


Review Article
ANALYTICAL SCREENING OF CERTAIN MEHAGHNA AND PRAMEHAGHNA PLANTS OF CHARAK SAMHITA WITH SPECIAL REFERENCE TO ANTI-DIABETIC STUDIES
G.C. Nanda

Assistant Director and Incharge (Scientist -IV), Regional Ayurveda Research Institute for Eye Diseases, Lucknow, Uttar Pradesh, India.

ABSTRACT

Diabetes mellitus has become a challenge for human civilisation due to want of dependable and safer medicines. Though modern science has stepped up to maximum with the help of technological advancement but still the alternative approach stands as option, Ayurveda has described the complete treatment package for the disease *Prameha/Madhumeha* as it is compared with the disease *Prameha/Madhumeha* in Ayurveda. Different inter disciplinary etiopathogenesis are met with suitable scientific evaluations for its treatment. The herbal drugs are playing vital role in drug research in world scenario today. Several classical books are famous for their description of medicinal plants with various pharmacological values. Ayurveda has the answer for complete management of Diabetes mellitus as evident from the available treatises. Several herbs/plants are now been identified having antidiabetic effects today by the researchers but Charak Samhita an age old treatise of Ayurveda bears a lot of description about the potent plants/drugs for various diseases out of which certain *Pramehaghna/Madhumehaghna* plants are of concern. In 6th chapter of *Charak Chikitsa* several plants/plant materials have been identified working in *Prameha/Madhumeha*. Few plants selected from this chapter were taken to compare its efficacy in Diabetes at par with the available experimental/clinical studies. A search was made in the paper only to find out specific few plants described as *Pramehaghna /Mehaghna* in *Charak Samhita* to verify with experimental/clinical anti-diabetic study so far done and it was found that the plants so described in *Charak samhita* are having the anti-diabetic activities it would be praiseworthy to mention here that the result will find out a better way of solution in treating Diabetes Mellitus with further extensive trails.

KEYWORDS: *Charak samhita, Mehaghna, Pramehaghna Plants, Anti-diabetic.*

INTRODUCTION

To day more than 20 million people of the world are suffering from the disease Diabetes mellitus, which is a major public health problem known with great risk as far as the morbidity and mortality are concerned. In many, it can cause prolonged ill health and premature death also. The disease is rapidly developing into a major health hazard in our country with the changed life styles. The disease is affecting the average Indian at a quite younger age also, Diabetes mellitus is one of the oldest diseases known to mankind so far classical references are concerned. The disease was well known to the ancient Indian medical experts. All the renowned classic text of Ayurveda like Charaka Samhita, Sushruta Samhita and Vagbhatt etc. refer to this disease under the term *Madhumeha* (sugar in the urine)/*Prameha* and *Meha* etc.

The causes of diabetes are many known factors. Methods of prevention and treatment are prime concern. Furthermore, diabetes is a major cause of disability through its complications of retinopathy, nephropathy, cardiomyopathy and neuritis, which may lead to blindness, kidney failure, coronary thrombosis, gangrene of the lower extremities and amputation sometimes. Apart from detailed description its aetiopathogenesis a definite familial predication to the disease are also referred in Ayurveda as *Jata prameha*. Besides, the importance given

to dietary regulations, physical exercises and the use of *Mehaghna* plant drugs in the management of disease.

MATERIALS AND METHODS

Several medicinal plants are studied for their anti-diabetic effect and many of them are also used in practice, however, many herbal/plant drugs are seen in *Charak Samhita* as *Pramehaghna* and are listed below to compare with the available literature having potency against diabetes.

Attempt was taken to provide the information compiled and references collected from the text and other materials.^[1]

Enumeration of drugs with their Experimental/Clinical study References (See table)

Emblica officinalis Gaertn (*Amlaki*) is most important drug in Ayurveda used as medicine. It is known as preventive for diabetes when used raw Amla fruit and have been confirmed through several studies. As per a study methanolic seeds extract of *Emblica officinalis* possess significant anti-diabetes activity in streptozotonic-induced type- 2 diabetes mellitus rats. ^[2]

Magnifera indica Linn. (*Amra* or mango) is very important plants known for its fruits all over the world but so many scientific studies have been done on different

parts of the plants. However, the kernel of the seed is a noted anti-diabetic agent used by traditional physicians also. A study shows 100 gm powder of mango leaves taken daily, effectively reduced weight, elevated blood glucose level and relief in symptoms of type II diabetes mellitus patient. [3]

Tribulus terrestris Linn. (*Gokshura*) usually prescribed for urinary disorders but a study indicates that alcoholic extract of *Tribulus terrestris* possesses hypoglycaemic activity in type-I model of diabetes. [4]

Tinospora cordifolia (Willd.) Miers. (*Guduchi*) is otherwise Known as *Amruta* is a potent drug in Ayurvedic system and is used for a various disease conditions. The stem is generally used for medicine. The processed form called *Guduchi satva* which is an aqueous extract of the plant. A study shows that the root extract of *Tinospora cordifolia* is protective and is hypoglycaemic in nature. [5] Isoquinoline alkaloid rich fraction of *Tinospora cordifolia* (AFTC) may have hypoglycemic effects via mechanisms of insulin releasing and insulin-mimicking activity and thus effective in postprandial hyperglycemia in normal rats. [6]

Commifera wighiti (Arnott) Bhandari (*Guggulu*) is a very common drug useful for management of all sorts of neuro-musculo-skeletal diseases in Ayurveda and several compound formulations are in use. As per a study the administration of *Commifera wighiti* ethalonic extract (CMEE) has the ability to improve insulin sensitivity and delays the development of insulin resistance, aggravate antioxidant status in diabetic rats. [7]

Curcuma longa L. (*Haridra*) is a household item used from cosmetics to medicine. Several human studies have been done, having its anti-diabetic effect single or mixed with *Amla* (*Embllica affinalis*) [8]. A study reveals that the spent turmeric oleoresin being wasted at present can be used as anti-oxidant and anti-diabetic agent [9].

Terminalia chebula Retz. (*Haritaki*) a well-known drug in Ayurveda and is an important component of *Tiriphala*. After search it was found that fruit of *Terminalia chebula* or *Haritaki* extract was comparable with glibenclamide, a well-known hypoglycaemic drug in modern medicine. A study shows that the ethanolic extract of *Terminalia chebula* fruit has potential hypoglycaemic action. [10]

Citrullus colocynthis (L.) Schrad (*Indrayan*) has become rare due to massive deforestations. A study has been undertaken with aqueous extracts *Citrullus colocynthis* (2000mg/kg) exhibited significant anti diabetic activity in alloxan induced diabetic rats [11], aqueous extracts *Citrullus colocynthis* s an insulinotropic effect [12] and *Citrullus colocynthis* (CCT) is used in Iranian traditional medicine as a healing agent for reducing obesity-related diabetes troubles. [13]

Terminalia arjuna (Roxb) W & A (*Arjuna*) is drug used as hridya (Cardiac) but a study suggests that *Terminalia arjuna* is effective in reducing hyperglycemia, hyperlipidemia and oxidative stress related to the risk of diabetes. [14]

The drug *Myrica nagi* Thunb. (*Katphala*) is used for *Nasya* (errhine therapy) purpose under *Panchkarma*

procedure in Ayurveda. A study shows the anti-diabetic action of the extracts of *Myrica nagi* (*Katphal*) may be due to the blocking of glucose absorption. [15]

Costus speciosus Koen ex. Retz. (*Kemuka*) is also a noted drug used for various diseases like uterine problem and digestive problem etc. and it is often used by tribals of Assam. However, studies significantly prove that *Costus speciosus* root extract possesses hypoglycaemic, anti-hyperlipidemic and anti-oxidative effects, which may be clinical importance in the managements of diabetes and its complications. [16]

Acacia catechu Linn. (*Khadira*) is a drug used in various types of skin disorders and a study shows that ethalonic extract of *Acacia catechu* and the water insoluble fraction of ethalonic extract exhibited significant antihypoglycaemic activity and produced dose dependent hypoglycaemia in fasted normal rats. [17]

Rubia cordifolia Linn. sensu Hook. f. (*Manjistha*) is extensively used for skin diseases both externally and internally. A study suggests that *Manjistha* is a natural anti-oxidant, which might be helpful in management of diseases like diabetes. The study represents root of *Rubia cordifolia* as a potential hypoglycaemic agent. [18]

Piper longum L. (*Pippali*) is a bitter substance and is used with restriction due to its burning sensation when used orally. Most often it is used in anti-cough preparations but it has a potent anti-diabetic effect which was known from a study that the result indicates *Piper longum* ethanolic extract has potent hypoglycaemic and anti-lipid peroxidative effects in alloxan induced diabetic rats. [19]

Azadirachta indica A. Juss. (*Nimba*) is used as a drug from time immemorial for skin diseases and for various diseases also. From an experiment it is known that *Azadirachta indica* alcoholic leaf extract significantly lowered the blood sugar level in glucose-fed and adrenaline induced hyperglycaemic rats. [20]

Diospyros peregrina (Gaertn.) Gurke (*Tinduka*), is most often used to control dysentery and diarrhoea and polyurea. It possesses significant anti-diabetic activity and supports the traditional usage of the matured fruits for the control of diabetes. [21]

Lagerstroemia speciosa (L.) Pers. (*Tinisha*), being named as *Patala*, *Tinisha* and in vernacular name *Jarula* in Hindi, azar in Assamease etc. However, there have been many studied done on this remarkable herb. ellagic acid derivatives showed an inhibitory effect on glucose transport assay and presence of corosolic acid in the leaves of plant activate the transport of glucose transporter which helps reduce blood sugar level. [22]

Peterocarpus marsupium Roxb. (*Bijaka*) is a potent anti-diabetic drug both in Ayurveda and modern known through experiments. In an another study, it was bound that phenolic C-glycosides present in *Peterocarpus marsupium* heart wood are the phytoconstituents responsible for the anti-hyperglycemic activity and validate the claim of anti-diabetic activity of heart wood of *Peterocarpus marsupium*. [23]

List of *Mehaghna* and *Pramehaghna* Plants of Charak Samhita

Sl.No.	Name of the Plant/drug	Latin/ Botanical Name	Reference
1.	<i>Amlaki</i>	<i>Emblia officinalis</i> Gaertn	Charak chikitsa Chapter 6
2.	<i>Amra</i>	<i>Magnifera indica</i> Linn.	-do-
3.	<i>Gokshura</i>	<i>Tribulus terrestris</i> Linn.	-do-
4.	<i>Guduchi</i>	<i>Tinospora cordifolia</i> (Willd.) Miers	-do-
5.	<i>Bhandari (Guggulu)</i>	<i>Commifera wighiti</i> (Arnott)	-do-
6.	<i>Haridra</i>	<i>Curcuma longa</i> L.	-do-
7.	<i>Haritaki</i>	<i>Terminalia chebula</i> Retz.	-do-
8.	<i>Indrayan</i>	<i>Citrullus colocynthis</i> (L.) Schrad	-do-
9.	<i>Arjuna</i>	<i>Terminalia arjuna</i> (Roxb) W & A	-do-
10.	<i>Katphala</i>	<i>Myrica nagi</i> Thunb.	-do-
11.	<i>Kemuka</i>	<i>Costus speciosus</i> Koen ex. Retz.	-do-
12.	<i>Khadira</i>	<i>Acacia catechu</i> Linn.	-do-
13.	<i>Manjistha</i>	<i>Rubia cordifolia</i> Linn. sensu Hook. f.	-do-
14.	<i>Pippali</i>	<i>Piper longum</i> L.	-do-
15.	<i>Nimba</i>	<i>Azadirachta indica</i> A. Juss.	-do-
16.	<i>Tinduka</i>	<i>Diospyros peregrina</i> (Gaertn.)	-do-
17.	<i>Tinisha</i>	<i>Lagerstroemia speciosa</i> (L.) Pers.	-do-
18.	<i>Bijaka</i>	<i>Peterocarpus marsupium</i> Roxb.	-do-

OBSERVATION AND DISCUSSION

It was observed from the total plants identified from Charak Samhita have *Mehaghna* effect which are not specific as, *Madhumehaghna* or anti-diabetic. Out of the above plants have experimentally found having anti-diabetic effect mostly on animal model. Among the major chemical constituents of plants credited with hypoglycemic actions are glycoside, alkaloids, glycans, triterpenes, mucilages, polysaccharides, oils, vitamins, saponins glycoprotein's, peptides, amino acids hypoglycaemic activities have been done using various animal models like normal, fasting rate and rabbits; alloxen- treated rabbits and hyperglycaemia. In most animal studies water extracts or alcoholic extracts of the plants have been screened. In few studies, the active principles of plants have been investigated for hypoglycaemic activity induced in rate by andrenaline, corticoropin, and by sources and screening processes strengthening the concept.

CONCLUSION

Ayurvedic texts like Charak Samhita written thousands year back and a lot of plants are being described as *Mehaghna/Pramehaghna*. In this context the concept of *Mehaghna/Pramehaghna* was verified in the terms of anti-diabetics of modern medicine. After verifying the experiments done on the plants described in Charaka Samhita for anti-diabetic effect. It may be conceptualized that the *Mehaghna/Pramehaghna* plants of Charaka Samhita is identical for anti-diabetic properties. So, these plants could be taken for higher studies in term of clinical validation in future.

REFERENCES

1. Charaka Samhita, 1980. Commentary by Chaturvedy, G.N. and Shastri, K.N., IX. Edition, Chowkhamba Vidhyabawan, Varanasi.
2. Sharan, S.B., Mondal P., Zaman M.D.K., Junajo J.A., Verma V.K. 2013. In vivo Anti-diabetic activity of the Methanolic and aqueous bark extracts of the plant *Emblia officinalis* Gaertn, Academic journal of Plant Sciences, 6(2), 64-68.
3. Gupta C., Gupta A., 2011. A study on hypoglycemic effect of mango leaves (*Mangifera indica* Linn.) on type II diabetic patients (30-70 years). Food Science Research Journal; 2 Issue (2): 146-151.
4. El-Tantawy W.H., Hassanin L.A., 2007. Hypoglycemic and hypolipidemic effects of alcoholic extract of *Tribulus alatus* in Streptozotocin-induced diabetic rats, a comparative study with *T. terrestris* (Caltrop). Indian J Exp Biol. 2007 Sep; 45(9): 785-90.
5. Verma R.K., Aslam I. & Roy S.P., 2013. Hypoglycemic effect of *Tinospora cordifolia* on swiss albino mice. Indian J Fundtl Applied Life Sci, 3 (1). 120-122.
6. Patel M.B., Mishra S., 2011. Hypoglycemic activity of alkaloidal fraction of *Tinospora cordifolia*. Phytomedicine.;18 (12):1045-1052.
7. Ramesh B., Saralakumari D., 2012. Anti-hyperglycemic, hypolipidemic and antioxidant activities of ethanolic extract of *Commiphora mukul* gum resin in fructose-fed male wistar rats, J Physiol Biochem. 68 (4): 573-582.

8. Nanda G.C., Chopra K.K., Sahu D.P., Padhi M.M. 1998. Nishamalaki in Madhumeha (NIDDM) : A clinical Study; JRAS, 19(1-2): 34-40.
9. Nampoothiri SV, Lekshmi PC, Venugopalan VV, Menon A.N., 2012. Anti-diabetic and Antioxidant potentials of Turmeric oleoresin, a by-product from curcumin production industry, Asian pacific journal of Tropical Disease, S169-S172.
10. Gandhipuram P.S.K., Palanisamy A., Durairaj S.K., Sorimuthu P.S., 2006. Anti-diabetic activity of fruits of Terminalia Chebula on Streptozotocin induced diabetic rats, Journal of Health science. 52(3), 283-291.
11. Agarwal V., Sharma A.K., Upadhyay A., Singh G., Gupta R., 2012. Hypoglycemic effect of Citrullus colocynthis roots, Acta poloniae Pharmaceutica drug Research, 69(1), 75-79.
12. Abdel-Hassan I.A., Abdel-Barry J.A., Tariq M.S., 2000. The hypoglycaemic and antihyperglycaemic effect of Citrullus colocynthis fruit aqueous extract in normal and alloxan diabetic rabbits. J. Ethnopharmacol., 71: 325-330.
13. Sanadgol N., Najafi S., Ghasemi L. V., Motalleb G., Estakhr J., 2011. A study of the inhibitory effects of Citrullus colocynthis (CCT) using hydro-alcoholic extract on the expression of cytokines: TNF- α and IL-6 in high fat diet-fed mice towards a cure for diabetes mellitus. Journal of Pharmacognosy and Phytotherapy; Vol. 3(6), pp. 81-88.
14. Parveen K., Khan Rashid, Siddiqui Waseem A.; 2011. Anti-diabetic effects afforded by Terminalia arjuna in high fat-fed and streptozotocin-induced type-2 diabetic rats, Int J Diabetes and Metab, 19, 23-33.
15. Mukesh S., 2008. Anti-diabetic effects of Myrica nagi aqueous extract fractions in alloxan-induced diabetic rats, Thesis, pp 121.
16. Bavarva J.H., Narasimhacharya A.V.R.L., 2008. Antihyperglycemic and hypolipidemic effects of Costus speciosus in alloxan induced diabetic rats. Phytotherapy Research. 2008; 22(5): 620- 626.
17. Jarald E., Joshi Si.B., Jain D. C., 2009. Biochemical study on the hypoglycemic effects of extracts and fraction of Acacia catechu Wild in alloxan-induced diabetic rats, Int J Diabetes and metabolism, 17, pp 63-69.
18. Rani S., Mandave P., Khadke S., Jagtap S., Patil S., Kuvalekar A., 2013. Antiglycation, antioxidant and anti-diabetic activity of traditional medicinal plant, Rubia cordifolia Linn. for management of hyperglycemia, International Journal of Plant, Animal and Environmental Sciences (IJPAES); 3 (July-September, 2013) pp 42-49.
19. Silvan S., 2007. Anti-hyperglycemic and anti-lipidperoxidative effects of Piper longum dried fruits in alloxan induced diabetic rat, Journal of Biological Sciences, 6(1), 161-168.
20. Manoharan S., Silvan S., Vasudevan K. and Balakrishnan S., 2007. Antihyperglycemic and Antilipidperoxidative Effects of Piper longum (Linn.) Dried Fruits in Alloxan Induced Diabetic Rat. Journal of Biological Sciences, 7: 161-168.
21. Rahaman M.W., Mostofa M., Sardar S.A., Sultana M.R., Haque M.M. and Choudhary M.E., 2005. Investigation of comparative hypoglycemic effect of neem, karala and nayantara with glibenclamide on rat, IJP, 1(3), 257-260.
22. Kumar K.E., Mastan S.K., Sreekanth N., Chaitanya G., Sumalatha G. and Krishna P.V., 2008. Hypoglycemic and antihyperglycemic activity of aqueous extract of Diospyros perigrina fruits in normal and alloxan-induced diabetic rabbits, Pharmacologyonline, 3, 250-256.
23. Bai N., He K., Roller M., Zheng B., Chen X., Shao Z., Peng T. And Zheng Q., 2008. Active compounds from Lagerstroemia speciosa, insulin-like glucose uptake-stimulatory/ inhibitory and adipocyte differentiation-inhibitory activities in 3T3-L1 cells, J.Agric.Food chem, 56(24), 11668-11674.
24. Mishra A., Srivastava R., Srivastava S.P., Gautam S., Tamrakar A.K., Maurya R. and Srivastava A.K., 2013. Anti-diabetic activity of heart wood of Pterocarpus marsupium Roxb. and analysis of phytoconstituents, IJEB, 51, 363-374.

Cite this article as:

G.C. Nanda. Analytical Screening of Certain Mehaghna and Pramehaghna Plants of Charak Samhita with Special Reference to Anti-diabetic Studies. International Journal of Ayurveda and Pharma Research. 2016;4(11):1-4.

Source of support: Nil, Conflict of interest: None Declared

***Address for correspondence**

Dr. G.C. Nanda

Assistant Director and Incharge
(Scientist –IV), Regional Ayurveda
Research Institute for Eye Diseases,
Lucknow, Uttar Pradesh-226016, India.

Email: vdgnanda@gmail.com

Mob. No. 09415001345