

CONCEPT OF DIABETES MELLITUS TYPE II (ZIABETUS SHAKRI QISM-E-SANA) IN UNANI SYSTEM OF MEDICINE: AN OVERVIEW

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ABSTRACT

Diabetes is one of the top killer diseases of mankind. Although it affects all the sect of society, its impact is mainly on affluent society. The today’s description of diabetes has almost stabilized, which mainly revolves around the role of pancreas, insulin, and its peripheral resistance along with other causes, to a lesser extent; however, this description needs reconsideration. The accelerating burden of the disease reveals that even the recent remarkable advancement in medical sciences does not have a justifiable answer to tackle and cease its ever-increasing load; therefore, there is a need of time to rethink about the preventive strategies, line of treatment, management, and all aspects of diabetes. Unani system of medicine is the oldest system, which has an entirely different and promising concept to understand all aspects of diabetes and offer a range of drugs to counter this disease. Diabetes mellitus is a group of metabolic diseases involving carbohydrate, lipid, and protein metabolism. It is characterized by persistent hyperglycemia which results from defects in insulin secretion, or action or both. Diabetes mellitus has been known since antiquity. In the 2nd century AD Aretaeus of Cappadocia provided the first accurate description of diabetes, coining the term diabetes, while in 17th century Thomas Willis added the term mellitus to the disease, in an attempt to describe the extremely sweet taste of the urine.

KEYWORDS: Diabetes Mellitus. Causes and prevention, Herbal drugs.

I. History and Background of Diabetes Mellitus. (Ziabetus Shakri Qism-e-Sana)

The word diabetes is derived from the Greek word Diabanmo meaning passing through or to run through or

si phon, which is characterized by excessive thirst, excessive urination, presence of sugar in urine, increased appetite, gradual loss of body weight, etc.^[1,3]

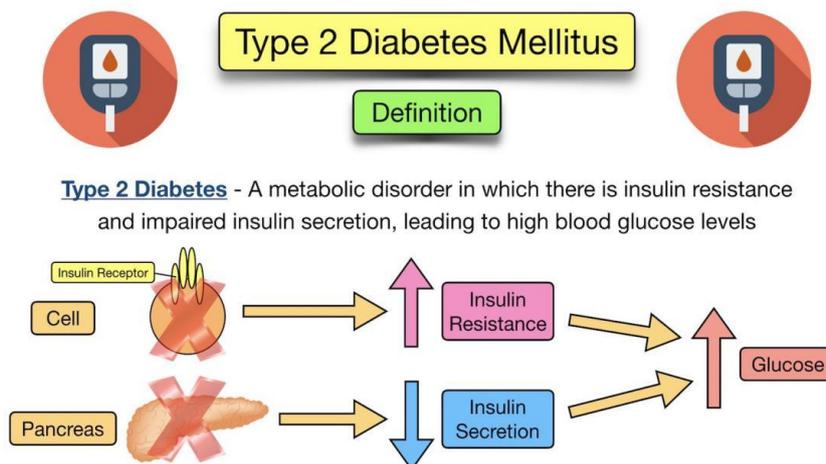


Fig. 1: Type 2 Diabetes Mellitus.

Ziabetus is the terminology used for diabetes, in general, and Ziabetus Shakri for diabetes mellitus, in particular, in Unani system of medicine. These terms are mentioned in most of the Unani literature like Al Qanon, Al Hawi, Kamilus Sanaah, etc. Unani Atibba considered that Ziabetus is a disease of kidneys. Arabian physicians described Ziabetus by some other terms also such as Moattasha, Atsha, Zalaqul kulliyya, Dolab, Dawwarah, Barkar, Barkarya, and Qaramees.^[3,7] Before going to the description of Unani prospect of diabetes, let us see the historical milestones and advances in the understanding of diabetes, which will surely help in making a better understanding of this disease.

Diabetes mellitus is one of the oldest diseases, with a testimony of 3000 years. Its historical aspect can be divided into the following categories through the history. Clinical features similar to diabetes mellitus were described 3000 years ago by ancient Egyptians. They were the first to write documents about this disease, which is proved by the discovery of Eberes papyrus in the graves of Thabes in 1862, written by Georg Eberes about 1550 BC. It contained descriptions of a polyuric state resembling diabetes mellitus.^[8,11] Hippocrates (460 BC) mentioned a disease with excessive urinary flow and waste out of the body.^[12] The first known clinical description of diabetes appears to have been made by Aulus Cornelius Celsus (30 BC-50 AD), but it was Aretaeus of Cappadocia (second century AD) who provided a detailed and accurate account and introduced the name "diabetes" from the Greek word for "siphon."

Aretaeus commented that life does not last very long, for great masses of flesh are liquefied into urine.^[11,13] Galen (131-201 AD) defined diabetes as Diarrhea Urinosa (diarrhea of urine) and dipsakos (thirsty disease). He described it as a disease specific to kidneys because of weakness in their retentive ability, and as he came across only two cases of diabetes, therefore he termed it a rare disease. He believed that the urine of diabetic patients was unchanged drink, which may have accounted for a different aroma.^[12,14,15] The Chinese and Japanese literature explained a disease with sweet urine, which attracted dogs and insects. Such patients were more prone to develop boils and tuberculosis.^[14,15] During the fifth and sixth centuries, the sweet taste of urine in polyuric patients was also described in the Sanskrit (Indian) literature by Susruta, Charaka, and Vaghbata, and the disease was named Madhumeha. They described that the urine of these patients tasted like honey (madhu), sticky to touch, and ants were strongly attracted to it.

A disease characterized by the 'too great emptying of urine' finds its place in antiquity through Egyptian manuscripts dating back to 1500 B.C. Indian physicians called it *madhumeha* ('honey urine') because it attracted ants. The ancient Indian physician, Sushruta, and the surgeon Charaka (400–500 A.D.) were able to identify the two types, later to be named Type I and Type II diabetes. Recognized for the last three millennia,

recorded history attributes the first complete descriptions in the first century A.D. to Aretaeus the Cappadocian, who coined the word *diabetes* (Greek, 'siphon') and dramatically stated "... no essential part of the drink is absorbed by the body while great masses of the flesh are liquefied into urine". Avicenna (980–1037 A.D.), the great Persian physician, in *The Canon of Medicine* not only referred to abnormal appetite and observed diabetic gangrene but also concocted a mixture of seeds (lupin, fenugreek, zedoary) as a panacea.

II. Signs and symptoms of Diabetes

Many patients with type 2 diabetes are asymptomatic. Clinical manifestations include the following

- Classic symptoms: Polyuria, polydipsia, polyphagia, and weight loss
- Blurred vision
- Lower-extremity paresthesias
- Yeast infections (eg, balanitis in men).

III. Diagnosis of Diabetes Mellitus Type II

In 1674, Dr. Thomas Willis, personal physician to the late English King Charles II, described the sweet taste of urine from diabetic patients "as if imbued with honey and sugar," hence, the name "mellitus" is Latin for honey. In 1766 Mathew Dobson proved that the sweet taste of urine from diabetic patients was due to sugar. He made the crucial observation of the excess of sugar in blood.^[8,19] It was only in 1776 that Dobson (Britain) first confirmed the presence of excess sugar in urine and blood as a cause of their sweetness. In modern time, the history of diabetes coincided with the emergence of experimental medicine. An important milestone in the history of diabetes is the establishment of the role of the liver in glycogenesis, and Claude Bernard (France) in 1857 pointed out that diabetes is basically caused by excess glucose production.^[14] Diagnostic criteria by the American Diabetes Association (ADA) include the following

- A fasting plasma glucose (FPG) level of 126 mg/dL (7.0 mmol/L) or higher,
- A 2-hour plasma glucose level of 200 mg/dL (11.1 mmol/L) or higher during a 75-g oral glucose tolerance test (OGTT),
- A random plasma glucose of 200 mg/dL (11.1 mmol/L) or higher in a patient with classic symptoms of hyperglycemia or hyperglycemic crisis. Whether a hemoglobin A1c (HbA1c) level of 6.5% or higher should be a primary diagnostic criterion or an optional criterion remains a point of controversy. Indications for diabetes screening in asymptomatic adults includes the following^[2, 3, 4, 5]:
 - Sustained blood pressure >135/80 mm Hg
 - Overweight and 1 or more other risk factors for diabetes (eg, first-degree relative with diabetes, BP 140/90 mm Hg or above, and HDL < 35 mg/dL and/or triglyceride level >250 mg/dL)
 - The ADA recommends screening at age 35 years in the absence of the above criteria.

IV. Concept of Diabetes Mellitus Type II in Unani. (Ziabetus Shakri Qism-e-Sana)

According to Unani medicine, Ziabetus Shakri is a disease in which the consumed water is passed out through the kidney immediately after intake by the patient. It is like the Zalqul Meda wal Ama (irritable bowel syndrome) in which the food passes rapidly through the stomach and intestine without proper digestion.^[8] In this disease, the patient feels excessive thirst and takes plenty of water and passes all the water he consumed without any metabolic change.^[20]

The Unani philosophy of disease causation is based on

mizaji (temperamental) and saakhti (structural) deviation. Any imbalance between mizaj and saakht (structure) results in disease. In this disease the mizaj (temperament) of kidneys becomes Haar (Hot), so they absorb water from blood circulation and send to the urinary bladder immediately due to weakness in Quwate Masika (retentive power). It has also been described that kidneys attract the watery substance of blood, but the urinary bladder does not attract any thing. So kidneys attract water from the circulation, liver, stomach, and intestines because of which patients feel the immoderate thirst (polydipsia).^[4,5,7,21]

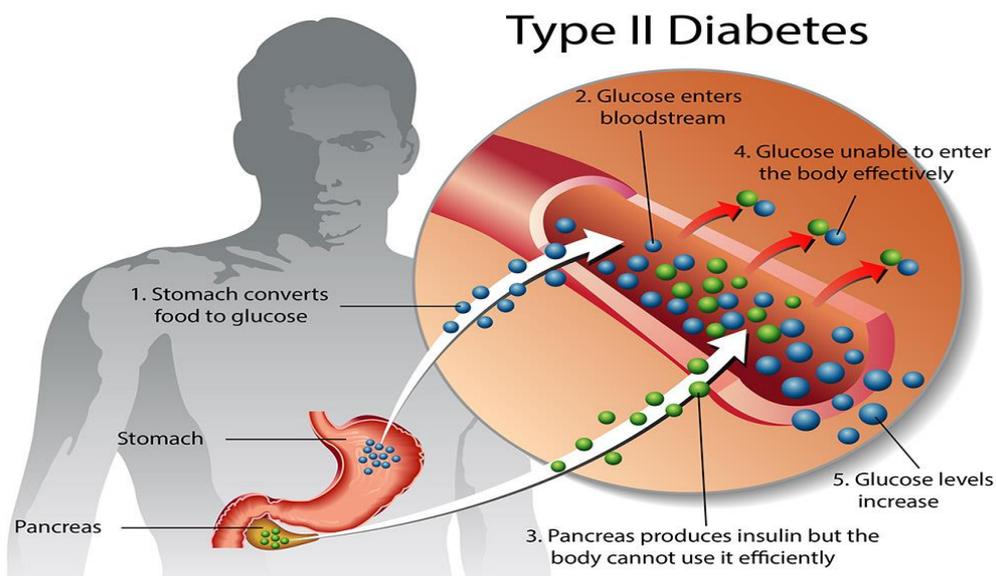


Fig. 02: Insulin Secretion in Human.

V. Etiology of Diabetes Mellitus.

The concept of Quwa (power/faculties) is unique in USM. The Quwa is a property of the body with which the phenomenon of the life is manifested. The Quwa provides the basis for different bodily functions. Each and every organ is furnished with a power through which specific physiological functions are performed by that particular organ. The Quwa is specific for a particular tissue or organ on which the specific functions of that organ depend. The organ is the seat of Quwa, and the Quwa give rise to functions.

There are three major divisions of the Quwa of the body.

- Al Quwa at Tabiyah (natural faculties).
- Al Quwa at Nafsaniya (psychic or mental faculties).
- Al Quwa at Haiwaniya (vital faculties).

Al Quwa at Tabiyah are responsible for ingestion, digestion, absorption transformation (metabolism), assimilation of ghiza (food), excretion of waste products, and preservation of the race. According to the function, Quwa at Tabiyah have been divided by Ali Ibn Abbas Majusi (930-994 AD) into three faculties: Quwate Ghaziya (nutritive faculty), Quwate Namya (growth faculty), and Quwate Muwallida (reproductive faculty).

Quwate ghaziya (nutritive faculty) is responsible for ingestion, digestion, absorption transformation (metabolism), assimilation of ghiza (food), and excretion of waste products. According to the function, this faculty is divided into four types: Quwate Jaziba (power of absorption), Quwate masika (power of retention), Quwate hazima (power of digestion) or Quwate mughayira (power of transformation), and Quwate dafia (power of propulsion and excretion).

Quwate Jaziba: This is the power that absorbs the Akhlat (humors) and runs into the cells with the help of various enzymes, hormones, or simply through natural forces.

Quwate Masika: This is the power that retains the Akhlat (humors) inside the cells for their Istahalah (metabolism).

Quwate Mughayira: This is the power that transforms the materials (such as phosphorylation of glucose after entering the cells) either into energy or/and makes it to assimilate.

Quwate Dafia: This is the power that helps the cells and tissues expel out the waste products (by-product)

produced in the course of istahala.

Each and every organ is furnished with a Quwat, as previously discussed, through which specific physiological functions are performed. The organs of digestive faculty (Azae Hazm) include Banqaras (pancreas) along with oral cavity, salivary glands, esophagus, stomach, intestines, liver, and spleen. Liver is considered the main center of Quwate Tabiyah. According to Abu Sahl Masihi (Died 1010 AD), each of the above four Quwa are found in two folds: one is found in the gastrointestinal tract (GIT) and liver and the other in all the cells of the body. So the Quwa of all the cells of the body absorb food materials and Ruh (pneuma), and metabolize and transform them into various compounds and replace the wear and tear by producing the energy for the proper functioning of the body (22-26).

The above description of Quwa and its function is described in Umoore Tabiyah (basic physiology), specially, in the context of digestion and absorption of food materials from the GIT and transportation of these toward the tissues; absorption and retention of materials by the help of different Quwa into the cells can be clearly understood.

VI. Classification of Diabetes Mellitus

According to the presence or absence of sugar in the urine, Ziabetus is divided into two types

- Ziabetus Sada (diabetes insipidus), which is also called Ziabetus gair shakari. It is characterized by excessive thirst and excessive urination, but there is no sugar in the urine.
- Ziabetus Shakari (diabetes mellitus), which is characterized by excessive thirst and urination and the presence of sugar in the urine.

According to the khiffat and shiddat (intensity) of the sign and symptom, Ziabetus is also divided into two types

- A. Ziabetus Haar in which acute symptoms of the Ziabetus with abrupt onset occur, such as excessive thirst (polydipsia) and increase urination (polyuria), with the symptom and sign of other sue mizaj haar, such as heat in flanks and dryness of the body, due to sue mizaj haar sada (excess of heat) of kidneys.
- B. Ziabetus Barid in which the thirst and frequency of urine are comparatively less.

The important etiological factors mentioned in USM are the following

- Zofe Gurda (Weakness of Kidneys)
Water cannot be retained properly due to the weakness of kidneys and their Quwate masika (retentive faculty), and kidneys are unable to metabolize the water that is coming from liver.
- Ittesae Gurda wa Majrae Bole (Dilatation of Kidneys and Tubules)
Water cannot be retained for long/required time due to

dilatation of Gurda wa Majrae Baul (Dilatation of Kidneys and Tubules), so it is passed out rapidly (polyuria).

- Baroodate Badan, Jigar wa Gurda
Sometime Ziabetus develops due to the excessive exposure of the whole body or liver or kidneys to cold, which leads to sue mizaj barid (cold derangement in temperament).
- Sue Mizaj Haar Gurda (Hot derangement in the temperament of kidneys)
Kidneys absorb water in an excess amount from circulation due to excessive hotness or derangement in temperament, so they cannot retain much amount of fluid and pass in the form of urine frequently (polyuria) and the patient drinks water frequently (polydipsia) to overcome his thirst.
- Sue Mizaj Barid Gurda (Cold Derangement in Temperament of Kidney) Sometimes, Ziabetus develops due to excessive exposure of cold to kidneys that may lead to sue mizaj barid (cold derangement in temperament).^[1,5]

We can summarize the etiopathogenesis as follows: the nutritive capacity of all the organ and body as a whole performs three functions, such as Tehseel (acceptance), Ilsaaq (adherence), and Tashbia (assimilation). These three functions are served by four other capacities Masika (retentive), Dafia (eliminative), Jaziba (absorptive), and Hazima (digestive). And these functions are mediated by four Kaifiate (quality) of Mizaj, i.e., Hararat, Burudat, Ratubat, and Yabusat. So, deviation in these mizaji Kaifiat (temperamental quality) by any cause hampers the function of Quwwate Ghazia and thereby results into Badal ma yatahallal (assimilation), which is essential for the maintenance and growth of the body and its members.

VII. Asbab-Causes of Type 2 Diabetes

- **Genes:** Scientists have found different bits of DNA that affect how your body makes insulin.
- **Weight:** Having extra weight or obesity can cause insulin resistance.
- **Metabolic syndrome:** People with insulin resistance often have a group of conditions including high blood sugar, high blood pressure, and high cholesterol and triglycerides.
- **Too much glucose from your liver:** When your blood sugar is low, your liver makes and sends out glucose. After you eat, your blood sugar goes up, and your liver usually slows down and stores its glucose for later. But some people's livers don't. They keep making sugar.
- **Bad communication between cells:** Sometimes, cells send the wrong signals or don't pick up messages correctly. When these problems affect how your cells make and use insulin or glucose, this can lead to diabetes.

- **Broken beta cells:** If the cells that make insulin send it out at the wrong time, your blood sugar gets thrown off. High blood sugar can damage these cells, too.

VIII. Stages of Type 2 Diabetes

Researchers have defined four stages of type 2 diabetes:

- A. Insulin resistance:** In this stage, your body usually makes enough insulin to keep blood sugar levels in the normal range. But if your cells "resist" the insulin (don't use it correctly), your body will make more insulin to try to help the glucose get into them. Insulin resistance can be temporary, but it can also last. There's no test to detect insulin resistance, so it can be hard to diagnose.
- B. Pre-Diabetes:** Eventually, insulin resistance causes glucose to build up in your blood. You have prediabetes when your blood sugar levels are higher than normal, but not high enough to be considered diabetes. An A1c between 5.7% and 6.4% means you have prediabetes. You may not have any symptoms. But prediabetes ups your risk for heart disease, stroke, and type 2 diabetes.
- C. Type 2 diabetes:** If your A1c is 6.5% or higher, you have diabetes. You may have symptoms like increased thirst, blurred vision, and numbness in feet or hands. Or you may not have any symptoms at all.
- D. Type 2 diabetes with vascular complications:** At this stage, your diabetes has led to vascular (blood vessel) problems. You may have damage to vessels in your eyes (retinopathy), kidneys (nephropathy), and certain nerves (neuropathy). You might also develop heart disease, stroke, or circulation issues.

IX. Treatment of Diabetes Type II

Cause: Sue Mizaj- Barid Ratab (Excess of coldness and wet)

Above both qualities (Barid and Ratab) interfere with Quwae Ghazia, Masika, and Jaziba and favor the production of fat. Hence we can say that both causative factors and material are present here for the production of fat, resulting in excess fat deposit. These above qualities make the Quwa Dafiah (power of eliminative) hyperactive. So organ interstices become full of unused material, and thereby blood becomes loaded with nutrients that start to appear in urine.

Burudat (coldness) causes Kasafat (hardness), Lazuzat (sticky), and Ghilzat (Viscous) in humors, so humor starts adhering to the walls of vessels. Unused material being Barid Ratab (cold and wet) calm down Hararat Gharizia making the person prone to infection, which further exaggerates loss of H. Gharizia and its weakness. Hence H. Ghariba tends to overpower the H. Gharizia, and the condition becomes more favorable to infection. Vascular Sudda (obstruction) is formed by Ghaleez (viscous) Humor, which cuts off the delivery of Ruhe

Haiwani (pneuma).

In the end, we can say there are so many factors that tend to deviate the mizaj toward Burudat and Rutubat; these factors belong to Asbab Sitta Zaroorya (six essential factors) and Ghair Zaroorya (non-essential) Ghair Muzadda such as excess diet, sedentary mode life, bathing after diet, excess of sleep, use of cold drinks, avoidance of sun exposure, and excess of mental stress.

Once Barid Ratab Mizaj becomes established, its obligations start to appear. Organs with Barid Mizaj are affected most. This Burudat-e-Mizaj interferes with capacities of hot-tampered organs. So the most affected organs in diabetes are brain, nerve, glands, and Heart.

X. Modern treatment of Diabetes Mellitus Type II.

People with type 1 diabetes and some people with type 2 diabetes need to use insulin every day. People continued to use injectable animal-based insulin for many years, but recent years have seen further advances in treatment. These include the introduction of insulin analogs and the development of new ways to deliver insulin. Both of these factors have made diabetes treatment more effective.

A. Human insulin: In 1978, scientists the first human-based insulin, which they named Humulin. Humulin is identical in structure to human insulin. Lispro, the first short-acting insulin, appeared on the market in 1996. Lispro begins to work about 15 minutes after injection and keeps working for 2–4 hours. Long-acting insulin's, such as insulin glargine, take longer to absorb and remain active for up to 24 hours. People who use insulin tend to combine long- and short-acting types. The long-acting dose works throughout the day, while the short-acting dose boosts insulin levels around mealtimes.

Nowadays, it is normal for people to manage diabetes at home. Over time, not only have new forms of insulin become available, but there are also new methods of delivery. In the 1980s, the first blood glucose monitors became available for home use, providing an accurate way to monitor blood sugar. People who use insulin have to measure their glucose levels to determine how much insulin they need and how well their treatment is working.

In 1986, the insulin pen delivery system appeared. These prefilled syringes, which come in specific measures, are a safe and convenient way of delivering the required dose of insulin.

The 1990s saw the invention of external insulin pumps, which, with correct use, can provide:

- Better results
- More flexibility
- Easier treatment management

These and other inventions help people manage their condition themselves. By increasing their awareness and

skills, people can take more control over their health and feel more confident that they are managing their condition.

B. Non-insulin treatment: Not everyone with type 2 diabetes uses insulin. Research has increasingly shown that a healthful diet is crucial for preventing and managing type 2 diabetes. Ongoing research is investigating the most appropriate diet to follow and the role of other lifestyle factors, such as cigarette smoking, stress, and sleep. A number of non-insulin therapies for diabetes emerged during the 20th century. People can take each of these by mouth.

They include

➤ **Metformin:** The discovery of metformin stemmed from the use of *Galega officinalis* (also known as goat's rue or French lilac) as a medieval treatment for diabetes. Metformin is a biguanide. Scientists developed several biguanides during the 19th century, but they either had severe side effects or did not reach the market. Metformin became available in the United States in 1995.

➤ **Sulfonylureas:** These contain a type of chemical called sulfonamides, some of which can reduce blood sugar. Carbutamide became available in 1955, and since then, other sulfonylureas have appeared.

➤ **Pramlintide:** Doctors sometimes prescribe this drug for people with type 1 diabetes to slow the rate at which the stomach empties, reduce glucagon secretions from the pancreas, and help a person feel full. In this way, it can help with weight loss and reduce the amount of insulin that a person needs.

➤ **Sodium-glucose cotransporter 2 (SGLT2) inhibitors:** These reduce blood glucose independently of insulin by decreasing the amount of glucose that the body absorbs. They can also help lower blood pressure and body weight. Current guidelines recommend that doctors prescribe them for people with type 2 diabetes who have a risk of atherosclerotic cardiovascular disease. The Food and Drug Administration (FDA) have not approved them for the treatment of type 1 diabetes.



Fig. 03 Jamun and Fenugreek used in Diabetes Mellitus.

XI. Herbal drugs used in Treatment of Diabetes Mellitus.

A. Jamun Seeds For Diabetes (Jamun Seeds Powder)

Jamun seeds (Blackberries) are considered among the effective home remedies for diabetes. These seeds are a rich source of jamboline and jambosine. These two ingredients help in slowing down the glucose release into the blood. It also reduces symptoms of frequent urination and thirst. A study published in the National Library of Medicine says jamun decreased HbA1c in diabetes patients who participated in the study. From 11.1% of HbA1c, jamun consumption for over 12 weeks brought HbA1c down to 5.6%. Check how to make this one of the most effective home remedies for diabetes: Check how to make this, one of the most effective home remedies for diabetes.

B. Fenugreek seeds

Fenugreek seeds (Methi seeds) are a rich source of glucomannan fiber. This fiber helps in delaying the intestinal absorption of sugar. Alkaloids like fednugrecin and amino acids 4 hydroxy-isoleucine present in the seed act on the pancreas to release insulin, thereby helping in high sugar control. Follow the steps below and benefit from one of the most effective and common natural remedies for diabetes.

C. Amla Juice For Diabetes

Indian gooseberries or amla are powerful antioxidants. When it comes to thinking of the best home remedies for high sugar, Amla is a perfect choice. As it is a rich source of Vitamin C, amla's have been widely used for immunity boosting. Studies have shown amla also lowers postprandial sugar levels. Amla can control pancreatitis

and thus helps in the proper production of insulin. It increases the body's response toward insulin and regulates carbohydrate metabolism, all helping in controlling high blood sugar levels.

CONCLUSION

In spite of tremendous advancement in medical science, we are still in the dark as we were few decades ago regarding preventive and curative aspects of diabetes. Lots of epidemiological work have been carried out and so many risk and related factors have come to our knowledge, but we are unable to get effective treatment. We will have to think about and follow alternative therapies. The holistic Unani concept of medicine is a ray of hope for the suffering. In Ziaetus, the maximum damage is prone to vessels and vascular organs. So the Unani insight of correcting organs may be effective managing strategy, Correction of Sue Mizaj (in temperament) and ultimately faculties may be best preventive and curative steps to halt the progress of disease because in the Unani prospect, iabetes is nothing but a disturbance of vascular and organic digestion.

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