Sys Rev Pharm 2023; 14(3): 204-208
A multifaceted review journal in the field of pharmacy
E-ISSN 0976-2779 P-ISSN 0975-8453 / DOI: 10.31858/0975-8453.14.3.204-208

Research Article

Pharmaceutical and Analytical Study of Gandharva Haritaki Prepared by Murchhit and Amurchhit Erand Tail and Comparative Assessment for *In Vitro* Bio-Accessibility

Anjali S Katore, Anita Wanjari*, Bharat Rathi, Mujahid Khan, Makrand Sonare
Department of Rasshastra and Bhaishajya Kalpana, Mahatma Gandhi Ayurved College Hospital Research Centre, Wardha, India

Article History: *Submitted: 23.02.2023* *Accepted: 09.03.2023* *Published: 17.03.2023*

ABSTRACT

Introduction: Murchhana (the processing of base oil before it is used in preparation) is a specific Sneha (oil) process that is required for Sneha Paka (oil processing). Murchhanais used to get rid of Sneha's Amadosha (early rancidity factor), which has pharmacological and therapeutic implications. It also improves the Sneha's bio accessibility.

Aim and objective: Pharmaceutical and Analytical Study of Gandharva Haritaki (GH) prepared by Murchhita Erand Tail (MET) and Amurchhita Erand Tail (AET) and comparative assessment for *in vitro* bio accessibility.

Materials and methods: During the preparation of the pharmaceutical study, special attention was paid to Paka Lakshanas of Sneha (i.e. stage detection of oil formulation completion), and in the analytical study, both samples were subjected to physicochemical analysis such as refractive index, specific gravity, saponification value, acid value, unsaponifiable matter, iodine value, and peroxide value.

Observation and results: Physicochemical and organoleptic features of Murchhit Erand Talia (MET) and Amurchhita Erand Talia (AET) and Gandharva Haritaki (GH) made by Murchhit and Amurchhita Erand Talia (MandAET) will be studied. The conclusions will be reached based on observations and the application of appropriate tests. It will be recorded and presented in the form of a table and charts, among other things.

Conclusion: Sneha Murchhana idea improves the scent, aroma, and stability of Sneha Kalpa, as well as the efficacy of Sneha Kalpa, by absorbing the active components included in the Murchhana Dravyas.

Keywords: Amurchhana, Erand Talia, Franz diffusion Test, Gandharva Haritaki Churn, Murchhana

***Correspondence:** Anita Wanjari, Department of Rasshastra and Bhaishajya Kalpana, Mahatma Gandhi Ayurved College Hospital Research Centre, Wardha, India, E-mail: wanjarias@rediffmail.com

INTRODUCTION

Ayurveda, which literally translates to "Science of life and longevity," It is India's traditional medical system. In the sense that it is a full system, it is a science. It is a high-quality, all-encompassing science of health and longevity. Ayurveda recommends unique lifestyle, food, exercise, yoga, herbal treatments, and even spiritual activities to each individual.

Bhaishajya is the natural weapon provided by Ayurveda to prevent the spread of deadly disease. Kalpana is the process in the preparation of pharmaceutical process. Bhaishyajya is the part and pride of Ayurveda, and it is one among chikitsa Chatushpada. Bhaishajya Kalpana is the branch of Ayurveda related with preparation of various herbal dosage from such as Swaras, Kalka, kwatha, Hima, Phant as main dosage forms and Asavaristha, Avaleha, Churna, medicated Ghrita-Tail as a sub-dosage forms (Singh N and Chaudhary A, 2011).

In Bhaishajya Kalpana, preparation of medicated Tail and Ghrita has been dealt under the heading of Sneha Kalpana. 'Sneha Kalpana' is a pharmacological technique for making oleaginous medicine from substances like Sneha, Kalka and Dravya. They are manufactured in precise quantities by exposing them to a consistent heating pattern and duration in order to meet specified pharmacological characteristics as dictated by therapeutic needs. The primary intension of performing Sneha murchhana is to remove Ama Dosha from raw Sneha and make the therapeutic compounds in it readily absorbable from the medications with which it is treated. This procedure, also known as oil refinement, aims to remove undissolved particles from crude oil, moisture content, undesirable colour, free fatty acids, phosphatides, and other contaminants that may change Sneha's physicochemical characteristics.

The concept of Sneha Murchhana can be found in Shrangdhara's Dipika commentary, which was composed in the late 14th century. Bhaishajaya Ratnavali looks into the concept of Sneha murchhana in significant detail. According to few recent authors Sneha Murchhana process increases proportion of high density lipoproteins, therapeutic efficacy and reduces rancidity. There is need to evaluate such changes while preparing various medicated Tail and Ghrita.

Prior to the preparation of any type of medicated tail, Murchhana a kind of pharmaceutical process on crude oil is essential. The major goal of doing Sneha Murchhana is to remove Ama Dosha, unpleasant odour, and Ama Dosha from raw Sneha, as well as to increase its desire for medicine absorption (Lade A, *et al*., 2020). Sneha also develops a pleasant odour, becomes lighter for digestion, and improves medicine absorption and assimilation. The chemical compositions of Sneha Dravya may be altered by a specific group of plant materials utilised in the Murchhana process, which may help in the extraction of active principles into the Sneha medium effectively (Rai P, 2015). Murchhana process has aided significantly at enhancing the potency and acceptability of medicated oil. It helps to maintain the stability of medicated oil.

Gandharva Haritaki (GH) is mentioned in Raj Nighantu and Bharat Bhaishyajya Ratnakar, with mild purgative action. The ingredients of GH are *Terminalia chebula* and Eranda Taila (castor oil). However, in the process Murchhita Eranda Taila or Amurchhita Eranda Taila should be used is not specified (Gandhi AJ, 2016) (*Tables 1 and 2*). In this study the analytical parameters of the GH

prepared by Murchhit and Amurchhita Erand Tail will be assessed. However, for the rate of absorption and the efficacy the comparative assessment of *in vitro* bioavailability of Murchhit and Amurchhita Erand Taila and GH prepared by Murchhit and Amurchhita Erand Taila will be studied and further the assessment of Erand Taila is done.

The Franz diffusion study is the method in which the *in vitro* diffusion (drug release) will be analyzed. For that reason of faster and more effective absorption rate it become important to know about the rate and extent of absorption of drug, along with its therapeutic efficacy to ensure the quality of the drug for its consumption. Absorption often refers to the overall transport of a drug and related substance into the body. The gastro-intestinal part plays a major role in determining the rate and extent of drug absorption.

This study is designed to determine the importance of Sneha murchhana on Erand Tail, GH prepared by Murchhitand Amurchhita Erand Tail. Erand Tail is most widely used formulation by ayurvedic practitioners, it is necessary to establish the standard procedure and evaluate its analytical parameters for preparation of Murchhitand Amurchhita Erand Tail.

GH is a formulation with purgative action. The clinical studies were conducted on GH but, analytical standardization with respect to the use of Murchhitand Amurchhit ErandaTaila is not yet studied. There are few studies on Taila Murchhana which were done but there is no such research work on ErandaTailaMurchhana which has been established yet. Sneha Murchhana has been mentioned in Bhaishajya Ratnavali which can improve pharmacokinetic and pharmacodynamic actions of medicated Tail and Ghee. This study will help in understanding role of Murchhana and its scientific bases with special reference to Erandataila. In this study the analytical parameters of the GH prepared by Murchhit and Amurchhita Erand Tail will be assessed. However, for the rate of absorption and the efficacy the comparative assessment of *in vitro* bioavailability of Murchhit and Amurchhita Erand Taila and GH Prepared by Murchhit and Amurchhita Erand Taila will be studied (Kamble S, *et al*., 2021).

Table 1: Composition of materials

S.No	Dravya	Scientific name	Part to be used	Proportion
1	Erand Tail	*Ricinus communis* Linn	Oil	768 ml
2	Manjistha	*Rubia cordifolia* Linn	Stem	3 gm
3	Mustaka	*Cyperus rotindus* Linn	Rhizomes	3 gm
4	Dhanyaka	*Coriandrum sativum* Linn	Fruit	3 gm
5	Triphala-			
	Haritaki	*Terminalia chebula* Retz	Pericarp	3 gm
	Bibhitaki	*Terminalia bellirica* Roxb	Pericarp	3 gm
	Amlaki	*Emblica officinalis* Gaertn	Pericarp	3 gm
6	Vaijayantika (Agnimantha)	*Premna serratifolia* Linn	Bark	3 gm
7	Hribera	*Pavonia odorata* Linn	Fruit	3 gm
8	Vanakharjura	*Phoenix sylvestris* Roxb.	Fruit	3 gm
9	Vatasrngi	*Ficus bengalensis* Linn	Rhizopodes	3 gm
10	Haridra	*Curcuma longa* Linn	Rhizome	3 gm
11	Daruharidra	*Berberis aristate* DC	Stem	3 gm
12	Nalika	*Cinnamomun* verum	Leaves	3 gm
13	Ketaki	*Pandanus odorotissimus* Linn	Root	3 gm
14	Sunthi	*Gingiber officinal* Rosicoe	Rhizomes	3 gm
15	Dadhi	Dadhi	Curd	15.36 ml
16	Kanjika	Kanjika	Rice gurel	15.36 ml

Table 2: List of ingredients used for Gandharva Haritaki (GH)

S.No	Sanskrit name	Scientific name	Part to be used
1	Bal Haritaki	*Terminalia chebula* Retz	Fruit
2	Erand Oil	*Ricinus communis* Linn	Tail

MATERIALS AND METHODS

Materials, drug collection and authentication

The required drug will be procured from Dattatray ayurveda rasashala and herbal Garden, MGACH and RC, Salod (H.),Wardha. Authentification and verification of drugs will be done by Dravyaguna department. Standardization of drug will be done as per API (Active Pharmaceutical Ingredients).

Details of drug preparation

- Kanjika preparation
- Erand Tail Murchhana
- GH by using Murchhit Erand Tail
- GH by using Amurchhit Erand Tail

Preparation of kanjika: Sastika salidhanya is pounded and boiled with 3000 ml water until rice particles are properly cooked. The preparation (Manda) is allowed to cool down. Then, Manda and water of 3 times quantity is added to a big vessel which is sealed later. The pot/vessel is kept in warm place undisturbed for a week. After a week, this pot is opened to siphon out the sour liquid, by which kanjika is obtained.

Preparation of Murchhit Erand taila: Uncooked 'Eranda Taila' is taken into a vessel and heated over mild fire until foam appears. This is a phase where the preparation becomes stable. Step two is where drug preparation is cleaned to remove foreign matter individually. The individual drugs will be then powdered using pulverization technique and are sieved through mesh no.80. All the particles attained in such a manner are weighed separately. Powder of drugs will be mixed with sufficient quantity of water to prepare Kalka. Now the tail will be placed again over mild fire (mandaagni). Then Dadhi (Curd) along with Kanjika mixture are added to oil. Kalka is added to vessel and boiled further with frequent stirring till Sneha siddha lakshana appears. Tail is allowed to cool down and is filtered through double muslin cloth. Murchhita Erand Tail is obtained which is stored in air tight glass bottle.

Snehasiddhi lakshanas-in process quality control: Kalka is checked by rolling it between fingers. Once Kalka starts breaking between the fingers while forming varti, heating is stopped. This is the phase where froth appears on the surface of oil. Varti is then exposed to flame in order to confirm the absence of crackling sound.

Preparation of GH by using Murchhita Erand Tail: Authenticate Bal Haritaki is taken and is fried in Murchhita Erand Taila. Meanwhile, Haritaki is powdered after frying and is sieved through mesh no.80 to obtain GH Churna by Murchhita Erand Taila. The preparation thus obtained is stored and packed in air tight container.

Preparation of GH by using Amurchhita Erand Tail: Similarly authenticate Bal Haritaki is taken and is fried in Amurchhita Eranda Taila. Then, Haritaki is powdered after frying and is sieved through mesh no.80 to obtain GH churna by Amurchhita Erand Tail is obtained, which is stored in air tight container.

RESULTS AND DISCUSSION

Analytical study

Organoleptic characters of Murchhit and Amurchhit Erand Taila (Ubale J, *et al*., 2017):

- Colour
- Odour
- Taste
- Touch

Specifications: Colour, aroma, touch, and taste will be evaluated using organoleptic criteria in this parameter. The sensory organs were used in this evaluation.

Weight: The weight per millilitre of a liquid is the weight in gm of 1 ml of a liquid when weighed in air at 40°C, unless otherwise specified.

Physio-chemical parameters

- Rancidity
- Specific gravity
- Refractive index
- Viscocity
- Acid value
- Saponification value
- Iodine value
- Peroxide value
- Unsaponifiable matter
- HPTLC

Determination of refractive index: The refractive index was calculated using Abbe's Refractometer. First, the Abbe's Refractometer's mirror was set to 45 degrees. The samples of Amurchhita and Murchhita Tila Talia were then pipette-inserted into the prism box. After each sample was assessed, the refractometer was cleaned with petroleum ether and then distilled water. In the right eye piece, different colored bands were visible. With the help of the compensator knob, these color bands were erased, leaving only the black and white area visible in the right eye piece. With the use of a lever, the black and white section became used to the cross wire. Finally, using the left eye piece, the result will be recorded on the scale. Both samples were examined in the same way.

Determination of viscosity: The viscosity of a fluid is the measurement of its resistance to flow. Fluids resist the relative motion of immersed objects through them, as well as the motion of layers within them with different velocities. The resistance to flow is strongly related to viscosity, which is a property of a liquid.

Kinematic viscosity=Dynamic viscosity/Density

Determination of acid value: Oil was dissolved in a neutral alcohol:ether combination (1: 1). Using phenolphthalein as an indicator, this mixture was titrated against a 0.1 mol/l sodium hydroxide solution.

Acid value=(v × 5.61)/w

Where, v=Number of ml of 0.1 NaOH required and w=Weight of sample in g

Determination of saponification: Value oil sample will be saponified with 0.5 N KOH by refluxing for 1 hr in a boiling water bath. Using phenolphthalein as an indicator, the solution will be titrated with 0.5 N HCl. The technique will be repeated, excluding the sample.

Saponification value=v × 28.05/w

v=difference in ml, between the titrations

w=Weight of the substance in g

Determination of iodine value: Oil sample will be taken in a dry iodine flask. Chloroform will be added to dissolve it. After adding iodine monochloride solution, for 30 minutes, the flask will be kept in the dark. It will be mixed with a potassium iodide solution and water. Then, approaching the end point, it will be titrated against 0.1 N sodium thiosulphate with starch solution as the indicator. The procedure will be repeated excluding the sample.

Iodine value=1.269 v/w

where v=difference in ml, between the titrations and w=Weight of sample in g.

Determination of peroxide value: Oil will be dissolved in mixture chloroform:glacial acetic acid (3:2). Saturated potassium iodide solution and water will be added to it. Then it will be titrated against 0.1 M sodium thiosulphate using starch solution, as the indicator, near the end point. The procedure will be repeated excluding the sample.

Peroxide value=10 v/w

Where v=difference in ml, between the titrations and w=Weight of sample in g.

Determination of unsaponifiable matter: Unsaponifiable matter refers to the components of oils and fats that are not saponified by alkali hydroxides but can be extracted into ether.

Oil will be saponified using 2 M ethanolic potassium hydroxide. The contents of the flask will be rinsed with water before being extracted with ether. The ether layer will be washed several times with water and treated with a potassium hydroxide solution. Ether layer will be further washed with water till free from alkali. Ether will be distilled off and acetone will be added to it. Acetone will be removed by vacuum drying. The residue will be further dried to the constant weight at 100°C to 105°C, and weighed at room temperature.

The % of the unsaponifiable matter=100a/w

Where a=weight of the residue

w=weight of sample

Chromatographic study: HPTLC will be carried out to assess the qualitative and quantitative estimation of the end product which is Eranda haritaki churna and murchita and Amurchita Eranda Taila (Kale UP, *et al*., 2019).

HPTLC will be carried out on E. Merck (Darmstadt, Germany) 60 F254 HPTLC plates with a 10 cm × 20 cm aluminium-backed silica gel. The mobile phase Toluene:Ethyl Acetate:Hexane will be prepared in Camag twin-trough glass chamber. The proportion of the mobile phase will be decided as per the appearance of the spots. The plates will be observed under UV light at different wavelengths.

pH (10% aqueous extract): The pH of the medicine will be determined using a 10% aqueous extract of the drug. For pH determination, a calibrated digital pH metre will be utilized (Wanjari AS, *et al*., 2016).

Loss on drying at 105°C: The testing will take place in a hot air oven. This parameter will be used to monitor the amount of water that evaporates from the medication. The drug will be precisely weighed and placed in a tarred petri dish that will be heated at 105°C for 5 hours in a hot air oven. The desiccator will be used to dry the petri dish. Every hour, the raw material will be dried and weighed in the petri dish until the difference between two successive weights is less than 0.01 gm. The difference between the original weight and the weight after 5 hours will be measured to estimate the moisture content (Mehkarkar DD, *et al*., 2017).

Ash value analysis: The ash value represents the inorganic salts which remain and adhere along with the drug after incineration. Total ash, water soluble ash, and acid insoluble ash are the three forms of ash that will be assessed. 2 grams of precisely weighed medication will be placed in tarred silica crucibles with lids for total ash determination. The crucible with lids will be placed in a muffle furnace at 450°C for at least 5 hours, till ash is collected. The percentage of ash will be calculated with reference to air dried drug.

The whole ash will be boiled for 5 minutes with 25 ml of water to determine the water-soluble ash. Whatmans filter paper will be used to collect the insoluble ash. The filter paper will be placed in a tared crucible at 450°C for 15 minutes.

The difference between total ash and water insoluble ash will be used to determine the water-soluble ash. The acid insoluble ash will be determined by heating the water insoluble ash with 25 ml of diluted hydrochloric acid and collecting the insoluble stuff in Whatmans filter paper. Before being weighed and placed in a desecrator, the insoluble material will be rinsed with water and set aside for half an hour. The procedure will be repeated until the required weight has been reached. The proportion of acid insoluble ash will be computed.

Extraction values

Water soluble extractive: 5 g of sample will be mixed with 100 ml chloroform water, and then it is left undisturbed for 18 hours before being filtered quickly to avoid solvent loss. A pipette will be used to extract 25 millilitres of filtrate, which will be evaporated in a tared shallow bottom dish and will be dried on a water bath to a consistent weight. With reference to the moisture free medication, the proportion of water soluble extractive will be calculated.

Alcohol soluble extractive: 5 g of sample will be combined with 100 ml of 90% alcohol and shaken repeatedly for 6 hours before being kept undisturbed for 18 hours. The proportion of alcohol soluble extractive with reference to the moisture free medication will be calculated.

Franz diffusion test: The vertical Franz diffusion cell is a straightforward and reliable assay for detecting drug release *in vitro*. The Franz cell consists of two major chambers connected by a membrane. The test product is administered to the membrane through the top chamber's donor compartment. Compound absorption into a membrane, finite dosage permeation, and compound steady-state flow (alone or in formulations) can be determined using this method (Córdoba-Díaz M, *et al*., 2000).

Govind Das Sen was the first to introduce the concept of Murchhana Samskara for Sneha. It is a method for increasing the strength of ghee or oil as well as removing undesirable odours and Amadosha. Murchhana of Sneha improves the oil's ability to absorb more active ingredients and raises Sneha's Veerya (potency). Murchhana is mentioned for the first time in Bhaishajya Ratnavali (Sheikh S, *et al*., 2021). Murchhana reduces acidic level while increasing saponification value, according to studies. A lower acid value suggests a lower percentage of free fatty acids, while a greater saponification value indicates lower molecular weight fatty acids (Córdoba-Díaz M, *et al*., 2000; Mohapatra S, *et al*., 2013). Low molecular fatty acid-containing medicated ghee/oil formulations are quickly absorbed. Murchhana Taila and Ghrita from unwanted or undigested material, allowing them to absorb all of the benefits of the herbs used in the preparation (Akshata S, *et al*., 2017).

In the nineteenth century A.D, the Murchhana technique was developed to improve the therapeutic potential of medicated fatty formulations (Mohapatra S, *et al*., 2013; Sharma V, *et al*., 2021). Murchhana is the medicinal refining of oils with the goal of achieving various goals such as removing Aam, imparting colour and odour, increasing oil stability, and increasing therapeutic efficacy (Patil T and Deshmukh A, 2018).

CONCLUSION

Murchhana Dravyas provides antioxidants to Sneha. Chemically, Sneha are stable and readily absorbed into the body. Sneha has a high penetrating ability and can absorb dissolved active ingredients of pharmaceuticals used for Murchhana, as well as when treated with specific drugs for specific purposes, such as the drugs utilized in this study, which were Eranda Taila formulation drugs. As a result, the objective of this work was to establish the pharmacological and analytical study of GH made by Murchhit and Amurchhit Erand Tail, as well as to conduct a comparative assessment for *in vitro* bio accessibility. Murchhana can be used to check the oxidation process and other findings and observations will also be developed according to the current research. Analytical observations between AET, MET, and GH prepared by murchhit and Amurchhita Erand taila will be included in the conclusions.

REFERENCES

1. Singh N, Chaudhary A. A comparative review study of Sneha Kalpana (Paka) vis-a-vis liposome. Ayu. 2011; 32(1): 103.
2. Lade A, Deogade M, Rajput DS, Wanjari A. Comparative analytical evaluation of Ayurveda oil processing method on sesame and mustard oil. Annals Ayurvedic Med. 2020; 9(1): 22-28.
3. Rai P. Concept of medicated oil and ghrita in Ayurvedic pharmaceutics-"A literary review". Int J Pharm Life Sci. 2015; 6(7): 4620-4622.
4. Gandhi AJ. Industrial approach of process validation of Bharjana (frying) process WSR to Eranda Bhrishta Haritaki: An experimental observation. Int J Green Pharm. 2016; 10(04).
5. Kamble S, Wanjari A, Rathi B, Rajput D. Pharmaceutico-analytical study of Muktashukti Pishti and Muktashukti Bhasma and comparative evaluation of their relative oral bioavailability. J Pharm Res Int. 2021: 1-9.
6. Ubale J, Wanjari A, Rathi B, Rajput D. Pharmaceutico-analytical study of Shrugatakadi Taila using the concept of Taila Murchhana (Oil Processing). J res tradit med. 2017; 3(2): 36.
7. CCRAS, Parameters for quality assessment of ayurveda and Siddha drugs (Part - A), Analytical specifications of Tailas/Ghritas/Thailam/Nei (Medicated oils and Ghee), p. 28.
8. Kale UP, Wanjari AS, Rathi B, Rajput DS. Pharmaceutico-analytical standardization of Yashtimadhvadi Taila prepared from Murchhita and Amurchhita Tila Taila. J Indian syst med res. 2019; 7(2): 119.
9. Wanjari AS, Magar S, Chouragade NB, Wanjari DS. Evaluation and standardization of herbal formulation. Res J pharmacogn phytochem. 2016; 8(3): 133-140.
10. Mehkarkar DD, Rathi B, Wanjari A, Rajput DS. Pharmaceutico-analytical standardization of Devdarvyadi Churnakriya (Processed powder). J Res Tradit Med. 2017; 3(3): 64.
11. Sheikh S, Wanjari A, Kamble S, Wankhede S, Wanjari D, Chouragade N. Pharmaceutical preparation of arka lavan and assessment for its analytical study. J Pharma Res Int. 2021; 30; 33(34A):81-85.
12. Córdoba-Díaz M, Nova M, Elorza B, Córdoba-Díaz D, Chantres JR, Córdoba-Borrego M. Validation protocol of an automated in-line flow-through diffusion equipment for *in vitro* permeation studies. J Control Release. 2000; 69(3): 357-367.
13. Mohapatra S, Sarashetti R, Hiremath VV, Hiremath BS. Effect of murchhana samskara in the preparation of Hingutriguna Taila-an analytical study. Biomed Pharmacol J. 2013; 6(2): 371-374.
14. Akshata S, Gowda S, Doddamani MS. A conceptual review on taila murchana. Int j res Ayush pharm res. 2017: 82-85.
15. Sharma V, Firdaus Z, Rai H, Nayak PK, Singh TD, Gautam DN. Consumption of Ashtanga Ghrita (clarified cow butter added with herb extracts) improves cognitive dysfunction induced by scopolamine in rats *via* regulation of acetylcholinesterase activity and oxidative stress. Drug Metab Pers Ther. 2021; 36(4): 337-350.
16. Patil T, Deshmukh A. Comparative analytical study of amoorcchita and MoorcchitaTilaTaila. Int J Res Ayur Med Sci. 2018; 1: 44-51.