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Research Article

ROLE OF HERBAL PLANT IN TREATMENT OF DIABETES

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ABSTRACT

Diabetes or Prameha is an important human ailment affecting many from various walks of life in different countries. In India it is proving to be major health problem. Now days use of herb as a medicine is increasing in common people. This review focus on herbal plants which are commonly used in treatment of Prameha which is also known as Diabetes by various traditional healers. A list of medicinal plant with proven anti diabetic effect and other beneficial effect on health. They are mention in ancient samhitas as a pramehahar dravya in various texts.

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INTRODUCTION

The word prameha derived from the 'Miha Snehane' which means watering. 'Pra' mean excess of urine in both quality and frequency. Prameha thus becoming self explanatory and holds the twin meaning of 'Prabhut Mutrata' or excessive urination, and 'Avil Mutrata' or turbid urination. Ayurveda has describe that hungry person should takes the food containing all six tastes i.e. Sweet (Madhu), Sour (Amla), Saulty (Lavana), Bitter (Tikta), Pungent (Katu) and Astringent(Kashaya); insted if he takes only one taste i.e. Sweet, then sweet is predominant and it can increase Kapha and medas cause prameha. while discribing causes of prameha Achaya narretes following:

"Navvanapanam Gudavaikrutamcha Pramehahetu"¹

That means excess of newly harvested food grains. Jaggery preparation and factors responsible for elevation of kapha, may contributed to development of prameha later in life.

"Asyasukha Sawpna sukam Dadhini...."C.Chi.6/4¹

Asyasukham mean happiness of tongue, eating food which is sweet, salt, sour in taste. Swapansukham meaning sleeping in a day for more than 30 min and sleeping more at night. it is also means not leaving an active healthy life with good amount of exercise and sports.

Charaka samhita is a massive treaties on ancient Indian medicine. The prameha has been described eloquently and

elaborately in Charaka Samhita chikitsa sthan 6th chapter. Nidanasthan 6 th chapter of Sushruta Sanmhita and prameha nidana 33 rd chapter of Madhavanidana.

According to Ayurvedic point of view the basic principle or chikitsa sutra of prameha are shodhana and shamamn. Shodhan has been done in obese diabetic patient. the process has panchakarma like vamana, virechana, and lots of medicines and diet to normalize the condition. management would lead to more harm than good. hence in general practice shamana chikitsa is prevalent and popular.

Shamana chikitsa

Shamana means palliative treatment and santarpan (anti - vata) tratement. The herb used in the management of prameha syndrome are bitter, astringent and pungent in rasa. All herbs having test are having anti diabetic property. while treating prameha. herbs used either individually or with combination of other herbs or mineral. Following herb are described in ancient as well as modern Ayurvedic text for solution of prameha: Devdaru, Vijayasara, Jamun, Bel, Karela, Methi, tula, Daruharidra, Haridra, Amla. etc.

Apamarg: *Achyranthus aspera*

Blood glucose level of normal and alloxan induced diabetic rats were determined after per os administration of various doses of *Achyranthus aspera* powdered whole plant aqueous and

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methanolic extract. a significant dose related hypoglycemic effect in normal as well as in diabetic rabbits were observed. It is possible that the plant could act by providing certain necessary trace elements like (Ca, Zn, Mg, Cu) to the β -cells.⁴

Babbul: *Acacia arabica*

It is a moderate sized almost evergreen tree found throughout the drier part of India. The bark of this plant has various traditional uses including anti diabetic property. A significant hypoglycemic effect of powdered seed administered in normal rabbits as per os administration of various dose it was postulated that it is based on the release of insulin from pancreatic β -cells.⁵

Bael: *Aegle marmelosa*

Alloxan induced diabetic animal model was used to evaluate the potential anti diabetic effect of bael leaf extract. the diabetic animal were given insulin injection and another group *Aegle marmelous* leaf extract orally. the result indicated that the Bael leaf extract has similar hypoglycemic activity to that of insulin treatment. the treatment with leaf extract showed improved functional state of pancreatic β -cells. the result indicate that potential hypoglycemic effect of the leaf extract possibly involved in process for the regeneration of damaged pancreas. the leaf extract reduce blood sugar and urea serum cholesterol in all alloxanied rats. along with exhibiting hypoglycemic activities. this extract also prevented peak rise in blood sugar level at one hour in oral glucose tolerance test.⁶

Bhringaraj: *Eclipta alba*

Its an indigenous medicinal plant, has a folk medication in rural south India. As a hypoglycemic agent. The reported study on alloxan diabetic rats clearly showed that the per os administration of *Eclipta alba* possessed potent anti hyperglycemic activity.⁷

Bimbi: *Coccinia indica*

Coccinia indica leaf extract is an indigenous plant used in ayurvedic medicine in India. Administration of extract to normal and STZ diabetic animal exhibit significant hypoglycemic and anti hyperglycemic effect and reversed the associated with diabetes biochemical alteration. the result were indicated that the per os administration of *Coccinia indica* leaf extract. to diabetic animal normalize blood glucose level and caused marked improvement of altered carbohydrate metabolizing enzymes during diabetes.⁸

Chakramard: *Cassia tora*

Cassia tora fibers supplements consisting of soluble fibers extract from *Cassia senan*, tocopherol, ascorbic acid and maltodextrin was formulated in a pack and given to type II diabetes subject with certain treatment instruction according to the obtained results, cassia tora suppliment can help to improve serum lipid level in type II diabetic subject without serious adverse effect.⁹

Chandrashur: *Lepidium sativum*

The hypoglycemic effect of an aqueous extract of *Lepidium sativum* seed was investigated in normal and ST- induced rats. It was concluded that the aqueous extract of the plant exhibit potent hypoglycemic activity in rats after per os administration, without affecting the leaves of plasma insulin concentration.¹⁰

Chirayat: *Swertia chirayta*

A xanthon was isolated from the hexane fraction of *Swertia chirayta* plant. swerchirin, it has very significant blood sugar lowering effect after per os administration in fasted, glucose loaded and tolbutamine pre treated albino rat model.¹¹

Indrayan: *Citrullus colocynthisis*

The effect of aqueous, glycosides, alkaloidal and saponin extract of the rind of *Citrullus colocynthisis*. on the plasma glucose level were investigated in normal rabbit. the results were suggested that per os administration of the aqueous extract of the rind posses hypoglycemic effect and its hypoglycemic action could be attribute mainly to the presence of saponine, in addition to presence of glycoside compound.¹²

Jambu: *Eugenia jumbolana*

In India, the decoction of kernels of *Eugenia jumbolana* is used as a household remedy for diabetes. the hypoglycemic activity of different parts of *Eugenia jumbolana* (Indian black berry) seed such as whole seed, kernel and seed coat was studied on STZ- diabetic rats. after per os administration whole seed showed a moderate hypoglycemic effect, and seed coat did not show any activity.¹³

Kadali: *Musa sapientum*

It is commonly known as banana. wildy used in folk medicine for treatment of Diabetes. the flower extract present a decrease in body weight and also resulted in decreased in free radicle formation in experimental animal after per os administration. thus the study showed that the oral administration of banana flower extract has an anti hyperglycemic activity.¹⁴

Karvellaka: *Momordica charantia*

its commonly called bitter gourd, is a medicinal plant used in the ayurvedic system of medicine for treating various disease including Diabetes mellitus. at present unripe fruit, seed and aerial parts of the plant have a widespread used as vegetables and as a phytomedicine in various parts of the world to treat Diabetes. a hypoglycemic peptide, polypeptide-p has been isolated from fruit seed and tissue of *Momordica charantia*. polypeptide-p is very effective hypoglycemic agent when administered subcutaneous to gerbils, lungoor and humans.¹⁵

Carasee, a wild variety of *Momordica charantia* is traditionally prepare as a tea for the treatment of Diabetes mellitus in India. Investigations were carried to evaluate the effect of *Momordica charantia* on the glucose toleranceof the type II diabetes patient. the fruit juice of *Momordica charantia* was found to be significantly improved the glucose tolerance of 73% of the patients investigated while others 27 % fails to respond. The hypoglycemic effect of per os administered extract of fruits of cultivated *Momordica charantia* was examined in normal and STZ diabetic rat. The result suggested that per os administered karela extract lower glucose concentration independently of intestinal glucose absorption and involve an extra pancreatic effect. The extract seems to act like insulin or via insulin secretion from the pancreas like the action of the sulfonylurease.¹⁶

Khadir: *Areca catechu*

The nut contain large quantity of tannin, Gallic acid, fixed oil gum, volatile oil, lignin and alkaloids like arecoline, arecain, guracine etc, Arecoline was investigated and reported to have hypoglycemic activity in an animal model of diabetes upon Subcutaneous administration.¹⁷

Kumari: *Aloe vera*

Aloe is a desert plant with cactus like appearance and has been used since prehistoric time for burns and wound healing. the positive influence of aloevera on the healing of full thickness wound in diabetic rats is reported. the result indicate that aloevera may enhance the wound healing process by influencing the phases such as inflammation, fibroplasia, collagen synthesis, maturation and wound contraction. these effects may be due to reported hypoglycemic effects of the aloe gel.

The dried sap of the aloe is one of the several traditional remedies used for diabetes in Arabian peninsula. its ability to lower the blood glucose level when administered per os, was studied in patients with type II diabetes in Swiss albino mice. it was concluded that aloes contain hypoglycemic agent which lowers the blood glucose level.¹⁸

Latakaranj: *Caesalpinia bonducella*

Caesalpinia bonducella is a shrub wildy distributed throughout the India. The tribal people of India used it for controlling the level of blood glucose. seed kernels are used in management of Diabetes mellitus in folklore medicine of India. The seed kernel powder was reported to have hypoglycemic activity in experimental animals. four extract of seed kernel were prepare and tested for their hypoglycemic potential in normal as well as in alloxan induce diabetic rats.¹⁹

Markandika: *Cassia alata*

The per os effectivness of cassia alata leaf extract on STZ induced hyperglycemia in rats has been studied and the results were compared with glybenclamide while the extract has no effect on glucose level in normoglycemic animals. it reduce the blood sugar valu is STZ induced hyperglycemic animals.²⁰

Methika: *Trigonella foenum graecum*

Its seed is commonly found ingredient in Indian home. it has been found to diminished hyperglycemic in normal and STZ-induced diabetic rats after per os administration. fasting blood glucose, urine sugar excretion, serum cholesterol and triglyceride level of diabetics were significantly reduced. clinical symptoms like polyurea, polyphagia, polydypsia were improved. these effect of fenugreek seeds seems to be due to gum fiber present in them. fenugreek reported to be absolutely safe for consumption for longer duration.²¹

Mudga: *Phaseolus vulgaris*

An investigation was carried out to evaluate the effect of *Phaseolus vulgaris* (White bean) an indigenous plant used in unani and ayurvedic medicine in India, on blood glucose plasma insulin, cholesterol, triglyceride, free fatty acid, phospholipids and fatty acid composition of total lipids in liver, kidney and brain in normal had STZ- diabetic rats after per os administration. the results were suggested that plant exhibit hypoglycemic activity and hypolipidemic effect in STZ-

induced rats. it's also prevented the fatty acid changes observe during diabetes.²²

Punarnava: *Boerhavia diffusa*

It is a common plant that grows wildely in the topics in both dry and rainy season in India. A study was designed to investigate the anti hyperlipidaemia activity of an aqueous extract of *Boerhavia diffusa* leaves in alloxan induce diabetic rats. hyperlipidemia is an associated complication of diabetes mellitus. per os administration of *Boerhavia diffusa*. leaf extract resulted in significant reduction in serum and tissue cholesterol, free fatty acid, phospholipids and triglyceride.²³

Palandu: *Allium cepa*

It's a common vegetable. antidiabetic and antioxidant effect of s- methyl cysteine sulfoxide (SMCS) isolated from *Allium cepa* were studied in alloxan induce diabetic rats after using it for treatment for two months . the probable mechanism of action of smcs may be partly dependant on the stimulation of insulin secretions and partly due to its antioxidant activity.²⁴

Rason: *Allium sativa*

for thousand year and S- ally cysteine sulphoxide a sulphur containing amino acids which is precursor of alloxan diebetic rats. per os administration of it significantly decrease the concentration of serum lipid, blood glucose and activities of serum enzyme like alkaline phosphate, acid phosphates and lactate dehydrogenase and liver G6PD. it is also increased linen and intestinal HMGR activity and line HK activity.

Garlic and garlic preparation are also reported as agent used for the prevention and treatment of atherosclerosis related disease. Garlic indirectly effect the atherosclerosis by reduction of hyperlipidemia, hypertention and probably Diabetes mallitus and prevent thrombous formation. in animal models, garlic causes direct anti atherogenic (preventive) and anti atherosclerotic effect at the level of artery wall. Garlic causes direct effect on atherosclerosis may be explained by its capacity to reduce lipid content in arterial cell and to prevent intracellular lipid accumulation. Based on another study concerning the therapeutic potential of the ethanol extract of garlic, it was found that when it was responsible for antihyperglycemic and anti noiceptive effect in alloxan induced diabetic mice.

The effect of aged garlic extract administered or stem induced hyperglycemic effect was also investigated using the immobilization stress model in mice. it was suggested that it may be prevent stress induced hyperglycemia which is the risk of suffering from diabetes mellitus and its progression.²⁵

Sitaphalam: *Annona squamosa*

In many parts of India the young leaves of the custard apple tree, has antidiabetic properties was investigated. Diabetic mellitus was induced with STZ and doses of the aqueous leaf extract when administered in drinking water to normal and experimental diabetic rats. The findings of the study supported the antidiabetic claims of *Annona squamosa*. there is significant Antidiabetic potential of extract in ameliorating the diabetic conditions in diabetic rats.²⁶

Tarwad: *Cassia auriculata*

In experimental diabetes, enzyme of glucose and fatty acid metabolism are markedly altered, persistence hyperglycemic is a major contributor to such metabolic alteration, which lead to the pathogenesis of diabetic complications. The reported study was designed to the study effect of *Cassia alata*. flower extract on hepatic glycolytic and gluconeogenic enzymes and STZ induced Diabetes mellitus. rats were given the plant extract per os for 30 days. in conclusion, the observation shows that the aqueous extract posses an anti hyperglycemic effect and suggested that enhanced gluconeogenesis during diabetes is shifted towards normal and that the extract enhance the utilization of glucose through increased glycolysis. the effect of the extract was more prominent than that of glibenclamide.²⁷

Tulsi: *Occimum sanctum*

Per os administration of alcoholic extract of leaves of *Occimum sanctum* led to marked lowering of blood sugar level in normal, glucose fed hyperglycemic and STZ-diabetic rats, further the extract potentiate the action of exogenous insulin in normal rats.²⁸

Vijayasaar: *Pterocarpus marsupium*

Insulin resistance (Hyperinsulinaemia) is now recognised as a major contributor to the development of glucose intolerance, dyslipidemia and hypertension in type II diabetic patient. aqueous extract of *Pterocarpus marsupium* and *Trigonella foenum graecum* seed has been show to exert hypoglycemic effect in experimental as well as in clinical study. Results of the study in addition to previous clinical benefits of *Pterocarpus marsupium* seen in type II diabetes. Though several antidiabetic principle, caepcatechin, pterosupin, marsupin has been identified and should be studied in future to assess their safety and efficacy.²⁹

DISCUSSION

Herbal plants are used in treatment of Diabetes in India. herbal plants are gaining popularity all over world due to its natural origin and less side effects. Medicine listed above are most frequently used in various formulation available in market. This plant are proved to be a good anti diabetic medicine. They can be used as a single or in polyherbal formulation.

CONCLUSION

Herbal medicine used in India more than 3000 yrs. however herbal medicine did not receive analytical attention through western scientific method until recent decades. In this article review of few herbal drug which used most frequently in Diabetes mellitus treatment. Which has been experimentally demonstrated by modern in- Vitro and in - Vivo studies on drug induce Diabetes mellitus. The potential mechanism of these herb in DM are proved by lowering the blood sugar level. Hence, the evidence therapeutic potential of these herb suggested that this herb may be a good source for future drug development of new drug for Diabetes mellitus.

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