

**TREASURE OF AYURVEDA FOR DIABETES AND OBESITY****Kajaria Divya^{1*} and Chandola H. M².**¹Assistant Professor, Department of Kayachikitsa, Ch. B. P. A. C. S, New Delhi.²Director-Principal, Ch. Brahm Prakash Ayurveda Charak Sansthan, New Delhi-110073 India.Article Received on
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C. S, New Delhi.**ABSTRACT**

Eternity of Ayurveda cannot be denied by calling rudely it as unscientific without knowing its integrity and credibility and by unseeing profound proofs. Research work is the integral part co-existing along with the sequential development of science knowingly or unknowingly. Ayurvedic science is nothing devoid of it. In Ancient treatise we find a vivid description of the disease solely attributed to metabolic derangement along with genetic predisposition. Changing life style, lack of exercise, fast foods, improper unbalanced diet, and sedentary lifestyle are showing upward trend in India. This has lead to the outbreak of Life style disorders. Holistic approach of Ayurveda in

regard to preventive, promotive and purificative measures with due consideration of appropriate diet management proved to be fruitful to provide better health in such diseases. Among most dreaded life style disorders, obesity and diabetes are most important human ailment afflicting masses in different countries. In India these are proving to be major health problems, especially in the urban areas. Though there are various approaches to reduce the ill effects of diabetes and obesity and their secondary complications, herbal formulations are preferred due to lesser side effects and low cost. A list of medicinal plants with proven pharmacodynamic actions and related beneficial effects as well as Ayurvedic approach in the management of these disease are compiled in this paper.

KEYWORDS: *Prameha, Sthoulya, Ayurveda, Herbs.***INTRODUCTION**

Obesity itself is a disease but the horrible side of this disease is that it is a root cause of many other diseases like diabetes. Ayurveda says that *Agnimandya* (default/ disturbed metabolism) is the seed for development of all types of diseases. *Agnimandya* occurring at any level

whether it is at the level of *Kostha* (alimentary tract) or *Dhatu* (tissues) produces a sequence of unified diseases. Vitiated *Sleshama/ Kapha* (abnormal lipidogenesis) is the initiator of pathology in both *Prameha* and *Sthoulya*. Abnormality in the lipid metabolism may be acquired secondary to faulty life style and dietary habit or may be inherited due to *Bijabhagavayava dusti* (genetic default). There are many theories postulated for the pathogenesis of obesity in the modern medical science. One such theory says that due to lack of proper enzymes essential for lipid metabolism in mitochondria body is unable to use lipid as fuel for the liberation of energy and therefore it starts accumulated in the body causing obesity. One such enzyme is L-carnitine which is essential for the transfer of long-chain fatty acids from the cytosol to mitochondria for subsequent beta oxidation. Its lack impairs the ability to use fat as fuel. This can result in an acute metabolic decompensation, most often early in life, with hepatic encephalopathy and hypoketotic hypoglycaemia.^[1] The liver is a central organ for carnitine metabolism; therefore it is not surprising that carnitine metabolism is impaired in patients and experimental animals with certain types of chronic liver disease. Hampered metabolism of lipid in liver causes accumulation of fats in liver cells, increase FFAs, adipokines, adiponectin, resistin etc in the liver cells and leads to insulin resistance that secondarily produces type-2 diabetes mellitus. Disturbed lipid metabolism (*Medoagnimandya*) causes abnormal lipidogenesis (production of cholesterol, LDL and VLDL) that further deterioration of *Mamsa dhatu* (accumulation of lipids in smooth muscle cells of arterial wall). Affiliation of lipids with smooth muscle cell causes atherosclerosis and produces Hypertension. Thus the defective lipid metabolism causes a complex syndrome known as Metabolic Syndrome. Consequently the whole array of complexity can be singly targeted merely by correcting default lipid metabolism. Management aiming to regularise lipid metabolism in liver may or may not be adjuvant with hypoglycaemic drugs will definitely prove to be useful in Diabetes.

First, we will discuss those herbs that are proved to have hypoglycaemic activity and that are abundantly used for the management of Diabetes, as follows.

Gymnema Sylvester

Meshashringi (*Gymnema Sylvester* (Retz.) R.Br.; Gurmar) targets several of the etiological factors associated with diabetes, including chronic inflammation, obesity and pancreatic B-cell function.^[2] In a study on rats with streptozotocin – induced diabetes, *G.sylvestre* treatment resulted in 30% increase in total pancreatic weight, and a significant increase in the

number of islets and number of B-cells per islet. The regenerated pancreatic tissue resulted in complete control of fasting blood glucose levels within 20-60 days. Normal rats in this study did not experience an increase in insulin release when treated with *G. sylvestre* extract, indicating that this herb has a normalizing effect on the blood glucose and may therefore be safer than conventional oral hypoglycemic agents such as sulphonylureas.^[3] Several clinical studies have demonstrated that *G. sylvestre* effective in decreasing blood glucose levels in patients with type 1 and type 2 diabetes.^[3,4,5] Two (2) clinical trials investigated the effects of combining *G. sylvestre* treatment with conventional therapy compared to the conventional therapy alone. In 22 patients with type 2 diabetes, treatment with *G. sylvestre* extract significantly reduced blood glucose, glycosylated hemoglobin, and glycosylated plasma proteins, whereas with conventional treatment alone (i.e. glibenclamide or tolbutamide), these values increased or remain the same. The patients receiving the herbal extract were able to decrease the dosage of their conventional drug, and 5 patients were able to discontinue the drug entirely and maintain their glucose level using only *G. sylvestre*⁴. In 27 patients with type 1 diabetes, *G. sylvestre* treatment reduced fasting blood glucose, glycosylated hemoglobin, and glycosylated plasma protein levels.^[5]

Tinospora cordifolia

Aqueous and alcoholic extracts of Guduchi [*Tinospora cordifolia* (Willd.) Hook. f. & Thomson] reduced glucose levels in rats with alloxan- induced diabetes. The antihyperglycemic effect may be due to pancreatic islet free- radical- scavenging activity. This herb also lowers the levels of tissue and serum cholesterol, phospholipids, and free fatty acids.^[6,7]

Curcuma neilgherrensis

Curcuma neilgherrensis Wight, in the dose of 400mg/kg showed mild reduction in blood glucose level at 3rd and 5th hour in normoglycemic mice; however the observed decrease in blood glucose level was found to be statistically insignificant. Even though the drug failed to cease the hypoglycemia in the first hour after the glucose overload, it attenuated the same in later hours, but not in significant manner. The study reveals that *C. neilgherrensis* is having mild hypoglycemic potential and moderate antihyperglycemic effect. Clinical trial investigating the effects of combining *C. neilgherrensis* treatment with conventional therapy compared to the *C. neilgherrensis* alone showed that *C. neilgherrensis* significantly reduces the level of fasting blood sugar, postprandial blood glucose level, glycosylated hemoglobin, serum cholesterol, LDL and urine sugar.^[8,9]

Swertia chirata

Kiratikta [*Swertia chirata* (Roxb.) Buch.-Hum; also known as *Swertia chirayita* (Roxb.) H. Karst.] is a potent anti-diabetic herb. In a pilot study, *Swertia chirata* produced a significant decrease in fasting and postprandial blood glucose level in patients with diabetes¹. It contains swerchirin, a xanthone found in the *Swertia* species of plants. Xanthones are a unique class of biologically active compounds with antioxidant properties. Research has shown swerchirin produces a significant decrease in blood glucose levels in rat models.^[10-14] A 60% decrease in blood glucose induced by swerchirin was accompanied by a marked depletion in B- granules and insulin in the pancreatic islets. Glucose uptake and glycogen synthesis by the diaphragm muscle was significantly enhanced *in vitro* by the serum of swerchirin- treated rats. It was therefore concluded that swerchirin lowers blood glucose levels by stimulating insulin release from the islets of Langerhans.^[14]

Enicostema littorale

Mamejjaka (*Enicostema littorale* Blume) is used as a single herb and also as a part of an anti-diabetic mixture.^[15] In a clinical study on patients with type 2 diabetes, *E. littorale* reduced blood glucose and prevented the progression of diabetic complications. There was significant improvement in the lipid profile, blood pressure, and kidney function.^[16] It significantly reduced blood glucose and lipid peroxides in rats with alloxan- induced diabetes, and increased superoxide dismutase, catalase, and glutathione peroxidase.^[17] In studies on rats with streptozotocin- induced type 1 diabetes, *E. littorale* significantly reduced glucose, cholesterol, and triglyceride levels^[18], and ameliorated diabetic nephropathy. Serum creatinine and urea were significantly decreased, and glomerular function improved.^[19] In rats fed a hypercholesterolemic diet, *E. littorale* decreased serum cholesterol, triglycerides, LDL, VLDL, liver and kidney cholesterol levels, and lipid peroxidation levels. There was an increase in HDL, and an increase in reduced glutathione levels.^[20]

A pilot study on an herbal mixture containing *Tejapatra* (*Cinnamomum tamala*).^[21,22], *Pushkarmula* (*Inula racemosa*), *Mamejjaka* (*E.littorale*), *Meshashringi* (*Gymnema sylvestre*), and *Jambu* (*Syzygium cumini*) seeds with *Karvellaka* (bitter gourd; bitter melon; *Mommordica charantia*) juice, administered at a dose of 5g twice a day before meals, decreased fasting and post- prandial blood glucose levels in patients with diabetes.^[23] *Avartaki* (*Cassia auriculata* Linn.) and *Methika* (*Trigonella foenum- graecum*) as single herbs and decoction of *Nimba* (*Azadiracta indica* A.juss; *Neem*) have also demonstrated

blood glucose- lowering action.^[24] In a clinical study on patients with type 2 diabetes, *Neem* showed significant hypoglycemic effect. The effect of *Neem* was comparable to that of glibenclamide.^[25,26]

The herb *Gokshura* (*Tribulus terrestris* Linn.)^[27], *Asana* (*Pterocarpus marsupium* Roxb.)^[28], *Kulatha* [*Vigna unguiculata* (Linn.) Walp.], and *Saptaparna*^[29] [*Alstonia scholaris* (Linn.) R.Br.] are also beneficial in treating *Prameha*. These herbs can be used in different combinations, depending on the Doshic involvement and severity of illness. An herbal mixture comprised of one part each of *Karvellaka* (bitter gourd; bitter melon; *Mommordica charantia*), *Jambu* (*Syzygium cumini*), *Gurmar* (*Meshashringi* G.sylvestre), and *Amra* (*Moringa indica* Linn.), taken along with *Shilajit*, was investigated in a clinical study on 805 patients with diabetes. The results showed a statistically significant reduction in fasting and postprandial blood glucose along with clinical improvement (website of India's Central Council for Research in Ayurveda and Siddha).

Now we will discuss those herbs that have hypolipidemic activity in combination with hypoglycemic effect. All these herbs possess good anti-oxidant activity which is supposed to be key factor for their hypoglycemic and hypolipidemic activities.

Herbs useful in management of hyperlipidemia and hyperglycemia

- **Guggul** (*Commiphora mukul*): Guggul have been proven to be very effective in cholesterol control with none of the side effects of statin drugs. It has been shown that Guggul can lower blood cholesterol by 14-27% and can lower triglycerides by 22-30%. The effects that Guggul has on the blood cholesterol levels is comparable to prescription medications but, being a natural plant extract, it is a far superior and much safer product. Guggul works on the liver by increasing the metabolism (or break down) of the bad cholesterol known as LDL Cholesterol. After taking the product for 4 to 12 weeks, total cholesterol levels can drop triglyceride levels can drop and an increase in HDL (the good cholesterol) of approximately 16% can occur. Its benefits as a weight-loss and fat burning agent have been well researched and documented.^[30]
- **Lahsuna** (*Allium sativum*): In *Kashyapa Samhita* a full chapter is devoted to *Lahsuna* *Kalpa* and *Acharya* says that all types of menstrual disorder can be cured by it. Naturally occurring Sulphur containing compounds present in the *Allium* family may influence plasma cholesterol and atherosclerosis.^[5] The garlic preparations showed significant

reduction on serum cholesterol levels in clinical^[31] as well as experimental studies.^[32] *A. sativum* proved to have significant hypolipidemic activity. It is found to reduce serum cholesterol, triglyceride, LDL-C and atherogenic index.

- **Haridra (*Curcuma longa* Linn.):** Curcumin, a polyphenol present in the rhizomes of turmeric (*Curcuma longa*) spice, influences oxidative and lipid-mediated stress in the vascular system.^[33]
- **Haritaki (*Terminalia chebula*):** Haritaki was found to possess significant hypolipidemic activity. It produces significant reduction in total cholesterol, triglycerides, total protein and elevation of high density lipoprotein cholesterol. Haritaki at 1.05 and 2.10 mg/kg b.wt. concentrations are an excellent lipid-lowering agent.^[34]
- **Kumari (*Aloe vera*):** The administration of Processed Aloe vera lowered triacylglyceride levels in liver and plasma. Histological examinations of periepididymal fat pad showed that it reduces the average size of adipocytes.^[35]
- **Kalajaji (*Nigella sativa*):** Polyphenols, the main compound of *N. sativa* oil have many biological properties. They possess powerful antioxidative components, which can inhibit membrane lipid peroxidation^[36], and their administration exerts a therapeutic protective effect by decreasing oxidative stress.

DISCUSSION AND CONCLUSION

All the herbs we discuss above are proved to have action in Diabetes and Obesity but neither of them is used to treat both the disease simultaneously. Take an example to understand this- Mamejjaka (*Enicostema littorale* Blume) and Meshashringi (*Gymnema Sylvester* (Retz.) R.Br.; Gurmar) are supposed to work as hypoglycemic drugs and mostly use to treat diabetes but not obesity, though it reduces liver gluconeogenesis only by regularizing liver lipidogenesis but their use for management of obesity or atherosclerosis is not recommended. Now the question arises why there is such discrimination in the treatment strategy of unified diseases. When we say that diabetes is a consequence or complication of obesity then why hypolipidemic drugs are taken as a second line treatment for diabetes? Why lahsuna or haritaki or any other herb claim to lower lipid is not added in the treatment of diabetes from the beginning or why we always consider managing manifestations (symptoms) rather than uprooting cause of the disease. Therefore it can be concluded that for proper management of Diabetes and Obesity it is essential to treat the cause i.e. faulty metabolism with the help of proper combination of drugs rather to targeting consequences separately.

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