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"A PHARMACEUTICO ANALYTICAL STUDY OF PRAPAUNDARIKADI GHRITAM PREPARED ACCORDING TO THE REFERENCE OF CHAKRADATTA".

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ABSTRACT

The science of *Ayurveda* has been framed upon *trisutras*. Out of this *Aushadha* and its preparation is very important. *Bhaishajya Kalpana* is a branch of *Ayurveda* that basically deals with the preparation of medicinal formulations. *Sneha Kalpana* is one of the widely used and preferred dosage forms of Ayurvedic system of medicine. It is a pharmaceutical procedure done for preparing oleaginous medicaments from *Kalka dravya, Sneha dravya* and *Drava dravyas* taken in 1:4:16 proportion[1]. The mixture is boiled until the attainment of *Sneha Sidhi Lakshana*. The aim of *Sneha Kalpana* is to extract the lipid soluble active principles from the drug as well as to increase the shelf life of the drug. It is the only *Kalpana* in which drug is used through 4 modes of administration like *pana, basti, nasya, abhyanga*[2]. *Sneha Kalpana* involves *Ghrta, Taila, Vasa, Majja*. Among them *Ghrta* is considered best because it can incorporate the medicinal properties of the other drugs with which it is mixed and it does not leave its own inherent properties even after mixing with other drugs[3]. *Prapaundarikadi Ghritam* was prepared and the analytical study of the drug was done.

KEYWORDS: Pharmaceutical, Analytical, Prapaundarikadi Ghritam.

INTRODUCTION:

Sneha Kalpana is a unique dosage form in *Ayurveda*. *Sneha Kalpana* is used for treating wide range of diseases. Here oleaginous medicaments are prepared by a pharmaceutical process from *kalka, sneha* and *drava dravya* by means of a unique heating pattern. *Kalka* is herbal paste of plants. *Sneha* is oleaginous substance. *Drava dravya* can be a liquid medicament like milk, meat juice, etc. Drugs under *Sneha Kalpana* are used for both medicinal purposes and cosmetic purposes. It is a unique technique to achieve absorbtion of fat soluble and water soluble extractives into oil medium[4]. The pharmaco kinetic action of drugs under *Sneha Kalpana* is far

superior than other *kalpanas* because of the lipoid nature of bio membranes because lipid soluble drugs can easily permeate into cells[5]. *Sneha Kalpana* is mainly used for the treatment of mind, neurological disabilities, skin conditions, etc. This is one among the types of medicine that can be administered through all the routes of the body. *Sneha Moorchana* is carried out before doing *Sneha Kalpana* to remove the *ama dosa* of the oleaginous substances. There are different steps involved in the preparation of *Sneha* like *Purva karma, Pradhana karma, Paschat karma.*

Prapaundarikadi Ghritam was prepared as mentioned in *Chakradatta* and the analytical study of the drug was done for the purpose of standardization.

AIMS AND OBJECTIVES :

- To prepare *Moorchita Ghritam* as per classical reference.
- To prepare *Prapaundarikadi Ghritam* as per classical reference.
- To analyse the prepared *Prapaundarikadi Ghritam*.

MATERIALS AND METHODS :

Bhaishajya Kalpana is the science of pharmacy. *Sneha Kalpana* comes under *Bhaishajya Kalpana.* But before *Sneha Kalpana*, *Sneha moorchana* was done to remove the *ama dosha* from the *Sneha.*

In this part of the study, a detailed description is given regarding the practical steps done for the preparation of *Prapaundarikadi Ghritam* as per the classical reference.

Drug Preparation :

Collection of Raw Materials :

The ingredients used for *Ghrita Moorchana* and for the preparation of *Prapaundarikadi Ghrita* was collected from Kochi. It was further identified as genuine by the *Dravyaguna* Department of Karnataka Ayurveda Medical College, Mangalore.

Moorchitha Ghrita Preparation :

- 1 litre of *ghrta* is taken and heated in a vessel in *mandagni*. Water is added four times in quantity and heating is done
- The *churna* of *Haritaki, Vibheetaki, Amalaki, Musta, Haridra* are taken and mixed with *matulunga rasa* so as to prepare *kalka*. Later this *kalka* is added to the boiling *ghrta* and water.
- It is boiled and stirred until the attainment of *ghrta sidha lakshana*. At the end of the procedure, *ghrta* is filtered.

Prapaundarikadi Ghrita Preparation :

- *Moorchita ghrita* was taken in a wide mouthed vessel and is subjected to *mandagni*. Equal quantity of milk and 4 times water is added to it.
- Later ingredients like *Prapaundarika, Manjishta, Madhuka, Usira, Padmaka, Haridra* are made into *kalka* and added to the vessel. It should be subjected to continuous stirring to prevent sticking of *kalka dravyas* to the bottom of the vessel and to prevent its carbonization.
- The process of boiling and stirring is carried out until the attainment of *ghrita sidhi lakshanas.* The *ghrta* is taken out from the fire and is later filtered through a clean cloth.

OBSERVATIONS :

- By *ghrta moorchana* procedure, the *amatwa* of the *ghrta* subsides
- The unpleasant odour subsides
- An aromatic odour was observed
- *Ghrta* attains pleasant taste
- The colour of the final product was yellow

ANALYTICAL STUDY :

1. Refractive index :

Place a drop of water on the prism and adjusted the drive knob in such a way that the boundary line intersects the separatrix exactly at the centre. Noted the reading. Distilled water has a refractive index of 1.3320 at 30˚C. The difference between the reading and 1.33194 gives the error of the instrument. If the reading is less than 1.33194, the error is minus (-) then the correction is plus (+) if the reading is more, the error is plus (+) and the correction is minus (-). Refractive index of oil is determined using 1 drop of the sample. The correction if any should be applied to the measured reading to get the accurate refractive index. Refractive index of the test samples were measured at 30˚C.

2. Specific gravity :

Cleaned a specific gravity bottle by shaking with acetone and then with ether. Dried the bottle and noted the weight. Cooled the sample solution to room temperature. Carefully filled the specific gravity bottle with the test liquid, inserted the stopper and removed the surplus liquid. Noted the weight. Repeated the procedure using distilled water in place of sample solution.

3. Viscosity:

The given sample is filled in a U tube viscometer in accordance with the expected viscosity of the liquid so that the fluid level stands within 0.2 mm of the filling mark of the viscometer when the capillary is vertical and the specified temperature is attained by the test liquid. The liquid is sucked or blown to the specified height of the viscometer and the time taken for the sample to pass the two marks is measured. Viscosity is measured using the formula

$$\eta 1 = \frac{\rho 1 t 1 \text{ X } \eta 2}{\rho 2 t 2}$$

η1 – Viscosity of sample

η2 - Viscosity of water

t1 and t 2- time taken for the sample and water to pass the meniscus

ρ1 and ρ2 – Density of sample and water

X= Specific gravity of sample x 0.9961/specific gravity of water

П= X x Time for samplex1.004/specific gravity of waterx70sec

4. Acid value :

Weighed 2- 10g of **Prapaundarikadi ghritham** in a conical flask. Added 50 ml of acid free alcohol-ether mixture (25 +25ml) previously neutralised with the 0.1M potassium hydroxide solution and shaken well. Added One ml of Phenolphthalein solution and titrated against 0.1M Potassium hydroxide solution. End point is the appearance of pale pink colour. Repeated the experiment twice to get concordant values.

5. Saponification value :

Weighed 2g of the **Prapaundarikadi ghritham** into a 250 ml RB flask fitted with a reflux condenser. Added 25ml of 0.5M alcoholic potash. Refluxed on a water bath for 30 minutes. Cooled and added 1 ml of Phenolphthalein solution and titrated immediately with 0.5 M Hydrochloric acid (a ml). Repeated the operation omitting the substance being examined (blank) (b ml). Repeated the experiment twice to get concordant values.

6. Iodine value :

0.1g **Prapaundarikadi ghritham** was accurately weighed in a dry iodine flask. Dissolved with 10ml of CCl_4 , 20ml of iodine monochloride solution was added. Stopper was inserted, which was previously moistened with solution of potassium iodide and flask was kept in a dark place at a temperature of about 17^0 C for 30 min. 15ml of potassium iodide and 100ml of water was added and shaken well. This was titrated with 0.1N Sodium thiosulphate, starch was used as indicator. The number of ml of 0.1N sodium thiosulphate required (a) was noted. The experiment was repeated with the same quantities of reagents in the same manner omitting the substance. The number of ml of 0.1N sodium thiosulphate required (b) was noted. The experiment was repeated twice to get concordant values.

7. Determination of Unsaponifiable matter :

Weighed 5g of the **Prapaundarikadi ghritham**into the flask. Added 50ml alcoholic KOH into the sample. Boiled gently but steadly under reflux condenser for one hour. The condensor was washed with 10ml of ethyl alcohol and the mixture was collected and transferred to a separating funnel. The transfer was completed by washing the sample with ethyl alcohol and cold water. Altogether , 50ml of water was added to the separating funnel followed by an addition of 50ml petroleum ether. The stopper was inserted and shaken vigorously for 1 minute and allowed it to settle until both the layers were clear. The lower layer containing the soap solution was transferred to another separating funnel and repeated the ether extraction six times more using 50ml of petroleum ether for each extraction. All the extracts were collected in a separating funnel. The combined extracts were washed in the funnel 3 times with 25ml of aqueous alcohol and shaked vigorously. And drawing off the alcohol-water layer after each washing. The ether layer was again washed repeatedly with 25ml of water until the water no longer turns pink on addition of a few drops of Phenolphthalein indicator solution. The ether layer was transferred to a tarred flask containing few pieces of pumice stone and evaporated to dryness on a water bath. Placed the flask in an air oven at 85°c for about 1 hour to remove the last traces of ether. A few ml of acetone was added and evaporated to dryness on a water bath. Cooled in a desicator to remove last traces of moisture and then weighed.

8. Peroxide value :

5g of the **Prapaundarikadi ghritham**was weighed accurately into a conical flask, added 30 ml of mixture of 3volumes of glacial acetic acid and 2 volumes of chloroform, added 0.5ml of potassium iodide, allowed it to stand for 1 minute, add 30ml of water titrate gradually with vigorous shaking with 0.1M sodium thiosulphate until the yellow color disappears. Add 0.5ml of starch indicator continued the titration until blue color disappears.

Peroxide value= 10(a-b)/W
Where W= weight in g of the substance

9. Determination of pH :

Preparation of buffer solutions:

Standard buffer solution: Dissolved one tablet of pH 4, 7 and 9.2 in 100 ml of distilled water.

Determination of pH:

1 ml of sample was taken and make up to 10 ml with distilled water, stirred well and filtered. The filtrate was used for the experiment. Instrument was switched on. 30 minutes time was given for warming pH meter. The pH 4 solution was first introduced and the pH adjusted by using the knob to 4.02 for room temperature 30°C. The pH 7 solution was introduced and the pH meter adjusted to 7 by using the knob. Introduced the pH 9.2 solution and checked the pH reading without adjusting the knob. Then the sample solution (1%) was introduced and reading was noted. Repeated the test four times and the average reading were taken as result.

10. Rancidity test :

1ml of melted fat was mixed with 1ml of conc . Hcl and 1ml of 1% solution of phloroglucinol in diethyl ether and then mixed thoroughly with the fat acid mixture. A pink color indicates that the fat is slightly oxidized while a red color indicates that the fat is definitely oxidized.

Table No.1: showing results of standardization parameters

Parameter	***Results n = 3 %w/w***
	Prapaundarikadi ghritham
Refractive index	1.45617
Specific gravity	0.898
Viscosity	100.48
Acid value	3.26
Saponification value	67.78
Iodine value	31.44
Unsaponifiable matter (%)	2.88
Peroxide value	0.0
pH	6.0
Rancidity	Not oxidised

DISCUSSION ON DRUG REVIEW:

Prapaundarikadi Ghrita is taken from *Chakradatta* and it consists of 6 ingredients like *Prapaundarika, Manjishta, Madhuka, Usira, Padmaka, Haridra*.

- *Prapaundarika*

The botanical name of *Prapaundarika* is Nelumbo nucifera Gaertn.Fruct. and it belongs to Nymphaeaceae family. It is commonly called East Indian Lotus.

It is a large aquatic herb with branched elongated stems. Leaves are membraneous, orbicular, concave, entire and glabrous, 60 – 90 cm diameter. Petioles are very long.

Flowers are 15-30 cm diameter, solitary and large with fragrance. Petals are 5-10 cm long but sepals are very small. Carpals are 12 mm long and fruits are at a diameter of 5-10 cm and ovoid. It is having *Kashaya, Madhura, Tiktha rasa* and *seeta veerya*.

It pacifies *kapha* due to *kashaya, tiktha rasa* and *laghu guna*. It acts also as *pitta samaka* by *kashaya tiktha madhura rasa, sita veerya* and *madhura vipaka*.

Prapaundarika is sweet and bitter. It can alleviate fever, vomiting, etc. Roots can cure cough since it is bitter and is used in piles, dysentery, etc. Rhizomes can be made to *kwatha* and taken in to check vomiting. It is also applied externally for skin diseases and eruptions.Tender leaves are cool and cures burning sensation of the body. Flower is sweet and cooling and is beneficial to eyes. Decoction of flowers is given in cholera, fever, etc. Anthers are cool and aphrodisiac and can cure *kapha* and *pitta*.

Fruit is bitter and astringent and can also remove kapha and pitta dosha. Seeds are aphrodisiac and can alleviate *vata* and *kapha*

- *Manjishta*

The botanical name of Manjishta is Rubia cordifolia Linn and it belongs to Rubiaceae family. It is commonly called Indian maddar. It is a herbaceous and a perennial climber. Roots are long with red bark. Stems are long and woody at the base.

Branches scandent by means of Numerous divaricate. Petioles are quadrangular and glabrous. Leaves ovale and lower leaves are larger than the upper leaves.

Base of the upper leaves are acute. Petioles are triangular and has prickles. Flowers in terminal panicled glabrous cymes. Calyx is 0.85 mm long and fruits 4-6 mm in diameter and smooth. It is having *Kashaya, Tikta, Madhura rasa* and *ushna veerya.*

It is pitta hara because of *kashaya, tikta* and madhura rasa. It is also kapha hara due to *kashaya tikta rasa, ushna veerya* and *katu vipaka*. Root of *Manjishta* is sweet and bitter and anti pyretic and analgesic. It can alleviate uterine and vaginal diseases. It

also can cure piles, leucoderma and urinary discharges. Leaves can increase appetite and cures vata. Fruits are effective in splenomegaly. Stem is good in snake bite and scorpion bite. *Manjishta* root is made to a paste along with honey and applied

on the face for *vyanga. Kwatha* prepared out of *manjishta* and *chandana* is good in *pittaja prameha*. Paste of *manjishta* along with *yashtimadhu* is applied in fractures.

- *Madhuka*

The botanical name of *Madhuka* is Glycyrrhiza glabra Linn and it belongs to Fabaceae family. It is commonly called Liquorice root. It is a perennial plant 50 cm to 2 m height. Leaflets are acute or obtuse with 4-7 pairs. Raceme inflorescence.

Flowers are 1 cm long. Pods are 1.3 cm long which are flat and straight with 2-3 seeds. Stolon is dark brown with small bud. It consist of a small central pith. Roots are without pith. It is having Madhura rasa and *seeta veerya*. It is vatapitta samaka. It

is *vatahara* due to *madhura rasa, guru snigdha guna* and *madhura vipaka*. It is *pitta samaka* due to *madhura rasa, sita veerya* and *madhura vipaka*. It has a *rasayana* property when mixed with milk. It is given with cow milk for increasing lactation. Can be useful in burns when mixed with ghee and applied externally. It is a good aphrodisiac too. Along with *chandana, madhuka* is taken in *raktapitta* conditions. *Kwatha* prepared out of *madhuka* is taken for peptic ulcer. *Lepa* prepared out of *madhuka*, honey and ghee are useful in skin diseases like herpes, eczema, etc. When mixed with ghee it helps in wound healing.

- *Usira*

The botanical name of *Usira* is Vetiveria zizanoides Linn.Nash and it belongs to Poaceae family. It is commonly called Cuscus grass. *Usira* is a dense perennial grass.

Culms stout upto 1-8 m long. Lower leaf sheaths are imbricate and smooth. Blades are narrow, linear, acute, rough. Midrib is slender, lateral nerves close to the midrib.

Panicle oblong upto 30 cm, smooth. Whorls are 6-10 with 20 rays. Inflorescence is raceme upto 5 cm long and very slender. Style and stigma are short. Stigma is purple in colour. Anthers are 2-3 mm long. Roots upto 2 mm in diameter and is

yellowish brown in colour. It is having strong aromatic odour and is bitter in taste. It has *tikta, Madhura rasa* and *seeta veerya. Usira* is *vata hara* because of *madhuravipaka*. It is also *pitta samaka* due to *tikta madhura rasa, madhura vipaka* and *sita veerya. Usira* is an important ingredient in *shadanga paniya* for curing *jwara*. In *pitta vikara*, decoction of *usira* is given. Water is boiled with *usira* and *balaka* and taken in to control vomiting. It can also relieve burning sensation and thirst. For homeostasis, it is taken mixed with *chandana*. *Usira* paste is applied externally for skin diseases.

- *Padmaka*

The botanical name of Padmaka is Prunus cerasoidus Linn and it belongs to Rosaceaefamily. It is commonly called Wild Himalayan Cherry. It is a large sized tree with barks in horizontal strips and brown in colour. Leaves are glossy, glabrous , simple, alternate and acuminate. Petiole is 1.5 cm long. Stipules pinnately or palmately divided. Flowers can be white or crimpson red . Pedicels are slender and longer than calyx. Fruits are reddish yellow in colour and ovoid or globose and astringent in taste. It is having *Kashaya, Tikta rasa* and *seeta veerya*. It is *kapha pitta hara*. It is *kapha samaka* due to *kashaya tikta rasa, laghu guna* and *katu vipaka*. It is *pitta samaka* because of *kashaya tikta rasa* and *sita veerya*. Stem is bitter and can cures leprosy, leukoderma and can also can prevent abortion. It is powdered and applied as *lepa* on the skin. It is taken in to check nausea and vomiting. *Kwatha* prepared out of *padmaka* is taken in for vaginal bleeding and other uterine infections. Water boiled with the bark of *padmaka* can relieve jwara and daha. Stem is made to paste and applied in case of snake bite and scorpion bite.

- *Haridra*

The botanical name of *Haridra* is Curcuma longa Linn and it belongs to Zingiberaceae family. It is commonly called turmeric. It is a tall herb with sessile

cylindric tubers. Leaves very large 4 ft long. Petiole is as long as the blade, oblong. Inflorescence is spike, 10 – 15 cm long, peduncle 15 cm which is concealed by petiole. Flowers 4-6 inch long and pale green. The upper half of corolla tube is funnel shaped and is white in colour. Rhizome is in 2 forms- long turmeric and round turmeric. Round turmeric is considered as the primary rhizome and is oblong, ovate or conical in shape with 3 cm diameter. Long turmeric is cylindrical in shape with a breadth of 2 cm. It is having *Katu, Tikta rasa* and *ushna veerya*. It is *pitta hara* is due to *tikta rasa*. It is also *kapha hara* due to *ushna veerya, katu tikta rasa* and *katu vipaka*. In *pratisyaya* it can be taken with milk. In *prameha* taken with *amalaka rasa*. In *pradara* taken with *guggulu*. In skin diseases like *pama, vicharchika*, it is taken after mixing with *gomutra*. In *netrabhishyanda*, it is used as eye drops. In *arsas,* mixed with *kumari* and applied externally. It is mixed with *gomutra* and applied along with *guda* in filiariasis. In *panduroga, haridra churna* is mixed with *triphala,* honey, ghee and taken. *Haridra kwatha* is taken with *guduchi* in *kaphaja vatarakta.*

DISCUSSION ON PHARMACEUTICAL STUDY :

1) Procurement and identification of raw drug :

The raw drugs required for the study was procured from the local market in Kochi.It was again verified and certified genuine by the Department of Dravyaguna, Karnataka Ayurveda Medical College Mangalore.

2) Preparation of *Prapaundarikadi Ghritam :*

Before the preparation of *Prapaundarikadi Ghritam*, the *moorchana* procedure is carried out to remove the *ama dosha* of the *ghritam*. The *moorchana* procedure is mentioned in *Bhaishajya Ratnavali*. *Moorchana* procedure helps in rendering ready absorbability of medicinal properties of the drugs with which the *Sneha* is mixed. It increases the appetite of drug absorbtion. The *ghrta* will also attain good odour and will be lighter for digestion. Thus the *moorchana* procedure will alter the chemical composition of *ghrta*. For *moorchana* procedure, 1 part of *ghrta* is boiled with 4 parts of water in *mandagni*. To this *kalka dravyas* are added. *Kalka* is prepared by mixing *churna* of *Haritaki, Vibheetaki, Amalaki, Musta* and *Haridra* with *Matulunga rasa*. It is boiled until the attainment of *ghrita sidha lakshana*. Later the *moorchita ghrita* is filtered. The step by step addition of *kalka dravyas* were maintained during the procedure. During the procedure, continuous stirring of the *ghrta* was done so as to prevent sticking of *kalka dravya* to the bottom of the vessel and to prevent its carbonization. An aromatic odour is obtained at the end of the procedure. Now we should prepare *Prapaundarikadi ghritam* which is mentioned in *Chakradatta*. The *moorchita ghrita* is mixed with equal quantity of milk and boiled. To this, 4 times water is added and boiled in *mandagni*. The ingredients like *Prapaundarika, Manjishta, Madhuka, Usira, Padmaka, Haridra* are added into it in the form of *kalka*. It should be subjected to continuous stirring to prevent sticking of *kalka dravyas* to the

bottom of the vessel and to prevent its carbonization. The process of boiling and stirring is carried out until the attainment of *Sneha sidhi lakshanas*. At last the prepared *ghrita* is filtered. The final product is yellow in colour with characteristic odour and semi solid consistency.

CONCLUSIONS :

- *Sneha Kalpana* is a unique form of dosage in the field of *Ayurveda* which is used for treating wide range of diseases
- In *Sneha Kalpana*, oleaginous medicaments are prepared from *kalka dravya, Sneha dravya* and *drava dravya*
- This *Kalpana* helps in the absorbtion of lipid soluble active ingredients from the drug and can also enhance the shelf life of the drug
- *Prapaundarikadi ghritam* is mentioned in *Chakradutta* written by *Acharya Chakrapani*
- *Prapaundarikadi ghritam* was prepared by using *murchita ghrita*
- Physico chemical analysis was done on *Prapaundarikadi ghritam*
- *Prapaundarikadi ghritam* is found to be stable as far as the rancidity is concerned and is standardised as per the standard testing protocol.

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