



TRADITIONAL APPROACHES FOR THE TREATMENT OF DIABETES

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ABSTRACT

Diabetes is a metabolic disorder caused due to increased glucose level in blood due to various problems regarding secretion of hormone ie. Insulin which is secreted from the beta cells of islets of langerhance or glucose resistance takes place in the cells. According to WHO there are total 125 million diabetic patients throughout the word and 33 million in India which is expected to incr. by 80 million in 2030. This review will briefly summarie anti diabetic drugs will be discussed. The aim of this article is to present an overview of all anti diabetic drugs on the basis of they were used by the various tribal groups in different part of India. More than 100 traditional plants which were been used by tribal groups for the treatment of diabetes. Traditional treatments have mostly disappeared in occational socities, but some are prescribed by practitioners of alternative medicine or taken by patients as supplements to conventional therapy. However, plant remedies are the menstay of treatment in underdeveloped regions. In this article I have included 124 plant along with their family, local name, tribal group, area, pharmacological action, type of diabetes, part of plant, to be taken, along with the reference in the tabular form.

INTRODUCTION

1.1 Herbal Medicine

Plant kingdom had played vital role in man's existence on this earth. Nature has always stood as a golden mark to amplify the outstanding phenomenon of symbiosis. Medicinal plants existing even before human being made their appearance on the earth.^[1] Natural products have been derived from higher plants, microbes or animals and those can be of either terrestrial or marine or aquatic origin.

Practically every country develops its own medical system, which includes the ancient civilization of China, Egypt and India. Thus, the Indian Medical system Ayurveda came into existence. The raw materials for Ayurvedic medicines were mostly obtained from plant sources in the form of crude drugs such as dried herbal powders or their extracts or mixture of products. In addition, Siddha and Unani are traditional health care systems have been flourishing for many centuries in the country. Apart from these systems there has been a rich heritage of ethanobotanical tradition of herbs by diversity of tribal communities in the country.

The medicinal preparations based on these raw materials were in the form of crude drug. Many of these reputed medicinal plants came under chemical investigation leading to the isolations of active principles with the advent of scientific methods.

There was continuous activity in this area since 1800 AD and many of the well known medicinal plants were chemically analyzed and their active principles were characterized. Soon after their isolation and characterization of these compounds, either in pure state or in the form of extracts, became part of pharmacopoeias of several countries. This is where herbal medicine and modern medicine have a common link.^[2] Care system, because of popular concern over toxicity and resistance of modern drugs. India is one of 12 leading bio-diversity centers with presence of over 45,000 different plant species, 15000-18000 flowering plants, 23,000 fungi, 16,000 lichens, 18,000 bryophytes and 13 million marine organisms. From this flora 15,000 to 20,000 have good medicinal value. Among those only about 7,000 plants are used in Ayurveda, 600 in Siddha, 700 in Unani and 30 in modern medicines.

The WHO estimated that 80% of the population of developing countries relies on traditional medicines, mostly plant drugs, for their primary health care needs. Also, modern Pharmacopoeias still contain at least 25% drugs derived from plants and many others which are synthetic analogues built on prototype compounds isolated from plants. Demand for medicinal plant is increasing in both developing and developed countries due to increasing recognition of natural products, being non-narcotic, having less side-effect, easily available at affordable prices and sometime the only source of health

care available to the poor. Medicinal plant sector has traditionally occupied an important position in the socio-cultural, spiritual and medicinal arena of rural and tribal lives of India.^[3]

Demand for medicinal plant is increasing in both developing and developed countries, and the bulk of the material trade is still from wild harvested sources on forest land and only a very small number of species are cultivated. The expanding trade in medicinal plants has serious implications on the survival of several plant species, with many under serious threats to become extinct. A holistic management action plan is necessary to formulate for assessment and management of resource base; best harvesting and processing practices; trade issues and aspects dealing with the intellectual property rights on the traditional medicines by the tribal people.^[4]

1.1.2 Steps necessary for promoting herbal drugs

Phytochemistry or natural product chemistry research is the backbone of herbal industry. For promoting use of herbals in modern medicine, phytochemistry should be envisaged for; isolation, purification and characterization of new phytoconstituents, use of newly isolated phytoconstituents as “lead” compound for the synthetic design of analogues with either improved therapeutic activity or reduced toxicity and conservation of lead phytoconstituents into medicinally important drugs.

1.1.3 Ethno-pharmacological approach to herbal drugs

The term ethno-pharmacology refers the interdisciplinary scientific observation, description, and experimental investigation of indigenous drugs and biological activities. Recent interest in the use of ethno-pharmacological information of plant drugs has greatly increased for several reasons. Scientists showed that 119 important plant derived drugs used in one or more countries, 88 were regarded as having been discovered as a result of being derived from a plant used in traditional medicine.^[5]

1.1.4 Current status of herbal drugs

Recent years newer and newer diseases are posing threat to humanity. In fact diseases are not new but are detected newly. Despite this, WHO had taken the vouch of providing “Health for all” by 2000 AD. In spite of stupendous advances made by modern medicine, the present century has many more health problems than earlier centuries. Drugs for viral diseases like AIDS, certain type of cancers, arthritis, parkinsonism are yet to come. The newer concepts about herbal drugs have immunomodulators and are recognized for prophylactic and preventive therapy.

Surprisingly, a recent survey revealed that more than 50% of all prescription drugs issued by rational physicians are either directly derived from the natural sources or synthesized from the natural models as the sole ingredient or as one of the several ingredients. It

seems certain that the continued scientific study of medicinal plants afford a plethora of novel, structurally diverse and bioactive compounds. Multidisciplinary research on plants has lead to many new drugs, as well as prototype active molecules and biological tools.^[6]

1.1.5 Future prospects in herbal medicines

At the moment, scientific research on medicinal plants is continuing most intensely in research institutes, universities and pharmaceutical laboratories as well as in the clinics of many developed countries. This research is oriented mainly in two directions. Firstly the active ingredients of plants that have long been known for their healing properties are been investigated. The second sphere of basic research has led to the discovery of new kinds of medicinal plants and new drugs from the more remote regions of the world where new species with unknown substances still remain to be looked into.

Each and every traditional medicine are tested and validated scientifically. CSIR, New Delhi, already involved in this filed, validated about 350 formulations for different activities. The WHO has emphasized the need to ensure the quality control of herbs and herbal formulations by using modern techniques. Several countries have herbal pharmacopoeias and lay down monographs to maintain their quality. The Ayurvedic pharmacopoeia of India which was recommends basic quality parameters for eighty common Ayurvedic herbal drugs.^[7]

1.2 Diabetes

There are many diseases that are caused due to genetically disorders, and one of this is Diabetes Mellitus. Diabetes is a disorder of metabolism (the way our bodies use digested food for growth and energy). Most of the food we eat is broken-down by the digestive juices into a simple sugar called glucose. Glucose is the main source of fuel for the body. After digestion, the glucose passes into bloodstream where it is available for body cells to use for growth and energy. Glucose gets into the cells in presence of insulin, a hormone produced by the pancreas. Normally, pancreas is automatically producing the right amount of insulin to move the glucose from our blood into our cells. If body doesn't make enough insulin or the insulin doesn't work right, the sugar cannot get into the cells. It stays in the blood. This makes high levels of glucose (or sugar) in the blood producing hyperglycemia. As a result, glucose builds up in the blood, overflows into the urine, and passes out of the body in urine (glucosuria). Thus, the body loses its main source of fuel even though the blood contains large amounts of glucose. Thus, Diabetes is a chronic condition that occurs when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin.^[8]

There are more than 125 million people with diabetes in the world today and this number is expected to approach 220 million. It is also estimated that there are 30 to 33

million diabetics in India now, and every fourth diabetics in the world today is an Indian. Indians are genetically more susceptible to diabetes and the WHO predicts the number of diabetes in India would group to 80 million by 2030. There are two types of Diabetes; Diabetes insipidus and Diabetes mellitus.

1.2.1 Diabetes Insipidus: Despite the similar names diabetes insipidus is not related to diabetes mellitus. Some people with diabetes insipidus have kidneys that don't concentrate urine very well (meaning their urine is more diluted). They might wake up 2 or 3 times in the night to urinate. People with diabetes insipidus are thirsty all the time They often. want to drink liquids every hour.

Etiology of Diabetes insipidus suggests that in some people, a part of the brain doesn't make enough anti diuretic hormone (ADH). In other people, the kidneys do not work with this hormone the way they should. Most people with diabetes insipidus get it after an injury to the head or after brain surgery or in case of a brain tumor.^[9]

1.2.2 Diabetes mellitus: It is a clinical syndrome characterized by hyperglycemia due to the pancreas may produce little insulin, if any. In other cases, the pancreas may produce some insulin, but the cells do not respond to it. Diabetes mellitus is characterized by hyperglycemia, glucosuria, negative nitrogen balance and sometimes ketonemia. It is classified as follows.

Type I: Immune mediated - Juvenile onset /Insulin dependent (could be in children with a more rapid onset or adults with a slower onset "late autoimmune diabetes of adults").

Type II: Insulin resistant -Adult onset diabetes/non-insulin dependent diabetes.

- A. Gestational diabetes mellitus
- B. Other specific types (e.g. certain genetic defects; drug induced; etc).^[10]

Type I: It is characterized by severe lack of insulin due to the destruction of most or all of the beta cells in the islets of Langerhans by an autoimmune process, usually leading to absolute insulin deficiency. The onset is usually acute, developing over a period of a few days to weeks. Over 95% of persons with type 1 diabetes mellitus develop the disease before the age of 25 and most often between the ages of 10 and 16, with an equal incidence in both sexes and an increased prevalence in the white population. Type I diabetes is invariably treated with insulin.

Type II: Insulin resistance in peripheral tissue and insulin secretory defect of the beta cell of pancreas, so that less glucose is produced, and impairment of insulin's ability to stimulate the uptake of glucose in muscles and other tissues. The cause of this insulin resistance has not yet been fully established, but may involve defects in the action of insulin after it has bound to the insulin receptor

on the surface of cells. This is the most common form of diabetes mellitus and is highly associated with a family history of diabetes, older age, obesity and lack of exercise.^[10]

A. Gestational diabetes: Occur during pregnancy, sensitivity to insulin decreases (placental hormones affect glucose tolerance). Beta cells may not be able to meet this increased need for insulin gestational diabetes. They are occurs in up to 14% of pregnancy. This increases subsequent risk of developing type II diabetes. Increased risk for perinatal mortality and neonatal morbidity.

B. Other types of diabetes mellitus: Specific genetic/molecular defects have been identified in a minority of what were considered type II diabetes: Genetic defects of function of beta cell. e.g. Hepatic nuclear factor 4 alpha - autosomal dominant condition of impaired insulin secretion; early onset and slowly progressive; type I(mature onset diabetes of the young).e.g. Mutation of mitochondrial DNA.

- 2) Genetic defects in the action of insulin: e.g. insulin receptor - (severe insulin resistance) Lipoatrophic diabetes.
- 3) Endocrine disorders
 - Diseases of the pancreas, e.g. pancreatitis, neoplasia, cystic fibrosis, haemochromatosis
 - Endocrinopathies, e.g. acromegaly, Cushing's syndrome, hyperthyroidism, pheochromocytoma
- 4) Drug/chemical induced, e.g. vacor, pentamidine, glucocorticoids, thiazides, dilantin
- 5) Infection, e.g. congenital rubella, cytomegalo virus
- 6) Immune mediated (uncommon), e.g. Stiff man syndrome, anti-insulin receptor antibodies.

7) 1.2.3 Causes of Diabetes

- a. Heredity i.e. family history of late onset diabetes
- b. Obesity i.e. over weight
- c. Lack of physical activity i.e. sedentary life style
- d. Women with prior gestational diabetes
- e. Stress and Strain

1.4.4 Diabetes Symptom

A. Symptoms of type I diabetes may include

- Increased thirst and urination
- Blurred vision
- Feeling very hungry
- Weight loss in spite of increased eating

B. Symptoms of type II diabetes may include

- Feeling tired or ill
- Frequent urination (especially at night)
- Unusual thirst
- Weight loss
- Blurred vision
- Frequent infections
- Slow healing of sores.
- Having dry, itchy skin
- Having tingling in the feet.

1.2.5 Complications occur in diabetes

Acute Complications

Type – I Diabetes (IDDM)

- Due to illness or fever, insulin requirement increases and if additional requirement of insulin is not met with, a diabetic coma can develop.
- Diabetic Ketoacidosis – Appearance of large amount of glucose along with „Ketone“ bodies in urine.

Type – II Diabetes (NIDDM)

- Dehydration coma – Loss of excessive amounts of water and salt.
- Skin problems.

Long term complications

- **Eyes:** Progressive loss of vision, leading to blindness, diabetes is among the three common causes of blindness today.
- **Heart:** Diabetics are very prone to developing high blood pressure.
- **Blood vessels and circulation:** The arteries may develop fat deposits hindering flow of blood, affecting the blood supply to extreme parts of limbs.

An injury of such limbs may develop gangrene, which may lead to an amputation.

- **Kidneys:** More susceptible to infections of the urinary bladder and Kidneys. It may also lead to failure of kidney functions.
- **Nervous System:** Diabetes affects the nerves leading to loss of sensation. In contrast certain diabetics may suffer from tingling or burning sensation in extreme parts of limbs (10,1)

1.2.6 Prevention of diabetes mellitus

It may not be possible to prevent diabetes in all cases but even delay in its onset is an achievement. First step is the identification of high-risk groups. These high-risk individuals follow.

- Regular exercise to maintain normal body weight
- Obese persons should undergo diet control and exercise to reduce weight.
- Avoid fast food and take original Indian lacto vegetarian food
- Avoid stressful life.
- Meditation and yoga can also help.
- Two diabetics should not marry.

If above non-pharmacological methods fail drugs may be used for prevention of diabetes. Marker compound, chemical constituents within a medicinal plant that can be used to verify its potency, isolated for direct use as drugs and lead compounds or pharmacological agents. Here given some active agents isolation from medicinal plants used as an antidiabetic agent are given in table 1.1 (11).

Table 1.1: Active antidiabetic principles isolated from the medicinal plants.

Sr. No	Botanical name	Part used	Active Principles (Marker)
1	<i>Aconitumcarmichaelii</i>	Root	Aconitan A,B,C &D
2	<i>Anemaranas</i>	Rhizomes	Anemaranas A, B, C&D
3	<i>Atractylodes japonica</i>	Rhizome	Glycons A,B,C,D Atractants
4	<i>Bauhinia pururea</i>	Aerial part	Quercetin
5	<i>Capsicum annum</i>	Fruit	Capsaicin
6	<i>Clytiarichardiana</i>	Leaves	SaudinRhamnoside
7	<i>Cyperusrotundus</i>	Rhizome	Cyperene
8	<i>Dioscorea japonica</i>	Rhizome	Glycans A,B,C,D,E,F
9	<i>Galegaofficinalis</i>	Seed	Galegin
10	<i>Holarrhenaantidysenterica</i>	Seed	Conessine
11	<i>Holarrhenaantidysenterica</i>	Stem Bark	Conessine
12	<i>Lathyrus japonica</i>	Seed	Lathyrines
13	<i>Lepidiumruderale</i>	Aerial part	Lepidine
14	<i>Picrorrhizakurroa</i>	Rhizome	Picroside I, II
15	<i>Piper nigrum</i>	Fruit	Piperin
16	<i>Piper longum</i>	Fruit	Piperin
17	<i>Potatorumancisteroides</i>	Aerial part	Tormetic acid
18	<i>Plumbagozeylanica</i>	Root	Plumbagin
19	<i>Swertiachirata</i>	Whole plant	Sawertiamarine, Mangeferin
20	<i>Zingiberofficinale</i>	Rhizome	6,8,10-gingerol

2. MATERIAL AND METHODS

The present study is an attempt to compile the medicinal plants growing and utilizing among the different tribal culture in India with their mode of use. We reviewed scientific studies published in journals, books, theses and reports. Relevant literature was searched in various electronic databases^[12] using keywords such as “medicinal plants”, “tribal”, “ethnobotany OR ethnopharmacology OR Indigenous OR Indian”, and “survey”.

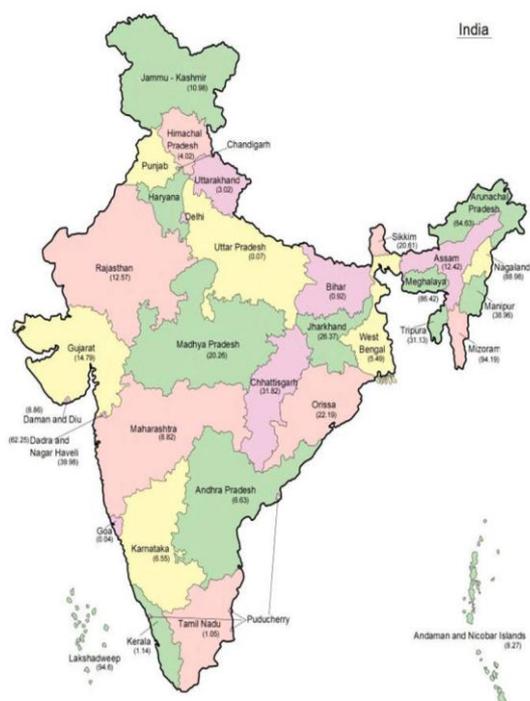


Figure 1: Distribution of % population of tribes in Indian states.

We do not claim to have included all the tribal communities existing information about traditional uses of medicinal plants, but we rather chose to focus on information easily accessible to researchers. In last few decades, it is possible to record the traditional and tribal knowledge related to medicinal plants of different tribal communities. However, in most cases, this information has yet to be made available to modern world.

We reviewed 15 publications that provided information about the use of medicinal plant species to treat diabetes's diseases. We only used publications presenting first-hand ethnobotanical information. A list was produced, showing name(s), part(s) used, use(s), mode of use(s), type of diabetes, pharmacological action(s) and reference(s).

In present study, we focused our review on traditional medicinal practices of tribal communities living in the different Indian forests. The precision of botanical identification in this review depended on that from original sources. Latin names and native status (native vs. introduced) were verified.

Table 2.1

Name of Plant with Family	Local Name	Area	Type of Diabetes	Pharmacological Action	To Be Taken	Part of Plant	Reference
<i>Catharanthus roseus</i> Apocynaceae	Nithyakalyani	Kancheepuram District of Tamil Nadu, India	Type II Diabetes	Glucose metabolism , Lipid peroxidation	cow's milk and taken Orally	Whole plant	Elavarasi, S., & Saravanan, K. (2012).
<i>Gymnema sylvestre</i> Asclepiadace	Sirukurinchan	Kancheepuram District of Tamil Nadu, India	Type II Diabetes	Insulinotropic , glucose utilization , glucose hemeostatic	cow's milk and taken orally	Leaf	Elavarasi, S., & Saravanan, K. (2012)
<i>Momordica charantia</i> Cucurbitaceae	Karella	Plants Diversity of Bhadrawati Tahsil of Chandrapur District, Maharashtra,	Type I & Type II Diabetes	HIT-T15 hamster pancreatic β cells , cells reparative effect		Fruits and Seeds	Harney, N. V. (2013)
<i>Enicostema axillare</i> (Lam) Gentianaceae	Raynal	Studies on herbal medicinal plants in Marathwada region (MS) India	Type I Diabetes	Insulin theapy in relation to nephrapathy , amelioration of STz Induced.	Leaf juice	Leaves	Ladda, R. G., Aradwad, (2013)
<i>Aeglemarmelos Corr.ex</i> Roxb (Rutaceae)	Vilvam	Plants of kalavai, vellore district, tamil	Type II Diabetes	Repair pancrea's beta calls	Leaf juice	Leaves	Natarajan(2013)
Name of Plant with Family	Local Name	Area	Type Of Diabetes	Pharamacological Action	To Be Taken	Part of Plant	Reference
<i>Brassica juncea</i> (Linn.)Czern. Brassicaceae	Sarson	The baiga tribe living in rewa district m.p.	Type I Diabetes	Anti diabetic , Antihyperlipidemics , immunomodulators	round powdered seeds mixed with lime juice	Seed	Yadav, M., Khan, K. K.,(2012)
<i>Cajanus cajan</i> (Linn.)Millsp. Fabaceae	Arhar	The baiga tribe living in rewa district m.p.	Type II Diabetes	Prevent Insulin Resistance	One teaspoon seeds with water	Seed	Yadav, M., Khan, K. K.,(2012)

<i>Cassia fistula L.</i> Caesalpiaceae	Amaltas	The baiga tribe living in rewa district m.p.	Type II Diabetes	Insulin treatment Reverses the insulin Resistance , Haematemesis , Diabetes , Leucoderma	One tea spoon powder of seeds is given once In the morning for about 15 days or more.	Seed	Yadav, M., Khan, K. K.,(2012)
<i>Cassia occidentalis</i> Linn. Caesalpiaceae	Chakwad	The baiga tribe living in rewa district m.p.	Type II Diabetes	Hematic glucocorticoid activating enzyme , Diabetes , Hepatic B Constipation , fever , malaria	One teaspoon seeds with water is taken orally for about 15 days	Seed	Yadav, M., Khan, K. K.,(2012)
<i>Cassia sophera L.</i> Caesalpiaceae	Kasundi	The baiga tribe living in rewa district m.p.	Type II Diabetes	Blood sugar under control during diabetes , Pain killer , snakebites		Bark	Yadav, M., Khan, K. K.,(2012)

Name of Plant with Family	Local Name	Area	Type Of Diabetes	Pharamacological Action	To Be Taken	Part of Plant	Reference
<i>Hedyotis scandens</i> Roxb. Rubiaceae	<i>Yakauka</i>	Khamptis of arunachal pradesh	Type II Diabetes	Antidiabetic action , antioxidant , antibacterial	Leaf juice	Leaf extract	Sen, P., Dollo, M., Choudhury, M. D. (2008)
<i>Lobelia sinensis</i> Lobeliaceae	<i>Yahang-en</i>	Khamptis of arunachal pradesh	Type I , II Diabetes	Hypoglycemic , Antidiabetic agent	Leaf juice	Leaf extract	Sen, P., Dollo, M., Choudhury, M. D. (2008)
<i>Vincarosea</i> Linn. Apocynaceae	<i>Nayantara</i>	Khamptis of arunachal pradesh	Type II Diabetes	Anti hyperglycemic Activity , Hepotoprotective effect	Leaf juice	Leaf extract is used	Sen, P., Dollo,
<i>Pterocarpus marsupium</i> Roxb. Fabaceae	<i>Venga</i>	Achenkovil forest of kollam district, kerala	Type II Diabetes	Pancreatic beta cell regulation , hypoglycemic activity	is taken internally thrice a day for two weeks against diabetes.	Dried heart wood	M., Choudhury, M. D. (2008)
<i>Hedyotis scandens</i> Roxb Rubiaceae	Yakauka	Ethnomedicinalsurveyuri,kash mirhimalaya	Type II Diabetes	Antidiabetic action , antioxidant , antibacterial	Leaf juice	Leaf extract is used	Khan, Z. S., Khuroo, A. A. (2004)
Name of the plant and family	Local name	Area	Type of diabetes	Pharamcolgical action	To be taken	Part of plant	Reference
<i>Aristolochia bracteolate</i> Aristolochiaceae	Kiramar	Survey on ethnomedicinal anti-diabetic plants from deori taluka of gondia district (maharashtra)	Type II Diabetes	Decreases lipid peroxidation , enhance level of glutathione	juice is taken orally	Leaves,	Ghoshal, K. P., & Gadekar, G. P. (2014)
<i>Aloe vera</i> Liliaceae	Korphad	Survey on ethnomedicinal anti-diabetic plants from deori taluka of gondia district (Maharashtra)	Type II Diabetes	Aute hypoglycaemic , antihyperglycemic Antihypercholesterolemic agent	Leaf juice is taken orally	Leaves	Gadekar, G. P Ghoshal, K. P.

<i>Allium Sativum</i> Lilliaceae	Lahsun	The baigatribe living in rewa district m.p.	Type II Diabetes	Diabetic nephropathy,improved glucose tolerance	Leaf and bulb taken orally to treat diabetes.	Leaves	Yadav, M., Khan,K. K.(2012)
<i>Centella Asiatica Linn.</i> Apiaceae	Bormanimuni	Ethno antidiabetic plants of assam	Type II Diabetes	Immunocompromised condition , ischemia	juice is taken orally	Whole plant	Sarmah, P. C. (2011)
<i>Lobelia sinensis</i> Lobelliaceae	Yahang-en	Ethnomedicinalsurveyuri,kash mirhimalaya	Type II Diabetes	Angiotension Receptor Blocker in Treatment of	Leaf juice	Leaf extract is used	Khan, Z. S Khuroo, A. A., . (2004)
Name of the plant and family	Local name	Area	Type of diabetes	Pharamcolgical action	To be taken	Part of plant	Reference
<i>Colocasia esculenta(L)</i> Araceae	Kolakachu	Ethno antidiabetic plants of Assam	Type II Diabetes	Hypoglycemic activity , antibacterial activity		Roots	Sarmah, P. C. (2011)
<i>Adhatoda vasica</i> Acanthacrae.	Vasaka	Local people in javadhu hills tamilnadu, india	Type II Diabetes	Antitubercular action , cold , fever , antitissue		Plant	Thirumalai, T., DSathiyara.(2012)
<i>Brassica juncea</i> Brassicaceae	Kadugu	Local people in javadhu hills tamilnadu, india	Type II Diabetes	Hypertension , hyperglycaemia	Seed decoction is taken daily	Seed	Thirumalai, T., Beverly, C. DSathiyara.(2012)
<i>Cassia</i> Caesalpinacea	Auriculata	Local people in javadhu hills tamilnadu, india	Type II Diabetes	Antioiceptive activity , antioxidant	Two flower take	FLOWER	Thirumalai, T., Beverly, C. DSathiyara.(2012)
<i>Cajanus cajan</i> Fabaceae	Thovaray	Local people in javadhu hills tamilnadu, india	Type II Diabetes	Antidiabetics hypoglycemic	Seed	SEED	Thirumalai, T., Beverly, C. DSathiyara.(2012)
<i>Costus igneus</i> Costaceae	Kostum	Local people in javadhu hills tamilnadu, india	Type I , II Diabetes	Hypoglycemic	Leaves juice	Leaves	Thirumalai, T., Beverly, C. DSathiyara.(2012)
<i>Colocasia esculenta</i> Araceae	Shaepkamiz Hangu	Local people in javadhu hills tamilnadu, india	Type II Diabetes	Hypoglycemic	POWDERED Leaves are USE	Leaves	Thirumalai, T., Beverly, C. DSathiyara.(2012)

Name of Plant with Family	Local Name	Area	Type of Diabetes	Pharmacological Action	To Be Taken	Part of Plant	Reference
<i>Curcuma longa</i> Zingiberaceae	Kasturimanja L	Local people in javadhu hills tamilnadu, india	Type I, II Diabetes	Disfuncton & insulin rsistance are basis of hypertension		Rhizome	Thirumalai, T., Beverly, C. DSathiyara (2012)
<i>Cuminum cyminum</i> Apiaceae	Cheerakam	Local people in javadhu hills tamilnadu, india	Type II Diabetes	Hypoglycemic activity , pancreatic beta cells regeneration	One teaspoon seeds with water	Seed	Thirumalai, T., Beverly, C. DSathiyara.(2012)
<i>Ficus benghalensis</i> Moraceae	Aalamaram	Local people in javadhu hills tamilnadu, india	Type I ,II Diabetes	Hypoglycemic activity , antibacterial activity	One teaspoon seeds with water	Seed	Thirumalai, T., Beverly, C. DSathiyara
<i>Euphorbia hirta</i> Euphorbiaceae	Amman Pacharisi	Local people in javadhu hills tamilnadu, india	Type II Diabetes	Hypoglycemic activity , antibacterial activity, Antihyperlipidemic	Leaf juice	Leaves	Thirumalai, T., Beverly, C. DSathiyara.(2012)
<i>Eclipta alba</i>	Karsalamkanni	Local people in javadhu hills	Type II Diabetes	Antihyperglycermic hypercholesterolemic , diuretic			Thirumalai, T., Beverly, C.

Asteraceae		tamilnadu, india			Leaf is used	Leaves	DSathiyara.(2012)
<i>Enicostemma littorale</i>	Vellaruku	Local people in javadhu hills tamilnadu, india	Type I , II Diabetes	Diabetic retinopathy , cancer	powder leaves	Leaves	Thirumalai, T., Beverly, C. DSathiyara.(2012)
Gentianaceae							

Name of Plant with Family	Local Name	Area	Type of Diabetes	Pharmacological Action	To Be Taken	Part of Plant	Reference
<i>Gymnema sylvestre</i>	Sakkaraikolli	Local people in javadhu hills tamilnadu, india	Type II Diabetes	Control of blood glucose level , acte hypoglycaemic effect	Leaves Leaf juice is taken daily	Leaves Leaf	Thirumalai, T., Beverly, C. DSathiyara. (2012)
<i>Hibiscus rosa sinensis</i>	Chemparathy	Local people in javadhu hills tamilnadu, india	Type II Diabetes	Antihyperglycemic activity , pancreatic beta cells release	Leaves Fresh leaf is taken regularly	Leaves leaf	Thirumalai, T., Beverly, C. DSathiyara. (2012)
		Local people in	Type II	Blood pressue , anti diabetic	Seed powder is		Thirumalai, T.,

<i>Momordica charantia</i> Cucurbitaceae.	Pavakai	Javadhu hills tamilnadu, india	Diabetes	agent , antihyperglycemic	mixed with water and taken Orally	Seed	Beverly, C. DSathiyara (2012)
<i>Mangifera indica</i> Anacardiaceae	Mamaran	Local people in Javadhu hills tamilnadu, india	Type II Diabetes	Antioxidant	Leaves The powdered leaves are mixed with cow milk and taken Orally	Leaves	Thirumalai, T., Beverly, CD Sathiyara (2012)

Name of Plant with Family	Local Name	Area	Type of Diabetes	Pharmacological Action	To Be Taken	Part of Plant	Reference
<i>Melia azedarach</i> Meliaceae	Malaivembu	Local people in javadhu hills tamilnadu, india	Type II Diabetes	Cancer , osteogenic sarcoma	Seed powder	Seeds	Thirumalai, T., Beverly, C. DSathiyara. (2012)
<i>Ocimum sanctum</i> Lamiaceae	Tulsi	Local people in javadhu hills tamilnadu, india	Type II Diabetes	Hypoglycemic , antihyperglycaemia		Leaves	Thirumalai, T., Beverly, C. DSathiyara (2012)
<i>Punica granatum</i> Lythraceae	Madulai	Local people in javadhu hills tamilnadu, india	Type II Diabetes	Improved glucose tolerance digestive problem		Flower	Thirumalai, T., Beverly, C. DSathiyara. (2012)
<i>Phyllanthus amarus</i> Euphorbiaceae	Kilanelli	Local people in javadhu hills tamilnadu, india	Type II Diabetes	Antioxidant , antinociceptive	Leaves Leaf juice is taken orally to treat	Leaves Leaf	Thirumalai, T., Beverly, C. DSathiyara. (2012)
			Type II Diabetes	Insulin mimetic activity ,			Thirumalai, T.,

<i>Psidium guajava</i> Myrtaceae	Koiyaa	Local people in javadhu hills tamilnadu, india	antihyperlipidemic	Fruit Daily one fruits is taken	Fruits	Beverly, C. D Sathiyara (2012)
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Name of Plant with Family	Local Name	Area	Type of Diabetes	Pharmacological Action	To Be Taken	Part of Plant	Reference
<i>Sperma cocehispid</i> Rubiaceae	Nathachuri	tamilnadu, india	Type II Diabetes	Antioxidative activity	leaves are taken twice Daily	Leaves	DSathiyara 2012
<i>Solanum nigrum</i> Solanaceae	Manattakkali	Local people in javadhu hills tamilnadu, india	Type II Diabetes	Hypoglycemic activity , antihypertension	Leaves Leaf juice is taken orally	Leaves Leaf	Thirumalai, T., Beverly, C. DSathiyara. (2012)
<i>Trigonella foenum</i> Fabaceae	Vendhyem	Local people in javadhu hills tamilnadu, india	Type II Diabetes	Insulin mimetic propertic , reduce lipid peroxidase	Seed powder	Seed	Thirumalai, T., Beverly, C.

							DSathiyara (2012)
<i>Eugenia jambolana</i> Myrtaceae	Naval	Local people in javadhu hills tamilnadu, india	Type I ,II Diabetes	Hypoglycemic activity , antidiabetic activity	Seed powder	Seed	Thirumalai, T., Beverly, C. DSathiyara. (2012)
<i>Ficus racemosa</i> Moraceae	Atthi	Local people in javadhu hills	Type II Diabetes	Hypoglycemic activity , antihyperglycemic activity	Root decoction is	Root	Thirumalai, T.,

Name of Plant with Family	Local Name	Area	Type of Diabetes	Pharmacological Action	To Be Taken	Part of Plant	Reference
<i>Vincarosea</i> Apocynaceae	Nittiyakalyani	Local people in javadhu hills tamilnadu, india	Type II Diabetes	Antihyperglycemic effect , hypoglycemic effect , antioxidant increases pancreatic , secretion	Leaves Leaf juice is taken orally	Leaves Leaf	Thirumalai, T., Beverly, C. DSathiyara
<i>Cassia tora</i> Fabaceae	Tarota	Bhadrawatitahsil of chadrapur,districtmahar ashtra, india	Type II Diabetes	Reduce insulin resistance , diabetic nephropathy , Anti inflammation ,	Leaf juice	Leaves	Harney, N. V. (2013)
<i>Butea monosperma</i> Fabaceae	Palas	Bhadrawatitahsil of chadrapur,districtmahar ashtra, india	Type II Diabetes	Antidiabetic , hyperlipidemic		Barks, leaves, fruits, seeds	Harney, N. V. (2013)
<i>Ficus bengalensis</i> Moraceae	Wad	Bhadrawatitahsil of chadrapur,districtmahar ashtra, india	Type II Diabetes	Antidiabetic , diabetes mellitus , reduces oxidative stress , Pancreatic beta cells regenerated		Bark, leaves, fruits, seeds	Harney, N. V. (2013)
<i>Syzigium cumini</i> Myrataceae	Jambul	Bhadrawatitahsil of chadrapur,districtmahar ashtra, india	Type I , II Diabetes	Hypoglycemic activity, antidiabetic , preventing and treatment of diabetes		Bark, leaves and fruits	Harney, N. V. (2013)

<i>Momordica charantia</i> Cucurbitaceae	Karella	Bhadrawatitahsil of chadrapur, district maharashtra, india	Type I , II Diabetes	Hypoglycemic activity, antidiabetic activity ,	Seed powder	Fruits and Seeds	Harney, N. V. (2013)
Name of Plant with Family	Local Name	Area	Type of Diabetes	Pharmacological Action	To Be Taken	Part of Plant	Reference
<i>Diospyros melanoxylon</i> Ebenaceae	Tembhurni	Bhadrawatitahsil of chadrapur,districtmahar ashtra,India	Type II Diabetes	Anti hypertension , diabetes mellitus , gall bladder disease , stoke		Fruits and Seeds	Harney, N. V. (2013)
<i>Ficus recemosa</i> Moraceae	Medi	Raditional Healers of thadvai, warangal district, andhra pradesh, india.	Type II Diabetes	Antidiabetic activity , antihyperglycemic activity , hypoglycemic activity.		Bark	Naini, V., & Mamidala, E (2013)
<i>Marsilea minuta L</i> (Marsileaceae)	Aarakkerai	Plants of kalavai, vellore district, tamil Nadu, india	Type I , II Diabetes	Antidiabetic activity , drug resistance epilepsy	Leaf juice	Leaves	Natarajan(2013)
<i>Cynodon dactylon</i> (L.)Pers Poaceae	Arugampul	Plants of kalavai, vellore district, tamil Nadu, india	Type I Diabetes	Antidiabetic activity ,		Whole plant	Natarajan(2013)
<i>Abrus precatorius L</i> .Fabaceae	Ghumchi	Plants of tribal areas of	Type I ,II Diabetes	Antidiabetic activity , heart disease , tumors ,	Leaf juice (two	Leaf	Yadav, M., Khan, (2012).

		district rewa used to treat		Colic	teaspoon) given orally	
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Name of Plant with Family	Local Name	Area	Type Of Diabetes	Pharmacological Action	To Be Taken	Part of Plant	Reference
<i>Wrightia tinctoria</i> , (Roxb.) Apocynaceae	Safed Korea	Surguja district	Type I, II Diabetes	Antioxidant , diabetic neuropathy , antihypertension	Seed powder	Seed	Shrivastava, S., & Kanungo, V. K (2013)
<i>Gymnema sylvestre</i> , R.Br .Asclepiadaceae	Gudmar	Surguja district	Type I Diabetes	Antidiabetic activity , repair pancreatic damage	Leaf juice	Leaves	Shrivastava, S., & Kanungo, V. K .(2013)
<i>Tinospora cordifolia</i> , Miers. Menispermaceae	Guluchi	Surguja district	Type II Diabetes	Antidiabetic activity , hypoglycemic activity		Stem	Shrivastava, S., & Kanungo, V. K. (2013)
<i>Pterocarpus marsupium</i> , Roxb .Fabaceae	Beeja	Surguja district		Antidiabetic activity , hypoglycemic activity		Bark	Shrivastava, S., & Kanungo(2013)
<i>Anogeissus latifolia</i> , Roxb Combretaceae	Dhawa	Surguja district	Type II Diabetes	Antidiabetic activity , hypoglycemic activity , endocrine disease		Bark	Shrivastava, S., & Kanungo, V. K. (2013)
<i>Asparagus racemosus</i> , Liliaceae	Willd.	Surguja district	Type II Diabetes	Antioxidant , neuropathy , antidiabetic , Nephropathy		Root	Shrivastava, S., & Kanungo, V. K (2013)

<i>Cassia fistula, L</i> Fabaceae	Amaltas	Surguja district	Type I Diabetes	Antidiabetic , improve serum lipid		Fruit	Shrivastava, S., & Kanungo, V. K. (2013)
<i>Madhucalongifolia, var LatifoliaRoxb.</i> Sapotaceae	Mahua	Surguja district	Type II Diabetes	Anti-inflammatory , snake bite poisoning		Flower/Bark	Shrivastava, S., & Kanungo, V. K. (2013)

Name of Plant with Family	Local Name	Area	Type of Diabetes	Pharmacological Action	To Be Taken	Part of Plant	Reference
<i>Catharanthus roseus, G.Don</i> Apocynaceae	Sadabahar	Surguja district	Type II Diabetes	Antidiabetic activity , Antioxidant .	Leaf juice	Leaves	Shrivastava, S., & Kanungo, V. K. (2013)
<i>Momordicacharantia, L</i> Cucurbitaceae	Karela	Surguja district	Type I , II Diabetes	Antidiabetic activity , Hypoglycemic activity		Fruit	Shrivastava, S., & Kanungo, V. K. (2013)
<i>Syzygium cumini, (L.)Skeels</i>	Jamun	Surguja district	Type I , II Diabetes	Antidiabetic activity , Antiinflammatory ,	Leaf juice	Leaves	Shrivastava, S., & Kanungo, V. K.

Myrtaceae				antioxidant .			(2013)
<i>Ptarocarpus marsupium</i>	Egisa	District, andhra pradesh, india.	Type II Diabetes	Antidiabetic activity , Hypoglycemic activity	stem juice	stem	Sarmah, P. C. (2011)

Name of Plant with Family	Local Name	Area	Type of Diabetes	Pharmacological Action	To Be Taken	Part of Plant	Reference
<i>Ocimum sanctum L.</i> Lamiaceae	Kalitulasi	The baiga tribe living in rewa district m.p.	Type II Diabetes	Antidiabetic activity , Hypoglycemic , reduction of blood sugar	Leaf powder is taken orally with honey	Leaf	Yadav, M., Khan, K. K(2012)
<i>Hibiscus rosa-sinensis L.</i> .Malvaceae	Gurhal	The baiga tribe living in rewa district m.p.	Type II Diabetes	Antidiabetic activity , Stimulate insulin secretion	Leaf juice	Leaf	Yadav, M., Khan, K. K(2012)
<i>Punica granatum L.</i> Punicaceae	Anar	The baiga tribe living in rewa district m.p.	Type II Diabetes	Antidiabetic activity , Antioxidant , antihypertension		Fruit	Yadav, M., Khan, K. K(2012)
<i>Nelumbo Nucifera Gaertn.</i> .Nelumbonaceae	Kamal	The baiga tribe living in rewa district m.p.	Type II Diabetes	Antidiabetic activity , improve glucose tolerance	Flowers made to juice and taken orally	Flower	Yadav, M., Khan, K. K(2012)
<i>Ficus retusa Linn.</i> Moraceae	Athimaram	Plants of kalavai, vellore district, tamil	Type II Diabetes	Diabetes mellitus Antidiabetic activity ,	Leaf juice	Leaves and fruit	Natarajan (2013)

		Nadu, india					
<i>Gymnema sylvestris</i> Asclepiadaceae		Studies on herbal medicinal plants in Marathwada region (MS) India	Type I, II Diabetes	Diabetes mellitus Antidiabetic activity ,	Leaf juice	Leaves	Ladda, R. G., Aradwad, (2013)
<i>Syzygium cumini</i> Linn. (Myrtaceae)	Naval palam	Plants of kalavai, vellore district, tamil Nadu, india	Type I, II Diabetes	Antidiabetic activity , anti-inflammatory , antinociceptive	Seed powder	Seed	Natarajan (2013)

Name of Plant with Family	Local Name	Area	Type of Diabetes	Pharmacological Action	To Be Taken	Part of Plant	Reference
<i>Allium cepa</i> Linn .Liliaceae	Piyaz	Plants of tribal areas of district rewa used to treat diabetes	Type I , II Diabetes	Antidiabetic activity, antihyperglycemic, antioxidant.	Leaf juice is taken orally with honey or milk till	Leaf	Yadav, M., Khan, K(2012).
<i>Cassia fistula</i> L .Caesalpinaceae	Amaltas	Plants of tribal areas of district rewa used to treat diabetes	Type I Diabetes	Antidiabetic activity , improve serum level	One tea spoon powder of seeds is given once In the morning for about	Seed	Yadav, M., Khan, K(2012).

					15 days or more.		
<i>Ficus benghalensis</i> <i>Linn</i>	Bargad	Plants of tribal areas of district	Type I ,II Diabetes	Antidiabetic activity , antistress , antiallergic , improve insulin stimulation	Ground powder mixed	Bark	Yadav, M., Khan, K. K.(2012)
Moraceae		rewa used to treat diabetes			along with honey is		

Name of Plant with Family	Local Name	Area	Type of Diabetes	Pharmacological Action	To Be Taken	Part of Plant	Reference
<i>Ficus racemosa L</i> Moraceae	Gular	Plants of tribal areas of district rewa used to treat diabetes	Type II Diabetes	Antidiabetic activity , antibacterial	dried frits taken with warm water	Fruit	Yadav, M., Khan, K. K.(2012)
<i>Lantana camara</i> Linn .Verbenaceae	Raimunia	Plants of tribal areas of district rewa used to treat diabetes	Type II Diabetes	Antidiabetic activity , asthma , emphysema .	Leaf and fruits consumed raw	Leaf and fruit	Yadav, M., Khan, K. K.(2012)
<i>Mangifera indicaL</i> .Ana Cardiaceae	Aam	Plants of tribal areas of district rewa used to treat diabetes	Type II Diabetes	Antidiabetic activity , reduce blood pressure , antimicrobial	Dry kernel powder with cow's milk is taken till care	Seed	Yadav, M., Khan, K. K
<i>Musa paradisiacal</i> Musaceae	Kela	Plants of tribal areas of district rewa used to treat diabetes	Type II Diabetes	Antidiabetic activity , antioxidant activity	Stem extract	Stem	Yadav, M., Khan, K. K.(2012)
<i>Nelumbonucifera</i>		Plants of tribal areas of district	Type I , II Diabetes		Flowers made to juice		Yadav, M., Khan,

<i>gaerth</i> .Nelumbonaceae	Kamal	rewa used to treat diabetes		Antidiabetic activity , diabetes mellitus .	and taken orally for about 15 days.	Flower	K. K.(2012)
<i>Ocimum sanctum L</i> .Lamiaceae	Kalitulsi	Plants of tribal areas of district rewa used to treat diabetes	Type II Diabetes	Antidiabetic activity , hypolipidemic , reduce of blood sugar .	Leaf powder is taken orally with honey.	Leaf	Yadav, M., Khan, K. K.(2012)

Name of Plant with Family	Local Name	Area	Type of Diabetes	Pharmacological Action	To Be Taken	Part of Plant	Reference
<i>Punica granatum L .</i> Punicaceae	Anar	Plants of tribal areas of district rewa used to treat diabetes	Type II Diabetes	Antidiabetic activity , antioxidant , Antihypertension, hypolipidemic .		Fruit	Yadav, M., Khan, K. K(2012)
<i>Zygium cumini</i> Myrtaceae	Jamern	Plants of tribal areas of district rewa used to treat diabetes	Type I ,II Diabetes	Antidiabetic activity , repair immunoreactive beta cells	Seed powder	Seed	Yadav, M., Khan, K. K(2012)
<i>Bombox malabaricum D</i> C Bombacaceae	Simolu	Ethno antidiabetic plants of Assam	Type II Diabetes	Antidiabetic activity ,		Root	Sarmah, P. C. (2011)
<i>Bougainvillea</i> <i>spectabili swilld</i>	Bougainvelli	Ethno antidiabetic plants of	Type II Diabetes	Antidiabetic activity , antihyperglycemic activity	Leaf juice	Leaf	Sarmah, P. C.

Nyctaginiaceae	a	Assam					(2011)
<i>Caesalpinia crista</i> Linn .Caesalpinaceae	Lataguti	Ethno antidiabetic plants of Assam	Type II Diabetes	Antidiabetic activity , obesity , cancer , stoke , antioxidant	Seed powder	Seed	Sarmah, P. C. (2011)
<i>Cajanus cajan</i> Mill Papilionaceae	Rahar	Ethno antidiabetic plants of Assam	Type II Diabetes	Antidiabetic activity ,acute hypoglycemic	Leaf juice	Leaf	Sarmah, P. C. (2011)
<i>Canna indica</i> Linn Cannaceae	Parijat	Ethno antidiabetic plants of Assam	Type II Diabetes	Antidiabetic activity , hypoglycemic activity , antihypertension	Leaf juice	Leaf,Stem	Sarmah, P. C. (2011)
<i>Cannabis sativa</i> Linn Cannabaceae	Bhang	Ethno antidiabetic plants of Assam	Type II Diabetes	Antidiabetic activity , neuroprotective effect , Psycho tonic effect ,	Leaf juice	Leaf,stem, flower	Sarmah, P. C. (2011)
Name of Plant with Family	Local Name	Area	Type of Diabetes	Pharmacological Action	To Be Taken	Part of	Reference
<i>Carrica papaya</i> Linn Carricaceae	Amita	Ethno antidiabetic plants of Assam	Type II Diabetes	Antidiabetic activity , heart attack , stoke , anemia , jaundice	Seed powder	Seed	Sarmah, P. C. (2011)
<i>Casia alata</i> Linn. Caesalpinaceae	Khorpat	Ethno antidiabetic plants of Assam	Type II Diabetes	Antidiabetic activity ,antinociceptive , antioxidant		Tender,leaf	Sarmah, P. C. (2011)
<i>Cassia angastifolia</i> Linn Caesalpinaceae	Channa	Ethno antidiabetic plants of Assam	Type II Diabetes	Antidiabetic activity , Antioxidant , hypoglycemic	Leaf juice	Leaf	Sarmah, P. C. (2011)

<i>Marsilea minuta</i> L. (Marsileaceae)	Aarakkerai	Plants of kalavai, vellore district, tamil Nadu, india	Type I , II Diabetes	Antidiabetic activity , drug resistance epilepsy	Leaf juice	Leaves	Natarajan(2013)
<i>Cynodon dactylon</i> (L)pers Poaceae	Arugampul	Plants of kalavai, vellore district, tamil Nadu, india	Type I Diabetes	Antidiabetic activity ,		Whole plant	Natarajan(2013)
<i>Abrus precatorius</i> L Fabaceae	Ghumchi	Plants of tribal areas of district rewa used to treat	Type I ,II Diabetes	Antidiabetic activity , heart disease , tumors ,. colic	Leaf juice (2 teaspoon) given orally	Leaf	Yadav, M., Khan, K(2012).

Name of Plant with Family	Local Name	Area	Type of Diabetes	Pharmacological Action	To Be Taken	Part of Plant	Reference
<i>Cassia sophera</i> Linn Caesalpinaceae	Bonmadelu	Ethno antidiabetic plants of assam	Type II Diabetes	Antidiabetic activity , antihyperlipidemic antioxidant	Seed powder	Seed,stem,b Ark	Sarmah, P. C. (2011)
<i>Tinospora Cordifolia</i> (Menispermaceae).	ThippaTeega	Raditional Healers of thadvai, warangal district, andhra pradesh, india.	Type II Diabetes	Antidiabetic activity , Oxidation stress	Creepers and Leafs Dry powder or One teaspoon Juice	Leaf	Naini, V., &Mamidala, E. (2013)
<i>Litsea sebifera</i> Lauraceae	Narre Mamedi	Raditional Healers of thadvai, warangal district, andhra pradesh, india.	Type I Diabetes	Antidiabetic activity , Anti-inflammatory , antipyretic	Bark, Juice of bark is mixed with water	Bark	Naini, V., &Mamidala, E. (2013)
<i>Sphaeranthus indicus</i> Linn Asteraceae	Sphaeranthus indicus Linn (Asteraceae)	Raditional Healers of thadvai, warangal district, andhra pradesh, india.	Type II Diabetes	Antidiabetic activity , Antiobesity , antioxidant	The leaves are grinded with pepper and a dose of spoon extract is taken	Leaf.leaves	Naini, V., & Mamidala, E.(2012)

Name Of The Plant With Family	Local Name	Area	Type Of Diabetes	Pharamacological Action	To Be Taken	Part Of Plant	Reference
<i>Acacia Arabica</i> Mimosaceae	Indian babool	Kolli hills, Namakkaldistrict,tamilnadu, southern india	Type II Diabetes	Antidiabetic activity , Hypoglycemic activity	Orally	Bark, gum, pods, leaves and Seeds	Elavarasi, S., & Saravanan, K. (2012)
<i>Syzygium cumini</i> Myrtaceae	Java plum	Kolli hills, Namakkaldistrict,tamilnadu, southern india	Type I , II Diabetes	Antidiabetic activity , antidyslipidemic		Fruit, leaves, dried seed and bark	Elavarasi, S., & Saravanan, K. (2012)
<i>Ficusra cemos</i> Urticaceae	Cluster fig	Kolli hills, Namakkaldistrict,tamilnadu, southern india	Type II Diabetes	Antidiabetic activity ,diarrhea , dysentery , heomoptysis		Bark, leaves and unripe fruit	Elavarasi, S., & Saravanan, K. (2012)
<i>Cedrus deodara Loud</i> Pinaceae	Deodar	Medicinal plants Of tehsil billawar, district kathua, j&k,	Type II Diabetes	Antidiabetic activity, antitumor , anti- inflammatory , analgesic		Leaves	Bhushan, B., & Kumar, M.

.		India			Leaf juice		(2013)
<i>Mimosa pudica</i> Linn. Fabaceae	Chui-mui	Medicinal plants Of tehsil billawar, district kathua, j&k, India	Type I ,II Diabetes	Antidiabetic activity , urinary problem	Leaf juice	Leaves	Bhushan, B., & Kumar, M. (2013)

Name of Plant with Family	Local Name	Area	Type of Diabetes	Pharmacological Action	To Be Taken	Part of Plant	Reference
<i>Xanthium strumarium</i> Asteraceae	Maruloo Mathangi	Traditional healers of thadvai, warangal district, andhra pradesh, india.	Type II Diabetes	Antidiabetic activity , antioxidant activity		Roots & Seeds	Naini, V., & Mamidala, E. (2013)
<i>Sesbania sesban</i> <i>Merill</i> Papilionaceae	Jayanti	Ethno antidiabetic plants of Assam	Type II Diabetes	Antidiabetic activity , hypoglycemic , antioxidant , diabetic nephropathy	Leaf juice	Leaf, tender stem	Sarmah, P. C. (2011)
<i>Sterculia villosa Roxb.</i> Sterculiaceae	Udal	Ethno antidiabetic plants of Assam	Type II Diabetes	Antidiabetic activity , dysentery , skin disorder		Root	Sarmah, P. C. (2011)
<i>Swetia chirayta Roxb.</i> Gentianaceae	Cherota	Ethno antidiabetic plants of	Type II Diabetes	Antidiabetic activity , hypoglycemic activity , analgesic, hepatic , antiinflammation		Aerial plant	Sarmah, P. C. (2011)

Name of Plant with Family	Local Name	Area	Type of Diabetes	Pharmacological Action	To Be Taken	Part of Plant	Reference
<i>Tabernaemontana diveri</i> Cota (L) R Br Apocyanaceae	Kothalphool	Ethno antidiabetic plants of Assam	Type II Diabetes	Antidiabetic activity , hypoglycemic activity	Leaf juice	Leaf	Sarmah, P. C. (2011)
<i>Terminalia catapa</i> Linn Combretaceae	Badam(desi)	Ethno antidiabetic plants of Assam	Type I, II Diabetes	Antidiabetic activity , hypoglycemic activity		Fruit,seed	Sarmah, P. C. (2011)
<i>Terminalia chebula</i> Roxb .Combretaceae	Selekha	Ethno antidiabetic plants of Assam	Type I , II Diabetes	Antidiabetic, tumor ,colic , swelling		Fruit	Sarmah, P. C. (2011)
<i>Thevetia peruviana</i> (pers) MerillApocyanaceae	Halodhiakoro Bi	Ethno antidiabetic plants of Assam	Type II Diabetes	Antidiabetic activity , antiapoptatic , Antilipidemic		Bark	Sarmah, P. C. (2011)
<i>Tinospora cordifolia</i> Miers Menispermaceae	Sidhilota	Ethno antidiabetic plants of Assam	Type I Diabetes	Antioxidant, antidiabetic	Leaf juice	Leaf, bark	Sarmah, P. C. (2011)
<i>Tinospora crista</i> Miers Menispermaceae	Sagunilata	Ethno antidiabetic plants of Assam	Type II Diabetes	Anti-inflammatory , asthma , fever , jaundice		Leaf, root	Sarmah, P. C. (2011)
<i>Vinca rosea</i> Linn (<i>cartharanthu sreseus</i>) Apocyanaceae	Nayantora	Ethno antidiabetic plants of Assam	Type II Diabetes	Antidiabetic activity , hypoglycemic activity, Antioxidant	Leaf juice	Leaf	Sarmah, P. C. (2011)

<i>Conscinium fenestratum</i> Menispermaceae	Maramaneal	Raditional Healers of thadvai, warangal district, andhra pradesh, india.	Type II Diabetes	, Diabetic retinopathy decrease lipid peroxidation, antioxidant		Stem	Naini, V., & Mamidala (2011)
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Name of Plant with Family	Local Name	Area	Type of Diabetes	Pharmacological Action	To Be Taken	Part of Plant	Reference
<i>Momordica charantia</i> L. Cucurbitaceae	Pavakai	Kalavai, vellore district, tamil Nadu, india	Type I,II Diabetes	Blood pressure control Antidiabetic activity ,		Bark	Natarajan (2013)
<i>Ficusretusa</i> Linn Moraceae	Athimaram	Kalavai, vellore district, tamil Nadu, india	Type II Diabetes	Antidiabetic activity , Anti-inflammatory , hypocholesteroaemic	Leaf juice	Leaves and Fruit	Natarajan (2013)
<i>Cassia auriculata</i> L. Caesalpiniaceae	Aavaram poo	Kalavai, vellore district, tamil Nadu, india	Type I Diabetes	Antioxidant , antidiabetic activity		Whole plant	Natarajan (2013)
<i>Aegle marmelos</i> Corr.ex Roxb Rutaceae	Vilvam	Kalavai, vellore district, tamil Nadu, india	Type II Diabetes	Ophthalmia , deafness, diarrhea , dysentery antidiabetic	Leaf juice	Leaves	Natarajan (2013).
<i>Syzygium cumini</i> Linn. Myrtaceae	Naval palam	Kalavai, vellore district, tamil Nadu, india	Type II Diabetes	Antidiabetic activity , hypoglycemic activity , Antiinflammtory	Seed powder	Seed	Natarajan (2013).

<i>Cynodon dactylon</i> (L.)Pers. Poaceae	Arugampul	Kalavai, vellore district, tamil Nadu, india	Type I,II Diabetes	Antioxidant , antihyperglycemic , Antihyperlipidemic		Whole plant	Natarajan (2013).
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Name of Plant with Family	Local Name	Area	Type of Diabetes	Pharmacological Action	To Be Taken	Part of Plant	Reference
<i>Lobelia sinensis</i> Lobeliaceae	<i>Yahang-en</i>	Khamptis of Arunachal Pradesh	Type II Diabetes	Angiotension Receptor Blocker in treatment of diabetic nephropathy		Leaf extract is used for The Treatment	Sen, P., Dollo, M., Choudhury M. D. (2008)
<i>Vincarosea</i> Linn. Apocynaceae	<i>Nayantara</i>	Khamptis of arunachal pradesh	Type II Diabetes	Hypolipidaemic Effect , Hypoglycemic Properties , Neuropsychopharmacological effects		leaf extract is used for the treatment	Sen, P., Dollo ,M., Choudhury M. D. (2008),
<i>Pterocarpus marsupium</i> Roxb Leguminosae		Kollam district, kerala	Type II Diabetes	Pancreatic beta cell regulation , Hypoglycemic activity	decoction is taken internally thrice a day	Dried heart Wood	Udayan, P. S., George, S.
<i>Coccinia grandis</i> Cucurbitaceae	Koovai	Local people in javadhu hills tamilnadu, india	Type I , II Diabetes	Antiulcerogenic , antioxidant	Fruit	Fruit	Thirumalai, T. Beverly, C.

Name of Plant With Family	Local Name	Area	Type of Diabetes	Pharmacological Action	To Be Taken	Part of Plant	Reference
<i>Agel marmelos</i> Rutaceae	Bel	Survey on ethnomedicinal anti-diabetic plants from deori taluka of gondia district (maharastra)	Type II Diabetes	Repair tissue , Diabetic foot ulcer , hyperlipidemia		The dried And Powdered Leaves	Ghoshal, K. P., & Gadekar, G. P. (2014)
<i>Asparagus racemosus</i> Asparagaceae	Shatavari	Survey on ethnomedicinal anti-diabetic plants from deori taluka of gondia district maharastra	Type II Diabetes	Diabetic retinopathy , decrease lipid peroxidation , enhance level of glutathione		Tuberous root,	Ghoshal, K. P., & Gadekar, G. P. (2014)
<i>Andrographis paniculata</i> Acanthaceae	PaniculataBhui, Neem	Survey on ethnomedicinal anti-diabetic plants from deori taluka of gondia district(maharastra)	Type II Diabetes	Increase glucose utilization & lower Hyperglycemic , cold, fever, malaria.	juice is taken orally	Leaves, The juice of the leaves	Ghoshal, K. P., & Gadekar, G. P (2014).
<i>Azadirachta indica</i> Meliaceae	Neem	Survey on ethnomedicinal anti-diabetic plants from deori taluka of gondia district (maharastra)	Type II Diabetes	Reduce peripheral utilization of glucose	juice is taken orally	Leaves, Dried and Powdered leaves	Ghoshal, K. P., & Gadekar, G. P. (2014)

3. DISCUSSION

The present review is an attempt to compile the traditional ethnobotanical medicinal plants utilized in various parts of India. This study will be help to future researcher to understand the correlation between different tribes and their approach to treat Diabetes s. In this study, medicinal plants which are being utilized to treat0 the Diabetes disease among the tribes were focused. Data obtained from present investigation is compiled in Table 2.1 and the medicinal plants species are arranged in alphabetical order. A total of 124 plant species belonging to 63 families have been reported for the treatment of Diabetes diseases. The most of the medicinal plants are belongs to malvaceae, leguminosae, poaceae, liliaceae, cucurbitaceae, gentianaceae, asteraceae, zingiberaceae, verbenaceae and Apocynaceae. The botanical name, local name, native tribe utilized, part of plant, mode of use, pharmacological activity and references are provided. The compilation revels that the different plant parts were used in treatment of diabetes. Among these leaves were highly utilized leaves (27%) followed by whole plant (4%), roots (8%), seed (22%) fruit (17%) , stem (6%), shoot and bark (12%), Table 1 show that there are some medicinal plants which were accepted in different tribes as medications for diabetes. They are either used single or in combination or the same part or other parts. These plants are also recommended in Indian system of medicines such as Ayurveda and siddha systems of medicines, these findings indicate these tribes are some or other way relates to these systems. The preparation method of medication sometimes varies from *vaidus* (Medicine man) to *vaidus*. The popular forms are decoction, juice, extract, powder, fresh part, and paste. The duration of treatment varies from weeks to months.

4. CONCLUSION

A significant contribution to human health are provided by medicinal plants of the locality and one of the most significant ways in which humans directly reap the benefits are provided by biodiversity. India has long history of medicinal plant utilization in traditional and tribal culture. Here we reported on 124 medicinal plant species. Used in the traditional health care systems of tribal people from the India. This is the most comprehensive review to date and it shows striking similarities between medicinal plants being used in nations. Thus, by triangulation, it is probably still possible to document most of the knowledge, but research should continue, especially in areas or within nations that have received less attention.

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