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TITLE

Pharmaceutico - Analytical Study of *Shrungatakadi Taila* Using the Concept of *Taila Murchhana* (Oil Processing)

AUTHORS

Juhi Ubale*, Anita Wanjari¹, Bharath Rathi², Dhirajsingh Rajput³

*PG Scholar, ¹ Professor, ² Professor & Head, ³ Asst. Professor, Rasashastra & Bhaishajya Kalpana Department, Mahatma Gandhi Ayurved College, Hospital & Research Centre, Wardha, Maharashtra, India

CORRESPONDING AUTHOR

Dr. Juhi Ubale

PG Scholar, Rasashastra & Bhaishajya Kalpana Department, Mahatma Gandhi Ayurved College, Hospital & Research Centre, Wardha, Maharashtra, India

Email:

juhiubale@gmail.com

QR Code



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ABSTRACT

BACKGROUND: *Shrungatakadi Taila* is a Ayurvedic herbo-mineral hair oil mentioned in classical text *Rasaratnasamucchaya*. *Murchhana* (processing of base oil before taking into preparation) is a specific process of *Sneha* (oil) indicated as a prerequisite for *Sneha Paka* (oil processing). *Murchhana* is indicated to remove *Amadosha* (early rancidity factor) of *Sneha*, which has both pharmaceutical and therapeutic significance. **AIM:** An attempt has been made to determine the importance of *Murchhana* on the stability of *Shrungatakadi Taila* prepared by using *Murchhita Tila Taila* (processed sesame seed oil) and *Amurchhita Tila Taila* (Unprocessed sesame seed oil) on the basis of changes in their organoleptic characters and other analytical studies. **METHODOLOGY:** In pharmaceutical study, special emphasis was given to *Paka Lakshanas* of *Sneha* (i.e. stage detection of completion of oil formulation) during preparation & in analytical study both the samples were subjected for physicochemical analysis like refractive index, specific gravity, saponification value, acid value, unsaponifiable matter, iodine value and peroxide value. **RESULTS:** On the parameters assessed of the sample made after *Murchhana* process revealed increase of saponification value and decrease of iodine and peroxide value. This suggested that the application of *Murchhana* process on the base oil; *Tila Taila* enhanced the properties and stability of *Shrungatakadi Taila*. **CONCLUSION:** *Sneha Murchhana* concept enhances the good smell, odour and stability of the *Sneha Kalpa* & *Sneha* takes up the active principles present in the *Murchhana Dravyas* also thereby improves the efficacy of *Sneha Kalpa*.

Keywords: *Murchhana, Shrungatakadi Taila, Tila Taila, Pharmaceutical and analytical study*

Introduction

Ayurveda is a highly evolved system of life and health science based on its unique, original concepts and fundamental principles. *Bhaishajya Kalpana* is embarked based on the concept of modification of natural substances to promote and preserve the health besides alleviating the disease. *Sneha Kalpana* (Medicated lipid/fatty formulations) gains significance on the basis that it is a novel, effective both externally as well as internally. It is the formulation in which pharmaceutical preparation involves minimal interference. It is one of the eye-catching techniques in Ayurvedic drug industry to achieve both fat soluble and water soluble extractives into the oil media which acts on liposomal level. For preparing a medicated oil different crude oils like *Tila Taila* (Sesame oil - *Sesamum indicum* L.), *Eranda Taila* (Castor oil - *Ricinus communis*), *Katu Taila* (Mustard oil - *Brassica nigra* L. Koch) etc. are taken as base. Before using these oils as base of particular medicated oil, a special Ayurvedic treatment is given to that oil called *Taila Murchhana*. It is a process adopted for enhancing the potency of ghee or oil and to remove the bad odour and *Amadosha*. *Murchhana* of *Sneha* increases the capability of oil to receive more active principles and it enhances the *Veerya* (potency) of *Sneha*.

Bhaishajya Ratnavali is the first book to mention about *Murchhana*. [1] Researches show that *Murchhana* decreases the acid value and increases saponification value. Reduced acid value indicates less percentage of free fatty acids and increased saponification value indicates higher content of low molecular weight fatty acids. [2] Medicated ghee/oil preparations containing low molecular fatty acids are absorbed fast. Hairs are having major concern in beauty, keeping in mind of beauty concept, *Shrungatakadi taila* was prepared by using concept of *Murchhana* to the base oil; i.e. sesame oil. In Ayurvedic literatures, so many formulations on *Keshya* (hair nourishing properties) are found, one of them is *Shrungatakadi Taila* mentioned in *Rasaratnasamucchaya* text in the chapter entitled *Shirorogachikitsa*. [3] Its application to the scalp results in straightening of hairs, keeps them black and strong.

In the present study, two samples of *Shrungatakadi Taila* were prepared and analysed, one sample was prepared by using plain *Amurchhita Tila Taila* and another sample was prepared by using *Murchhita Tila Taila* and both the sample were subjected to various the analysis for understanding the efficacy of *Murchhana*.

Materials & Methods

Pharmaceutical study

Preparation of *Murchhita Tila Taila*

Murchhita Tila Taila was prepared according to Bhaishajya Ratnavali.^[4] As per reference *Nalika* (*Cinnamomum verum* J. Presl.) should be used as one of the drug in *Murchhana* process. However, *Ratanjot* was used instead of *Nalika*.^[5] All the drugs were authenticated by Dravyaguna department of Mahatma Gandhi Ayurved College Hospital & Research Center, Salod(H), Wardha; before taking them into the preparation. Pharmaceutical preparation was done in the department of *Rasashastra* & *Bhaishajya Kalpana* of the same institute.

Churna (powder) of ingredients from 3 to 10 (as shown in table no. 1) were taken in prescribed quantity which was sieved through 80 no. mesh size. *Kalka* (paste) of all the powdered drugs was made by adding sufficient quantity of potable water. *Manjishtha* (*Rubia cordifolia* L.) was coarsely powdered and sieved through 60 no. mesh size and taken in the prescribed quantity for the preparation. Cleaned iron vessel and one long thick iron ladle was taken in the preparation. *Tila Taila* was kept for heating on a gas stove to remove any moisture content from oil and then oil was allowed to cool down to room temperature. *Manjishtha* was added to the oil before adding *Kalka* of the drugs and stirred well using ladle and then *Kalka* of remaining drugs were added and mixed well. Potable water was added to the mixture and the mixture which was heated on a *Mandagni* (low flame) i.e. maintaining temperature up to 90^o to 110^oC. Heating was continued till attaining all the *Sneha Siddhi Lakshanas* (signs showing the proper *Paka* of *Sneha*) such as *Varti Pariksha* (proper wick formation without breaking from the *Kalka*), *Phenodgama* (appearance of foam in the oil) & *Agni Pariksha* (putting wick of *Kalka* placed in fire should not create any cracking sound). After doing all *Parikshas* of *Taila*, oil was filtered with cotton cloth when it was warm & after cooling, it was packed in a sterile glass bottle to use for further preparations.

Preparation of ST (*Shrungatakadi Taila*) using *Amurchhita Tila Taila* (ATT) and *Murchhita Tila Taila* (MTT)

ST was prepared according to *Sneha Kalpana* procedure as per Sharangdhara Samhita Madhyamkhanda.^[6]

Kalka of ingredients from 1 to 7 in the prescribed quantity (as shown in table no. 2) was prepared by adding potable water in fine powders (mesh 80 no.) of

dry drugs and fine paste of wet drugs to get smooth and soft paste to use in the preparation. Cleaned iron vessel and one iron ladle was taken in the preparation. MTT was kept for heating on a gas stove, when oil attained to boiling stage heating was stopped and oil was allowed to cool to room temperature. Boluses of *Kalka* were added to the MTT and mixed well. Potable water was added in the mixture and the mixture was heated on a *Mandagni*. On the 1st day, *Taila Paka* was done for 3 hrs & on the 2nd day the heating was continued till attaining the *Sneha Siddhi Lakshanas* (which required 5 hrs). After doing all *Parikshas* of *Taila*, oil was filtered with cotton cloth; the filtration was done in the warm condition (at 70^oC) to avoid minimum loss. After cooling *Murchhita Shrungatakadi Taila* (MST) was labeled & stored in amber coloured glass bottle of 100 ml. By following the same procedure ST was prepared by using ATT. In this way the two samples of oil were prepared; viz., MST & AST (*Amurchhita Shrungatakadi Taila*). Both the samples were subjected for the analysis.

Analytical study

In the present study, analytical evaluation of MST and AST was carried out to develop preliminary standards. The samples were analyzed first of all on the basis of organoleptic characters. The organoleptic characters involved the testing of samples using sensory organs. These are four subjective parameters – Colour, Odour, Touch & Sound. The colour was observed with naked eye in natural light, odour was smelt. The feeling of drug was judged by touch and *Agni Pariksha* of oil was judged by sound i.e. absence of cracking sound.

Physico-chemical parameters such as Specific gravity, Refractive index, Acid value, Saponification value, Unsaponifiable matter, Iodine value, and Peroxide value were done for analysis of MST and AST sample at Laboratory of Dattatraya Ayurved Rasashala, MGACH&RC, Salod (H), Wardha.

Observation and Result

At the time of *Sneha Paka* stages of MST as well as AST sample; the change in colour with specific smell was observed. Characteristic & pleasant smell with dark reddish brown colour to oil were found in MST sample and sticking of *Kalka Dravya* at the bottom of vessel was observed during *Paka*. When the *Paka* reached the stage of completion it was found that all the *Siddhi Lakshanas* of *Sneha Paka* was properly identified with mild *Phenodgama*. Observation of organoleptic features of MST, AST and MTT are shown in Table- 5,6,7.

Table- 1: Ingredients used for the Murchhana of Tila Taila

Sr.no.	Sanskrit Name	Latin Name	Part to be used	Quantity
1	<i>Tila</i>	<i>Sesamum indicum L.</i>	Seasame seed oil	6000ml
2	<i>Manjishtha</i>	<i>Rubia cordifolia L.</i>	Root	375 gms
3	<i>Haridra</i>	<i>Curcuma longa L.</i>	Rhizome	100 gms
4	<i>Lodhra</i>	<i>Symplocos racemosa Roxb.</i>	Stem bark	100 gms
5	<i>Musta</i>	<i>Cyperus rotundus Linn.</i>	Tuber (<i>Kanda</i>)	100 gms
6	<i>Ratanjot</i>	<i>Alkanna tinctoria(L.) Tausch</i>	Root	100 gms
7	<i>Amalaki</i>	<i>Embllica officinalis Gaertn.</i>	Pericarp	100 gms
8	<i>Bibhitaki</i>	<i>Terminalia bellerica Roxb.</i>	Pericarp	100 gms
9	<i>Haritaki</i>	<i>Terminalia chebula retz.</i>	Pericarp	100 gms
10	<i>Suchipushpa mula (ketaki)</i>	<i>Pandanus odoratissimus L</i>	Root	100 gms
11	<i>Vatankura</i>	<i>Ficus benghalensis</i>	Leaf buds	100 gms
12	<i>Jala</i>	Water	-	24000ml

Table- 2 Ingredients used for the preparation of MST and AST

Sr.no.	Sanskrit name	Latin name	Part to be used	Quantity
1	<i>Shrungataka</i>	<i>Trapa bispinosa Roxb.</i>	Fruit pulp	100gms
2	<i>Amalaki</i>	<i>Embllica officinalis Gaertn.</i>	Pericarp	100gms
3	<i>Vibhitaki</i>	<i>Terminalia bellerica Roxb.</i>	Pericarp	100gms
4	<i>Haritaki</i>	<i>Terminalia chebula retz.</i>	Pericarp	100gms
5	<i>Bhringaraj</i>	<i>Eclipta alba (L.) hassk.</i>	Whole plant	100gms
6	<i>Nilkamal</i>	<i>Nelumbo nucifera Grertn.</i>	Flowers	100gms
7	<i>Loha Bhasma</i>	Fe_2O_3 [7]	-	100gms
8	<i>Tila tail-Murchchhita / Amurchhita</i>	<i>Sesamum indicum L.</i>	Processed sesame oil/ Plain sesame oil	2000ml
9	<i>Jala</i>	Water	-	8000ml

The duration of *Paka* of MTT, MST and AST with yield and % loss in ml as well as gm are mentioned in in table no. 3 & 4. The values of results of physic-chemical analysis of sample MST and AST shows differences, as shown in table no. 8.

Discussion

Concept of *Murchhana Samskara* for *Snehas* was first established by Govind Das Sen. This is not mentioned in ancient classical lexicons. The present research work advocates that by *Murchhana*; oxidation process can be checked. Antioxidants are added to *Sneha* through *Murchhana Dravyas*. *Snehas* are chemically stable and quickly absorbable in to the system.

Table- 3 Showing duration of *Paka*, yield of MTT, and % of loss in gravimetric as well as volumetric form

Name of <i>Taila</i> Used for <i>Murchhana</i>	Duration of <i>Paka</i>	Initial volume of oil in ml	Final yield of oil in ml	Initial weight of oil in gm	Final yield of oil in gm	% loss of oil in ml	% loss of oil in gm
<i>Tila Taila</i>	17hours, 45mins	6000	5430	5376	4942	9.5%	8.07%

Table- 6 Organoleptic features of *Murchhita Shrungatakadi Taila* (MST)**Table- 4 Showing duration of *Paka*, yield of MST and AST with loss and % of loss of both the samples in gravimetric as well as volumetric form**

Name of sample	MST	AST
Total heating duration	700min	770min
Initial Qty. of oil (in ml.)	2000	2000
Initial Qty. of oil in gms	1838	1800
<i>Kalka</i> added in gms	500	500
Water added in ml.	8000	8000
Water added in gms	8020	8020
<i>Taila</i> obtained in ml.	1815	1828
<i>Taila</i> Obtained in gms.	1670	1652
Loss oil in ml	185	171
Loss oil in gms	168	147
% loss in ml	9.25	8.55
% loss in gms	9.14	8.16

Sr. No.	Organoleptic Feature	Observation
1	Colour	Dark reddish brown coloured
2	Odour	Characteristics
3	Consistency	Oily (viscous liquid)
4	Appearance	Viscous reddish liquid
5	Clarity	Slightly ambiguous
6	Opalescence	Opaque

Table- 7 Organoleptic features of *Amurchhita Shrungatakadi Taila* (AST)

Sr. No.	Organoleptic Feature	Observation
1	Colour	Dark greenish coloured
2	Odor	Characteristics
3	Consistency	Oily (viscous liquid)
4	Appearance	Greenish coloured liquid
5	Clarity	Slightly clear
6	Opalescence	Slightly transparent

Table- 5 Organoleptic features of *Murchhita Tila Taila*

Sr. No.	Organoleptic Feature	Observation
1	Colour	Dark reddish orange
2	Odour	Characteristic
3	Consistency	Viscous, oily
4	Appearance	Oily
5	Clarity	Clear
6	Opalescence	Translucent

Table-8 Result of physicochemical analysis of MST and AST

Parameters	MST	AST
Specific gravity at 22°C	0.920	0.904
Refractive Index at 27°C	1.471	1.462
Acid value	0.54	0.50
Saponification Value	86.50	70.64
Unsaponifiable matter	0.10	0.95
Iodine value	55.58	65.46
Peroxide value	5.73	7.75

Sneha have good penetrating capacity and it can absorb dissolved active constituents of drugs used for *Murchhana* and also when further treated with specific drugs for specific purposes, as here in this study, drugs of formulation of *Shrungatakadi Taila* were used. Due to *Murchhana*; *Taila* and *Ghrita* becomes free from *Amadosha* and will be able to imbibe all the properties of herbs added during preparation.

The preparation of MTT was carried out in an iron vessel and the whole procedure of *Murchhana* was completed in 4 days duration. The reasons for the loss during *Murchhana* of *Tila Taila* may be due to,

- A. Usage of dry *Dravyas* used in *Murchhana* which caused more absorption of oil by *Kalka* and thereby resulted in loss of oil,
- B. Evaporation of oil during heating,
- C. Spillage of oil during processing like filtration resulted loss during *Sneha Siddhi Parikshas*.

The difference in the 9.5 % loss volume wise and 8.07% loss weight wise was due to varied consistency of plain *Tila Taila* and MTT. Dark reddish orange color with characteristic smell comes to *Tila Taila* after *Murchhana*. The duration of *Paka* of AST were found slightly more than MST. MST was done in 700 min and AST was done in 770 min. The % loss in weight wise and volume wise of MST were found slightly more than AST sample i.e. in MST it was 9.25% volume wise and 9.14% weight wise while in AST it was 8.55% volume wise and 8.16% weight wise. The colour of MST found was dark reddish brown which is similar to the base oil used for the preparation (i.e. *Murchhita Tila Taila*). In AST the colour was found dark green. The odour of MST was characteristic as the base oil was *Murchhita* but in AST the odour was not characteristic. Consistency of MST was found to be more thick and viscous than AST; which shows that more bio-constituents were get added to the sample of MST as compare to AST.

The specific gravity increased after the process of *Murchhana* i.e. in MST (0.920) which may be due to the addition of some active bio-constituents from the herbs used for *Murchhana*. The specific gravity of AST (0.904) was found less when compared to MST samples. It can be presumed that due to the process of *Murchhana* more active principle may get dissolved in the oil leading to high therapeutic efficacy than the *Amurchhita* samples. The RI of the MST was found higher i.e. (1.471) than AST (1.462). Increased value of RI in *Murchhita* sample found higher which may be due to coloration and additional phyto-constituents.

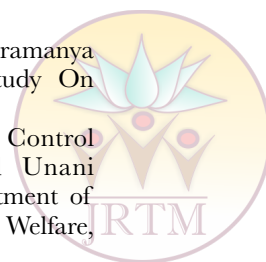
Acid value indicates the amount of free fatty acid present in oil and fat. A high acid value in the oil may leads to early rancidity of the oils. There was slight increase in the acid value in MST (0.54) which may be due to acidic nature of *Triphala* (Three Myrobalans) which were used in the process of *Murchhana* as well as in the formulation *Shrungatakadi Taila*. The acid value of AST (0.50) was lesser than the MST. The saponification value in MST was found 86.50 and in AST 70.64. Saponification value gives an idea about the molecular weight of fats/oils. The saponification number and molecular weight of an oil are inversely proportional to each other, thus high saponification values indicate that the fat is made up of low molecular fatty acid and vice versa. [8] Increased saponification value increases the stability of oil. The un-saponified matter in MST found (0.10) was lesser in comparison to AST (0.95) which clearly confirms the process of refining of oil, lesser the un-saponified matter more refined is the oil. Iodine value indicates the degree of unsaturation of oil. Greater the degree of unsaturation greater will the possibility of the oil becoming rancid due to atmospheric oxidation. [9] In MST iodine value found was 55.58 and in AST 65.46, here lesser iodine value in MST shows increased shelf life of oil. Peroxide values are milli equivalent of peroxide per kg of fat. Peroxides (O₂) are intermediate products of fat oxidation & breakdowns rapidly to aldehydes, ketones and other products. Peroxide value analysis is the best known test for analysing the stability of oils.[10] The peroxide value of MST was found to be 5.73 and in AST it was 7.75. The decreased peroxide value in *Murchhita* sample was may be due to antioxidant substances, as *Manjishtha*, *Haridra*, *Vatankura* and *Bhringaraj* these drugs have antioxidant properties in their pharmacology thus it indicates the increase in stability of MST.

Conclusion

Pharmaceutical study revealed that; the duration of heating for the *Paka* was decreased in MST, In MST pleasant and characteristic smell with beautiful dark reddish brown colour was found. Increase in Saponification value, specific gravity, refractive index while decrease in iodine value, peroxide value of *Murchhita* samples indicates more stability and increased shelf life of MST than AST. The analytical data of saponification value, iodine value and peroxide value of MST can be considered as standard values for future perspective aspect. Considering all the data recorded, it can be concluded that the process of *Murchhana* has high significance in establishing stability of product for better therapeutic efficacy. Hence the process of *Murchhana* should be included as prerequisites of any medicated oil preparations.

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