International Journal of Herbal Medicine
Available online at www.florajournal.com

E-ISSN: 2321-2187
P-ISSN: 2394-0514
www.florajournal.com
IJHM 2025; 13(4): 12-17
Received: 12-04-2025
Accepted: 16-05-2025

Vaishnavi G Karule
Shri Swami Samarth Institute of Pharmacy, At Parsodi, Dhamangaon Rly, District-Amravati, Maharashtra, India

Jitendra A. Kubde
Department of Quality Assurance, Shri Swami Samarth Institute of Pharmacy, At Parsodi, Dhamangaon Rly, District-Amravati, Maharashtra, India

Pooja R Hatwar
Department of Pharmaceutics, Shri Swami Samarth Institute of Pharmacy, At Parsodi, Dhamangaon Rly, District-Amravati, Maharashtra, India

Ravindra L Bakal
Department of Pharmaceutical Chemistry, Shri Swami Samarth Institute of Pharmacy, At Parsodi, Dhamangaon Rly, District-Amravati, Maharashtra, India

Gayatri J Khanderao
Shri Swami Samarth Institute of Pharmacy, At. Parsodi, Dhamangaon Rly, District-Amravati, Maharashtra, India

Corresponding Author:
Vaishnavi G Karule
Shri Swami Samarth Institute of Pharmacy, At Parsodi, Dhamangaon Rly, District-Amravati, Maharashtra, India

Herbal remedies for diabetes mellitus: A comprehensive review of medicinal plants and their antidiabetic properties

Vaishnavi G Karule, Jitendra A Kubde, Pooja R Hatwar, Ravindra L Bakal and Gayatri J Khanderao

DOI: https://www.doi.org/10.22271/flora.2025.v13.i4a.992

Abstract
Diabetes mellitus is a chronic metabolic disorder that affects millions worldwide, necessitating the exploration of alternative therapeutic approaches. Herbal remedies have been used for centuries to manage diabetes, with numerous plant species exhibiting hypoglycemic properties. This review aims to provide a comprehensive overview of herbal agents, phytochemicals, and their potential in diabetes management. A wide range of medicinal plants, including *Acacia catechu, Aloe vera, Ocimum tenuiflorum*, and others, have been discussed for their antidiabetic properties. Phytochemicals such as flavonoids, terpenoids, and phenolic compounds have been identified as key contributors to the hypoglycemic effects of these plants.

Keywords: Diabetes mellitus, herbal remedies, phytochemicals, hypoglycemic agents, medicinal plants

1. Introduction

The chronic metabolic disorder known as diabetes mellitus or hyperglycemia, interferes with the metabolism of lipids, proteins and carbohydrates. This disruption can result in a number of organ-specific disorders that impact kidneys, blood vessels and eyes, as well as lower the quality of life for countless people around the world [1]. As a metabolic disorder caused by abnormalities in either insulin secretion, insulin action or both diabetes mellitus can lead to long-term organ failure, malfunction and damage. Diabetic patients are more likely to die from heart disease, renal disease, blindness, vascular or neurological issues that might result in amputation and other conditions. Additionally, those with diabetes have a far greater fatality rate than people without the condition [2]. According to the Indian Council of Medical Research, it is one of the refractory disorders that require the use of alternative medicine. The prevalence of diabetes mellitus is rising in the modern world [3]. An elevated risk of vascular problems, aberrant blood sugar levels and changes in the metabolism of fats, proteins and carbohydrates are the hallmarks of diabetes mellitus, a chronic metabolic disease caused by insulin insufficiency [4]. Low blood insulin levels or insulin-insensitive target tissues are associated with abnormalities in glucose metabolism, which in turn causes diabetes [5].

Numerous microvascular problems such diabetic nephropathy, neuropathy, retinopathy, diabetic ulcers and coronary artery disease, peripheral arterial disease and stroke are also linked to it. Alpha glucosidase inhibitors, thiazoliodinediones, sulphonylureas and insulin therapy are among the therapeutic agents, with metformin serving as the first line of treatment. Type II diabetes can clearly be delayed or prevented by improving one's lifestyle, controlling one's food and using nonpharmacological strategies like exercise, meditation and so forth [6]. Insulin is the main treatment for diabetes, along with diet, exercise and the use of oral hypoglycemic medications. In addition to being costly, currently available synthetic antidiabetic medications have significant adverse effects. Medicinal plants have the benefit of having no negative side effects, which is one of the numerous herbal remedies that have been suggested for the treatment of diabetes mellitus in addition to the currently available therapeutic choices [7]. Numerous chronic diseases are a result of significant changes in human lifestyle and eating patterns over the past century. Reduced quality of life and elevated risk factors for morbidity and mortality are linked to the condition [8]. Diabetes has no known etiology; however environmental variables including weight and inactivity seem to contribute as well as hereditary factors [9].

Organ failure, dysfunction and long-term damage are among the consequences of diabetes mellitus. Classical symptoms of diabetes mellitus include blurred vision, excessive thirst (polydypsia), excessive food (polyphagia), excessive urination (polyuria), and weight loss. Ketoacidosis can progress in its most severe forms resulting in stupor, coma and death if treatment is not effective. Individuals who have diabetes are more likely to develop peripheral vascular, cerebrovascular and cardiovascular diseases [10].

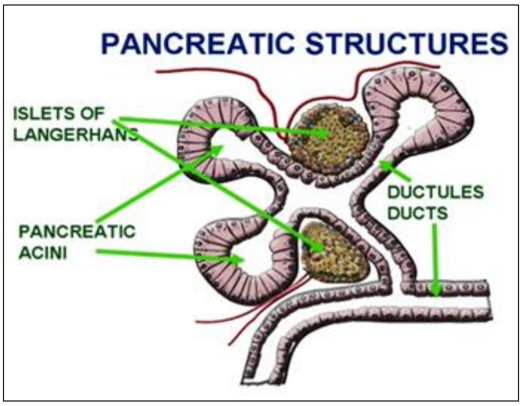

Fig 1: The structure of the pancreas which houses islets of Langerhans [10].

2. Epidemiology of Diabetes Mellitus

The Latin term "mellitus," which means "sweetened with honey," refers to the presence of sugar in the urine, while the Greek word "diabetes" is derived from the word "Diab," which means to pass through and describes the cycle of intense thirst and frequent urination. Ancient Hindu doctors described "Madhumeha" as a condition in which a patient had sweet urine and a sweet physique. According to their observations, "a person has symptoms of diabetes mellitus if there are too many ants around a urine spot." The World Health Organisation predicts that by 2025, there would be 300 million or more people with diabetes [11].

3. Classification of Diabetes Mellitus [2]

3.1 Type I diabetes

Insulin-dependent or childhood, onset is characterized by a lack of insulin production.

3.2 Type II diabetes

Non-insulin-dependent or maturity/adult-onset diabetes.

3.3 Type III or Gestational diabetes

This type of diabetes first occurs during pregnancy.

4. Treatment of Diabetes Mellitus [12]

4.1 Insulin and oral hypoglycemic drugs

The goal of insulin therapy should be to follow nature, which reduces postprandial hyperglycemia and avoids hypoglycemia in between meals with remarkable success. A variety of insulin formulations are available including human, cow and pork insulin. Insulin treatment is not without its problems and side effects. When incorrect insulin dosage is administered and meals and insulin injections are not coordinated, the most significant side effects are weight gain and hypoglycemia.

4.2 Herbal therapy of diabetes

Over 300 plant species recognized for their hypoglycemic qualities is the most instructive of multiple literature reviews done by various writers regarding anti-diabetic herbal remedies.

5. Antidiabetic Herbal Agents

The emergence and development of numerous traditional herbal medicines have been greatly aided by the therapeutic qualities of plant species. A wide range of phytopharmaceuticals, which are found in many plants, which have significant uses in human, veterinary and agricultural medicine [13]. Natural items have been used for thousands of years to treat illnesses and prevent them from happening. The use of natural sources to treat a variety of illnesses is documented in the ancient Chinese, Indian and North African civilisations. Plants are represented in tomb paintings mentioned in Egyptian medical papyri and occasionally discovered in medical jars that contain trace amounts of plants. Scientists started to extract and alter the active compounds from plants in the early 19th century, when chemical analysis was first made available [8]. The most fundamental component of all modern medications, particularly in rural areas are plant-based treatments because of their accessibility, affordability and lack of side effects. Numerous plants also contain a wide range of bioactive substances with strong pharmacological benefits and no negative side effects. The secret to naturally treating diabetic problems may lie in traditional plant remedies or herbal mixtures. Additionally, medicinal herbs are used to cure diabetes in poor nations, especially to lessen the cost of conventional medications for the populace [14]. Herbal medicine also known as phytomedicine. It is the application of plants for therapeutic and medicinal purposes in order to treat illnesses and enhance human health. Phytochemicals derived from the Greek word "phyto," which means "plant," are secondary metabolites found in plants. These substances shield plants against microbial diseases and pest infestations. Active compounds with therapeutic qualities that are regarded as drugs or medicines are called phytochemicals [15]. Since they are non-toxic plants are said to be the best chemists in the world. Natural compounds (secondary metabolites) of medicinal significance, including terpenes, alkaloids, cardiac glucosides and others are primarily found in many higher plants [9]. Avonoids, terpenoids, coumarins, phenolic compounds and other components found in herbal or plant products have been shown to lower blood glucose levels [16].

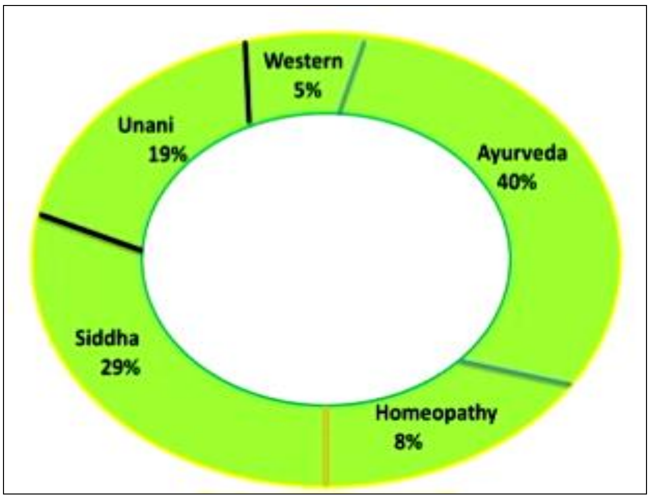

Fig 2: Percentage of plant species under different systems of Indian medicine (NMPB 2008) [15].

Some medicinal plants are traditionally used for treatment and management of diabetes

Fig 3: Some important plants possessing potential anti-diabetic activity [17].

1) *Acacia catechu* (Mimosaceae)
Khair in Hindi and Nalla Sandra in Telgu are its common names of *acacia catechu*. India, Pakistan, Nepal and China are where it is primarily distributed. Diabetes is mostly treated with the plant's heartwood and bark [18].

2) *Aloevera*
Aloe, a desert plant of the Liliaceae family that resembles a cactus, is well known for its *Aloe vera*. It is frequently used to heal wounds and treat burns. Throughout the Arabian Peninsula, the dried sap of *Aloe vera* is used as a traditional treatment for diabetes. The hydro-soluble fiber glucomannan, which is present in aloe gel made from the inner section of the leaves, may contribute to the plant's hypoglycemic properties [19].

Fig 4: Herbal plant *Aloe vera* used for antidiabetic [20].

3) *Ocimum tenuiflorum* L. (Family Lamiaceae)
Ocimum, the genus that includes basil, contains several species that have been used to cure a variety of illnesses from diabetes and cancer to bronchial asthma and catarrhal bronchitis. Basils have been utilized for culinary, fragrant, decorative and medicinal uses all throughout the world because of their diverse morphological variations and aromatic components. The primary center of variety is thought to be Africa despite its Indian origins [21].

4) *Cassia auriculata* Linn. (Caesalpiniaceae)
Common names for it include "Mature tea tree" in English, "Tarwar" in Hindi, and "Awal" in Gujarati. Its primary distribution areas include Ceylon, South India, the Western Coast and the Central Provinces. Diabetes is mostly treated with the plant's flower buds [18].

5) *Smallanthus sonchifolius* syn.
Smallanthus sonchifolius is commonly called yacon. It is native to the Andean highlands. It is generally grown in gardens in Colombia and Venezuela to northwestern Argentina and in Latacunga, Ecuador up to 3,300 m above mean sea level. Yacon produces large Mountain of dry matter with 10 to 14% dry matter in its roots. The bulk of the root is low polymerized fructo-oligosaccharides. The fructo-oligosaccharides are indigestible in the human system and therefore are considered as diabetic sweeteners [22].

6) *Trigonella foenum graecum:* (Fenugreek)
Fenugreek seeds are widely distributed throughout India and are frequently utilized as a key ingredient in Indian spices. A new amino acid found in fenugreek seeds, there is antioxidant activity in this plant [20].

7) *Allium cepa* (Onion) and *Allium sativum* (Garlic) (Family: Liliaceae)
It is grown all over India and is a significant part of the cuisine. It is made up of saponins, polysaccharides and alliins. It is thought that sulfur-containing compounds, such as diallyl disulphide (allicin) in garlic and allyl propyl disulphide (APDS) in onions [22].

Fig 5: Herbal Plant Onion used for Antidiabetic [20].

8) *Tinospora cordifolia*
Guduchi is another common name for giloy, a herbaceous vine belonging to the Menispermaceae family. Polysaccharides such as arabinogalactan polysaccharide and diterpene compounds such as tinosporone, tinosporic acid, cordifolisides A to E, syringen, the yellow alkaloid, berberine, giloin and a glucosidal bitter component are the active adaptogenic elements [17].

9) *Ocimum sanctum* (Family: Labiatae)
Known by several names in Hindi and English as Tulsi and Holy basil, respectively, this herb is grown in temples and gardens all over India even as high as 1,800 meters in the Himalayas. Oral administration of an alcoholic extract of O. sanctum leaves decreased glycaemia [22].

10) *Turmeric*
"The Indian Solid Gold" *curcumin* is also known by the common names haldi, arishia, pasupu, haridra and kurkum. It is *Curcuma longa* a member of the Zingiberaceae family. For ages, people have used dried powdered curcuma rhizomes as a spice, food preservative and yellow colouring agent for foods, medications, and cosmetics. *Curcumin* and its mono and bisdemethoxy derivatives referred to as curcuminoids are the main components that give turmeric its orange-yellow

colour and biological activity. *Curcumin* contains trace amounts of oils and resins in addition to curcuminoids. α-turmeron, β-turmeron, curlon, and zingiberen are some of these. It is a key herb in the majority of Ayurvedic diabetic treatments because it enhances glucose metabolism, decreases blood sugar and more than triples insulin activity [17].

11) *Gymnema sylvestre*
The woody climber *Gymnema sylvestre* (family Asclepiadaceae) grows in the dirty tropical forests of central and southern India. In ancient India, it was utilized as an adjuvant to treat diabetic mellitus. In diabetic rats, a water-soluble extract of *Gymnema sylvestre* leaves reduced blood sugar levels by promoting the regeneration of beta cells and pancreatic islets [23].

12) *Camellia sinensis*
A widespread beverage eaten daily in many parts of the world; tea is a member of the Thiaceae family. It is categorised as semi-fermented tea, completely fermented tea (black tea) and unfermented tea (green tea, white tea). Teatheaflavins, therubigins and caffeine predominate in semi-fermented and completely fermented tea, while catechins and caffeine are the primary chemical components in unfermented tea [24].

13) *Azadirachta indica*: Neem
The evergreen tree neem *(Azadirachta indica)* is grown throughout the Indian subcontinent. Neem has become a modern medical cynosure and has been widely employed in ayurvedic, unani and homoeopathic medicine [23].

14) *Coccinia indica*
Coccinia indical L is a member of the Cucurbitaceae family. Its native regions include Asia (India) and Africa. As a weed, it is found all over India and is grown on a sprawling scale. It exhibits a wide range of chemical components including gums, mucilages, triterpenoids, flavonoids, anthraquinones, polysaccharides, alkaloids, carbohydrates, glycosides and phenolic elements. Traditionally, C. indica has been used as an antidiabetic medicine in Ayurvedic and Unani systems. It also has anti-inflammatory, antipyretic, analgesic, antimicrobial, antibacterial, antidepressant and expectorant properties. C. indica's traditional use in the treatment of diabetes [24].

15) *Avocado pear* (Persea americana)
Many plants have been employed in traditional folk medicine, including avocados. Among the indigenous names for the plant in Nigeria are "igba," "apoka," or "ewe pia" in Yoruba, "ube-beke" or "akwukwo ube" in Igbo and "piya" in Hausa. In tropical and subtropical regions, Persea americana trees are grown. With alternating leaves that grow 12 to 25 cm long and greenish yellow blooms that contain a pear-shaped fruit, the plant often reaches a height of 20 meters (60 feet) [25].

16) *Pascher, Anisodus tanguticus* (Maxim.) (Solanaceae)
Chinese physicians utilize it to treat type 2 diabetes. In addition to reducing blood glucose, it is quite successful at improving complications [26].

17) *Tithonia diversifolia* (Wild Sunflower)
An outstanding member of the Asteraceae family, which includes sunflowers, is *Tithonia diversifolia* (Hemsl) A. Grey *Tithonia diversifolia* is the scientific name for a sunflower that is a member of the composite flower genus of annual and perennial herbs. South America is believed to be the natural home of this genus. Common names for *Tithonia diversifolia* include Mexican sunflower, tree marigold, Honduran sunflower, Japanese sunflower and shrub sunflower, wild sunflower and Nigerian ogbo or agbale (Yoruba). Commonly found in Nigerian fields, wasteland and along roadsides, it is a bushy perennial weed. The plant can be used as manure for farming or as an ornamental and it is used to cure liver, menstruation, sore throat, malaria and diabetes mellitus [25].

18) *Momordica charantia (*Cucurbitaceae)
Common names for the plant, which belongs to the Cucurbitaceae family, include kugua, karela, bitter gourd, and bitter melon. Diabetes is frequently treated with this well-liked herbal remedy. Momordica charantia boosts the production of insulin by the pancreas and promotes the regeneration of parital cells in the organ or it may allow the recovery of partially destroyed cells [26].

19) *Zeylanicum cinnamonomum*
Known by its common name, *cinnamon* (Lauraceae), it is used extensively in both Europe and East Asia. In traditional medicine, it is widely used to treat diabetes. Most of the volatile oils it contains are cinnamon aldehyde. Consuming cinnamon reduced total blood sugar levels while improving insulin sensitivity. It also drastically decreased postprandial glycaemic response and significantly decreased stomach emptying [27].

20) *Averrhoa bilimbi* Linn (Oxalidaceae)
Bilimbi, Averrhoa Linn (Oxalidaceae) is a tiny tree that can reach a height of 15 m and a diameter of 30 cm. The recognised chemical components of *Averrhoa bilimbi* include sugars, vitamin A, potassium ions, phenolics, citric acid and amino acids. It has antibacterial, antiscorbutic and astringent properties; it is used as a postpartum preventive medication and to treat fever, mumps, acne, rectum irritation and diabetes [28].

21) *Lawsonia inermis*
The leaves of this well-known member of the Lythraceae family. Henna contains fatty acids, proteins, phenolic compounds, tannins, terpenoids, alkaloids, quinones, xanthones, coumarins, carbohydrates and flavonoids [27].

22) *Polygonati Odorati:* This plant, which is a member of the Liliaceae family, has strong antidiabetic properties. It improves the metabolism of glucose and triglycerides by blocking the action of α-glucosidase in the digestive tract [27].

23) *Commelina communis* L. (Commelinaceae)
Commelina communis is an annual herbaceous plant in the dayflower family that is also referred to as the Asiatic dayflower. *Commelina communis* L. Leaf tea has been used as a gargle for a number of diseases including obesity, diabetes mellitus, acute tonsillitis, urinary tract infections, diarrhoea, acute intestinal enteritis and sore throats [28].

24) *Bauhinia forficate:* The most popular herbal remedy for diabetes management in Brazil is *Bauhinia forficata*, also referred to as Pata de Vaca (cow's foot). This plant's essential component that exhibits hypoglycemic action is its fresh leaves and the genus Bauhinia is a member of the Caesalpiniaceae family [16].

25) *Alpinia galangal* (L)
Dumparastramu in Telgu and Bara Kalisan in Hindi are its common names. In India, the plant is primarily found in Tamil Nadu, Meghalaya and Assam. Diabetes is mostly treated using the species' rhizomes [18].

26) *Eugenia jambolana* Lam *(*Myrtaceae)
The plant is called Nilaprala in Sanskrit, Jambuda in Gujarati and Jambul in English. From the Himalayas to South India, it is mostly found in the plains. The fruit's juice is used to treat diabetes [18].

27) *Morraceae's Ficus bengalensis*
The plant is commonly referred to as Vata in Sanskrit and Vada in Hindi. The lower Himalayan region is where it is primarily found. Lowering blood sugar levels with bark infusion [18].

28) *Andrographis paniculata*
A member of the Accanthaceae family, *Andrographis paniculata* is an annual herb that grows wild in wastelands all over the world and is also occasionally cultivated in gardens. This plant has long been utilized for its anti-inflammatory, antispasmodic, hepatoprotective, antidiabetic and antioxidant properties. The main components of *Andrographis paniculata* Nees include flavonoids, diterpenoids, and polyphenols [24].

29) *Silvibum marianum*, or milk thistle
The milk thistle is indigenous to North America and Europe. It belongs to the aster family, which also includes common daisies and other thistle species. This hardy herb has been used historically to treat gallbladder and liver problems. Silymarin, its active ingredient, is present in milk thistle plant seeds [29].

30) *Lantana camara*
Leaf extracts have antihyperlipidemic and antidiabetic effects. Furthermore, ethanol extracts have antidiabetic properties [30].

31) *Achyranthes aspera* L. (Amaranthaceae)
It can be found across tropical regions. One possible mechanism of action for this plant is to provide the cells with essential elements like calcium, zinc, manganese, copper and magnesium [31].

32) *Curcuma longa*
A member of the Zingiberaceae family is *Curcuma longa*. The people of India, Persia, Thailand and Malay utilize it extensively as a culinary spice and as part of their native pharmacopoeia to treat a variety of known and obscure diseases from anorexia to biliary disorders. Blood plasma levels impact the absorption of glucose from muscle tissue and control insulin production in pancreatic beta cells [32].

33) *Cyamopsis tetragono/obus*
These plant seeds provide *galactomanan gum* or guar, which is used as a bulking ingredient in cosmetics and food. Guar is used as a dietary supplement to slow down the pace at which glucose is absorbed, which lowers postprandial hyperglycemia [33].

34) *Artemisia pallens*
It is often known as *Davana.* In regions of south India, this indigenous shrub particularly in Mysore state. It is used in traditional medicine to treat diabetes mellitus [34].

35) *Alangium salvifolium (Alangiaceae)*
Alangium salvifolium leaves have antihyperglycemic and antihyperlipidemic properties in insulin resistance caused by dexamethasone; this could be because the extract has an insulinotropic and antioxidant impact [35].

36) *Myrtus Communis* L
Diabetes and its consequences are frequently controlled or treated with traditional medicinal plants or natural items. Turkish traditional medicine uses the leaves of *Myrtus communis L* and the volatile oil extracted from the leaves to reduce blood glucose levels in individuals with type-2 diabetes [36].

6. Conclusion
Diabetes is a slow-killing disease for which there is currently no cure. Its problems can be lessened, though with quick treatment and appropriate understanding. The three main problems are heart attack, kidney damage and blindness. Maintaining stringent control over patients' blood glucose levels is crucial to preventing problems. One challenge with strict blood glucose control is that it might result in hypoglycemia, which can cause far more serious problems than elevated blood glucose. Flavonoids, tannins, phenolic and alkaloids are among the anti-diabetic substances found in plants that enhance the function of pancreatic cells by either raising insulin secretion or reducing intestinal absorption of glucose. This makes plants natural antioxidants and powerful herbal treatments.

7. Reference

1. Singh KK, Singh SS, C. Sharma CL. Antidiabetic and antioxidant properties of important traditional medicinal plants from northeastern India. IJPSR, 2024;15(6):1728-1736.
2. Mani R, Kunchu K, Pallab KH. Role of herbal plants in the diabetes mellitus therapy: an overview. International Journal of Applied Pharmaceutics, 2014;6(3),1-3.
3. Sahu U, Tiwari SP, Roy A. Comprehensive Notes on Anti diabetic Potential of Medicinal Plants and Polyherbal Formulation. UK Journal of Pharmaceutical and Biosciences, 2015;3(3):57-64.
4. Balwan WK, Saba N, Zargar JI. Burden of Diabetes and Role of Medicinal Plants in Its Treatment. Saudi J Med Pharm Sci, 2022;8(7):355-361.
5. Manoharachary C, Nagaraju D. Medicinal plants for human health and welfare. Annals of Phytomedicine, 2016;5(1): 24-34.
6. Arya SS, Sonia NS and Nair DS. Functional potential of anti-diabetic medicinal plants. Journal of Pharmacognosy and Phytochemistry, 2021;10(2):1177-1181.
7. Elavarasi S, Saravanan K, Renuka C. A systematic review on medicinal plants used to treat diabetes mellitus. IJPCBS, 2013;3(3):983-992.
8. Moneim AA, Fayez H. A review on medication of diabetis mellitus and antidiabetic medicinal plants. Int. J. Bioassays, 2015;4(06):4002-4012.
9. Deepak KGK, Reddy NRN, Challa S. Role of Antidiabetic Compounds on Glucose Metabolism - A Special Focus on Medicinal Plant: *Salacia* sps. Med chem 2014;4(3): 373-381.
10. Oyagbemi AA, Salihu M, Oguntibeju OO, Esterhuyse AJ, Farombi EO. Some Selected Medicinal Plants with Antidiabetic Potentials. Intech, 95-113. http://dx.doi.org/10.5772/57230.

11. Patel DK, Kumar R, Laloo D, Hemalatha S. Diabetes mellitus: An overview on its pharmacological aspects and reported medicinal plants having antidiabetic activity. Asian Pac J Trop Biomed 2012;2(5):411-420.
12. Swaroopa P, Reddy VJS, Koshma M, Sudharani Y, Basha SJ, Adithya TN. Review on Antidiabetic Activity on Medicinal Plants. International Journal of Pharmacological Research 2017;7(12):230-235.
13. Pawar AV, Patil SJ, Killedar SG. Uses of *Cassia Fistula* Linn as a Medicinal Plant. International Journal of Advance Research and Development, 2017;2(3): 85-91.
14. Bushnak R, Mohamad HEI, Jaber A. A Review on the Antidiabetic Potential of Medicinal Plants. Sumerianz Journal of Medical and Healthcare, 2021;4(4): 172-189.
15. Shakya AK. Medicinal plants: Future source of new drugs. International Journal of Herbal Medicine, 2016;4(4):59-64.
16. Rao MU, Sreenivasulu M, Chengaiah B, Reddy KJ, Chetty CM. Herbal Medicines for Diabetes Mellitus: A Review. Int.J. PharmTech Res, 2010;2(3):1883-1892.
17. Aggarwal N, Shishu. A Review of Recent Investigations on Medicinal Herbs Possessing Anti-Diabetic Properties. J Nutrition Disorder Ther, 2011;1(1):1-10.
18. Kumar S, Saini M, Kumar V, Prakash O, Arya R, Rana M, Kumar D. Traditional medicinal plants curing diabetes: A promise for today and tomorrow. Asian Journal of Traditional Medicines, 2012;7(4):178-188.
19. Rosalie IO, Ekpe EL. Antidiabetic potentials of common herbal plants and plant products: A glance. International Journal of Herbal Medicine 2016;4(4):90-97.
20. Dwivedi C, Daspaul S. Antidiabetic Herbal Drugs and Polyherbal Formulation Used For Diabetes: A Review. The Journal of Phytopharmacology 2013;2(3):44-51.
21. Mentreddy SR, Mohamed AI, Rimando AM. Medicinal plants with hypoglycemic/Anti-Hyperglycemic Properties: A Review. Bioproduct:341-353.
22. Goel R, Bhatia D, Gilani SJ, Katiyar D. Medicinal Plants as antidiabetic: A Review. International Bulletin of Drug Research;1(2):100-107.
23. Kumar BD, Mitra A, Manjunatha M. *In vitro* and *In Vivo* Studies of Antidiabetic Indian Medicinal Plants: A Review. Journal of Herbal Medicine and Toxicology, 2009;3(2):9-14.
24. Sivakumar T, Deepa B. A critical review on Antidiabetic Potential of Herbal plants and its their bioactive components. Journal of University of Shanghai for Science and Technology, 2023;25(01):303-314.
25. Alhassan AJ, Lawal TA, Dangambo MA. Antidiabetic Properties of Thirteen Local Medicinal Plants In Nigeria, A Review. World Journal of Pharmaceutical Research, 2017;6(8):2170-2189.
26. Chauhan A, Sharma PK, Srivastava P, Kumar N, Dudhe R. Plants Having Potential Antidiabetic Activity: A Review. Der Pharmacia Lettre, 2010;2(3):369-387.
27. Singab AN, Youssef FS, Ashour ML. Medicinal Plants with Potential Antidiabetic Activity and their Assessment. Med Aromat Plants, 2014;3(1): 1-12.
28. Kumar AS, Kavimani S, Jayaveera KN. A Review on medicinal Plants with Potential Antidiabetic Activity. International Journal of Phytopharmacology, 2011;2(2):53-60.
29. Elbakry M, Elremaly W. Antidiabetic activity of some common medicinal plants. Biol. Biomed. J, 2023;1(2):1-16.
30. Patil R, Patil R, Ahirwar B, Ahirwar D. Current status of Indian medicinal plants with antidiabetic potential: a review. Asian Pacific Journal of Tropical Biomedicine, 2011:291-298.
31. Bilala M, Iqbalb MS, Shaha SB, Rasheedc T, Iqba HMN. Diabetic Complications and Insight into Antidiabetic Potentialities of Ethno-Medicinal Plants: A Review. Recent Patents on Inflammation & Allergy Drug Discovery, 2018;12(1):1-17.
32. Mustaffa F, Indurkar J, Ali NIM, Hanapi A, Shah M, Ismail S, Mansor SM. A Review of Malaysian Medicinal Plants with Potential Antidiabetic Activity. Journal of Pharmacy Research, 2011;4(11): 4217-4224.
33. Shukla R, Sharma SB, Puri D, Prabhu KM, Murthy PS. Medicinal plants for treatment Of Diabetes Mellitus. Indian Journal of Clinical Biochemistry, 2000;15:169-177.
34. Grover JK, Yadav S, Vats V. Medicinal plants of India with anti-diabetic potential. Journal of Ethnopharmacology, 2002;81:81-100.
35. Patel DK, Prasad SK, Kumar R, Hemalatha S. An overview on antidiabetic medicinal plants having insulin mimetic property. Asian Pac J Trop Biomed, 2012;2(4): 320-330.
36. Jung M, Park M, Lee HC, Kang YH, Kang ES, Kim SK. Antidiabetic Agents from Medicinal Plants. Current Medicinal Chemistry, 2006;13: 1203-1218.