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HYPOLIPIDEMIC ACTIVITY OF PANCHATIKA GHRITA PREPARED BY A MURCHITA AND MURCHITA GHRITA

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ABSTRACT: In Ayurveda, ghritha (ghee) and taila (oil) are commonly used for treatment either internally or externally. It is commonly believed that by consumption of oil or ghee will lead to hyperlipidemia. Hyperlipidemia is an ailment of lipid metabolism produced by an increase of plasma concentration of the various lipid and lipoprotein, which cause cardiac disease, premature coronary artery disease, stroke, atherosclerosis and pancreatitis. Before the preparation of anyoushadhi siddha (medicated) taila (oil), and ghritha (ghee), murchana (processing of ghee) is a kind of samskara (procedure) mentioned in bhaishajya ratnavali. On administration of panchatikta ghritha prepared by a murchita and murchita ghritha (processed ghee) in albino rats, the results shown murchana samskara (processing of ghee) helps to reduce total cholesterol, LDL, triglycerides and increase in HDL. Guna (properties) and karma (action) of the drugs used in the panchatikta ghritha and murchana samskara (processing of ghee) might have contributed. Recent studies also show that triphala, musta (*Cyperus rotandus*), haridra (*Curcuma longa*), and matulunga (*Citrus medica*) are used for murchana samskara (processing of ghee) have hypolipidemic and cardioprotective activity.

INTRODUCTION: Different types of fat or lipid media are used in ayurvedic treatment. Ghritha (ghee), taila (oil), vasa (fat), and majja (marrow) are mainly four sneha dravya (fat media) mentioned in Ayurvedic classics. Goghrita (cow's ghee) and tila taila (oil) are said be the best among all jangama (animal origin) and sthavara (plant origin) sneha (fat) dravya, respectively¹. It is a belief in the masses that consumption of oil or ghee will lead to hyperlipidemia.

Sneha in Ayurveda treatment is used wherein it acts therapeutically, giving the desired therapeutic result without any adverse effects. Before the preparation of any oushadhi siddha (medicated) taila (oil), and ghritha (ghee), murchana (processing of ghee) a kind of samskara (procedure) has to be adopted as mentioned in classics².

Previous research works carried out on physico chemical, chromatographical analysis, and experimental studies done on ghritha kalpana (ghee preparations) using Murchita ghritha (processed ghee) has also shown promising results^{2, 3, 4, 5, 6}. To explore some more data, this experimental study was conducted. Hyperlipidemia is an elevation of lipids (fats) in the bloodstream. These lipids include cholesterol, cholesterol esters (compounds), phospholipids, and triglycerides.

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It is of utmost significance because it leads to atherosclerosis of vessels (arterial walls), leading to vascular diseases. Hyperlipidemia may be associated with disorders such as heart attack, premature coronary artery disease, stroke, atherosclerosis, myocardial infarction, and pancreatitis^{7, 8, 9, 10}. Direct reference of hyperlipidemia in Ayurveda literature is not found, and this might be due to the fact that it is a metabolic disorder and not a full-fledged disease in itself. It is auxiliary to several other severe conditions like coronary artery disease, cerebrovascular accidents, metabolic syndrome, etc. In Ayurveda, various attempts have been made to use distinctive nomenclature to denote the word hyperlipidemia as follows

- a) rasagata sneha vriddhib) rasa raktagata sneha vriddhic) medovriddhi
- d) medoroga or medodoshae) ama medo dhatu

The study of Ayurvedic literature bears certain ambiguous references pertaining to an increase in the amount of circulating body lipids, yet the literal meaning of hyperlipidemia is not found to be distinctly stated anywhere. The study of hyperlipidemia can be done on the basis of studying two of the closest diseases in Ayurveda having some amount of relation with hyperlipidemia are atisthaulya or medo roga and prameha¹¹. To evaluate the hypolipidemic activity of panchatikta ghrita prepared by a Murchita ghrita (ghee) and Murchita ghrita (processed ghee) and to assess the importance of murchana samskara

(processing of ghee) by comparing the experimental results of panchatikta ghrita prepared by a murchita ghrita (ghee) and murchita ghrita (processed ghee), the present study was undertaken.

MATERIALS AND METHODS:

Pharmaceutical Study: Raw drugs required for the preparation of *Murchita ghrita* (processed ghee) and panchatikta ghrita were collected from teaching pharmacy of Sri Dharmasthala Manjunatheshwara College of Ayurveda, Hassan. Preparation of murchita ghrita (processed ghee) and panchatikta ghrita were conducted at Rasashastra and Bhaishajya kalpana practical laboratory, Sri Dharmasthala Manjunatheshwara College of Ayurveda, Hassan as per the reference of Bhaishajya Ratnavali.

Experimental Study: Wistar strains, Albino rats of either sex between 170 to 270 g were obtained from animal house attached to Department of Pharmacology, SDM Centre for Research in Ayurveda and Allied Sciences, Udupi. The experimental protocol was approved by the institutional ethical committee under the reference no-CPCSEA/IAEC/2014-15SDMHNS-05. The animals were fed with a normal rat diet and water *ad libitum*, cholesterol solution (40% cholesterol) throughout the study. They were acclimatized in the laboratory condition for one week prior to the experimentation. The housing provided has the following conditions: controlled lighting of 12:12h light and dark cycle, the temperature of 25 °C, and relative humidity of approximately 50%.

Animal Grouping:

TABLE 1: GROUPING OF ANIMALS WITH DRUG AND RESPECTIVE DOSE

S. no.	Group	Drug	Dose	No. of animals
1	Normal control	CMC 0.5%	5 ml/kg	6
2	Test drug group I	<i>Panchatikta ghrita</i> prepared by a murchita ghrita (ghee)	4320 mg/kg	6
3	Test drug group II	<i>Panchatikta ghrita</i> prepared by murchita ghrita (processed ghee)	4320 mg/kg	6

Experimental Protocol: Wistar strain albino rats of either sex weighing 170 g to 270g were divided into three different groups, six in each group. Control group rats were administered with CMC at a dose of 5 ml/kg (1 ml/200 gm) with a normal diet and water *ad libitum*. 1st and 2nd groups were administered with panchatikta ghrita prepared by a murchita (ghee) and murchita ghrita (processed ghee) samples (864 mg/200 gm bodyweight of

albino rats), respectively. Both test drugs were administered at morning hour for 21 consecutive days. The test drugs were administered directly due to their liquid form with the aid of gastric catheter.

Collection of Blood Sample and Biochemical Analysis from Serum: The blood was collected from the orbital plexuses at the end of the experiment on 21st day; 4 h after the last drug

administration using light ether anesthesia. The biochemical investigation was carried out to assess

total cholesterol, high-density lipoprotein, low-density lipoprotein, and triglycerides

OBSERVATIONS AND RESULTS:

TABLE 2: SUMMARY OF EFFECT OF GHRITA (GHEE) SAMPLES ON LIPID PROFILE

Group	Total cholesterol	HDL	LDL	Triglycerides
Normal control	52.66 ± 4.31	26.83 ± 3.26	17.00 ± 1.21	89.5 ± 5.70
<i>Panchatikta ghrita</i> prepared by <i>a Murchita ghrita</i> (ghee)	61.00 ± 3.20	32.66 ± 1.08	15.2 ± 1.15	171.33 ± 31.98
<i>Panchatikta ghrita</i> prepared by <i>Murchita ghrita</i> (processed ghee)	32.16 ± 1.53	34.6 ± 2.71	7.51 ± 1.25	108.4 ± 5.61

An apparent increase in the total serum cholesterol, LDL cholesterol, triglyceride, and decrease in HDL cholesterol was observed in *panchatikta ghrita* prepared using *Murchita ghrita* (processed ghee) compared to *panchatikta ghrita* prepared using *amurchita ghrita* (ghee) group.

DISCUSSION: The main objective of the present study was to determine the hypolipidemic potential of *panchatikta ghrita* prepared using *amurchita ghrita* (ghee) and *Murchita ghrita* (processed ghee) samples on albino rats.

Effect on Lipid Profile: Total cholesterol was increased in *panchatikta ghrita* prepared using a *Murchita ghrita* (ghee) group compared to normal control group and *panchatikta ghrita* prepared using *Murchita ghrita* (processed ghee) group. It indicates that after *murchana samskara* (processing of ghee) total cholesterol is decreased.

Total cholesterol is made up of LDL-Cholesterol, HDL-Cholesterol and a portion of triglycerides and is a risk factor for heart disease¹².

HDL was increased in *panchatikta ghrita* prepared using *Murchita ghrita* (processed ghee) group compared to normal control group and *panchatikta ghrita* prepared using *amurchita ghrita* (ghee) group.

HDL-cholesterol helps to remove the excess LDL-cholesterol from the body and has a lot of protein and less cholesterol. HDL-cholesterol below 40 mg/dl is a major risk factor for heart disease and above 60 mg/dl is protective for heart diseases.

LDL was decreased in *panchatikta ghrita* prepared using *Murchita ghrita* (processed ghee) group compared to normal control group and *panchatikta ghrita* prepared using a *Murchita ghrita* (ghee)

group. It indicates that *murchana samskara* (processing of ghee) attributes special properties and monounsaturated and omega 6 fatty acids might have been increased due to which LDL is decreased¹³. LDL-cholesterol causes blockages in arteries and increases the risk of heart attack and stroke. Saturated fats can raise LDL cholesterol, and mono-unsaturated fats can help to lower the amount of LDL cholesterol in the blood. Trans fats lower HDL (good) cholesterol and raise the level of LDL cholesterol in the blood.

Triglycerides were increased in *panchatikta ghrita* prepared using a *Murchita ghrita* (ghee) group compared to normal control group and *panchatikta ghrita* prepared using *Murchita ghrita* (processed ghee) group. Triglycerides are a common type of fat found in the blood and a major source of energy. Triglycerides are the storage form of excess calories. High triglyceride levels are associated with decreased HDL-cholesterol levels and an increased risk of heart disease¹⁴.

Murchana samskara (processing of ghee) attributes special properties to *ghrita* (ghee) by which monounsaturated and 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 in *Murchita ghrita* (processed ghee) group. This and analytical study provide evidence base to 'aadoo *murchayeta sneha*' mentioned in *bhaishajya ratnavali*.

Vasa (*Adhatoda vasica* Nees), *nimba* (*Azhardirakta indica*), *guduchi* (*Tinospora cardifolia*), *kantakari* (*Solanum xanthjocarpum* Schrad and Wendl) and *patola* (*Trichosanthes dioica*) are used as ingredients of *panchatikta ghrita*.

For ghrita murchana samskara (processing of ghee), haritaki (*Terminalia chebula*), amalaki (*Embllica officinalis*), bibhitaki (*Terminalia bellirica*), haridra (*Curcuma longa*), musta (*Cyperus rotandus*) and matulunga (*Citrus medica*) are used as mentioned in bhaishajya ratnavali.

Recent studies show that these have hypolipidemic and cardio protective properties^{15, 16, 17, 18, 19, 20, 21}. These properties of drugs have attributed the hypolipidemic activity of murchana samskara (processing of ghee). The analytical study has also shown increase in Dodecanoic acid, gondoic acid, oleic acid and unsaturated fatty acids that are expected to contribute to the beneficial effect in increasing HDL cholesterol, in decreasing risk of developing cardiovascular diseases and in reducing the risk of male infertility and growth retardation²².

As mentioned in classical book the drugs used in ghrita murchana are having katu (pungent), tikta (bitter), kashaya (astringent) rasa (taste), laghu (light for digestion) ruksha (dry) guna (properties), kaphahara doshagnata and lekhaneya (scraping) karma (action).

Drugs used in panchatikta ghrita have katu (pungent), tikta (bitter), kashaya (astringent) rasa (taste), laghu (light for digestion) ruksha (dry) guna (properties), katu (pungent) vipaka, ushnaveerya, and kaphahara, tridosahara dosagnata properties.

These guna (properties), karma (action) are attributed the medoharaproperty (hypolipidemic activity) in panchatikta ghrita prepared using murchita ghrita (processed ghee).

CONCLUSION: The results of the experimental study show that murchana samskara (processing of ghee) contributes specific properties in ghrita (ghee) to reduce total cholesterol, LDL, Triglycerides, and to increase HDL. This effect is useful to reduce harmful effects of fats which are considered to play a significant role in atherosclerosis and other cardiac diseases. Hypolipidemic activity in ghrita (ghee) is attributed by the drugs used in panchatikta ghrita and murchana samskara (processing of ghee) having katu (pungent), tikta (bitter), kashaya (astringent) rasa (taste), laghu (light for digestion) ruksha (dry) guna, kaphahara tridosahara doshagnata,

lekhaneya karma (action), ushnaveerya and katu vipaka.

These attribute the medohara property (hypolipidemic activity) to panchatikta ghrita prepared with murchita ghrita (processed ghee). Recent studies also show that triphala, musta (*Cyperus rotandus*), haridra (*Curcuma longa*) and matulunga (*Citrus medica*) which are used for murchana samskara (processing of ghee) have hypolipidemic and cardio protective activity. Panchatikta ghrita prepared with murchita ghrita (processed ghee) is therapeutically efficacious than panchatikta ghrita prepared with a murchita ghrita (ghee). Hence bhaishajya ratnavali statement stands scientific and beneficial.

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