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RESEARCH ARTICLE

A COMPARATIVE PHARMACEUTICO–ANALYTICAL STUDY OF MANJISHTADI ADITYAPAKA TAILA AND ITS OINTMENT

Dr. Aswathy. N. S[1] and Dr. Leena. K. C.[2]

1. PG Scholar, Department of Rasashastra and Bhaishajya Kalpana, Govt. Ayurveda College Kannur.
2. Professor and HOD, Department of Rasashastra and Bhaishajya Kalpana, Govt. Ayurveda College Kannur.

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Abstract

Background: *Manjishtadi Adityapaka Taila* is a herbo mineral formulation used externally for the treatment of *Pama kushta*, mentioned in *Kushta Adhikara* of *Chakradutta*. Its ingredients are *Manjishta*, *Hareetaki*, *Vibhitaki*, *Amalaki*, *Laksha*, *Nisa*, *Shodhita Manashila*, *Shodhita Haratala* and *Shodhita Gandhaka* along with *Tila taila*. Modification of this formulation into a more convenient form like an ointment may benefit its usage as well as storage.

Methodology: For the pharmaceutical preparation, after the authentication of each ingredient as per the API parameters, the *taila* was prepared by *Adityapaka* method as per the reference in *Chakradutta* and it was modified into ointment by adding beeswax as the base, as per the reference of *Siktha Taila* in *Rasa Tarangini*. The pH, loss on drying, acid value, iodine value, saponification value and HPTLC were checked for both the *taila* and ointment, while specific gravity, refractive index and peroxide value were checked only for *taila* and total acidity, total fat, viscosity, thermal stability, spreadability and homogeneity were checked specific for the ointment.

Results: From the analytical parameters, the ointment was found more stable than the *taila*.

Conclusion: The pharmaceutical modification of the *taila* into ointment has contributed in enhancing its stability.

Introduction:-

Bhaishajya Kalpana is the pharmaceutical science of *Ayurveda*, which deals with the pharmaceutical preparation of different formulations from the collection of its required raw materials to the standardization of the final pharmaceutical product. Among different *kalpana*s, *Sneha kalpana* deals with the preparations with either *ghrita* (ghee) or *taila* (oil). They can be prepared by two methods, with and without the use of direct fire. The latter method is known as *Adityapaka*, where the *paka* of *sneha* preparations is done with the help of sunrays instead of direct fire, by keeping the prescribed ingredients under the sunlight for a certain duration of time.

Manjishtadi Adityapaka Taila is one such formulation, mentioned in the *Kushta Adhikara* of *Chakradutta*.[1] It is mentioned to be prepared by keeping the finely powdered ingredients, *Manjishta, Haritaki, Vibhitaki, Amalaki, Laksha, Nisa, Shodhita Manahsila, Shodhita Haratala* and *Shodhita Gandhaka* along with *Tila taila* under the sunlight.[1]Modification of such *sneha* preparations for external application into more suitable dosage forms, like ointments, enhances its convenience to use and store.

Corresponding Author:- Aswathy. N.S.
Address**:**PG Scholar, Department of Rasashastra and Bhaishajya Kalpana, Government Ayurveda College Kannur, Kerala, India.

Aim:-

Comparative pharmaceutico – analytical study of *Manjishtadi Adityapaka Taila* and its modified ointment form.

Objectives:-

i) To prepare *Manjishtadi Adityapaka Taila* as per the classical reference.
ii) To modify it into ointment form according to the reference of *Siktha Taila* as per *Rasa Tarangini*.[2]
iii) To compare the analytical parameters of both the *taila* and the ointment.

Materials And Methods:-

The pharmaceutical study involves the collection of genuine raw materials for the preparation of both the *taila* as well as the ointment, their authentication as per API parameters, processing the collected raw materials and the preparation of the *taila* according to *Chakradutta Kushta Adhikara* and its ointment as per the reference of *Siktha taila* in *Rasatarangini*.[2]One sample each of the *taila* and ointment were prepared.
Authentication of herbal ingredients was carried out from the Department of Dravyaguna Vijnana, Government Ayurveda College Kannur.
Authentication of mineral ingredients were performed from the Department of Rasashastra and Bhaishajya Kalpana, Government Ayurveda College Kannur and Sophisticated Test and Instrumentation Centre, CUSAT, Kochi.
Physico-chemical analysis of the samples was carried out at CARe Keralam Thrissur and QC laboratory, QA department, Aryavaidyasala Kottakkal, Malappuram.

Pharmaceutical Study :

1. **Preparation of *Manjishtadi Adityapaka Taila*** :

Reference : *Chakradutta.* 50/157[1]

मञ्जिष्ठा त्रिफला लाक्षा निशा शिलाऽऽल गन्धकैः।

चूर्णितैस्तैलमादित्यपाकं पामाहरं परम्।।

Table 1- Ingredients of *Manjishtadi Adityapaka Taila* :

Sl No :	Drug	Botanical name	Quantity as per reference	Quantity taken
1	*Manjishta*	*Rubia cordifolia*	1 part	30 g each
2	*Haritaki*	*Terminalia chebula*		
3	*Vibhitaki*	*Terminalia bellerica*		
4	*Amalaki*	*Emblica officinalis*		
5	*Laksha*	*Kerria lacca*		
6	*Nisa*	*Curcuma longa*		
7	*Manahsila*	*Arsenic disulphide*		
8	*Haratala*	*Arsenic trisulphide*		
9	*Gandhaka*	Sulphur		
10	*Tila taila*	*Sesamum indicum*	4 parts	1080 ml

Preparation :

i) Pre-operative procedures :

a. Collection and authentication of raw materials :

Table 2 -Raw materials and procedures done :

Sl No :	Raw material	Procedures done
1	Herbal drugs	Evaluated macroscopically and microscopically as per their API standards.
2	Mineral drugs	X-Ray Diffraction
	Manahsila	
	Haratala	
	Gandhaka	
3	*Tila Taila*	Organoleptic evaluation
		Specific Gravity
		Refractive Index

b. Pre-pharmaceutical procedures :

Table 3- Processing of Raw materials :

Shodhana	Drug	Method
Mineral ingredients	*Manahsila shodhana*	*Bhavana* in *Ardraka Swarasa* for 7 times.[3]
	Haratala shodhana	*Dolayantra Swedana* in *Churnodaka* for 3 hours.[4]
	Gandhaka shodhana	*Dhalana* Method in *Godugdha* for 7 times.[5]
Herbal ingredients	*Shodhana* of *Laksha*	*Laksha* was crushed into small pieces in a clean *khalwayantra* and foreign bodies like stones or sticks were removed.

c. Preparation of *Kalka* :

After all the pre-pharmaceutical procedures, the finely powdered ingredients were sieved through sieve no. 85 and were mixed to form the *kalka.*

ii. Preparation of *Taila* by *Adityapaka* method :

The prepared *kalka* (270 g) was taken in a stainless-steel vessel and 1080 ml of *tila taila* was added to it, stirred well, and exposed under adequate sunlight for 7 hours per day (10 am – 5 pm) for 7 consecutive days.

Each day, after 7 hours, the vessel was taken from sunlight and kept closed with a lid. The contents were stirred on each day, before exposing the *taila* under sunlight. The observations and changes occurring to the *taila* were noted on each day. After 7 days, the *taila* was filtered through a two folded clean dry kora cloth. 990 ml of *Manjishtadi Adityapaka Taila* was obtained.

2. Preparation of *Manjishtadi Adityapaka Taila* Ointment :

Ointment base – *Siktha* (Beeswax)

a. Table 4 -Pre-pharmaceutical procedures :

Collection of beeswax	From an Apiculturist, Kannur.
Authentication	Acid value was checked from QA Department, Aryavaidyasala Kottakkal.
Purification of beeswax	It was melted and filtered through a clean cloth to remove any impurities present.

b. Preparation of ointment – By the method of *Siktha Taila* preparation[2] :

For 1 part of beeswax, 6 parts of *Manjishtadi Adityapaka Taila* was taken as per the reference of *Siktha taila* preparation in *Rasa Tarangini.* Thinly sliced beeswax was added into the *taila* and was melted by double boiling method. After complete melting, heating was stopped and the ointment was poured into a glass container and stored after cooling.

Analytical Study

Analytical study was carried out according to Ayurvedic Pharmacopoeia of India.[6]

1.Table 5 -Organoleptic and physico-chemical parameters

Manjishtadi Adityapaka Taila	*Manjishtadi Adityapaka Taila* Ointment
Organoleptic characters	Organoleptic characters
pH	pH
Specific Gravity	Total Acidity
Loss on Drying	Loss on Drying
Refractive Index	Total Fat
Acid Value	Acid Value
Iodine Value	Iodine Value
Saponification Value	Saponification Value
Peroxide Value	Viscosity
	Thermal Stability
	Spreadability
	Homogeneity

2. HPTLC

Images 1-12- Images of Pharmaceutical Study

1. *Haratala Shodhana* by *Dolayantra Swedana*

2.*Shodhita Haratala* (powdered)

3. *Bhavana* of *Manahsila* in *Ardraka Swarasa*

4. *Shodhita Manahsila* (powdered)

5. Melting *Gandhaka* for *Dhalana*

6. *Shodhita Gandhaka*

7. Adding *Tila Taila* into *kalka* (powdered ingredients)

8.*Manjishtadi Adityapaka Taila* after 7 days of *Adityapaka*

9. Filtered *Taila*

10. Beeswax after purification

11. Preparation of ointment by double boiling method

12. *Manjishtadi Adityapaka Taila* Ointment

Observations:-

Observations on each day of *Adityapaka* :

Day 1 - Colour – Deep yellow, brownish when the *kalka* was mixed well.
Later, the *kalka* got settled down according to their densities.
On exposure to high intensity of sunlight (around– 12 – 2 pm), egg yolk like appearance of the *taila*.
Red streaks - over the surface of *taila*, resembling blood vessels, which got faded on cooling.
Smell – Metallic smell, Smell of *Tila taila* and *Haridra.*

Day 2 - Egg yolk like appearance;
Red streaks around noon, which persists till afternoon.
Smell – Metallic smell and smell of *Haridra* were prominent.

Day 3 - Previous features persisted. Formation of flake-like appearance over the surface of *taila* was noted, which got faded on cooling.
Kalka settled below became thicker.

Day 4 - *Taila* and *kalka* had a thicker consistency than before.
Smell – Metallic. Layer of flakes became more prominent.

Day 5 - Previous features persisted. Flakes disappeared.

Day 6and 7 – Same as day 5; characteristic smell was present.

Images 13-20-Images of Manjishtadi Adityapaka Taila on 7 consecutive days :

13 - Day 1

14 - Day 2

15 - Day 3

16 - Day 4

17 - Day 4

18 - Day 5

19 - Day 6

20 - Day 7

Table 6 -Organoleptic characters of *Manjishtadi Adityapaka Taila* and Ointment :

Features	Taila	Ointment
Colour	Dark yellowish-brown oil	Yellowish brown
Odour	Characteristic	Characteristic
Texture	Viscous liquid	Semisolid mass
Appearance	Dark yellowish-brown viscous liquid	Dark yellowish-brown semisolid mass

Table 7 -Physico-chemical Parameters of *Manjishtadi Adityapaka Taila* and Ointment :

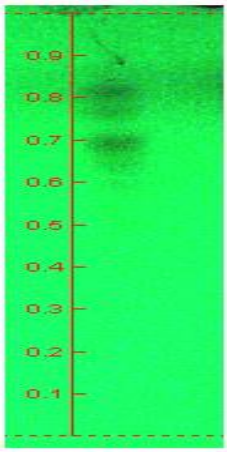
Parameters	Taila	Ointment
pH (of 10% aqueous solution)	3.44	3.87
Loss on Drying	0.50 % w/w	0.37 % w/w
Acid Value	3.80	3.0
Iodine Value	108.60	91.6
Saponification value	189.10	189.7

Sl No :	Parameters of *Taila*		Parameters of Ointment	
1	Specific Gravity	0.922	Total Acidity	0.03
2	Refractive Index	1.464	Total Fat	91.10
3	Peroxide Value	49.49	Viscosity	287100 cp
4			Thermal Stability	Complies
5			Spreadability	5.854
6			Homogeneity	Homogenous

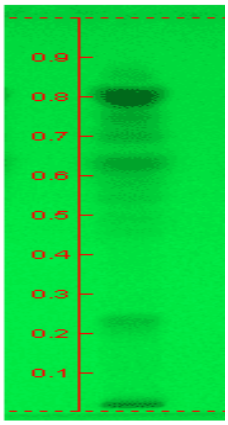
HPTLC :

1. Image 21 - At 254 nm

Sample 1

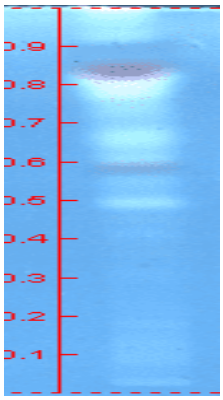


Sample 2



2. Image 22 - At 366 nm

Sample 1



Sample 2

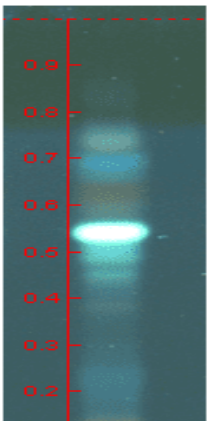


Table 8 -Rf value and area at 254 nm

No :	*Manjishtadi Adityapaka Taila*		*Manjishtadi Adityapaka Taila* Ointment	
	Rf Value	Area (AU)	Rf Value	Area (AU)
1	0.34	1024.3	0.15	5731.9
2	0.48	5272.0	0.32	793.5
3	0.56	5291.6	0.40	3683.8
4	0.62	3718.0	0.43	3792.9
5	0.67	8678.6	0.49	4848.7
6	0.76	7751.3	0.53	4511.2
7	0.80	9812.3	0.59	13877.4
8	0.88	3200.5	0.66	14296.2
9			0.71	10390.3
10			0.77	29610.0
11			0.82	4664.5

Table 9 - Rf value and area at 366 nm

No :	*Manjishtadi Adityapaka Taila*		*Manjishtadi Adityapaka Taila* Ointment	
	Rf Value	Area (AU)	Rf Value	Area (AU)
1	0.43	898.3	0.15	6265.2
2	0.48	1191.4	0.21	186.1
3	0.56	6980.9	0.43	6319.7
4	0.67	3147.7	0.49	8771.9
5	0.88	624.4	0.59	6685.4
6	0.89	1229.5	0.77	6926.4

Discussion:-

Discussion on Pharmaceutical Study :

Sneha preparations containing mineral ingredients are mostly prepared by *Adityapaka* method. This is because heating such minerals will cause unwanted chemical reactions, or lead to toxic effects, or changes the desired property of the drug, or lose the heat-sensitive active principles which may play an important role in its efficacy.

The mineral drugs present in this formulation was *Manahsila*, *Haratala* and *Gandhaka*. All of them were subjected to *shodhana* before *taila* preparation. *Shodhana* of *Manahsila* was done by *bhavana* in *Ardraka swarasa*. *Ardraka swarasa* being an acidic medium reduces the alkalinity of *Manahsila*. It also contains Phytochelatins – Cysteine and Methionine, which converts the Arsenic from its toxic form to a non-toxic form.[7]

Shodhana of *Haratala* was done by *Dolayantra swedana* in *Churnodaka*. Solubility of Arsenic trisulphide is more in alkaline solutions. Thus, *Churnodaka* acts as a good alkaline medium to dissolve the oxide vapours formed while heating Arsenic disulphide. Also, some amount of Arsenic can get leached along with the *Churnodaka*, thus reducing the Arsenic content.[8]

Shodhana of *Gandhaka* was done by *Dhalana* method in *ksheera* with *ghrita*. *Ghrita* and *ksheera* can help to dissolve away the fat soluble and aqueous soluble impurities in *Gandhaka* respectively. Also, while filtering through a cloth during the process of *Dhalana*, the physical impurities can also get separated.

Every day, during the process of *Adityapaka*, reddish streaks formed over the surface of *taila* around 12-2 pm, which faded on cooling. This was due to the presence of Realgar, which is pleochroic between dark red and orange red when exposed to UV rays.[9] Also the flake like appearance formed over the surface of the *taila* on 3rd and 4th day was due to the presence of Sulphur, as Sulphur particles form flakes when it cools after melting.

The *Adityapaka* procedure was carried out by ensuring gradual and sustained exposure of heat – ie., sunlight.

Considering the convenience of use and storage, the *taila* was modified into an ointment dosage form by adding beeswax as the base. Analytical parameters of both the dosage forms were checked and similar parameters were considered for comparison.

Discussion on Comparable Parameters of Analytical Study :

pH - From the pH values, both the *taila* and ointment are acidic, and comes in the range of exfoliants (pH 3-4).

Loss on Drying – Loss on drying indicates the amount of moisture content in a sample which is lost when dried, detected by a decrease in the weight of the sample. The value of Loss on drying is lesser for the ointment than the *taila*, which shows the least moisture content and more stability of the ointment compared to the *taila*.

Acid Value - The Acid value determines the amount of free fatty acids in an oil/fat. It is an important indicator of their rancidity. During oxidative rancidification, triglycerides are converted into glycerol and free fatty acids, resulting in an increase in acid value. So, a high acid value indicates rancidity as well as the age of the sample which has an impact on its shelf life and stability.

The Acid value of the ointment is less than that of the *taila*, which implies that the ointment is more stable against rancidity, compared to *taila.*

Iodine Value - The Iodine value of a substance is the weight of iodine consumed by 100 g of fat or oil. It is considered directly proportional to the amount of unsaturated fatty acid bonds in the oil. These are double bonds, which react with the iodine compounds. A higher iodine value indicates a higher degree of unsaturation in a fat. The unsaturated long chain fatty acids melt at a lower temperature than the saturated long chain fatty acids and is more prone to spontaneous oxidation.

The Iodine value is also lesser for the ointment than the *taila*, which represents the resistance of the ointment against oxidation and other changes of degradation, compared to *taila.*

Saponification Value - The Saponification value is the amount of potassium hydroxide (in mg) required to neutralize the fatty acids resulting from the complete hydrolysis of 1gm of oil or fat sample. The saponification value of oil is determined by the type of fatty acid it contains. Different oils have different saponification values, and the authenticity or adulteration of the product can be determined by comparing the obtained saponification values of the sample to the established standard value.

The saponification value obtained for the *taila* is 189.10 which falls under the normal range of the same value of raw *tila taila* and is also nearest to the value of the reference sample (189.04). So, the prepared *taila* has fatty acids under the normal range.

HPTLC - From the results of HPTLC, 8 bands were formed by the *taila*, whereas 11 bands were formed by the ointment under 254 nm. However, both showed 6 bands each under 366 nm. Seven bands were found having similar Rf values in both taila and ointment under 254 nm while three bands were found having similar Rf values under 366 nm. The formation of additional three bands under 254 nm by the ointment sample may be due to the additional ingredient, beeswax in the ointment.

Conclusion:-

From the study, the analytical parameters of ointment were found better than that of the *taila*, owing to its more stability over *taila*, thus benefiting the modification of *taila* into an ointment dosage form. Also, both come under exfoliant category.

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References:-

1. P.V. Sharma, Chakradutta (Sanskrit Text with English Translation).2007 edition. Chaukhambha Orientalia Varanasi Ch -50/157 P -408.
2. Ravindra Angadi, Rasa Tarangini of Sri Sadananda Sarma, Text with "Transcendence" descriptive English commentary, Edition 2020,ChaukhambaSurbharati Prakashan,Ch-6/59 & 62,P: 76.
3. Dr Indra Dev Tripathi, Rasaratnasamucchaya with Rasaprabha Hindi Commentary, Reprint Edition 2012, Chaukhambha Sanskrit Sansthan, Ch-3/91, P: 34-35.
4. Dr. Indra Dev Tripathi, Rasaratnasamucchaya with Rasaprabha Hindi Commentary, Reprint Edition 2012, Chaukhambha Sanskrit Sansthan, Ch-3/70, P: 33.
5. Dr. Damodar Joshi, Rasamrita, 2nd Edition 2003, Chaukhambha Sanskrit Bhawan, Varanasi, Ch-1/3, P: 30.
6. Dept of Ayush, Ministry of Health and Family Welfare, Government of India, The Ayurvedic Pharmacopoeia of India, First edition, Part II, Volume 2, Appendix – 3, The Controller of Publications, Civil Lines, New Delhi.
7. A. Verma et al, Process Standardization and Physicochemical Aspects of Shodhita and Ashodhita Manahsila, Journal of Traditional & Natural Medicines, Vol 2 (02), 2-7.
8. Kun Song et al, The Solubility Behaviour of Sodium Arsenate in NaOH solution based on the Pitzer model, Heliyon, Vol 9 (2023) e 12849, 1-10.
9. Dr. BandeppaSangolgi, Dr. Ganapathi Rao and Dr. Praveen Simpi, Concept of Manahsila Drug-A Review, International Journal of Development Research, Vol 07 (07), 13584-13589.