



Review on Lekhaniya Mahakashaya mentioned in Charak Samhita w.s.r. to hypolipidemic action

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ABSTRACT :

Hyperlipidemia is an umbrella term that refers to any of several acquired or genetic disorders that result in high levels of lipids in the blood including cholesterol and triglycerides which can be correlated to raise and vitiated Medodhatu (lipids) in the body as mentioned in Ayurveda. In recent times, increasing attention has been focused on serum lipid levels as a risk factor for coronary heart disease and stroke. Raised cholesterol is estimated to be responsible for 18% of cerebrovascular disease and 56% of ischemic heart disease. Overall, these diseases account for about 4.4 million deaths (7.9% of the total). India is sitting on a gold mine of well-recorded and well-practiced knowledge of traditional herbal medicine. In Ayurveda the chapter 4 of Charak Samhita sutrasthan deals with 50 different groups of 10 herbs with common action. The third of these groups is Lekhaniya Mahakashaya i.e. plants acting as scraping agents. The raised and vitiated Medodhatu (fats) in the body is scraped, digested and destroyed by these herbs. The present paper provides information about the pharmacological action of these Lekhaniya herbs with special reference to Hyperlipidemia. The probable mode of action of Lekhaniya Mahakashaya is excretion of bile in feces reducing absorption of fats, lipids in gut. It is hoped that this data shall be useful to all pharmacies & practitioners for the preparation of formulation and management of hyperlipidemia.

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1. Introduction

Hyperlipidemia is a family of disorders that are characterized by abnormally high levels of lipoproteins including cholesterol and triglycerides or both in the plasma. The two common lipid abnormalities are categorized either by high blood cholesterol levels (hypercholesterolemia) or high blood levels of triglycerides (hypertriglyceridemia). It is mainly associated with high fat-diets, a sedentary lifestyle, obesity and diabetes. Hyperlipidemia is one of a number of modifiable risk factors for Coronary Heart Disease (CHD).[1] From point of view of High Density Lipoprotein (HDL), 28.2% males and 12.9% females have HDL below 1 mmol/l. [2] Raised cholesterol increases the risks of heart disease and stroke. Globally, a third ischemic heart disease is attributable to high cholesterol. According to W.H.O. raised cholesterol is estimated to cause 2.6 million deaths (4.5% of total) and 29.7 million disability adjusted life years (DALYS), or 2.0% of total DALYS. Thus hyperlipidemia is a common problem. Unfortunately, over time this can be a serious condition that requires attention.

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Statins are a class of drugs often prescribed by doctors to help lower cholesterol levels in the blood but they have side effects like muscle pain, liver problems or memory fog. Therefore scientists are searching new types of medicines that can bring down cholesterol.

Ayurveda i.e. an ancient system of medicine has a rich treasure of medicinal plants which are very effective in prevention and management of diseases. Acharya Charak specifies and describes 50 Mahakashaya with 10 herbal drugs in each group with common action to combat the particular disease or disorder or help contribute to positive health. Likewise there is mention of group named Lekhaniya Mahakashaya i. e. group of herbs having scraping action. *Lekhan* is aimed basically for *Apatarpana* (emaciation) of the body.

According to Ayurveda Hyperlipidemia can be considered analogous with raised and vitiated MedoDhatu (lipids) in the body which is caused by hypo-functioning of Medodhatwagni (*Medo-dhatvagnimandya*) and these Lekhaniya herbs correct the *Medo-dhatvagnimandya* and check the process of *Medovridhi* (*increase in the quantity and subsequent deposition of medo dhatu*) in the body. And the herbs mentioned in Lekhaniya herbs promote Jatharagni as Agni is the part and parcel of all bio-transformations. The present article gives information about the pharmacological actions of the herbs included in Lekhaniya Mahakashaya with special reference to Hyperlipidemia.

2. Material and methods

To review the Lekhaniya herbs in chapter 4 of Charak Samhita sutrasthan was referred ⁽³⁾. It is the 3rd Mahakashaya amongst total 50 Mahakashaya defined by Acharya Charaka. The research work done by scholars on these herbs regarding hypolipidemic activity was also taken into consideration.

3. Observation and results

This group consists of 10 herbs as follows

Table. No. 1: Ten Herbs of Lekhaniya Mahakashaya

Sr. No.	Name of herb	Latin name	Family	English name	Part used
1.	Musta	Cyperus rotundus Linn.	Cyperaceae	Nut grass	Bulbous root
2.	Kushtha	Sassurea lappa (C.B.Clarke)	Compositae	Costus	Root
3.	Haridra	Curcuma longa Linn.	Zinziberaceae	Turmeric	Dry rhizome
4.	Daruharidra	Berberis aristata DC.	Berberidaceae	Indian berberri	Stem wood
5.	Vacha	Acorus calamus Linn.	Aaraceae	Sweet flag	Dry rhizome
6.	Ativisha	Aconitum heterophyllum Wall. Ex Royle	Ranunculaceae	Indian Atees	Root
7.	Katurohini	Picrorhiza kurroa Royle ex Benth.	Scrophulariaceae	Picrorhiza	Root
8.	Chitraka	Plumbago zylanica Linn.	Plumbaginaceae	Ceylon lead wort	Bark of root
9.	Chirbilva	Holoptelea integrifolia Planch.	Ulmaceae	Indian Elm	Bark of stem
10.	Haimavati	1) Paris polyphylla Sm. 2) Iris germanica Linn. 3) Iris ensata Thunb.	Liliaceae Iridaceae Iridaceae	Oris root	Root

Probable mode of action from Ayurvedic point of view

According to Ayurveda the etiological factors like lack of exercise, sleeping day time (Diwa swapa), excessive eating of madhura(sweet),snigdha (oily),sheeta (cold) food, bijadosha (genetic causes) which lead to the hypo-functioning of Medo-dhatwagni that results in Santarpanjanya Vyadhis (diseases produced by overnutrition). Due to this factor dushta (vitiated) medodhatu i.e. raised and unwanted quantity of lipids increases in the body (disturbance in fat metabolism) resulting into hyperlipidemia. According to Sharangdhar Lekhan (emaciation/desiccation) is the action of the drug which can remove abnormally increased Sneha.

In Ayurvedic classics, the action of drugs is interpreted on the basis of properties (Gunas) and Rasapanchaka is an indicator of drug action. The Rasapanchaka of the Lekhaniya herbs is as follows

Rasapanchaka of the lekhaniya herbs ^[4]

Name of herb	Rasa	Veerya	Vipaka	Guna	Prabhav
Musta	Tikta, Katu, Kashaya	Sheeta	Ushna	Laghu Ruksha	
Haridra	Tikta, Katu	Ushna	Ushna	Ruksha Laghu	
Kushtha	Tikta, Katu, Madhura	Ushna	Ushna	Laghu Ruksha, Tikshna	
Daruharidra	Tikta, Kashaya	Ushna	Ushna	Laghu Ruksha	
Vacha	Katu, Tikta	Ushna	Ushna	Laghu Tikshna	Medhya
Ativisha	Tikta, Katu	Ushna	Ushna	Laghu Ruksha	
Katurohini	Tikta	sheeta	Ushna	Laghu Ruksha	
Chitraka	Katu	Ushna	Ushna	Laghu Ruksha Tikshna	
Chirbilva	Tikta, Kashaya	Ushna	Ushna	Laghu Ruksha	
Haimavati	Katu, Tikta	Ushna	Ushna	Laghu Ruksha Tikshna	

On the basis of this Rasapanchaka the properties of Lekhaniya Mahakashaya can be stated as follows:

Rasa: Tikta, Katu, Kashay

Veerya: Ushna

Vipaka: Katu

Guna: Laghu, Rukha, Tikshna

The above properties present in the herbs of Lekhaniya Mahakashaya are very useful for Ama Pachana, so by means of these properties digestion of Ama, restoration of Agni (Deepana) at the dhatu level, removal of excessive Kleda, Kapha takes place.

Lot of researches are done on Lekhaniya Mahakashaya in obesity and observed that Lekhaniya Mahakashaya was beneficial in reducing total cholesterol level, LDL levels, and VLDL levels Lekhaniya Mahakashaya is doing Lekhan of excessive fat (reducing excessive fat) due to its Ushna, Tikshna, Lekhan (penetrating hot) properties.^[5]

Some research work showing hypolipidemic activity of herbs mentioned in Lekhaniya Mahakashaya is as following

MUSTA : Dominic Amalraj A., Parkavi C. et al has concluded that hypolipidemic activity of *Cyperus rotundus* on CCL₄ induced dyslipidemia in rat, the aqueous extract of *Cyperus rotundus* significantly show the hypolipidemic activation through lipid profile liver marker enzyme. *Cyperus rotundus* treatment proved to be effective in reducing the extent of lipid peroxidation improves the lipid profile. The potential hypolipidemic activity of *Cyperus rotundus* may be due to presence of phenolic groups. ^[6]

KUSHTHA: Anbu J; Anjana, Ashwini et al has concluded that, the food intake and body weight was increased in high cholesterol fed diet rats as compared to normal control. Treatment with ethanolic extract of *Saussurea lappa* showed no change in food intake but there was significant decrease in weight gain as compared to high cholesterol fed diet rats. The antihyperlipidemic activity may be due to presence of tannins, triterpenes, alkaloids, inulin, and essential oil present in the roots of *Saussurea lappa*. ^[7]

HARIDRA: Babu PS and srinivasan K (1997) has concluded that Streptozotocin- induced diabetic rats were maintained on 0.5% curcumin containing diet for 8 weeks. blood cholesterol was lowered significantly by dietary curcumin in these diabetic animals. Significant decrease in blood triglyceride and phospholipids was also brought about by dietary curcumin in diabetic rats. In order to understand the mechanism of hypocholesterolemic action of dietary curcumin, activities of hepatic cholesterol-7 α -hydroxylase and HMG CoA reductase were measured. Hepatic cholesterol-7 α -hydroxylase activity was markedly higher in curcumin fed diabetic animals suggesting a higher rate of cholesterol catabolism. ^[8]

DARUHARIDRA: Dipti Potdar, R. R. Hirwani et al has concluded that the plant of *Berberis aristata* showed the hypolipidemic activity on phyto-chemical and pharmacological screening. ^[9]

VACHA: Parab RS and Mengi SA has concluded that an administration of 50% ethanolic extract (100 and 200 mg/kg) of rhizomes of *Acorus calamus* as well as saponins (10 mg/kg) isolated from the extract demonstrated significant hypolipidemic activity. On the contrary, the aqueous extract showed hypolipidemic activity only at a dose of 200 mg/kg. ^[10]

ATIVISHA: Subhash AK and Augustine A has concluded that the methanolic extract of *Aconitum heterophyllum* was orally administered in diet-induced obese rats for 4 weeks. The *A. heterophyllum* treatment markedly lowered total cholesterol, triglycerides and apolipoprotein B concentration in blood serum. It also showed positive effects (increase) on serum high-density lipoprotein cholesterol (HDL-c) and apolipoprotein A1 concentration. On the other hand, *A. heterophyllum* treatment lowered HMG-CoA reductase activity, which helps to reduce endogenous cholesterol synthesis and also activated lecithin-cholesterol acyltransferase (LCAT), helping increase in HDL-c. An increase in fecal fat content is also an indication of the hypolipidemic effect of *A. heterophyllum*. The significant hypolipidemic effect of *A. heterophyllum* may be linked to its ability to inhibit HMGR activity and block intestinal fat absorption. The increase in HDL-c may linked to its ability to activate LCAT enzyme. ^[11]

KATUKROHINI: Vijender Singh, Ashok Chaudhary et al has concluded that, the alcoholic, chloroform and aqueous root extracts of *Picrorhiza kurroa* Royle ex Benth were screened for its antihyperlipidemic activity in Triton wr-1339 induced albino rats. Atorlip- 20 was used as reference standard. The result show significant decrease in triglyceride and cholesterol level when compared with the hypolipemic groups by using different dose: low (50mg/kg), high (200mg/kg) and standard Atorlip-20(4mg/kg bw) and by treating for 7hr and 24hr. Among all the three extract alcoholic extract proved to be most significant in the treatment of Hyperlipidemia. ^[12]

CHITRAKA: Sudha R. Pendurkar and Sushma A. Mengi has concluded that the oral administration of the aqueous extract of root of *Plumbago zeylanica* Linn. at the dose of 20, 40, and 80 mg/kg were found to

ameliorate the hyperlipidemic condition as evidenced by a reduction of cholesterol and triglyceride levels. Further, aqueous extract at all doses demonstrated a significant increase in fecal cholesterol excretion indicating a reduction in intestinal cholesterol absorption. Additionally, the activity of lipogenic enzymes like HMGCoA reductase in the liver remained significantly low on treatment with aqueous extract (80mg/kg) thus decreases the cholesterogenesis. ^[13]

CHIRBILVA: Subhash AK and Augustine A has concluded that oral administration of methanol extract of *Holoptelia integrifolia* (Roxb) planchon bark in diet-induced obese rats for 4 weeks. The *H. integrifolia* treatment markedly lowered body weight, serum lipids and apo B and increase high-density lipoprotein-cholesterol and apo A1 concentration. In this study, HMGR activity was enormously reduced, which helps to reduce cholesterol biosynthesis and an increase in LCAT activity was also observed. The methanol fraction of *H. integrifolia* on LC-MS and tandem mass spectrometry analysis shows the presence of a compound, 3-(7-ethoxy-4-methyl-2-oxo-2H- chromen-3-yl) propanoate. The result showed that the significant hypolipidaemic effect of *H. integrifolia* may be linked to its ability to inhibit HMGR activity and block intestinal fat absorption. ^[14]

HAIMVATI: M. Iqbal Choudhary, S. Naheed et al concluded that, two groups of Wistar rats were fed with high-fat diet and ethanolic extract of *Iris germanica* were administered orally in one group while other received saline for 10 weeks. Result indicate that ethanolic extract of *Iris germanica* significantly lowered the lipid components especially, the cholesterol and triglycerides. ^[15]

Discussion

Sharangdhar states that the drugs performing Lekhan karma have curretive and absorptive action on Dhatu and Mala. In the Sushruta Samhita it is mentioned that the drugs which execute Lekhan Karma are mainly composed of Vayu and Agni Mahabhoota (16). Thus for counteracting weight, bulkiness as well as fats and producing lightness in the body and to stimulate Agni Lekhaniya drugs are used. These actions help to reduce the deposition of excess fat in the body. Herbs of Lekhaniya Mahakashaya has properties like *Lekhana* (scraping agent), *Dipana* (*Stimulates Agni*), and *Pachana* (*Digests vitiated medodhatu*) which play major role in hyperlipiemia.

Tikta, Katu and Kashay Rasa: All of these three Rasas are Katabolic in effect and have absorbing effect and reduce *Kleda*. Hence they cause depletion of the *Meda Dhatus*. *Tikta* and *Katu rasa* these dravyas repairs altered *Jatharagni* and *Medodhatvagni*. The both Rasas are srotoshodha (Channel cleaning.) () Due to Vayu & Agni predominance Katu rasa absorbs the fluid and expels the obstructive material. Tikta rasa acts in a similar way by absorbing the fluid and slimy material due to Vayu and thus vacating space on account o Aakash. Due to Sookshma guna it permeates even to minute channels thus helps the drug to reach at cellular level and it helps to deplete Meda and Kleda. Tikta and Kashaya rasas have Lekhana guna that scraps out excessive Kapha and Meda from srotas.

Ushna veerya: *Ushna Virya* is dominated by *Agni Mahabhuta* and is responsible for the reduction of *Meda*. Ushna veerya stimulates Agni thus corrects the *Medo-dhatvagnimandya* and checks the process of *Medovridhhi*. It opposes any increment of kapha and meda by the vilayana property. *As Agni is the part and parcel of all bio-trasformations in the body*. In view of Charak any principle which is responsible for action is Veerya. Shivdasa in his commentary says that Veerya is the potency which is located in a particular fraction of the drug where the potency lies in concentrated form. This, more or less synchronises with the modern concept of active chemical fractions of the drug which are responsible for action.

Katu vipaka: The predominance of Agni, Vayu and Aakash Mahabhootas causes Katu Vipak and is responsible for Medodhatukshay. (Reduction in excessive Medodhatu) Moreover it pacifies increased *Kapha* due to its *Laghu Ruksha Guna*.

Laghu, Ruksha and Tikshna Guna: These gunas helps Rasas and thereby potentiates their action by way of synergism. Laghu Guna produces Laghutva (decreases weight or bulk) and Ruksha guna is responsible for creating dryness in the body. *Tikshna Guna* is dominated by *Agni Mahabhuta* and it breaks down the *Dosha Sanghata* in srotas (channels), as a result it helps in removing *Sanga* (obstruction) in Srotas. This action is performed by Chitraka, Vacha, Haimavati and Kushtha.

Thus all of these factors regulate *Jatharagni* which in turn checks the excessive growth and accumulation of *Medodhatu*.

By the virtue of *Deepana-Pachana Karma* these herbs increase *Agni* at all levels and it reduces *Ama* and corrects *Medodhatvagni Mandya*. The *Tikta, Katu Rasa, Tikshna Guna* properties irritate the intestine leading to increased propulsive movement of intestine. Hence, provides less time for absorption of fats from intestine. *Katuka* is one of the most important drugs mentioned in *Lekhaniya Mahakashaya*, which has choleric (Pittavirechak) and cholegogue-Virechak (purgative) action⁽¹⁷⁾. *Katuka* possess Choleric action i.e. it increases bile production. It has cholegogue action which promotes flow of bile from gall bladder into the intestines. The bile salts are required for absorption of fats and lipids from gut, thus the excretion of bile in feces leads to decrease absorption of fats, lipids in the gut hence concentration of lipids in serum is decreased. *Katuka* has irritant property which damage the structure of villi in intestine hence causes decreased capacity for absorption.^[18] *Musta* and *Ativisha* possess *Sheeta veerya* therefore perform *Grahi* action. Hence they control the excessive motion caused by *Katuka*. They also reabsorbs the water from large intestine, thus reduces the threat of dehydration because of loose motions. *Haridra* has linolenic acid. (19)

Alpha linolenic acid (ALA) can decrease the risk of cardiovascular disease (CVD) through various biological mechanisms, including reductions in lipids, in lipoproteins, and in the inflammatory markers C-reactive protein (CRP) and cell adhesion molecules (20). Thus each of the content of *Lekhaniya Mahakashaya* has its role in making it an ideal hypolipidemic formulation.

Conclusion

It is an attempt on the part of this review paper to highlight the information about the pharmacological actions of *Lekhaniya* herbs useful in hyperlipidemia. The probable mode of action of *Lekhaniya Mahakashaya* regarding hyperlipidemia is excretion of bile in feces reducing absorption of fats, lipids in gut. This data will be useful in advance study on these plants and promote research and development in field of medicine, pharmaceutical industry & therapeutic significance. The development of new herbal formulation will help to manage hyperlipidemia safe and effectively & can open new horizons for research and treatment of hyperlipidemia.

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