

# Traditional Herbal Plants Use for Treating Diabetes Mellitus

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**Abstract:** *Diabetes mellitus (DM) is very common problem for all age group considering from children to old age. DM can control through some of the plant herbs by using them in our day to day food habits. The present study renders the list of traditional medicines with its phytochemicals, antidiabetic activity and botanical description of plant. Work is describing the traditional medicinal formulations, which they claim to be active antidiabetic agents. The study survey was conducted nearby Gandhinagar district of India to find out the medicinal plants that use by the community as primitive care treatment of diabetes. Total 15 medicinal herbs are concluded here with their evidence base data. Given study interferes with the plants base herbal products which are having enormous potential for possible development of new and efficacious antidiabetic natural drug.*

**Keywords:** Diabetes Mellitus (DM), Phytochemicals, Antidiabetic, Traditional Medicines, Drug

## 1. Introduction

Diabetes mellitus is an endocrinological disorder arising from insulin deficiency or due to ineffectiveness of the insulin produced by the body. This results in high blood glucose and with time, to neurological, cardiovascular, retinal and renal complications. It is a debilitating disease and affects the population of every country of the world. Around 200 million people of the world suffer from this disease and this figure is projected to rise more and more in the coming years. It is believed that the use of Traditional medicinal can cure diabetes or at least alleviate the major symptoms and progression of this disease through its formulation and application of medicinal plants. One of the great advantages of medicinal plants is that these are readily available and have very low side effects. This paper aims to evaluate precious herbal medicinal plants studies on the management of diabetes mellitus and to framework for future studies.

## 2. Literature Survey

Diabetes mellitus is caused by the abnormality of carbohydrate metabolism which is linked to low blood insulin level or insensitivity of target organs to insulin (Maiti R, Jana D, Das UK, Ghosh D ,2004).The herbal drugs with antidiabetic activity are yet to be commercially formulated as modern medicines, even though they have been acclaimed for their therapeutic properties in the traditional systems of medicine (Wadkar KA, Magdum CS, Patil SS, Naikwade NS ,2008)Traditional medicine (herbal) is used for treatment of diabetes in developing countries where the cost of conventional medicines is a burden to the population (Saravanan G, Pari L ,2008). Many indigenous Indian medicinal plants have been found to be useful to successfully manage diabetes. Many studies have confirmed the benefits of medicinal plants with hypoglycemic effects in the management of diabetes mellitus (Malviya N, Jain S, Malviya S, 2010). Traditional medicinal formulations contain a number of plants, which they claim to be active antidiabetic agents. Since observation of indigenous practices have led to discovery of many modern drugs

(Rahmatullah M, Azam MN, Khatun Z, Seraj S, Islam F, Rahman MA, Jahan S, Aziz MS, 2012). Conventional use of many antidiabetic plants of Bangladesh can be rationalized by the presence of active compounds found in those plants (Mohammad FahimKadir, Muhammad Shahdaat Bin Sayeed, Tahiatul Shams, M M K Mia, 2012). Many scientific study was carried out for antidiabetic ethnomedicinal plant for feature drug. There are many data are present for ethno medicinal plants but actually not related evidences are available. Many plant species like *Begonia roxburghii*, *Calamustenuis*, *Callicarpaarborea*, *Cuscutareflexa*, *Dilleniaindica*, *Diplaziumesculentum*, *Lectucagracilis*, *Millingtoniahortensis*, *Oxalis griffithii*, *Saccharumspontaneum*, and *Solanumviarum*. Some of the plants reported in this study have an antidiabetic effect on rodent models but none have sufficient clinical evidence of effectiveness (Tag H, Kalita P, Dwivedi P, Das AK, Namsa ND.,2012). As per some studies Diabetes is mainly due to oxidative stress and an increase in reactive oxygen species that can have major effects. Many plants contain different natural antioxidants, in particular tannins, flavonoids, C and E vitamins that have the ability to maintain  $\beta$ -cells performance and decrease glucose levels in the blood (Wesam Kooti ,Maryam Farokhipour ,Zahra Asadzadeh , Damoon Ashtary-Larky , Majid Asadi-Samani 2016).

## 3. Methods

During this study regular field surveys were carried out throughout the year in nearby Gandhinagar district Gujarat. The data were collected through structured questionnaire. Different community, villages, urban and ruler areas were covered during this work. All plant species recorded which are used for the treatment of diabetes mellitus. All collected data were gathered and segregated on the bases of common species. The information such as scientific name, family, local name, medicinal use(s), parts used and preparation method were provided here in this work. Literature review was usedfor phytochemical study of selected plants. For more authentication of study all data were referred well from Google scholar, PubMed, journals, pharmacological related journals etc. Total 8 plants are segregated which are

commonly used by all most all the localities of selected area. Collected information are discuss here in below section.

#### 4. Results / Discussion

All collected data are segregated in different tables for easy assessment and understanding.

**Table 1** is indicating the Botanical name of plant, Family, and properties of particular species.

Sr No	Botanical Name	Family	Local Name	Property of plant
1	<i>Allium cepa</i>	Liliaceae	Onion	Allium cepa which helps to reduce the level of blood glucose, lipid peroxidation, serum lipids as well as oxidative stress. These compounds also aid in insulin secretion as well as boost the antioxidant enzyme activities taking place in the body.
2	<i>Cinnamomum cassia</i>	Lauraceae	Cinnamon	Cinnamon elevated glucose level for those with type 2 diabetes can benefit from the regular consumption of cinnamon. Moreover, those with high triglyceride or cholesterol levels can benefit tremendously from the daily consumption of cinnamon as it aids in minimising inflammation and infection.
3	<i>Allium sativum</i>	Amaryllidaceae	Garlic	The hypoglycemic effects of garlic on diabetes are as a result of the presence of volatile sulphur compounds. Garlic aqueous extracts are very effective for lowering insulin resistance in diabetic patients.
4	<i>Cymbopogon Citratus</i>	Poaceae	Green Tea, Lemon grass	Green tea contains a high amount of polyphenols and Epigallocatechin-3-gallate that have strong anti-inflammatory and antioxidant effects on oxidative stress and inflammation associated with diabetes.
5	<i>Trigonella foenumgraecum</i>	Fabaceae	Fenugreek	contain both antidiuretic, carminative, hypocholesterolemic, antithrombotic, antihypertensive, antibacterial, anticarcinogenic, antioxidant, hypoglycemic and antiulcerative properties.
6	<i>Syzygium cumini</i>	Myrtaceae	Jamun	The plant is rich in compounds containing anthocyanins, glucoside, ellagic acid, isoquercetin, kaemferol and myrecetin. The seeds are claimed to contain alkaloid, jambosine, and glycoside jambolin or antimellin, which halts the diastatic conversion of starch into sugar.
7	<i>Murraya Koenigii</i>	Rutaceae	Kadhipatta, Curry leaves	Studies have shown that curry leaves protein insulin-producing cells of the pancreas from free radical damage. They have sugar lowering effects. The presence of minerals like iron, zinc and copper, all of which are known to stimulate the pancreas in curry leaves
8	<i>Momordica Charantia</i>	Cucurbitaceae	Bitter guard, Karela	bitter gourd has a few active substances with anti-diabetic properties. One of them is charantin, which is famous for its blood glucose-lowering effect. Bitter gourd contains an insulin-like compound called Polypeptide-p or p-insulin which has been shown to control diabetes naturally. These substances either work individually or together to help reduce blood sugar levels.

**Table 2:** is describing about phytochemicals of species and its references for future studies.

Sr No	Botanical Name	Phytochemicals	Reference
1	<i>Allium cepa</i>	It contains alkaloids, tannins, flavonoids, carbohydrates, terpenoids and steroids, Onion is rich source of flavonoids, polyphenols, organic sulphur, saponins and many other secondary metabolites, which are mainly responsible for its medicinal activities. It also contains Kampferol, $\beta$ -sitosterol, ferulic acid, myricic acid and prostaglandins	(K. P. Sampathkumar, B. Debjiyt, Chiranjib, Biswajit, and P. Tiwari, 2010); (P. Namita and R. Mukesh, 2012)
2	<i>Cinnamomum cassia</i>	Its extracts contain several active components such as essential oils (cinnamaldehyde, cinnamic alcohol, cinnamic acid, and coumarin), tannin, mucus, and carbohydrates. The main constituents of <i>C. cassia</i> bark oil are cinnamaldehyde	(He ZD, Qiao CF, Han QB, 2005); (Bown D, 1995)
3	<i>Allium sativum</i>	garlic contains flavonoids and sulphur-containing compounds: diallyl sulphate, alliin, ajoene, <u>allicin</u> .	(Martins N, Petropoulos S, Ferreira IC, 2016); (Shang A, Cao SY, Xu XY, Gan RY, Tang GY, Corke H, Mavumengwana V, Li HB, 2019)
4	<i>Cymbopogon Citratus</i>	tannins, saponins, flavonoids, phenols, anthraquinones, alkaloids, deoxysugars, and various essential oil	(Boukhatem MN, Ferhat MA, Kameli A, Saidi F, Kebir HT, 2014); (Ekpenyong CE, Akpan E, Nyoh A, 2015)
5	<i>Trigonella foenumgraecum</i>	<b>Seeds contains</b> hydroxyisoleucine, diosgenin, gallic acid, protocatechuic acid, protodioscin, quinic acid, trigonelline, trigoneosides, trypsin Chymotrypsin	(Basu, A., S.K. Basu, A. Kumar, M. Sharma, R. Chalghoumi, A. Hedi, F. Solorio-Sánchez, M.O. Balogun, E.E. Hafez and W. Cetzal-Ix. 2014, 2014)
6	<i>Syzygium cumini</i>	informative molecules, namely malic acid, oxalic acid, gallic acid, betulic acid, tannins, flavonoids and essential oil. Various mineral and vitamins were reported like Ca, Mg, P, Fe, Na, K,	(P Virmani, S Gupta, Misra, RM Pandey, 2016); (Raw material., 2002)

		Cu, S, Cl, vitamin C, vitamin A, riboflavin, nicotinic acid, choline and folic acid. Glucose and fructose are the principle source of sweeteners in ripe fruit with no trace of sucrose	
7	<i>MurrayaKoenigii</i>	is very rich source of organic compounds with different chemical composition such as alkaloids, flavonoids carbohydrates, and sterol is present in the plant extract prepared in solvents such as petroleum ether, ethyl acetate, chloroform, ethanol and water	(Jain M, Gilhotra R, Singh RP, et al, 2017); (Priyanka Gupta, AlokNahata, Vinod K. et al,2012)
8	<i>MomordicaCharantia</i>	charantin, vicine, glycosides and karavilosides along with polypeptide-p a plant insulin, which are hypoglycemic in action and improve blood sugar levels by increasing glucose uptake and glycogen synthesis in the liver	(M Aslam, I H Stockley, 2016); (Taylor L,2002)

## 5. Conclusion

Presented research study is strongly recommended the folklore medicinal plants for the treatment of Diabetes mellitus. Traditional medicinal plants are mostly used for rural areas; because the availability of lavish amount of medicinal plants those areas. Therefore, treating diabetes mellitus with plant derived compounds which are accessible and do not require laborious pharmaceutical synthesis seems highly attractive. In the present paper an attempt has been made to investigate the antidiabetic medicinal plants which are commonly used by the community. The study is also refers phytochemicals for selected plants which can be useful base for the health professionals, scientists and scholars working in the field of pharmacology or pharmacy industries for their therapeutics development of harmless and low-cost antidiabetic drugs. Nature is provides its best to us, we need to find the way of its wise utilization and protection. This study can give the best platform for many new drugs for diabetes or we can say that we may introduce some food in our day to day life to avoid such diseases. Clinical intervention studies are required to provide evidence for a safe and effective use of the identified plants in the treatment of diabetes.

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