)	22 hours 30 min
6	Color of *Shodhita Manasila* (Purified realgar)	Dark orange
7	Odor of *Shodhita Manasila* (Purified realgar)	Odor of Ardraka (*Z. officianale*)
8	Gain of weight (gram)	40
9	Percentage gain	7.4%
10	pH of *Shodhita Manasila* (Purified realgar)	6.2

Table 4: Ingredients of *Nisha Manasila Taila* with quantity [5-7] (Fig. 5)

Specification	*Ingredient*	*Botanical name/ Chemical name*	*Quantity (gram)*
Kalka Dravya (paste)	*Shodhita Manasila*	Arsenic disulphide, As_2S_2	62.5
	Haridra Kalka	*C. longa*	62.5
Drava Dravya (liquid media)	*Arkapatra Swarasa*	*C. gigantea*	2000
Sneha Dravya (lipid media)	*Sarshapa Taila* (mustard oil)	*Brassica juncea*	500

was taken and subjected to moderate heat. Then added the mixture of *Haridra-Manasila Kalka* (paste of *C. longa* and realgar -125 gm) and 2000 gm of *Arkapatra Swarasa*. The mixture was stirred continuously. Heating was carried out until *Kharapaka Lakshanas* were seen (Fig. 9). Then the fire was turned off and was strained using a double folded cloth (Fig. 10). Preparation should be completed in three days since *Swarasa* (juice) was used as the liquid media (according to *Kala Niyama*) [8] (Table 4).

Fig. 5: Ingredients of *Nisha Manasila Taila*

Fig. 6: Preparation of *Arkapatra Swarasa*

Table 5: Results of *Nisha Manasila Taila* preparation

	Yield (gram)	*Duration*	*Weight of Kalka (gram)*	*Loss percentage (%)*
Sample 1	424	9 hours	222	15.2
Sample 2	418	8 hrs 50 min	226	16.4
Sample 3	415	8 hrs 45 min	230	17

Fig. 7: Paste of *C. longa*

Fig 8: Purified-powdered realgar

Fig. 9: Showing different stages of *Nisha Manasila Taila* preparation

Fig. 10: Prepared *Nisha Manasila Taila*

Table 6: Organoleptic characters

Organoleptic characters	*Mustard oil*	*Nisha Manasila Taila*
Color	Yellowish brown	Green
Odor	Pungent	Strong pungent odor
Appearance	Viscous	More viscous than mustard oil
Touch	Unctuous	Unctuous

After mixing of all the ingredients (Table 4), a light golden color was observed. After 15 minutes of heating, characteristic pungent Odor of *Arkaptrarasa* (juice of *C. gigantea*) was noticed. After 30 minutes of heating, bubble formation could be seen in the central portion of the oil. After one hour of heating, the light golden color of the oil darkened and turned brown. Juice extracts started to scatterover the oil portion, and *Haridra Kalka* (paste of *C. longa*) began to float on the surface, whereas *Manasila Kalka* (paste of realgar) settled down at the bottom of the vessel.

On the first day, it was heated for 4 hours, with temperature noted every 30 minutes using an infrared thermometer. The temperature was maintained between 60 to 80°C. On the second and third days, it was heated for 15 minutes with constant stirring. On the fourth day, heating continued for around 4 hours 30 minutes, and *Kharapaka lakshanas* were observed. The temperature was around 99°C at the end of the procedure. During the final stage, constant stirring and continuous monitoring are required to avoid stickiness and charring of the *Kalka* (paste).

RESULTS

Analytical Study

- Organoleptic characters
- Physico-chemical analysis
- Instrumental analysis (HPTLC)

Table 7: Physico-chemical analysis

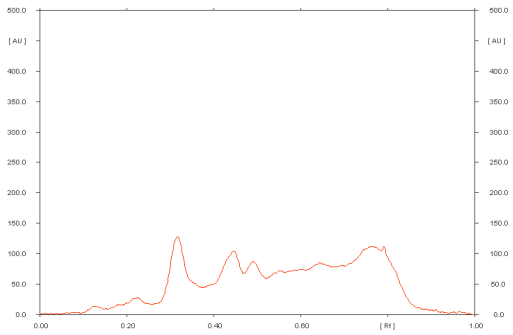
Parameter	*Mustard oil*	*Nisha Manasila Taila*
Refractive index	1.471	1.471
Specific gravity	0.9103	0.9129
Moisture content	0.0025	0.36
Viscosity	2.5477	3.2129
Saponification value	182.85	169.2
Acid value	1.0934	5.5
Iodine value	98.5	106.8

Table 8: Rf values at 254 nm

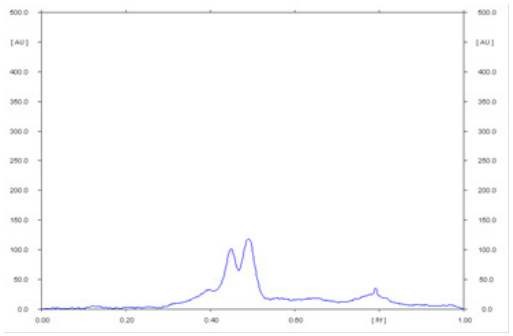
Peak no	*Rf value*	*Area*	*%Area*
1	0.12	360.1	1.14
2	0.22	1135.7	3.61
3	0.32	5596.0	17.78
4	0.45	5259.7	16.71
5	0.49	3042.1	9.66
6	0.55	2268.3	7.21
7	0.64	3599.8	11.44
8	0.76	6543.4	20.78
9	0.79	3672.9	11.67

Table 9: Rf values at 366 nm

Peak no	*Rf value*	*Area*	*%Area*
1	0.40	1263.3	13.38
2	0.45	3038.0	32.19
3	0.49	3688.1	39.08
4	0.79	1448.5	15.35



Graph 1: *Nisha Manasila Taila* at 254 nm



Graph 2: *Nisha Manasila Taila* at 366 nm

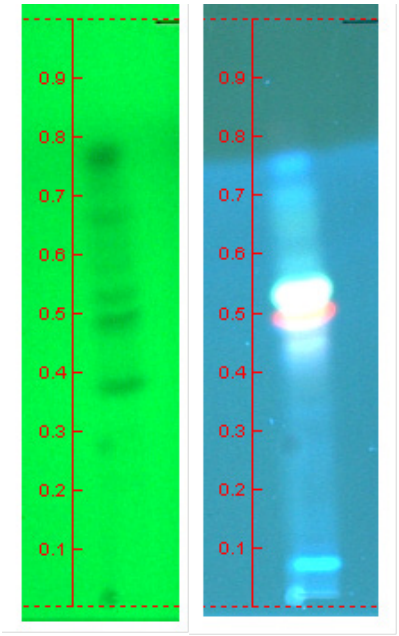


Fig. 11: TLC plate views of *Nisha Manasila Taila* at 254 nm, at 366 nm

DISCUSSION

Appearance plays an important role in present world. Superficial skin infections are one of the common reasons for patients approaching hospitals and clinics. The skin is the largest organ in the body that comes in direct contact with various kinds of microbial agents in the environment. Skin diseases, to varying extents, contribute to physical as well as psychological and social impairment. Microbial agents are responsible for the majority of superficial skin infections. Antimicrobial resistance is one of the biggest threats to global health, and it is rising daily to dangerously high levels in different parts of the world. There is a rapid emergence of resistant bacteria and fungi occurring worldwide. The Ayurveda field is in a dire state as manufacturing is disrupted due to scarcity of good quality raw materials. Shortage of herbal raw materials are adversely affecting the quality of end product and also making the product more costly.

Ayurveda mentioned promising remedies with excellent results which are indicated for different kind of skin disorders. *Nisha Manasila Taila* is one such unique formulation mentioned by *Acharya Chakrapanidatta*. In *Chakradatta*, *Acharya* not mentioned about the quantity of ingredients and also the method of preparation. So, the preparation was carried out following the general method of preparation of *Sneha Kalpana* (lipid-based dosage form) by *Acharya Sharngadhara*. The quantity of ingredients was described in the commentary by *Acharya Indradev Tripati*. Pharmaceutical study of *Nisha Manasila Taila* consists of two steps. *Manasila* (realgar), the mineral drug present in this formulation is subjected to purification as per the method mentioned in *Rasa Tarangini*. It is purified through *Bhavana* (levigation) in *Ardraka Swarasa* for seven times. This method will reduce the toxic effect of the sample and makes it therapeutically fit. *Ardraka Swarasa* is the antidote mentioned for *Manasila* (realgar) toxicity. *Ardraka* (*Z. officianale*) is a potent antimicrobial agent. Total 500 gm of realgar was subjected to purification. *Ardraka Swarasa* required for levigation of realgar was prepared as per *Swarasa* (juice) method mentioned in *Sharngadhara Samhita* with the yield of approximately 100 mL of juice from 140 gm of freshly collected *Z. officianale*; and prepared *Ardraka Swarasa* as per need. *Ardraka Swarasa* was having a pH of 5.63 showing its acidic nature. An increase in pH of realgar was noted after *Shodhana* that it changed from pH 5.39 of raw sample to 6.2 after 7th *Bhavana*. After 7th *Bhavana*, the sample was dark orange colored very fine powder with odor of *Ardraka* (*Z. officianale*). The gain in weight and change in pH may be because of the incorporation of starch content of *Ardraka Swarasa* into *Manasila* sample while doing levigation.

Pharmaceutically, *Nisha Manasila Taila* can be prepared using a minimal number of ingredients through simple pharmaceutical processing. Three samples of this formulation were prepared following thegeneral method of preparation of oil-based formulations.

Nisha Manasila Taila was prepared following the reference in *Chakradatta*. This oil-based formulation contains *Sarshapa Taila*, *Haridra*, *Manasila* and *Arkapatra Swarasa*. The main reference, *Chakradatta* has not specified about the quantity of ingredients to be taken as well as the method of preparation. So, the oilis prepared following the general method mentioned in *Sharngadhara Samhita*. The lipid media was taken 1 part, paste- ¼ parts and liquid media 4 parts.

In this preparation, since *Swarasa* was used as the liquid mediaso as per *Kala Niyama,* cooking should be done for '*Triratram*'. The total days taken for *Taila paka* were four days. On the first day, all the three samples were cooked for four hours. On the 2nd and 3rd days, *Paka* was done until the *Taila* started boiling, for only 15 minutes. After three days, on the 4th day, *Taila* was cooked until required *Pakalakshanas (Khara Paka)* were seen. For the first sample, the yield was 424 gms, and the duration was 9 hours. In the case of second and third sample, the yield was 418 and 415 gms, with durations of 8 hours 50 minutes and 8 hours 45 minutes, respectively. The weight of *Kalka* left after processing for the three samples was 222, 226, and 230 gms, respectively. The percentage of loss were 15.2, 16.4 and 17%, for the three samples respectively (Table 5). The variation in yield was due to absorption of *Taila* (oil) by *Kalka*. The ratio of *Kalka Dravya*s (paste) plays a vital role in *Taila Paka* (oil preparation). Changes during oil preparation- gradual changes of color were noted, the pungent and penetrating odor of mustard oil and was appreciated during the procedure.

Analytical study of both mustard oil and the prepared sample of *Nisha Manasila Taila* was carried out. Analytical study include- organoleptic analysis, physico-chemical analysis and finally instrumental analysis- high performance thin layer chromatography (HPTLC). The analytical parameters of *Nisha Manasila Taila* were compared with that of raw mustard oil.

Color of raw mustard oil was yellowish brown having characteristic pungent odor and it was stickier compared to other oils. This color change observed in mustard oil may be due to the chemical reaction between the oil and other ingredients added. When mustard oil is mixed with *C. longa*, realgar and juice of *C. gigantean* which are mainly acidic in nature, it can lead to color changes. Juice of *C. gigantean* contains chlorophyll and this combination may result in greenish color. The increased thicker consistency of the sample compared to raw mustard oil may be because of the addition of *Kalka Dravya* (paste) and Drava *Dravya* (liquid media) in the formulation.

The refractive index of Nisha *Manasila Taila* was 1.471. Specific gravity of mustard oil was 0.9103 and the prepared sample was having specific gravity value of 0.9129 and the slight change in specific gravity could be due to the addition of other ingredients in the formulation. limit of detection (LoD) of mustard oil is 0.0025. Moisture content of the prepared sample was 0.36. The significant difference in moisture content may be due to ingredients like *Swarasa* and *Kalka* present in this formulation. Viscosity value of mustard oil was 2.5477 and that of Nisha *Manasila Taila* was 3.2129. The higher viscosity value of the formulation suggests that the formulation is thicker and has a greater resistance to flow. This could be due to the presence of additional ingredients in the formulation that contribute to its viscosity. The ingredients like *Arkapatra Swarasa* and *Haridra Kalka* could potentially contribute to the viscosity of the formulation.

Saponification value of raw mustard oil was 182.85. The average saponification value of mustard oil ranges between 170 to 185 mg KOH/g. The saponification value of sample prepared was 169.2 and it suggest that fatty acid composition of the formulation is different from that of pure mustard oil. Possible reasons are processing of the formulation and the additional ingredients. Processing of the formulation might have altered the fatty acid structure, leading to a different saponification value. Acid value of mustard oil was 1.0934, which was within the normal range. *Nisha Manasila Taila* was having an acid value of 5.5. This acid value is significantly higher than the acid value of rawmustard oil. A value of 5.5 indicates a relatively high concentration of free fatty acids in the formulation. Such a high acid value might suggest that the formulation has undergone a significant degree of hydrolysis or degradation, potentially due to the presence of water and other ingredients, prolonged heating/duration, temperature, and oxygen exposure.

The iodine value of the raw mustard oil was 98.5. The prepared sample of *Nisha Manasila Taila* had an iodine value of 106.8, indicating a higher degree of unsaturation. Probable reasons may include prolonged processing, exposure to air, and heat which can lead to the oxidation of the unsaturated fatty acids in the oil. This can result in an increase in the iodine value because oxidation introduces more doble bonds in fatty acids. Prolonged processing and exposure to temperature might cause the breakdown of some unsaturated fatty acids (Tables 6 and 7).

HPTLC of *Nisha Manasila Taila* at 254 nm indicates the presence of nine detected peaks in this formulation. The Rf values of these peaks range from 0.12 to 0.79, reflecting the migration distance of the compounds relative to the solvent on the plate. Peak areas can vary widely among the different peaks, with the highest peak area associated with peak eight. The relative abundance of each compound in the sample is indicated by the percentage peak area. Peak eight has highest percentage area, suggesting it is the most abundant compound. Compounds corresponding to peaks 8, 4 and 3 exhibit higher concentrations as they have relatively high percentage peak areas. In this case, the varying Rf values and peak areas suggest that the sample is a mixture of multiple compounds with different properties (Graph 1)(Table 8).

HPTLC of the sample at 366 nm reveals the presence of four detected peaks, with the Rf value ranging from 0.40 to 0.79. The highest peak area associated with peak three. Peak three exhibits highest percentage peak area, suggesting that it is the most abundant compound at this wavelength (Graph 2)(Table 9).

Comparing the results of HPTLC analyses at 254 and 366 nm can provide insight into the composition of the sample. The presence of differing numbers of peaks and varying Rf values at the two wavelengths indicates that the sample contains a mixture of compounds with differing migration behaviors. Although peak eight emerged as the most abundant compound at both wavelengths, the relative prominence of other peaks varied. The variation in the number of detected peaks and the change in peak areas between the two analyses could signify the presence of compounds that absorb light differently at the two wavelengths (Fig. 11).

The results of the analytical study reveals that the prepared samples of *Nisha Manasila Taila* were of good quality and further more advanced analytical techniques are needed for the further characterization identification and quantification of the compounds.

CONCLUSION

Nisha Manasila Taila is a unique formulation explained in *Chakradatta Kushta Chikitsa Adhyaya* which is indicated in *Kandu* (itching) and *Pamadi Kushtarogas*. This oil was prepared following the general method of

preparation. Final yield of the samples was around 80to 85%. Results of the physico-chemical analysis reveals the that the prepared samples were stable physically and chemically and the analytical parameters are within the reference standard and this oil can be used for further studies like animal and clinical studies. These approaches may offer a more comprehensive understanding of the mechanism and action of the formulation in the case of the indicated diseases.

ACKNOWLEDGEMENT

I am grateful to the Quality Control department at MVR Ayurveda Medical College and Arya Vaidya Sala, Kottakkal for helping me complete this work.

CONFLICTS OF INTEREST

I declare that I have no conflicts of interest. I have no financial ties to any companies that could benefit from the research findings.

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HOW TO CITE THIS ARTICLE: Anagha KM, Muraleedharan AK. Pharmaceutico-analytical Study on *Nisha Manasila Taila*. *J Adv Sci Res*. 2024;15(2): 16-22 **DOI:** 10.55218/JASR.2024150204