



## A PHARMACEUTICAL ANALYTICAL STUDY OF MURCHITA GO-GHRITAM & CHAGALADYA GHRITAM

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## ABSTRACT

Ghee known as *Ghritam*, *sarpish* & *Ajya*, was used in ancient India as early as 1500 B.C. Rigveda, the oldest collection of Hindu hymns, contains numerous references to ghee, showing its importance in the Indian diet. The health benefits from ghee can be fundamentally categorized as those that are obtained from consuming ghee as food and those are obtained by using ghee as a medicine. Clarified milk fat or butterfat is known as *ghrita*. It is prepared by heating butter or cream to just over 100°C to remove water content. *Goghrta* is the best choice for food and medicinal purposes. So, in Ayurvedic classics and tradition, if not specified, the word *ghrita* always applies to *goghrta*. *Chagaladya ghrita* is one such classical, potent, unexplored, herbal preparation having properties of *Jwara-prashamana* (Antipyretic action), *Dhatu-vriddhikara* (Nourishes the Body tissues), improves mainly *Mamsa dhatu*, where *dhatu kshaya* is noticed in *Rajyakshama Rogi* by consuming of this *Aja-Mamsa* can restore the *Mamsa*

*dhatu kshaya (Mamsena Mamsa vruddhihi)*, also Increases body weight (*Brimhanakaraka*), *Ojoskara* (Immune-booster) indicated in the management of *Rajyakshama* presenting with predominant of *Shwasa and Kasa*. It contains mainly *Chagamamsa (goat's meat)*, *Ashwagandha*, *Vasapanchanga*, *Chagadugdha* and *Goghrita* and other *Prakshepaka dravyas*. *Ghrita* is one among the best *Ajasrika Rasayanas*. and is supreme in *Snehana Dravyas*. By its *Yogavahitva*, as per its ingredients, the medicated *Ghrita* will be attaining properties of the ingredients without forfeiting its properties.

**Keywords:** *Murchita Go-ghrita, Chagaladya Ghrita, Snehapaka, TLC*

## INTRODUCTION

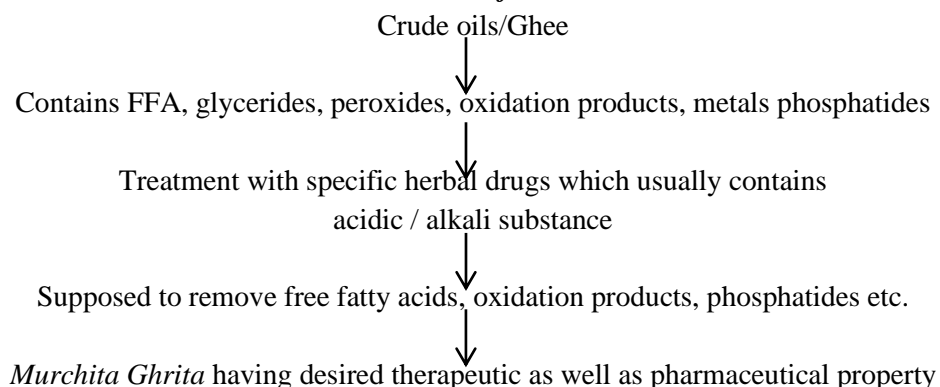
Now a day due to the increased demand for Ayurvedic preparations and increased global response towards the Ayurvedic system of medicine, the production of standard, effective, genuine, safe drugs in required quantity and utmost quality is a challenge for processing units of Ayurvedic drugs. So, the need of the hour is to research Ayurvedic drugs for large quantity production with high standard quality. The nomenclature of *Sneha Kalpana* is the sum of words *Sneha* and *Kalpana*, where *Sneha* means fat or fatty material and *Kalpana* stands for the pharmaceutical process of medicaments. The substance is called *Sneha.Snehana dravyas* are having *Guru, Sara, Snigdha, Manda, Suksma, Mrdu, Drava Gunas*. In *Ayurveda*, *Ghrita kalpana* is included under the *Sneha Kalpana*. *Ghrita, Taila, Vasa and Majja* are the best *Sneha Dravyas* of

### MATERIALS AND METHODS:

**METHOD OF PREPARATION:** The basic ingredients are *Kalka, Sneha, Drava Dravya* and the ratio of the above ingredients are 1:4:16. All the procedures are similar to that of *Sneha Kalpana* whether it is a *Ghrita Kalpana*.

all. Amongst them, *Ghrita* is considered a superior one. *Sneha Dravya* par-excellence because of its power to assimilate effectively the properties of the substances. The medicated Ghee mentioned in Ayurveda pharmacopoeia is prepared by boiling or cooking them with drugs, decoction, or juice etc. *Chagaladya Ghrita* is an important formulation that is mentioned in various textbooks like *Bhaishajya Ratnavali & Chakradatta*. It is prepared with *Murchita ghrita*<sup>(1)</sup> by adding the *Kalka* of the different herbs and along with water and milk, *Swarasa* etc. *Chagaladya ghrita*<sup>(2)</sup> is a very effective medicine, which is used in many diseases in Ayurveda. Traditionally this is used for *Rajyakshama* disease. It is also used for *Balya Brimhana* purposes, treating *Mamsa Kshaya, Dourbalya, Klaibya, Raktapitta* etc.

### Murchana of Ghrita:



There are generally three essential components required for the preparation of *Ghrita*. (A) **Kalka** (a fine paste of the drug or drugs) – **1 part**. (B) **Sneha Dravya** (*ghrita*) – **4 parts**. (C) **Drava Dravya** (a liquid which may be one or more as *Kashaya*, *Swarasa*, *Dugdha* etc.)- **16 parts**. The duration of *Paka* period depends on the nature of the *Drava Dravya* added to *Sneha*.<sup>(3)</sup>As mentioned for *Ksheena*- 2 days, *Swarasa*- 3days, *Takra*, *Aranala* etc. – 5 days, *Kwatha* prepared with *Mula* and *Valli* – 12 days, *Vrihidhanya* and *Mamsa-rasa* – 1-day *Paka* should be done. Depending upon the nature of *Drava Dravya*, the time duration of the *Sneha Paka* varies because each *Drava Dravya* has its concentration and releasing capacity of active ingredients into the *Sneha*. Hence Acharyas mentioned different time duration according to the *Drava Dravya*. In *Chagaladya Ghrita Paka*, first *Murchana* of *Ghrita* must be done then collected and warmed in the *Sneha Patra* by applying gentle heat. Then the *Kalka* and *Drava Dravya* to be used are added and the whole contents are boiled together till the water portion get evaporated and *Ghrita* becomes free from froth.

**There are confirmative tests for completion of *Sneha Paka*<sup>(4)</sup>-**

- (1) *Sneha Kalka* attains perfect wick shape when rolled between thumb and index figure.
- (2) If a part of *Sneha Kalka* is put into the fire, no sound is produced indicating the loss of moisture in it.
- (3) Foam disappears during the completion of preparation.

#### ◆ Preparation of *Ashwagandha Kashaya*<sup>(5)</sup>

**Ingredients:** *Ashwagandha Kwatha Churna* – 30kg, Water 120 litres.

**Procedure:** The clean and good quality ingredient was taken and put in the *khalwa* separately. Coarsely powdered *Ashwagandha Mula* was taken. The obtained products were weighed. In a clean steel vessel, *Churna* of *Ashwagandha mula* 30kg, 120 litres of water is added and heated on *mandagni* till it reduces to 1/4<sup>th</sup> i.e reduced upto 30 litres. Later it is filtered through the cloth and added in the *murchita ghrita* for the *Chagaladya ghrita*.

#### **Observation:**

- During the procedure powdering, the peculiar smell of the ingredient of *Ashwagandha mula* was appreciated.
- Initially floating of drugs were observed.
- A peculiar smell of *Ashwagandha mula* was observed.
- Time is taken for the preparation -8.30 hours
- Total days of *paka* – 1 day (*kashaya eka rathre*).

#### **Precautions:**

- *Mandagni* was maintained throughout the procedure.
- Stirring was done to avoid adherence to the drug.

**Similarly, *Vasapanchanga Kashaya* has been done<sup>(6)</sup>**

*Vasapanchanga Kwatha Churna*- 30kgs water- 120litres.

Procedure is same as the above.

#### **Preparation of *Chagaksheera paka* for *Chagaladya ghrita*<sup>(7)</sup>**

**Procedure:** the freshly collected *Chagaksheera* filtered through a sieve for physical impurities later boiled in *mandagni* for a while then it is filtered through a clean cloth and stored. And added in the preparation content of *kalkadravyas* and make the *paka* for 2 days.

**Observations:** Typical smell of *Chaga ksheera* was observed.

- Quantity taken -12litres.(Equal quantity of *Ghrita*)
- Quantity obtained-11.8 litres
- Total hours of *Chagaksheerapaka* – 19hrs.20mins
- Total days of *Chaga ksheera paka*- 2 days (*ksheeredwirathram*).

#### ◆ **Chagamamsa rasa preparation for the CG<sup>(8)</sup>**

**Procedure:** The clean and good quality of 30kgs of Goat meat (*Chagamamsa*) taken rinsed with water and filtered through a sieve and put in the clean steel vessel, in that 120 litres of water is added and heated on *mandagni* till it reduces to 1/4<sup>th</sup>. that should be reduced to up to 30 litres. Later it is filtered through the cloth and stored and added in the preparation.

#### **Observation:**

- During the procedure, *Chaga Mamsa* peculiar smell was felt.
- Initially skinned of *Chaga Mamsa* was observed.
- A peculiar smell of *Mamsarasa* was observed.

- Time is taken for the preparation -9hours 30 min.
- Total days of paka – 1 day (*Mamsa eka rathre*).

#### Final product of *Chagaladya Ghritam*<sup>(9)</sup>

##### Observation:

- While mixing pleasant smell of each *Kashaya's* was perceived.
- Colour of final product: Dark Greenish colour.
- Consistency: Greasy green
- Taste: Bitter, Astringent, lightly sweet.

##### Precautions:

- While mixing spilling of *kashaya and Mamsa rasa* should be avoided.
- The final product is filtered through a sieve and Cora cloth. The final product is stored in an air-tight glass jar.

##### Results:

- The total quantity of all the ingredients: 6000ml (6 kgs) of each batch.
- Obtained quantity:5.300ml
- Loss of the quantity:600ml
- Yield: 93.27%

##### Analytical study<sup>(10)</sup>

The analytical study reveals the chemical composition of the formulation as well as their concentration. By this, it helps to ensure the safety limits and accuracy of the drug. Physio-chemical analysis of the drugs is carried out by using current analytical methodologies for understanding and interpretation of Physio-chemical changes occurring during and after pharmaceutical processing. In the present study, analysis is done for MG and CG.

**Table 1:** Showing Organoleptic Characters<sup>(11)</sup>

	MG	CG
Colour	yellow	Green
Odour	Characteristic Aromatic	Characteristic aromatic
Texture	Solid	Semi-solid

**Table 2:** Showing Physio-Chemical Parameters of MG & CG<sup>(12)</sup>

Parameter	MG	CG
Loss on Drying at 105 <sup>0</sup> C (in %)	0.04%	0.03%
Saponification value	210.37	232.81
Iodine value	28.42	27.39
Acid value	0.21	0.22
Peroxide value	0.54	0.57
Ester value	210.16	232.59
Refractive index at 40 <sup>0</sup> C	1.4569	1.4568
Specific gravity at 40 <sup>0</sup> C	0.9126	0.9028
Weight (gm) per ml at 40 <sup>0</sup> C	0.921	0.9165
Viscosity at 40 <sup>0</sup> C	42.54	48.87
Rancidity test (Kreis test)	Negative	Negative
Total Aerobic counts	Nil	Nil
Total fungal counts	Nil	Nil

**Table 3:** Showing Microbial contamination of MG and CG<sup>(13)</sup>

Parameter	MG	CG
Yeasts and moulds (CFU/ml)	Nil	Nil
Aflatoxins	Not detected	Not detected

**Table 4:** Solvent system –Toluene: Ethyl Acetate: Hexane: 8:2:1 samples of MG& CG Extract: Methanol extract of Ghrita<sup>(14)</sup>

Short UV			Long UV	
Rf	MG	CG	MG	CG
0.12	-	-	(L,f. green)	(Light .f. blue)
0.23	(Orange)	-	(Illuminated f.green)	(Light.f.green)
0.29	-	-	(Illuminated f.green)	(Light.f.green)
0.37	(Orange)	(Light Orange)	(Illuminated f.green)	(Light.f.green)
0.46	-	-	-	(Light.f.green)
0.62	-	-	-	(Light.f.green)
0.77	-	-	-	(Light.f.green)

\*F – Fluorescent; L –Light; G-green; I-Illuminated

## DISCUSSION

### Discussion on *Murchana*:

- *Murchana* increases the degree of the dissolution of bioactive constituents, accordingly the excellence of properties of *Sneha*, *ghrita* establishes its superior position with a simple scientific explanation, *ghrita* has the power to effectively assimilate the properties of other substances with retaining its properties and *taila* when mixed with other substance assimilates the properties of others and give up its qualities together.
- According to some articles, it is said that *Murchana samskara* attributes special properties to *ghrita* by which monounsaturated & polyunsaturated fatty acids are increased and trans fatty acids are decreased. Due to these changes, there is a decrease in total cholesterol, LDL, Triglycerides and an increase in HDL was observed when *murchita ghrita* was administered.
- *Ama dosha* may be considered as an unwanted component among the raw *Sneha* including both *taila* and *ghrita*, like intermediate chemical constituents, dissolved gases, adulterants, plant toxins and moisture present in raw *Sneha* or developed due to long time storage.
- By removing its *Ama Lakshana* which inhibit lipid peroxidation and incorporated antioxidant property for augmentation of medicinal properties of the medicated *Sneha*. *Ama dosha* also can be considered as water content existing in oil/fat or the factor which inhibit the absorption (internal or external) of oil/fat.
- *Dourgandha* may be caused due to the long-term storage of the *Sneha* before the preparation we are ensuring that only pure and potent *Sneha* is taken for siddha *Sneha Kalpana*. No doubt, *Haridra* will help to impart good colour while *Murchana*. Other ingredients may help in contributing of good smell to the *Sneha*, meanwhile increasing the medicinal properties too.
- Hence pre- preparatory *Murchana* procedure is important to increase the potency of the *ghrita*.

**Table 5:** showing the significance of *Murchana* dravyas

Sr. No.	Name and Latin Name of the Drug	Contribution with <i>Murchana</i>	Chemical Constituents
1.	Haritaki consists of Dried fruit's pericarp of <i>Terminalia chebula</i>	Increase solubility of active principles	Tannin, Chebulic acid
2.	Amalaki consists of Dried fruit's pericarp of <i>Embllica Officinalis</i>	Increase acid value, the solubility of drugs	Vit-E, essential oil and phosphatides

3.	Vibhitaki consists of Dried fruit' spericarp of Terminaliabellirica	Increase solubility of active principles	Tannin, gallic acid, allergic acid.
4.	Musta consists of the rhizome of Cyperus rotundus	Increase the acid value and gives good Odour	Unstable alkaloids and essential oils
5.	Haridra consists of rhizome of Curcuma longa	Colouring and antifungal	Alkaloid curcumin, essential oil.
6.	Matulunga swarasa consists of fruit juice of Citrus medica	Increase acid value, the solubility of drugs, gives a good Odour.	Vit C, petroleum ether extract of Citrus medica, essential oil.

### Significance of snehadravya

The *Sneha*, which is glycerides of fatty acid interacts with drava and undergoes hydrolysis resulting in the formation of fatty acid and glycerol. So formed fatty acids are Amphipathic which comprises a hydrophobic exterior and hydrophilic interior.

### Significance of kalkadravyas

- The *drava* which diffuses into *Kalka* dissolves the water-soluble active principle and discharges it into the liquid media due to the collapse of the boundary layer which results in the transfer of active principles from *Kalka* to solvent.
- Soaking of the drug in the drava results in softening of the drug. It is due to the diffusion of liquid into *Kalka* by the phenomenon of osmosis. Due to the presence of the hydroxyl group, the *Kalka* swells which results in increased diffusion pressure inside the cells ultimately leading to the bursting of the cell wall.
- *Acharya Sarangadhara* has mentioned a specific quantity of *kalkadravyas* to be taken based on the *drava Dravya*. For *kashaya as drava Dravya*, the quantity of *kalkadravyas* should be 1/6<sup>th</sup> of the *snehadravya*. The same quantity has been adopted for the present study.

**Significance of Drava Dravya:** In the case of *Snehapaka*, the *drava Dravya* plays an important role and acts as an ideal medium. It facilitates the migration of the active principles from the *kalkadravyas*, thereby enriching the *Sneha*. The *Drava* itself has high therapeutic importance due to its absorption along the cell membranes. *Acharya Sarangadhara* has mentioned as *Sneha Kalpana* should not be finished within a day. By giving *agni paka* for several days there will be an increase in *gunasanchaya* occurs. The reason behind

boiling *Sneha* for 3days means the drug absorption is complete.

### The probable reason behind specifying the number of days for paka kala<sup>(15)</sup>:

- The meat soup or boiled rice or rice water are such substances which easily get fetid and impart foul smell within a day because of biodegradation as well as early putrefaction. Probably this might have given evidence to our Acharyas to get finish the oil preparation at the earliest i.e., within a day.
- Secondly, *ksheera* may get spoiled within a day or two, so *Acharyas* might have restricted the time duration to 2 nights.
- *Swarasa* as such is a *guru*, because of the presence of both water soluble and fat-soluble contents. So, it may take a little, longer period to give out active principles to the oleaginous media. This might have caused the scholars to fix a time for *swarasa in Sneha Kalpana* as within 3 nights or there may be chances of addition of unwanted active principles by increasing the time duration of preparation.
- *Moolas* are hard, dry, with more active principles compared to other parts of the plant. Almost all *Valli moolas* will be small, so our acharyas specified to take the whole plant. So, *Kalka* of these parts will be having more active principles when compared to *drava Dravya*.
- Due to different boiling temperatures of oil and water, they boil at different temperatures. The boiling point of a liquid depends upon the chemical bonds that hold them together. The chemical bonds that hold oil together are stronger than the ones holding water together. It takes more heat to break them apart.

- Active principles will get ample time to get interacted with the *drava Dravya* and *snehadravya* if the *agni* is given more than a day.

So, our Acharyas may specify that *ghrita* and *taila* preparations should not be completed within one day.

- CG was prepared on *mandagni* because at high-temperature carbonization of *Kalka Dravya* occurs as all liquid constituents will be evaporated early and no *drava Dravya* will be available for preparation.
- *Mandagni* provides stage wise release of the active principles at different temperatures and at different times which renders the Bio-constituents to get affixed inside the chemical bond of the saturated and unsaturated fatty acids. It also provides optimum release of active principles due to the increased duration of the *agni* contact.

**Role of temperature:** *Snehapaka* should be carried out under *mandagni*, which reduces boundary layer thickness, increases the diffusion coefficient, and decreases the viscosity of the liquid, thereby facilitating the migration of active principles from the solid component to the medium.

- **Pakalakshana-** In the *Madhyama paka*, no moisture is remained in *Kalka* and can be easily moulded into spindle shape. So that the *saveeryataavadhi* of the drug can be maintained and that signifies the drug cannot get affected by the influence of microbial contamination.
- **Siddhi Lakshanas:**
- **Shabdaheenoagninikshipta-** suggests a reduction of water i.e., the extent of moisture content. When water remains in the *Sneha* it produces the cracking sound, and this sound disappears gradually after the reduction of water. When *Kalka Dravya* of *Sneha* was put on fire it does not produce any sound that indicate *Kalka Dravya* was devoid of moisture.
- **Phenodgama-** specifically for *Taila*, froth can be seen. Suggests completion of the process of *Snehapaka*

Probable reason: *Tila taila* is an unsaturated fatty acid with a double bond structure. On heating, continuous oxidation takes place in oils. As a result of the

formation of lower fatty acids, bubbling appears on the surface of the oil.

- **Phenashanti-** specifically for *ghrita*, froth disappears. Suggests completion of the process of *Snehapaka*.

Probable reason: *Ghrita* is a saturated fatty acid with a single bonded structure. On heating, undergoes hydrolysis. As a result, the water part evaporates, and fumes subside.

- **Vartivatlakshana-** When *Kalka Dravya* was rolled between two fingers, it attains varti like shape that indicates a proper sign of *Sneha paka*. During this stage, the active component of *Kalka* will properly assimilate in the *Sneha Kalpana*.
- **Gandha varna rasodbhava-** suggest that the production of desired specific characteristics of Odour, colour and taste because of active constituents are transferred into the *ghrita* and *taila* media.

## DISCUSSION ON ANALYTICAL STUDY

For the present pharmaceutical preparations, an Analytical study was carried out by considering both Ancient Ayurvedic and modern parameters. According to Ayurvedic Parameters, the obtained CG was tested for all the organoleptic characters.

### Physio-chemical parameters

- **Refractive index-**It is the ratio of the velocity of light in a vacuum to its velocity in the substance. It is a fundamental physical property of a substance often used to identify a particular substance, confirm its purity, or measure its concentration. More will be Refractive Index, there will be more concentration of light which facilitates rancidification of *Ghrita* Refractive index of MG was- 1.4569, CG was 1.4568.
- **Specific gravity-** It indicates the solid to liquid ratio in the *Ghrita*. The specific gravity of the MG was- 0.9126, CG was 0.9028.
- **Rancidity-** Ghee and fat with a higher degree of unsaturation will pick up oxidative rancidity earlier. Fat is not oxidized in MG&CG.
- **Acid value-**It is a measure of the number of Carboxylic acid groups in a chemical compound, such

as fatty acid, or in a mixture of compounds, as oil-fats rancidify, triglycerides are converted into fatty acids and glycerol, causing an increase in acid. Less acid value denotes the less chance of decomposition of *Ghrita* thus increasing both life span and therapeutic value. The acid value of the MG was 0.21, CG was 0.22.

- **Saponification value** –Saponification value gives an idea about the molecular weight of an oil / Fat. The saponification value and molecular weight of oil are inversely proportional. It helps determine adulteration of given fat by one of the lower or higher saponification values. The saponification value of the was MG is 210.37, CG is 232.81.
- **Iodine value-** It indicates the degree of unsaturation. A greater degree of unsaturation indicates the possibility of the ghee becoming rancid due to atmospheric oxidation. And the iodine value of the MG was 28.42, CG was 27.39.
- **Peroxide value-** it is the most widely used analytical method. It gives a measure of the extent to which an oil/ghee sample has undergone primary oxidation; the extent of secondary oxidation may be determined from the p-anisidine test. The peroxide value of the MG was 0.54, CG was 0.57.

### Discussion on TLC

TLC is the sophisticated analytical parameter for the evaluation of the herbal drastic can also serve as Fingerprinting technique for identification and quantification of the herbal and Herbo-mineral formulations. Thought technique major phytochemical present the drug or formulation can be estimated. It helps to find out the adulteration in the formulation and is used as a standard for the herbal compounds. In the present study TLC of CG was carried out,

### CONCLUSION

1. *Chagaladya Ghrita* is one of the *Sneha kalpana*. There is a total of 5 references available with variations in the ingredients and method of preparation and dosage. Among them, the *Bhaishajya Ratnavali* (BR) & *Ayurvedic Formulary of India* (AFI) reference was selected for the preparation. The drug was prepared with *Ajamamsa*,

*Vasapanchanga Kashaya*, *Ashwagandha Kashaya*, *Murchita Go Ghrita*, *Chagadugdha*, *Astavarga dravyas* (Substituted drugs was taken) *Triphala*, *Trikatu*, *Chaturjata* & other *prakshepaka dravyas*.

2. *Murchita ghrita* total quantity is 12kgs. For practical convenience prepared in 2 batches. It is prepared by – *Haritaki*, *Amalaki*, *Vibhitaki*, *Musta*, *Haridra* each-750gms and *matulunga swarasa*-750ml according to B.R and AFI. The yield was (93.97%), out of 12000ml.
3. CG total quantity is 1200ml. For practical convenience prepared in 2 batches. It is prepared by *Murchita Ghrita*-12litres, *Ajamamsa* -30kgs, *Mamsa rasa*-30litres, *jala*-,400litres, *Vasapanchanga Kashaya*-30litres, *Ashwagandha Kashaya*-30litres, *Aja Ksheera*-12litres, and *Prakshepaka dravyas* each (75x32) =2400gms & (152gms) of *Chaturjata*.
4. The physical test shows CG Dark green greasy in colour with Bitter astringent taste and Characteristic aromatic Odour with semisolid consistency.
5. TLC study of CG and other herbal ingredients confirms the presence of Rf value and colour bands of *Vasapanchanga* in CG. In the TLC study presence of bands of *Vasapanchanga* shows the importance of *shapka*, where all the contents of *Ajamamsa* transferred to CG
6. *Chagaladya ghrita* at the dose of 10ml OD with *Ushnodaka* has a better result in *Rajyakshama*. Even though *Rajyakshama* is an *Asadhya vyadhi*, quality of life can be increased by the administration of *Shamana aushadhis* with proper *Anupana*. If patients having *uttama Bala* followed by *Vamana*, *Virechana* and *Shamana aushadhis* like *Chagaladya ghrita* can give appreciable results.

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