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AN UPDATE ABOUT MEDICINAL PLANTS USAGE FOR THE TREATMENT OF DIABETES AND SOME OTHER DISEASE IN BUNDELKHAND REGION

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Keywords:

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ABSTRACT: Nowadays, some medicinal plants have been reported to be useful in diabetes worldwide and have been used analytically as antidiabetic medicaments. Bundelkhand is a historic zone of central India. This region is known as the land of fighters, sacrifice, and love. It's spread in the range of Uttar Pradesh and Madhya Pradesh state. It includes seven sections of Uttar Pradesh and six sections of Madhya Pradesh. Despite the presence of known antidiabetic drugs in the pharmaceutical request, diabetes, and related complications continued to be major medical problems. Antihyperglycemic effects of these plants are attributed to their capability to restore the function of pancreatic tissues by causing an increase in insulin production or inhibiting the intestinal immersion of glucose to facilitate metabolites in insulin-dependent processes. Diabetes mellitus (DM), also known as insulin-dependent diabetes mellitus (IDDM) and non-insulin-dependent diabetes mellitus (NIDDM), is a common and serious metabolic condition that affects people each over the world. Traditional herbal plants have been employed to treat diabetes mellitus all throughout the world. Several herbs have been set up to treat and control diabetes among multitudinous drugs and polyherbal plants; they also have no side effects.

INTRODUCTION: Bundelkhand is a major region of central India. This region is known as the land of soldiers, offering, and love. It's spread in the home of Uttar Pradesh and Madhya Pradesh state. It includes seven sections of Uttar Pradesh and six sections of Madhya Pradesh. Seven sections of Uttar Pradesh are Jhansi, Lalitpur, Jalaun, Hamirpur, Mahoba, Banda, and Chitrakoot, located in the southern part of the state, and six sections of Madhya Pradesh (Chhatarpur, Datia, Damoh, Panna, Sagar, and Tikamgarh). The region is located at a low altitude with pitches from south to north and topographically, it's divided into northern monotonous flat Bundelkhand plain rises to Bundelkhand table, broken down into low flat-outgunned hills in the south.

A major part of the region contains an impermeable rocky subcaste making it prone to failure as well as flood tide. The elevation with gentle slopping and hilly terrain contains major leafage due to sparing downfall¹. The layout of Bundelkhand includes rich plains around rivers, defiles, and significant stretches of the table and hilly land. The soil of this region falls into two orders *viz.* Red flaxen soil and black soil with high complexion content. Climate change and thunderstorm failure have constantly caused the failure. The region being a rainfed area, dryland husbandry, and low productivity are the characteristics of this region.

The livelihood of the people significantly depends on husbandry. Periodic downfall in some sections is 663 mm or indeed less. Heavy soil corrosion leads to the large-scale confirmation of defiles along the swash Yamuna and Chambal. The total of the Bundelkhand region is positioned in the catchment area of the swash Yamuna and its branches *viz.* Chambal, Betwa, Dhasan, Ken, Mandakini, Sindh, Pariksha and Pahuj rivers. The

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area connecting the Madhya Pradesh state is inhabited by ethnic communities like Gond, Kol, Sahariya, etc.². Plants and plant-based medications have been employed since the dawn of civilization for elongating man's life by combating colorful affections. Ancient ethnic communities around the world have learned to use their neighbourhood herbal wealth for the restorative key is inhabited by over 54 million ethnic people dwelling in about 5000 forestland-dominated inlets spreading across the country comprising 15 of the total geographical area, their knowledge of plants developed frequently of the cost of their life in their natural residences through centuries-old experience couldn't be impeccably proved due to the lack of knowledge. It had rather descended from one generation to another as a domestic practice³. The region also contains a rich diversity of medicinally important weed plants employed by the region's original people and herbal interpreters⁴.

A total and expansive inspection has been made in a different part of Bundelkhand, and areas of elected medicinal plants have been connected for conservation. The study areas with further dominance were marked and connected for in situ conservation. Meanwhile, germplasm for cultivation in other places was collected, and studies on germination and plant growth and development were recorded for extension of the plant cultivation to other land.

Side-by-side protocols for extending the cultivation practices with the involvement of growers and other lodgers were prepared. Some thematic data and findings for public participation in civilization programs of medicinal shops were also noted. Meanwhile, germplasm from important medicinal plants was obtained and adapted in the Medicinal Plants Garden of the Ewing Christian College. Soil analysis and the development of an old fashion for medicinal plants have been initiated and the conservation of medicinal plants is being worked out on the pattern suggested by different authors⁵.⁶. The region is located at a low altitude with pitches from south to north, and topographically it's divided into northern monotonous flat Bundelkhand plain rises to Bundelkhand table, broken down into low flat- exceeded hills in the south. A major part of the region contains an impermeable rocky subcaste making it prone to

failure as well as flood tide. The highland with gentle slopping and hilly terrain contains meagre herbage due to skimp rainstorms⁷. In India, roughly 8,000 herbal drugs have been codified in well-known AYUSH systems. AYUSH suggests a fuse of a cover ordering of Medicine, originally familiar as India's System of remedies. AYUSH comprises Yoga, homeopathy, Ayurvedic, Unani, Naturopathy, and Siddha; these notorious Ayurveda and Unani remedial systems are well-developed and astronomically rehearsed in Indian culture. The main target of AYUSH is to raise clinical multiracialism and to represent styles and ways for mainstreaming the native fabrics of cures. The Division of AYUSH eases the AYUSH practices under the Health and Family Welfare Ministry at the Union Government position in India.

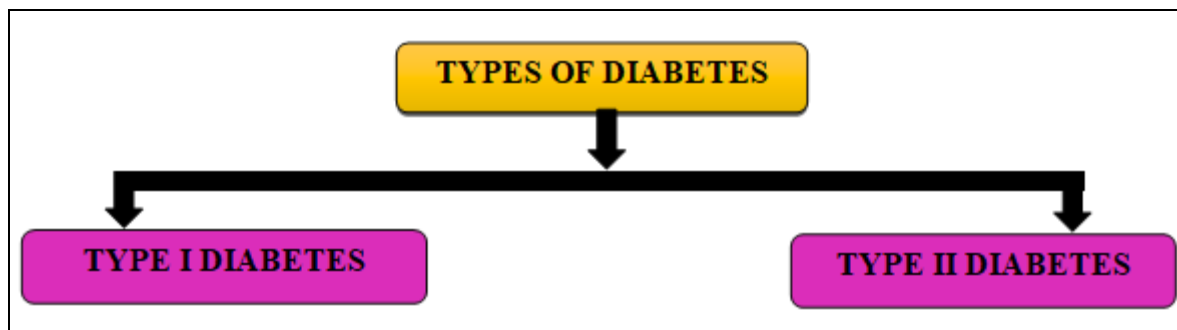
Over the period, the utmost of this clinical exercise started in India, and conterminous countries yet got supported in India. One central matter that impacts the expansion of India's AYUSH and an electoral medication announcement is the common perspective of remedy as a fresh medicament source. The Ayurvedic tradition believes that every part of the plant- leaves, flowers, fruit, stem, bark, etc. has some medicinal value, *i.e.*, the Arjuna tree makes an excellent heart tonic.

More than 7500 medicinal plants are listed, and more continue to be discovered⁸. Diabetic Mellitus (DM) is a metabolic complication that's dealing with people each over the world. DM is caused due to lack of insulin or ineffective insulin production in the pancreas. An aggregate of 463 million people was recounted to have diabetes mellitus in 2019, and this number is prognosticated to rise to 578 million by the time 2030 and 700 million by 2045. High blood sugar gives rise to numerous complications like diabetic retinopathy, diabetic nephropathy, atherosclerosis, hypercoagulability, cardiovascular complication, coronary heart complication, abdominal rotundity, hypertension, hyperlipidemia, cerebrovascular complication, coronary roadway complication, bottom damage, skin complications, Alzheimer's complication, hearing impairment, and depression. These life-changing complications make diabetes more severe than other conditions. World Diabetes Day provides an occasion to raise mindfulness of diabetes as a global public health issue and what

needs to be done, inclusively and collectively, for better forestalment, opinion, and operation of the condition. This time's theme "access to diabetes education", underpins the larger multi-year theme of access to care. It highlights the need for better access to quality diabetes education for health professionals and people living with diabetes. So, on this day and beyond, let ustransfigure our commitments into conduct to make healthier communities with better access to quality diabetes education, diabetes drugs, and watch^{9, 10}. Now a day's available curatives for diabetes include insulin and colorful oral anti-diabetic agents similar as sulfonylureas, biguanides, and glinides⁷.

They've numerous serious side effects; thus, the hunt for further effective and safer hypoglycaemic agents is one of the most important areas of disquisition. In diabetes, hyperglycaemia gives rise to reactive oxygen species (ROS), affecting lipid peroxidation and membrane damage. These free revolutionaries play a critical part in the development of diabetes mellitus secondary complications (kidney, eye, blood vessel, and nerve damage)^{8, 9}. Antioxidants defend against the circumstance of diabetes by blocking the peroxidation chain response, which prevents the death of β - cells.

Diabetes is Substantially Distributed into two types:



Type I Diabetes: Type I diabetes is known as insulin-dependent diabetes and is characterized by deficient products of insulin and requires diurnal administration of insulin. This happens due to the cellular-mediated autoimmune destruction of the β cells of the pancreas. In this type, the body doesn't produce any Insulin stashing. It has generally come about in children and youthful grown-ups. In Type 1 diabetes 5 -10 people suffer from this type of Diabetes. Type II is a noninsulin-dependent diabetes mellitus (NIDDM), in this type, the body doesn't produce enough, or indecorous use of buried insulin. It's the most common form of complaint.

Type II Diabetes: In Type 2 diabetes 90 - 95 of people suffering from this type of diabetes. Type 2 diabetes is an epidemic proportion because numerous senior people suffered from this type of diabetes because have a lesser frequency of rotundity and sedentary cultures. The following threat factors are generally involved in the development of type- II diabetes similaras inheritable factors, rotundity, poor diet, inadequate physical exertion, advancing age, hypertension, etc

^{11, 12}. There's another class of diabetes is reported known as gravid diabetes which substantially arises from glucose dogmatism, with an onset during gestation. This is a temporary condition but it may carry the long-term threat of diabetes¹³.

Symptoms of Diabetes: The classic symptoms of undressed diabetes are weight loss, polyuria "intermittent urination", polydipsia "stokedthirst", and polyphagia "stokedhunger". Symptoms may develop fleetly "in weeks or months in" type 1 diabetes, while they generally develop much more sluggishly and may be subtle or absent in type 2 diabetes. Several other signs and symptoms can mark the onset of diabetes, although they aren't specific to the complication. In addition to the given ones above, they include vague vision, headache, fatigue, slow recovery of cuts, and itchy skin. Dragged high blood glucose can beget glucose absorption in the lens of the eye, which leads to changes in its shape, performing in vision changes. Many skin rashes that can do in diabetes are inclusively known as diabetic dermadromes. People (generally with type 1 diabetes) may also witness occurrences of diabetic ketoacidosis, a type

of metabolic problem characterized by nausea, puking and abdominal pain, the smell of acetone in the breath, deep breathing known as Kussmaul breathing, and in severe cases a dropped position of attention. A rare but inversely severe possibility is a hyperosmolar nonketotic state, which is more common in type 2 diabetes and is substantially the result of moistness^{14, 15}.

Causes of Type 1 Diabetes: The exact cause of type 1 diabetes is unknown. In utmost people with type 1 diabetes, the body's vulnerable system which typically fights dangerous bacteria and viruses inaptly destroys the insulin-producing (islet) cells in the pancreas. Genetics may play a part in this process, and exposure to certain viruses may spark the complication¹⁶.

A Family History: Anyone with a parent or sibling with type 1 diabetes has a slightly increased risk of developing the condition.

Genetics: Certain genes indicate an increased risk of developing type 1 diabetes. In some cases—usually, through a clinical trial, genetic testing can be done to determine if someone who has a family history of type 1 diabetes is at increased risk of developing the condition.

Symptoms of Type1 Diabetes:

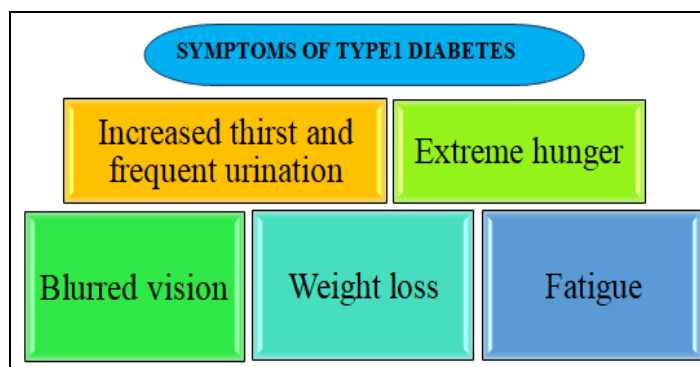


FIG. 1: TYPE 1 DIABETES SIGNS AND SYMPTOMS APPEAR QUICKLY AND MAY INCLUDE¹⁷

Complications of Type1 Diabetes Mellitus^{18, 19}: 'Type 1 diabetes can affect major organs in the body, including the heart, blood vessels, nerves, eyes, and kidneys. Keeping the blood sugar level close to normal utmost of the time can dramatically reduce the threat of numerous complications. Long-term complications of type 1 diabetes develop gradationally over time. Diabetes developed before- and controlled blood sugar may beget an

Geography: The incidence of type 1 diabetes tends to increase as you travel away from the equator. People living in Finland and Sardinia have the highest incidence of type 1 diabetes about two to three times higher than rates in the United States and 400 times that of people living in Venezuela.

Viral Exposure: Exposure to Epstein-Barr virus, coxsackie virus, mumps virus or cytomegalovirus may trigger the autoimmune destruction of the islet cells, or the virus may directly infect the islet cells.

Early Vitamin D: Research suggests that vitamin D may be protective against type 1 diabetes. However, early drinking of cow's milk, a common source of vitamin D, has been linked to an increased risk of type 1 diabetes.

Other Dietary Factors: Omega-3 fatty acids may offer some protection against type 1 diabetes. Drinking water that contains nitrates may increase the risk. Consuming dairy products, particularly cow's milk, may increase infants' disease risk.

Additionally, the timing of introducing cereal into a baby's diet may affect risk. One clinical trial found that between ages 3 and 7 months appears to be the optimal time for introducing cereal.

advanced e risk of complications. Ultimately, diabetes complications may be disabling or indeed life-changing. Heart and blood vessel disease. Diabetes dramatically increases your risk of various cardiovascular problems, including coronary artery disease with chest pain (angina), heart attack, stroke, narrowing of the arteries (atherosclerosis), and high blood pressure.

Nerve Damage (Neuropathy): Redundant sugar can injure the walls of the bits of blood vessels (capillaries) that nourish your nerves, especially in the legs. This can beget chinking, numbness, burning, or pain that generally begins at the tips of the toes or fingers and gradationally spreads overhead. Inadequately controlled blood sugar could beget you to lose all sense of feeling in the affected limbs ultimately. Damage to the nerves that affect the gastrointestinal tract can beget problems with nausea, puking, diarrhea, or constipation. For men, erectile dysfunction may be an issue.

Kidney Damage (Nephropathy): The kidneys contain millions of tiny blood vessel clusters that filter waste from your blood. Diabetes can damage this delicate filtering system. Severe damage can lead to kidney failure or irreversible end-stage kidney disease, which requires dialysis or a kidney transplant.

Eye Damage: Diabetes can damage the retina's blood vessels (diabetic retinopathy), potentially leading to blindness. Diabetes also increases the risk of other serious vision problems, such as cataracts and glaucoma.

Foot Damage: Nerve damage in the feet or poor blood flow to the feet increases the risk of various foot complications. Cuts and blisters, when left untreated can become serious infections. Severe damage might require toe, foot, or even leg amputation.

Skin and Mouth Conditions: Diabetes patients may be more susceptible to skin problems, including bacterial and fungal infections. Gum infections also may be a concern, especially if they have a history of poor dental hygiene.

Osteoporosis: Diabetes may lead to lower-than-normal bone mineral density, increasing the risk of osteoporosis.

Pregnancy Complications: High blood sugar situations can be dangerous for the mother and the baby. The threat of confinement, birth, and birth guard increases when diabetes isn't well controlled. For the mother, diabetes increases the threat of diabetic ketoacidosis, diabetic eye problems (retinopathy), pregnancy-convinced high blood pressure, and preeclampsia.

Hearing Problems: Hearing impairments occur more often in people with diabetes ²⁰.

Type II Diabetes: Type 2 diabetes, formerly known as adult-onset or noninsulin-dependent diabetes, is a habitual condition that affects the way the body metabolizes glucose, the main source of energy. In type 2 diabetes, the body either resists the effects of insulin- a hormone that regulates the movement of glucose into the cells- or doesn't produce enough insulin to maintain a normal glucose level. Undressed, type 2 diabetes can be life-changing. It's the result of failure to produce sufficient insulin and insulin resistance. Elevated blood glucose levels are managed with reduced food input, increased physical conditioning, and ultimately oral drugs or insulin ²¹.

Symptoms of Type 2 Diabetes:

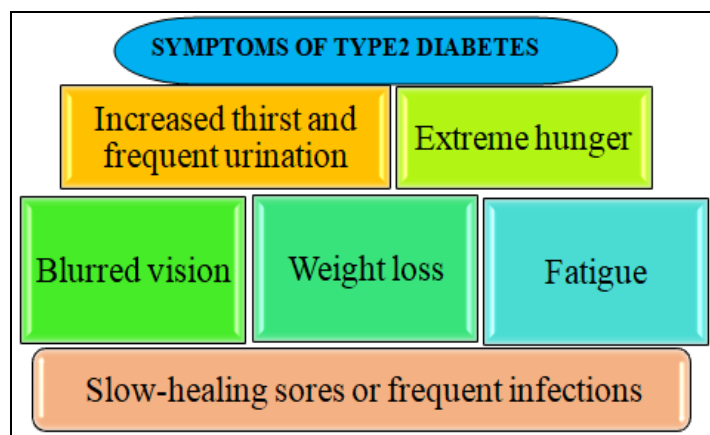


FIG. 2: TYPE 2 DIABETES SYMPTOMS MAY DEVELOP SLOWLY ²²

Causes of Type 2 Diabetes¹⁸:

Weight: Being overweight is a primary risk factor for type 2 diabetes. The fatter tissue the cells become more insulin resistant.

Fat Distribution: If the body stores fat primarily in the abdomen, the risk of type 2 diabetes is greater than if the body stores fat elsewhere, such as the hips and thighs.

Inactivity: The less active you are, the greater your risk of type 2 diabetes. Physical activity helps control weight, uses glucose as energy, and makes cells more sensitive to insulin.

Family History: The risk of type 2 diabetes increases if the parent or sibling has type 2 diabetes.

Race: Although it is unclear why, people of certain races including blacks, Hispanics, American Indians, and Asian Americans are more likely to develop type 2 diabetes than whites are.

Age: The risk of type 2 diabetes increases as you get older, especially after age 45. That is probably because people tend to exercise less, lose muscle mass, and gain weight as they age. But type 2 diabetes is also increasing dramatically among children, adolescents, and younger adults.

Prediabetes: Prediabetes is a condition in which your blood sugar level is higher than normal, but not high enough to be classified as diabetes. Left untreated, prediabetes often progresses to type 2 diabetes^{23,24}.

Complications of Type 2 Diabetes²⁵:

Heart and Blood vessel Disease: Diabetes dramatically increases the threat of cardiovascular problems, including coronary artery complications with chest pain (angina), heart attack, stroke, narrowing of arteries (atherosclerosis), and high blood pressure. The danger of stroke is two to four times more advanced for people with diabetes. The death rate from heart complications is two to four times advanced for people with diabetes than for people without the complication, according to the American Heart Association Alzheimer's disease; Type 2 diabetes may increase the threat of Alzheimer's complication and vascular madness.

The poorer your blood sugar control, the lesser the threat appears to be so, connects the two conditions. One theory is that cardiovascular problems caused by diabetes could contribute to madness by blocking blood inflow to the brain or causing strokes. Other possibilities are that too important insulin in the blood leads to brain-damaging inflammation or lack of insulin in the brain deprives brain cells of glucose.

Nerve Damage (Neuropathy): Redundant sugar can injure the walls of the bits blood vessels (capillaries) that nourish your nerves, especially in the legs. This can beget chinking, insensibility, burning, or pain that generally begins at the tips of the toes or fritters and gradationally spreads overhead. Inadequately controlled blood sugar can ultimately beget you to lose all sense of feeling in the affected limbs²⁶.

Kidney Damage (Nephropathy): The kidneys contain millions of tiny blood vessel clusters that filter waste from your blood. Diabetes can damage this delicate filtering system. Severe damage can lead to kidney failure or irreversible end-stage kidney disease, requiring dialysis or a kidney transplant.

Foot Damage: Nerve damage in the feet or poor blood flow to the feet increases the risk of various foot complications. Left untreated, cuts and blisters can become serious infections. Severe damage might require toe, foot, or even leg amputation.

Skin and Mouth Conditions: Diabetes may leave you more susceptible to skin problems, including bacterial and fungal infections. Gum infections also may be a concern, especially if you have a history of poor dental hygiene²⁷.

Basis of Diabetes Mellitus Treatment¹⁹:

Diabetes mellitus alone is because of its enormous incidence, morbidity, and mortality, diabetes has surpassed cancer as the third "killer" of humanity's health, behind cancer, cardiovascular, and cerebrovascular ails. As a result, formerly linked, it's successfully controlled with a variety of therapeutically effective drugs. Piecemeal from the fact that the treatment is grounded on chemotherapy medicines, the twentieth century has seen a shift toward naturopathy.

Therefore, medicinal plants have a significant part in the treatment or control of complaints that protract life, similar to diabetes mellitus, particularly in poor nations with limited resources. Along with a slew of other ails that have infected else healthy people. Using India's herbal integrity

to treat similar disorders is a feasible option. The herbal plants can be employed in part or whole to treat diabetes mellitus- related diseases. Likewise, plant extracts can cure associated ails including polyuria, polydipsia, and glycosuria, as well as habitual disorders like diabetes mellitus²⁸.

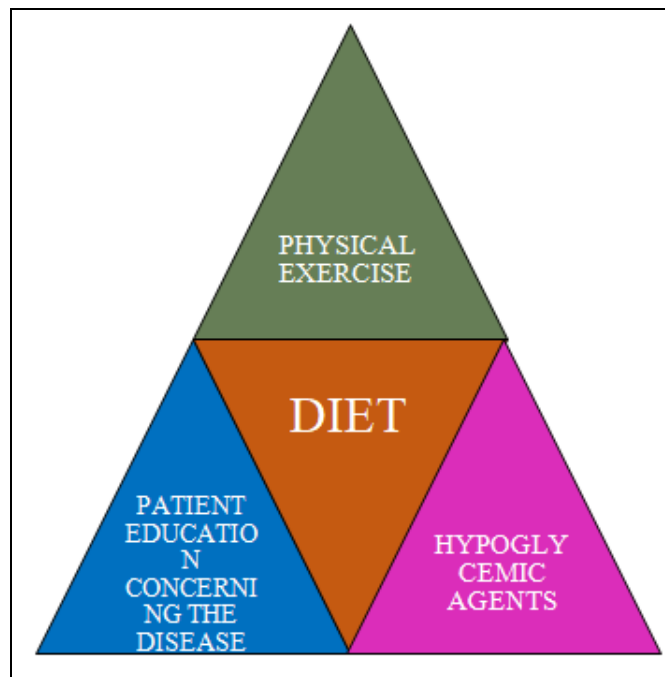


FIG. 3: TREATMENT DEPEND UPON THESE BASES

Advantages: Various advantages of herbal drugs which is the following.

- ❖ Most herbal drugs are well tolerated by the patient, having fewer casual consequences and fewer side effects than traditional medicine, and they may be safer to use.
- ❖ Herbal drugs are more effective for long-standing health complaints and they don't respond well to traditional medicine
- ❖ Cost of herbal drugs is much less than prescription medications. Research, testing, and marketing add considerably to the cost of prescription medicines. Herbs tend to be inexpensive compared to drugs.
- ❖ Herbs are available without a prescription. Simple herbs, such as peppermint and chamomile, can be cultivated at home^{29,30}.

Lifestyle for Patient: Some of the home and herbal remedies prescribed by Ayurveda are described below.

1. Turmeric and cinnamon are included in diets.
2. Oily, fried, and starchy foodstuffs are avoided.
3. Coffee, sugar, refined flour, and alcohol are avoided.
4. Eat smaller meals “low-fat diet” five to six times a day instead of having three large meals.
5. Intake of vegetables like spinach, cucumber, tomatoes, onion, sprouts, beans, and garlic, increased.
6. Refrain from taking stress.
7. Regular exercise. Walk for at least 40 minutes a day.
8. Avoid red meat and excessive salt in your meals. Fish and soybean can be taken due to their good protein value.
9. Avoid white bread, rice, potatoes, and sweet and sugary foods^{31,32}.

Mechanism of Action of Herbal Antidiabetics³³: The anti-diabetic activity of the herbal plant depends upon various mechanisms. The mechanism

of action of herbal anti-diabetic can be grouped as^{34, 28}:

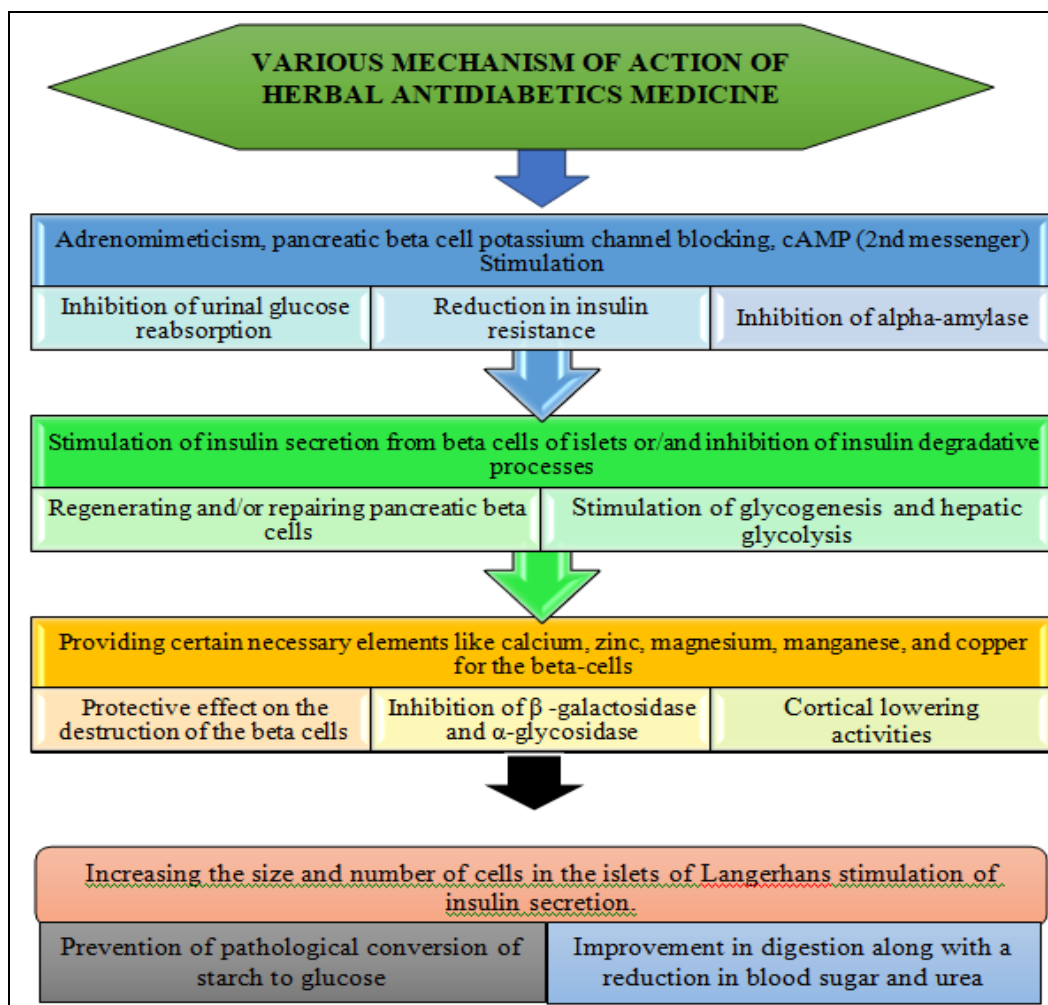


FIG. 4: MECHANISM OF ACTION OF HERBAL ANTIDIABETICS

Recent Regulatory Developments: Herbal specifics, defined by nonsupervisory standards, are traditional drugs that generally employ medicinal plants in remedial formulations. The World Health Organization has recently described traditional drug (including herbal drugs) as remedial methods that have been used hundreds of times or further before the creation and spread of ultramodern drug, as well as others presently in use. In recent times, the FDA and EMEA have shown a great interest in botanical drug exploration and have examined the nonsupervisory infrastructures controlling their use. This heightened interest has substantially boosted the natural goods industry, lowering the entry walls for botanicals and confederated items. These new rules are more pivotal than ever ahead since they ensure request exclusivity for botanicals and the approval of synergistic combinations of plant-

reduced bioactive products. Both developing and developed countries, India and China, have a distinct essential edge over the rest of the world^{35, 36}.

Natural Medications used for Diabetes Rehabilitation: Lately, some medicinal plants have been reported to be useful in diabetes worldwide and have been used empirically as antidiabetic and antihyperlipidemic remedies. Despite the presence of known antidiabetic drugs in the pharmaceutical market, diabetes, and related complications continued to be a major medical problem. Antihyperglycemic personalproperties of these plants are attributed to their capability to restore the function of pancreatic apkins by causing an increase in insulin output or inhibiting the intestinal absorption of glucose or the facilitation of

metabolites in insulin-dependent processes^{37, 38}. Further than 400 plant species having hypoglycaemic activity have been available in the literature, still, searching for new antidiabetic medicines from natural plants is still seductive because they contain substances that demonstrate indispensable and safe effects on diabetes mellitus. Utmost plants contain glycosides, alkaloids, terpenoids, flavonoids, carotenoids, etc., that are constantly intertwined as having an anti-diabetic effect. Species will be described in alphabetical order. Information about each species will include a sequence of general botanical and taxonomic data, distribution in the world, experimental study, and mode of action^{39, 40}.

Some plant species like ashwagandha (*Withania somnifera*), safed musli (*Chlorophytum barvillianum*), punarnava (boerhavia) grow naturally in the timbers of the region. Along with these plants, palash (*Butea monosperma*) is set up then in cornucopia. Adusa (malabar nut), which is used to treat cough, asthma, and backache is set up in plenty. Kaamraj herb, used to cure mouth ulcers and diarrhea, and arjuna condiment (*Terminalia arjuna*), used for heart conditions, are also set up then on a large scale. Unfortunately, these precious herbs have lost their glory and don't get any attention. Ginger agriculture is done by many planters of the Bruasagar, near Jhansi. In the forests of Jhansi, Orcha, Lalitpur, Chitrakoot, and Shivpuri, herbs like Jatamansi (Spikenard), Mahua, Kher, Giloy, Beal and Amla (Indian Gooseberry), are grown in huge quantity. However, also its size increases to the size of an apple, if the Amla tree is given further care. All these herbs are native to Bundelkhand. Including these, there are Haridra, Mustak, Nagkesar, Guggulu, Bhranraj, Apamarg, Gunja and Vacha, Sadabahar, Dhatura, Bhumi Amla, Imli, Arjuna, Makoi, Curry Patta, Shahjan, Bajradanti Katsareya, Chirchita, Bel, Neem, Satavari, Gwarpatha, Kundru, Punarnava, Sadabahar, Jamuni, Aam, Shahjan, Shahtoot, Curry Patta, Tulasi, Amla, Amrood, Bitter Melon (Karela), Fenugreek, are also grow then^{41, 42}.

Some Common Herbal Plants For Hypoglycemic Activity Grow Bundelkhand Region:

Mango *Mangifera indica* (Anacardiaceae): It's an herbaceous flowering plant that's native to East

Asia. It contains multitudinous phytochemical ingredients similar as steroidal Saponins, polysaccharides, etc⁴³. The waterless extract produces a loss in blood glucose situations in normoglycemic and glucose-convinced hyperglycemia but doesn't have any effect on streptozotocin-convinced diabetic mice under the same conditions when compared with that of an oral dose of chlorpropamide. The result indicates that the waterless extract of the leaves of *M. indica* possesses hypoglycemic activity.

Jamun: *Syzygium cumini* It belongs to Family Myrtaceae and is also known as Eugenia cumini Druce; *Eugenia caryophyllifolia* Lam., *Eugenia jambolana* Lam., *Eugenia Syzygium caryophyllifolium* (Lam.) DC., *Syzygium jambolana* (Lam.) DC., *Syzygium jambolanum* DC, *Calyptanthes oneillii* Lundell, *Calyptanthes jambolana* Willd. And *Myrtus cumini* L. Anthocyanins, glucoside, ellagic acid, isoquercetin, kaempferol, myricetin, and hydrolyzabetannins (1-0-galloyl castalagin and casuarina), alkaloid Jambo sine and glycoside jamboline⁴⁴. The waterless Jamun fruit pulp extract has also been reported to lower the serum glucose level in streptozotocin-convinced diabetes womanish Wistar rats still, the combination of Jamun fruit extract with the stem dinghy extract of *Cinnamon zeylanicum* was more effective than either treatment alone. The methanol extract of Jamun fruit (pulp, seed, seed fleece, and the kernel has been set up to produce an advanced antidiabetic effect lately⁴⁵. piecemeal from the seed and fruit, the extract of the stem bark of Jamun was also set up to be effective in reducing blood glucose levels in spontaneously diabetic rats. The ethanol extract of Jamun bark has been also set up to reduce blood glucose levels in rats. The waterless leaf extract of Jamun soothed the adenosine deaminase activity and glucose level in the serum of diabetic patients⁴⁶.

Jamun, *Syzygium cumini* belongs to Family: Myrtaceae and is also known as Eugenia cumini Druce; *Eugenia caryophyllifolia* Lam., *Eugenia jambolana* Lam., *Eugenia djouat* Perr., *Syzygium caryophyllifolium* (Lam.) DC., *Syzygium jambolana* (Lam.) DC., *Syzygium jambolanum* DC, *Calyptanthes oneillii* Lundell, *Calyptanthes jambolana* Willd. and *Myrtus cumini* L. Jamun, *Syzygium cumini* belongs to Family: Myrtaceae and

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***Memordica charantia* L. (Karela Fruits):** This vegetable type belongs to the family Cucurbitaceae. There were numerous inquiries publishing active components of bitter melon that support type 2 DM treatment. The important phytochemicals of the plants are steroids, momordicosides (A, B, C, D, E, G, F1, F2, I, K, L), acyl glucosyl sterols, adipose acids, amino acids, alkaloids, phenolic combinations, a steroidal saponin, vitamins, carbohydrates, and minerals, etc.^{47, 48}.

M. charantia (bitter melon) is generally known as vegetable insulin. An oral sucrose tolerance test reveals that administration of the waterless extract (AE), methanol bit (MF), or methanol undoable bit (MIF) each significantly suppresses plasma glucose levels at 30 min as compared with the control. In addition, the plasma insulin position at 30 min also lowers after MF administration than the control in the oral sucrose tolerance test, these results demonstrate that bitter melon suppresses postprandial hyperglycaemia by inhibition of α glucosidase activity.⁴⁹

***Costus pictus* (Insulin Plant):** *Costus pictus* D. Don, commonly known as the 'insulin plant' belongs to the Zingiberacea family. It has been famous for antidiabetic activity and is used as a traditional dietary supplement for diabetes treatment in Southern India. The analysis of phytochemicals of *C. pictus* has reported that most parts of the insulin plants including stem, leaves, rhizome, and flowers are a diversity of primary and secondary metabolites. Among them, there are many groups of secondary metabolites, including alkaloids, saccharides, terpenoids, glycosides, steroids, tannins, saponins, phenols, flavonoids, etc.⁵⁰. Besides the extract of this herb also contains trace elements such as K, Ca, Cr, Mn, Cu, and Zn. That investigation showed that the significant mechanism of antidiabetic activity of *Costus pictus* is the amylase and glucosidase inhibitory activity.^{51, 52}

***Zingiber officinale* Rosc (Ginger):** It's a traditionally unfolding racy plant in the family Zingiberaceae. All parts of this plant, including the rhizome, and ginger root are extensively used as essential food spices or traditional drugs. Ginger is relatively different depending on the origin and the fresh or dry state of parts of this herb. The phytochemicals of rhizome ginger contain strong free-radical reducing efficacy. They include unpredictable oils, phenolic components, and others. Among them, unpredictable oils, also known as gusto essential oils, are an admixture of terpenoid composites, including sesquiterpene hydrocarbons, monoterpene hydrocarbons, carbonylcomposites, and alcohols and esters. Especially, the phenolics in ginger are the most important factors. The Mode of lowering the glucose effect was explained because it can increase the viscosity of gastrointestinal contents, slow gastric evacuating, and acts as a barrier to dilution. Other studies also demonstrated that the folk medicinal plant ginger can control tissue glycogen content in diabetic rats by perfecting the supplemental application of glucose and repairing the bloodied liver.^{53, 54}

***Trigonellafoenum-graecum* (Fenugreek, Methi):** It belongs to the family Fabaceae and uses parts of plant seeds and leaves active combinations of saponins, 4-hydroxy isoleucine, and trigonelline, an alkaloid, and a high-fiber content treat for the Anti-diabetic, antihyperglycemic effect, antifertility.⁵⁵

Salutary fiber from fenugreek blunts glucose after a meal. The mechanisms for these effects haven't been completely illustrated. Fenugreek seeds contain 45.4 salutary fiber (32 undoable and 13.3 answerable), and the gum is composed of galactose and mannose. The ultimate composites are associated with a reduced glycemic effect. The hypoglycemic effect of fenugreek has been especially proven in humans and animals with type 1 and type 2 diabetes mellitus.⁵⁶

The galactomannan-rich answerable fiber fraction of fenugreek seeds may be responsible for the antidiabetic activity. A study on animals estimated the hypoglycemic effect the fenugreek seeds on dogs.

The seeds (defatted) lowered blood glucose situations, plasma glucagons, and somatostatin levels; carbohydrate-convinced hyperglycaemias also were set up to be reduced⁵⁷.

***Aegle marmelos* L. (Bael):** Generally known as Bael in Hindi is an essential food plant in India. Belong to the family Rutaceae. Traditionally the fruit was used to treat diabetes, respiratory problem, inflammation, dysentery, and diarrhea. The fruits of *Aegle marmelos* are rich in flavonoids, terpenoids, carotenoids, and coumarins Bael fruits are a power punch of colorful nutrients like beta-carotene, protein, riboflavin, and vitamin C. It's loaded with vitamins and B2, thiamine, riboflavin, niacin, and carotene and possesses good quantities of minerals like calcium, potassium, fiber, and good fats. These fruits are also popular for their antioxidant, anti-inflammatory, and laxative properties. They have been used for their medicinal and remedial properties in Ayurveda, Siddha, and other forms of the dispensable drug thousands of times. The active constituent "Feronia gum" present in the bark and branches of the Bael has reportedly shown helpful properties in controlling diabetes. It regulates the production of insulin from the cells into the bloodstream and the low glycemic indicator of Bael maintains the blood sugar level. A glass of Bael juice (not on empty stomach) every morning has proven salutary for people suffering from diabetes⁵⁸.

***Asparagus racemose* Willd. (Satavari):** Family Asperagaceae satavari presence of amino acids, steroids, cardiac glycosides, phenols, tannins, terpenoids, alkaloids, flavonoids, saponins, carbohydrates, and reducing sugar. *Asparagus racemose* Willd which is used in traditional ayurvedic drugs for the treatment of several complications has been serving as an anti-diabetic potentiality. Preliminarily, this salutary and priceless condiment wasn't been delved into for it's in vitro anti-diabetic activity^{59, 60}. This condiment has honored the eventuality of anti-diabetic activity and come out with the active principles responsible may be total flavonoids and terpenes happy combination. Flavonoids, like anti-oxidants, may help the progressive impairment of pancreatic beta-cell function due to oxidative stress and may therefore reduce the occurrence of type 2 diabetes⁶¹.

***Moringa pteridosperms* (SAHJAN):** Family Moringaceae have several Species *Pterygosperma* Genus *Moringa* and *Moringa oleifera*, they're available to different types of species. English Drumstick tree, horseradish tree, oil of been tree. Hindi Mungna, Sahjan, Saijna, Sanjna, Shajna, Soanjana, Soajna, Sohajna. A small or medium-sized tree up to 10 m altitudinous, with thick, soft, corky, deeply fissured bark and tomentose outgrowths⁶². Chemical ingredients Carotene, nicotinic acid, ascorbic acid, oxidase sulfur, prolamin and essential amino acids, vitamins A, B, and C, calcium, iron, and alpha-tocopherol. Uses External sores ulcers, Malaria/ Fever, Anti-hypertensive, Diabetes mellitus, Colitis, Gastritis/ ulcers, Syphilis, Flu, Asthma, Heartburn, Skin complication, Stress, Lactation enhancer, Anti-septic, Bronchiasis^{61, 63}.

***Morus alba* L. (SAHTOOT):** Family Moraceae botanical name *Morus alba* L. Use part of plant Leaves, fruits Waterless extract of splint and sorbet of fruits. Deep multi-colored mulberry fruits are rich in phenolic combinations, including flavonoids, anthocyanins, and carotenoids^{64, 65}. Diabetes mellitus, especially type 2 diabetes, with its fast-rising prevalence, has come a global epidemic. Mulberry (*Morus alba* L.) leaf has been known to have hypoglycemic goods since ancient times. In Asia, the mulberry leaf is used as a tea to round the treatment of diabetes mellitus. The methodologies by which mulberry leaf affects the body and its mode when combined with chemical agents have been studied considerably^{66, 67}.

***Murraya koenigii* (L.) (Curry Patta):** Curry Patta Spreng leaves the family Rutaceae. Aqueous extract Curry leaf extract helps reduce oxidative stress on pancreatic cells by confining the action of pancreatic alpha-amylase enzymes. The waterless slurry of dried leaf powder of this herb is useful in combating diabetes and serving as an implicit hypoglycaemic agent without preparing any organic solvent extract. The mode of action of *Murraya koenigii* has been suggested to be moreover due to inflamed cogenesis or dropped glycogen- analysis or gluconeogenesis and/ or to insulin secretion effect of MK, which causes an increased glucose uptake and its consumption by cells.

The hypoglycemic activity of curry leaves could be due to the presence of carbazole alkaloids, which retain alpha-glucosidase inhibitory properties. This intestinal enzyme breaks down complex sugars into glucose and thereby dropped serum glucose levels were observed in the curry-leaf-treated group^{68,69}.

***Psidium guajava* L. (Amrood):** Family *Myrtaceae* Leaves, fruits Waterless extract Guava leaves have been used as a folk herbal tea to treat diabetes for a long time in Asia and North America. In this study, we insulated polysaccharides from guava leaves (GLP) and estimated their antioxidant activity *in-vitro* and anti-diabetic effects on diabetic mice convinced by streptozotocin combined with a high-fat diet. Guava leaf extracts are known to effectively reduce your post-meal or postprandial blood glucose level. It can inhibit the action of alpha-glucosidase, an enzyme that can break down starch and other carbohydrates into glucose^{70,71}.

***Aloe barbadensis* (Aloe vera):** *Aloe vera* is a succulent plant species of the genus *Aloe*. Family *Asphodelaceae* (Liliaceae) Gwar Patha, Gheekwar, use part of plantleaves Pulp. It *Aloe vera* is the most popular medicinal plant ever known and the most applied medicinal factory, especially in the ornamental industry, and antidiabetic drugs. This traditional medicinal plant belongs to the family of Liliaceae. Phytoconstituents in the plant are alkaloids, flavonoids, tannins, phenols, saponins, carbohydrates, vitamins and minerals, and several other sweet ingredients⁷². These composites have been proven for colorful pharmacological activities, similar as antioxidant, antimicrobial, antidiabetic, anti-cancer, and so on. That's the result of why until now scientists continue to probe the natural activities of this plant to produce ultramodern drugs and traditional drugs. The trial on diabetic rats treated with *Aloe vera* water extract orally led to reducing significant blood glucose levels. Statistical analysis of results set up that *Aloe vera* water extract is antidiabetic with smaller side effects^{73,74}.

***Ocimum tenuiflorum* (Tulasi):** Family *Lamiaceae* use part of the plant Tulsi Leaves seeds, seed oil, Waterless excerpt, and decoction it's generally known as Tulsi. Since ancient times, this plant is known for its medicinal properties. The waterless extract of leaves shows a significant

reduction in blood sugar levels in both normal and alloxan-convincing diabetic rats. Significant reduction in dieting blood glucose, uronic acid, total amino acid, total cholesterol, triglyceride, and total lipid indicates the hypoglycemic and hypolipidemic effects of Tulsi in diabetic rats⁷⁵.

Oral administration of plant extract (200 mg/ kg) for 30 days leads to a loss in the plasma glucose level. Renal glycogen content increases 10-fold while cadaverous muscle and hepatic glycogen levels drop by 68 and 75 independently in diabetic rats as compared to control.

This plant also shows antioxidant, antibacterial, antifungal, antiviral, antiasthmatic, antistress, antitumor, gastric antiulcer conditioning, antimutagenic, and immunostimulant conditioning^{76,77}.

***Phyllanthus emblica* (Amla):** Family *Phyllanthaceae* use part of the plant. Amla Fruit leaves Teaspoons of fruit powder taken twice a day Fruit powder is used for anaemia, gastric, jaundice, liver lump, urinary, asthma, leucorrhoea, bronchitis, etc., leaves in boiled water used in blood sugar. Generally known as Amla, this factory is extensively available in India. It contains vitamin C, tannins, gallic acid, ellagic acid, chebulagic acid, etc.⁷⁸. It's used as an antiaging, anti-amnesiac, anti-inflammatory, anti-bacterial, anti-cancer, anti-fungal, antiviral, anti-venom, anti-ulcerogenic, tangy, etc. Shikha Mehta *et al* reported that the waterless extract of the seeds of the plant showed definite hypoglycaemic activity in streptozotocin-convincing type- II diabetic rats at the dose of 300 mg/ kg⁴³.

***Azadirachta indica* (Neem):** Family *Meliaceae* use part of plantneem bark leaves a Waterless extract generally known as Neem. It's a tree native to India, Burma, Bangladesh, Sri Lanka, Malaysia, and Pakistan, growing in tropical and semi-tropical regions. Low (0.5 g tid) and high (2g tid) doses of pulverized part, waterless extract, and alcoholic extract of *A. indica* shows significant hypoglycemic activity in high dose and can be successfully combined with oral hypoglycemic agents in type- 2 diabetic patients whose diabetes isn't controlled by these agents⁷⁹.

***Annona squamosa* L., Custard apple (Sita Phal):**

It belongs to the family Annonaceae and is an important tropical fruit cultivated in the West Indies, South and Central America, Ecuador, Peru, Brazil, India, Mexico, the Bahamas, Bermuda, and Egypt. Leaves of custard apple plants have been studied for their health benefits, Sita Phal Leaves Decoction of fresh leaves. The presence of glycosides, phytosterols, carbohydrates, oils, saponins, tannins, alkaloids, phenols, flavonoids, peptides, and colorful acetogenin Components causes these activities. Phytochemical assessments have emphasized that multitudinous active Components, similar to acetogenins and flavonoids, present in *Annona squamosa* also give rise to factory cytotoxic, antimalarial, antidiabetic, and immunosuppressive activities. Extract of ASLs helps maintain plasma insulin and lipid profiles and can significantly reduce blood glucose and lipid peroxidation. The literature on *Annona squamosa* lacks an expansive compilation of vital information on its phytochemical, nutraceutical, and natural conditioning. Hence, the present review is a sincere effort to aggregate pivotal information regarding the nutritive, pharmacological, and natural aspects, and conditioning of ASLs^{80, 81}.

Custard apple and there's further than one reason to include this delicate, sweet, and flavourful fruit in your diet. High on magnesium, fiber, Vitamin C, flavonoids, custard apple, or Sita phal not only helps reduce the threat of diabetes but also controls your blood pressure. It's also known to reduce the threat of heart attack and stroke. Vitamin C and riboflavin in the fruit also take care of your eyes while flavonoids in them may help treat certain types of cancer and lumps⁸².

***Achyranthes aspera* (Chirchita):**

Common names: chaff-flower, prickly chaff flower, devil's horsewhip, family Amaranthaceae. The plant is a standing herb or under shrub up to 1 m high. Flowers are greenish white, in small thick axillary heads or spikes. It's an important plant in traditional drugs in India. According to Ayurveda, it's bitter, pungent, heating, laxative, stomachic, carminative, and useful for the treatment of puking, bronchitis, heart disorder, piles, itching abdominal pains, ascites dyspepsia, dysentery, and blood disorders. Many triterpenoid saponins have been insulated from the plant having oleanolic acid as

aglycone. Other components of the plant are ecdysterone, long chain alcohol, viz. 17- penta triacontanol, 27- cyclohexyl heptaacosan-7- ol, 16- hydroxyl 26- methyl heptacosan- 2one and 36, 47- dihydroxy hen- pentacontan- 4one. It also contains a water-soluble base, betaine^{83, 84}. Several workers have worked and reported colorful conditionings similar to cardiovascular, effects on the urinary tract, antibacterial, and antifungal⁸⁵. antidiabetic, spasmolytic⁸⁶. Anti-asthmatic, anti-allergic, diuretic, and numerous further are reported in the literature. The species has cooling, pungent, mildly tangy, antiperiodic, digestive, purgative, laxative, and, abortifacient properties. The paste of the root is given to stop bleeding after abortion to grease delivery and stimulate labor pain. The decoction of the leaves is used in the early stage of diarrhea and dysentery. The paste of the leaves is externally applied over bites of toxic insects, wasps, bees, burns, and nephrotoxicity. The seeds are used as an emetic, expectorant, and brain tonic and are effective in biliousness and bleeding piles. The ash of the plant is said to be effective in cough, chest pain, and acidity. It's also been observed as effective in abdominal lumps⁸⁷.

***Phyllanthus niruri* L. (Bhoomi Amla):** Is the original name Bhuiamala, it's available in Bundelkhand region it belongs to the family Phyllanthaceae, with the botanical name *Phyllanthus niruri* L., Bhumi Amla is also known as 'Dukong anak' and 'Bhumi Amalaki' in Sanskrit. The whole plant possesses colorful medicinal properties^{88, 89}. Bhumi Amla helps in managing liver diseases and reverses any damage caused to the liver due to its hepatoprotective, antioxidant, and antiviral activities. It also helps to help ulcers by reducing gastric acid production as well as guarding the stomach filling against damage caused by inordinate gastric acid.

Bhumi Amla might also reduce the threat of order stone formation due to its diuretic property⁹⁰. It does so by promoting the removal of salts (substantially oxalate crystals) that are responsible for the formation of kidney stones⁹¹. According to Ayurveda, Bhumi Amla is considered good for indigestion and acidity due to its pitta-balancing property. It might also be salutary for diabetics as it helps manage blood sugar levels due to its tikta (bitter) properties. Bhumi Amla manages a high

sugar position due to its Tikta (bitter) and Kashaya (tangy) rasa properties which helps to ameliorate metabolism and control high sugar level in the blood and it has numerous medicinal properties^{92, 93}.

***Solanum nigrum* Linn. (Makoi):** Family Solanaceae is a common medicinal plant enjoying a wide variety of pharmacological activity. Phytochemical analysis of the waterless extract of *Solanum nigrum* Linn berries showed the presence of flavonoids, alkaloids, saponins, tannins, glycosides, terpenoids, proteins, carbohydrates, acetic Components, resin⁹⁴. The effect of waterless extract of *Solanum nigrum* fruit on blood glucose, lipid profile and sensitivity of vascular mesenteric bed to phenylephrine in streptozotocin-convicted diabetic rats. Authors observed that administration of fruit excerpt bettered the Ca/ Mg ratio, plasma glucose, and high-density lipoproteins, regularized low-density lipoproteins, total cholesterol, and triglyceride attention, and also dropped variation in vascular reactivity to vasoconstrictor agents. The loss in blood glucose level was due to the capability of the extract to repair the pancreatic beta cells or increase Glu4 translocation⁹⁵.

***Gymnema sylvestre* (Gurmar):** Family-Asclepiadaceae Gurmar Large woody climber Leaf powder Diabetes, *Gymnema Sylvester* (Asclepiadaceae) also known as gurmar' or 'sugar destroyer' is a woody, climbing traditional medicinal herb which has numerous remedial uses in Ayurvedic system of the drug. It's used for lowering serum cholesterol, triglycerides, and blood glucose level (hypoglycemic or antihyperglycemic), hypolipidemic, weight loss, stomach complications, constipation, water retention, and liver complications, either high or low blood pressure, tachycardia, or arrhythmias, and used as aperitive, purgative, in eye troubles, anti-inflammatory, smooth muscle relaxant, prevention of dental caries, cataract and as an anticancer- cytotoxic agent. Its flowers, leaves, and fruits contain alkaloids, flavones, saponins, sapogenins, anthraquinones, hentri- acontane, pentatriacontane, α and β - chlorophylls, phytin, resins, d- quercitol, tartaric acid, formic acid, butyric acid, lupeol, β - amyryn related glycosides and stigmaterol having main principle bioactive compounds viz. gymnemic acids, gymnemasides,

gymnemagenin, gurmarin, gymnemosides, gymnemanol, gymnemasins, gypenoside, and conduritol which act as a remedial agent and play a vital function in numerous remedial uses⁹⁶.

***Allium sativum* (Allium, Garlic) (Lahsun):** *Allium sativum* Linn. is a common herb that has been known as garlic, and belongs to the family Amaryllidaceae. Raw garlic contains numerous active phytochemicals like alkaloids, flavonoids, cardiac glycosides, terpenes, steroids, and resin. It also contains some sulphur Components, similar as alliin, allacin, ajoene, diallyl sulphide, enzymes, B- vitamins, proteins, minerals, saponins, flavonoids, etc., which aren't Sulphur- containing composites⁹⁷. Allacin, allixin, ajoene, and other organsulphur composites. exhibition of multitudinous natural goods including lowering of cholesterol and glucose, cancer prevention, antimicrobial properties, antioxidant, and antihyperglycemic goods, depending on these scientific studies, garlic's natural exertion in anti-diabetics has shown that its medium is to control the excretion of insulin from beta in cells, and enhance glucose forbearance and glycogen synthesis^{98, 99}.

For Illustration, these two bioactive Components, which are uprooted from garlic, allyl propyl disulfide, and S- methyl cysteine sulfoxide can drop blood glucose levels. In addition, the ethanol excerpt from garlic also had antidiabetic activity by restoring delayed insulin response^{100, 101}.

***Allium cepa* Linn (Onion):** *Allium cepa* (also known as pyaj) is a perennial herb with a stem in the underground bulb. Onions belong to the Liliaceae family, while some authors mention them as Alliaceae. In both types of diabetic patients, slices of *Allium cepa* exhibited significant antidiabetic effects, considerably reducing the levels of fasting blood glucose. Similar types of results were also obtained from the slices of *Allium cepa* when hyperglycemia was induced by a glucose tolerance test. *cepa* showed a significant decrease ($P < 0.05$) in blood sugar levels compared to the untreated animals. The decrease in the blood glucose level of the animals following the administration of the juice suggested that the plant possesses antidiabetic effects¹⁰².

Some Other Medicinal Plants for Various Therapeutic Activities:**TABLE 1: SOME OTHER MEDICINAL PLANTS WITH A LOCAL NAME HABIT, FORMULATIONS, AND PARTS USED IN MEDICINE BY THE TRADITIONAL HERBAL HEALERS AND RURAL PEOPLES OF BUNDELKHAND REGION, INDIA** ^{2, 39, 43, 103, 104}

S. no.	Botanical name/ habit	Family /Local name	Parts used in medicine and chemical constituents
1.	<i>Asparagus racemosus</i> (Willd.) Scandent or Scrambling	Liliaceae/ Satavari	shrub or under a shrub or climbing ShruTuber/juice Diarrhoea and dysentery, Root paste used as aphrodisiac, diuretic,
2	<i>Withania somnifera</i> (L.) Dunal	Solanaceae/ Ashwagandha	The roots are the source of the drug Ashwagandha. It is useful in cough, dropsy, rheumatism, and female disorders, and as a sedative in cases of A sense of disability
3	<i>Amaranthus spinosus</i> Linn.	Amaranthaceae/ Choulai	Spinous herb Root extract Eczema
4	<i>Anthocephalus cadamba</i> Miq.	Rubiaceae/ Kadam Tree	Tender branches/ tooth BrushGum infection and dentalcare
5	<i>Aloe barbadensis</i> Mill.	Liliaceae/ Gwarpatha	Herb Leaves/ pulp Scabies and boils
6	<i>Abutilon indicum</i> (L.)Sweet. Annual herb or undershrub	Malvaceae/ Kanghi	Whole plant Gonorrhoea
7	<i>Abelmoschus esculentus</i> (L.) Moench.	Malvaceae/ Bhindi	Erect herb Root/powder with milk Tuberculosis
8	<i>Achyranthes aspera</i> Linn. An erect herb Whole	Amaranthaceae/ Chirchita	Plant ash AsthmaBulb/ extract with sugar candy
9	<i>Allium cepa</i> Linn.	Liliaceae/Piyaz	Herb Stone of kidney Bulb/ roasted Diarrhoea and cold
10	<i>Allium sativum</i> Linn.	Liliaceae	Lahsun Herb Bulb/ raw Filariasis
11	<i>Andrographis paniculata</i> (Burm f.) Wall.	Acanthaceae/ Kalmegh	Herb Whole plant/decoction Snakebite
12	<i>Bambusa arundinacea</i> (Retz.) Willd.	Poaceae/ Bans	Woody grass Tender stem/ in crushed form with jiggery Irregular menstruation
13	<i>Blumea lacera</i> (Burm. F.)	Asteraceae/Kukaronda	Herb Leaf/ extract Cramps of children
14	<i>Terminalia bellerica</i> (Gaertn.) Roxb.	Combretaceae/ Bahera	Tree Fruit pulp/ munch Loose bowels and headache
15	<i>Carica papaya</i> Linn.	Caricaceae/ Papita	Small tree Latex/ raw Gum swelling
16	<i>Calotropis procera</i> (Ait.) Ait. f.	Asclepiadaceae/ Akaua	Shrub or under Shrub Young leaf/ paste with Jaggery Stomach pain
17	<i>Cassia fistula</i> Linn.	Fabaceae /Kawa	Tree Leaf /paste Ringworm lesions Flower / raw Stomachache and expel hook worm
18	<i>Clitoria ternatea</i> Linn. Perennial herb	Fabaceae/ Aparajita	Fresh leaves/ paste with pepper black Tuberculosis
19	<i>Cynodon dactylon</i> Pers.	Poaceae/ Doorva Grass	Root/Infusion To stop bleeding from piles
20	<i>Cyperus rotundus</i> Linn.	Cyperaceae/ Nagarmotha Grass	Rhizome/powder with black pepper, camphor, alum and cow milk Snake bite
21	<i>Ficus racemosa</i> Linn.	Moraceae /Gular Tree	Fruits/ raw Leucorrhoea
22	<i>Jasminum officinale</i> Linn.	Oleaceae/ Chameli	A large sub-erect twining Shrubs Fresh leaves/ chewed Mouth ulcers
23	<i>Nyctanthes arbor-tristis</i> Linn.	Oleaceae/ Harssingar Tree	small Leaves / decoction Fever
24	<i>Oxalis corniculata</i> Linn. Creeping annual herb	Oxalidaceae /Khattibuti	Fresh leaves/raw Chronic dysentery
25	<i>Phoenix sylvestris</i> Linn.	<i>Areaceae / Khajoor</i> Tree	Kernel/ juice Stomach worm
26	<i>Wrightia tinctoria</i> (Roxb.) R. Br.	Apocynaceae Dudhi	Small tree Stem bark/ decoction Snakebite
27	<i>Rauvolfia serpentina</i> Linn.	Apocynaceae/ Sarpghandha Herb	Or under shrub Fresh root/Juice Stomachache and Snakebite
28	<i>Butea monosperma</i> (Lamk) Taub.	Papilionaceae/ palas	Used of seed and leaves as anthelmintic, astringent, diuretic purgative, and aphrodisiac.
29	<i>Terminalia arjuna</i> Bedd.	Combrataceae /arjuna	Extract of bark and fruit used as cardiotonic, astringent,

30	<i>Madhuca logifolia</i> Macb.	Sapotaceae/ mahua	deobstruent, leaf extract in ear pain. Fruit and flower juice used in blood purifier, cardiac, ear pain etc., bark extract used in ulcer, leprosy.
31	<i>Zyzipus mauritiana</i> Lamk.	Rhamnaceae/ ber	Fruit is used for stomachs, anti-poisonous, leaves with areca nut used intyphoid.
32	<i>Acacia catechu</i> Willd	Mimosoidaceae/kath	Bark and heart wood extract used as astringent.
33	<i>Mangifera indica</i> (L.)	Anacardiaceae/ mango/aam	Ripe fruit, rind of fruit, kernel and bark used as laxative, diuretic, astringent, stimulant, tonic and anthelmintic.
34	<i>Catharanthus roseus</i> / wild	Apocynaceae/ Sadabahar	Anticancer

The pastoral senior learned and knowledgeable resource persons were using these plants to treat a number of complications and disorders like arthritis, asthma, bleeding, mars, boils, bronchitis, cold and cough, contraceptive use, cramps of children, cuts and injuries, diabetes, diarrheal, canine bite, dysentery, early development of boils, eczema, fever, filariasis, genital conditions, gonorrhoea, gum infection and dental care, lump, wakefulness, irregular period, leucorrhoea, loose intestine, headache, malarial fever, mouth ulcers, pustules, purgative, pyorrhoea, rheumatism, ringworm, lesions, scabies, snakebite, sore throat, spermatorrhoea, stomach worm, bellyache and expel hookworm, the stone of order, to help confinement, to squeeze all the pus, from boils, to stop bleeding from piles, toothache, whooping cough, etc. The different parts of these ethno medicinal plants were used as drugs by the original pastoral senior learned and knowledgeable resource persons to treat different complications and disorders.

These plant parts were root, stem, leaf, flower or flowery part, fruit, seed, bulb, tuber, tender branches, and occasionally they used whole plant also. Styles of using these plants vary according to the nature of affections and conditions. The manners of medication fall into eight orders viz., Ash, infusion, decoction, excerpt, juice, paste, powder, and colorful fresh plant corridor used directly. The pastoral senior learned and knowledgeable resource persons used common extended family products viz., alum, black pepper, camphor, honey, jaggery, lemon, milk, rice, and sugar candy to prepare ethno-medicinal formulations^{105, 106}.

CONCLUSIONS: Diabetes mellitus has been a major cause affecting the economy of patients, their families, and society. Likewise, unbridled diabetes leads to serious habitual complications like blindness, kidney failure, and heart failure. To

lower this problem, research on new antidiabetic agents is concerned. Because of the adverse effects of ultramodern curatives, numerous traditional drugs have been noticed. Also, herbal extracts currently can be used with standard medicines for combinatorial curatives. Each herb has its own active constituents that can lower blood sugar situations as well as control the complications of diabetes. Unborn exploration will concentrate on the insulation, purification, and identification of bioactive substances in plants. This review looks forward to furnishing the necessary information in managing diabetes.

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