

Review of nigerian medicinal plants used in the management of diabetes mellitus

Usman Garba Kurmi^{1*}; Adina Zahir²; Abbas Musa¹; Adesanya Deborah Iyadunni⁴; Usman Audu Tomsu¹; Parth K Patel³; Prosper Obed Chukwuemeka⁵

¹University of Maiduguri, Faculty of Science, Department of Biochemistry, Maiduguri, Nigeria.

²(DVM) Doctor of Veterinary Medicine, University of Veterinary and Animal, Lahore Pakistan.

³H.K. College of Pharmacy, Jogeshwari (W), Maharashtra, Mumbai-400102, India.

⁴Federal University of Agriculture, College of Food Sciences and Human Ecology (COLFHEC), Food science and Technology, Abeokuta, Nigeria.

⁵Federal University of Technology Akure, School of Sciences (SOS), Department of Biotechnology, Akure, Nigeria.

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***Corresponding Author:** Usman Garba Kurmi, University of Maiduguri, Faculty of Science, Department of Biochemistry, Maiduguri, Nigeria.
Tel: +2347064430032.
Email: usmankurmi@yahoo.com

Abstract

Diabetes mellitus is a cohorts of disorders involves transformed of insulin dysfunction which lead to high blood glucose levels. Generally diabetes mellitus is a long term disorder in which blood glucose concentration is raised from the normal range leading towards complications. Extensive research over the last 20 years and further physiological evidence of diabetes mellitus has been revealed. Herbals that can improve insulin resistance, activate and augment insulin receptors in the red blood cell are those used to treat and control diabetes mellitus. Strikingly, the extraction of herbal plants and medicines based on these pathways, including those that were attributable in Islamic civilization have been recorded as mediating their influence.

Keywords: Diabetes mellitus; herbal plants; momordicacymbalaria; cocciniaindica; momordicabalsamina.

Introduction

Diabetes is the most common clinically affected endocrine condition (Wais et al., 2012). By 2030 the number is projected to grow to more than 366 million (Wild et al., 2004). The diabetes is characterized by hyperglucemia, which results in insulin deficiency or insulin sensitivity of bodily cells or both by changes in carbohydrates, protein and fat metabolism [9]. Such mutations result in the high concentration of blood sugar that can lead to severe complications such as hyperglycemia and hypoglycemia in many organs and long-term problems, which can lead to an enhanced risk of atherosclerosis, insufficient kidneys, weakened nerves, heart distress and increased blindness [2]. Diabetes can be categorized and divided into three main categories based on the clinical appearance of the condition: type I diabetes, type II diabetes and gestational diabetes (Velho and Froguel, 2002). Diabetes is related to reduced life quality and an increased risk of death and death [23]. The market for medicinal herbs has been substantially increased with the support of medicinal vegetation [17]. It is believed to be a crucial source of new chemical compounds with

viable therapeutic outcome [12] and the need to isolate new bioactive compounds from medicinal plants is a required task in flowers where comprimés are obtained in order to correct a variety of diseases. A promising solution appears to be ethnomedicine (Newman, 2008). Traditional medicinal drug merchandise play a most important role in people's lives round the world in the face of the international upward thrust in drug resistance, toxicity, aspect results and the growing price of artificial merchandise [17]. In Nigeria, quite a few thousand flowers have been stated to have medicinal properties and have been used to deal with many disorder ailments (Iweala and Oludare, 2011). Many of these usual medicinal vegetation are used as spices and meals vegetation and for medicinal functions [14]. At present, medicinal plant life proceed to play a main function in the administration of diabetes, especially in growing countries the place most human beings do no longer have get entry to to contemporary anti-diabetic capsules [1]. However, information of the use of natural remedies in the therapy of diabetes nonetheless applies to regular healers, and this facts is misplaced or handed on to their youth orally. Therefore, there is a need to gather and document this infor-

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mation before losing such prosperous assets. Therefore, this work used to be intended to accumulate and document the medicinal plants used for the therapy of diabetes in Nigeria.

Review

Herbal treatment consists of an accumulation of quite a few traditional medicine systems’ research experiences and procedures that may also have influenced many centuries ago, frequently providing necessary recommendations for the selection, planning, and use of therapeutic benefits of natural remedies. Sickness and health/welfare treatment using natural remedies is the oldest and most common method of conventional health care practice practiced for the period of society records by means of all religions at some point in time. Medicinal flora has been used in multicultural medicine systems around the world since ancient instances of diabetes care and management (DM) have been used [13]. Medicinal vegetation plays an essential role in the management of DM at present, particularly in developing countries where many people do not have access to traditional diabetes treatment plans [3,4]. Since the advent of insulin and hypoglycemic oral capsules in the early 20th century, the usage of anti-diabetic tablets in developing countries is declining. However, hobbies in medicinal vegetation have resurged, suggesting hypoglycemic homes in more advanced countries [15]. In developing countries, renewed activity in anti-diabetic tablets is expected to be motivated by various elements, including adverse reactions, high differential failure costs and the cost of trendy anti-diabetics capsules [1]. In the last few months, the World Health Organisation (WHO) has facilitated the use of herbicide

medicines for DM and has supported experimental studies of a number of plant species with hypoglycemic residences [6]. As a result, modern estimates have shown that more than 70% of the world’s population uses daily medicine’s available assets to exploit and restrict DM and its problems [5, 7, 8].

Nigerian Plants Confirmed Management of Diabetes Mellitus

DM is emerging suddenly as Nigeria’s most significant public health issue. According to studies from the International Diabetes Foundation/WHO, almost a decade ago, the incidence of type II DM was projected to be an additional 3.4 percent of the 24 million people struggling with DM DM between 20 and 70 and a common 3.9 percent rise by 2025 [48, 49]. Moreover in sub-Saharan Africa, DM mortality rates and related problems range from 21 to 49 per 100,000 people, compared to 18 per cent in the USA and 6 per cent. UK 100,000 [50]. The use of a veterinary model was investigated for their anti-diabetic homes by several ordinary and standard Nigerian medicinal flora (Table 1) used and supported by the use of usual healers and clinical practitioners in the DM remedy. Numerous studies have been carried out at various research institutes in Nigeria and at universities on medicinal flowers that have the potential to fight diabetes [17, 26, 49, 51-54]. Almost all of these scientific lookup has been carried out the use of chemical-induced diabetes mice. A few different studies have been conducted using in vitro mobilephone bioassays-based bioassays [55].

Table 1: The names of some of the indigenous anti-diabetic plants of Nigeria are summarized below.

Medicinal plants names	Roles	Action	Plant part used
<i>Momordicacharantia</i>	It reduces blood glucose concentrations by acting on peripheral tissues and suppressing appetite	It stimulate the insulin secretion. It improve the insulin resistance It increase the β-cells.	Leaves Seed Whole plant
<i>Cocciniaindica</i>	It reduce the secondary complications It reduce the diabetic nephropathy by changes in extracellular matrix components leading to renal failure	It suppress the glucose-6 phosphatase It Stimulate glycogen synthase activity and reduction of phosphorylase activity.	Leaves
Carica papaya leaves	It facilitating the migration of viable cells from the wound edge into the wound cavity. It displays strong antioxidant activity and immune	It accelerate the wound healing It enhances the insulin sensitivity	Leaves
Momordica Basalmania	It decrease the oxidative stress in diabetic patients It improve the antioxidant status It improve the insulin resistance in T2DM	It activate the insulin receptor in cells It increase the uptake of glucose in the cells	Leaves

1) Momordicacharantia (Salt Bitter), Family-Cucurbitaceae

TOral and peritoneal administration of *M. charantia* juice fruit extract in normal mice reduced glycemic response except altering insulin response. Also, fluid excretion and residual after the release of alkaline chloroform reduced hyperglycemia in diabetic rats after 1 hour. The material acquired by means of this plant by washing water the acid released by using chloroform following the washing of alkaline water has a small hypo-

glycemic effect. These findings endorse that the oral administration of *M. Charantia* releases low glucose attention besides absorbing intestinal glucose and involves an extra pancreatic effect. In some other study, *M. cymbalaria* fruit powder brought on a minimize in blood sugar stages in alloxan mice following follow-up treatment for 15 days. High serum LDL cholesterol levels and triglycerides tiers are decreased with sizable upgrades in hepatic glycogen levels in diabetic rats.

Studies have shown anti-diabetic and hypolipidemic homes of *M. Cymbalaria* powdered fruit. In addition to being a dietary supplement, bitter gourds have long been used as a remedy for a variety of ailments, which includes type 2 diabetes.

The Role of *Momordica cymbalaria* (Bitter Melon) In Management of Diabetes Mellitus

The fruit consists of at least three powerful, antidiabetic substances which have been shown to have a reduction in blood sugar, vicinity and insulin-like insulin, as polypeptide-p. These components work together or personally to reduce blood sugar levels. It is additionally acknowledged that bitter melon includes lectin which lowers blood glucose attention via binding tissue and suppressing appetite - similar to the consequences of insulin on the brain. Fig 2 illustrates various pathways through which *M.charantia* reduces blood glucose levels.



Figure 1: *Momordica Basalmania*.

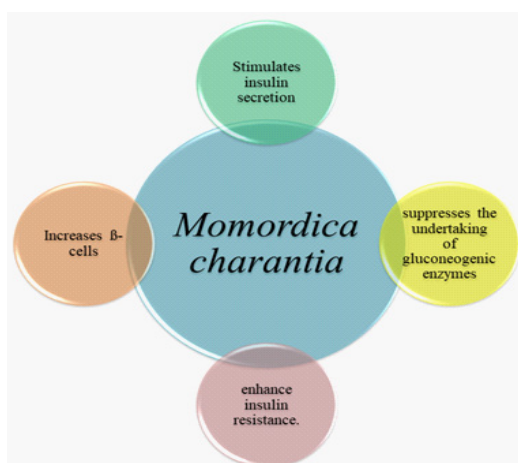


Figure 2: Different mechanisms through which *Momordicacharantia* lowers blood glucose.

2) *Coccinia indica*; Family: cucurbitaceae

Coccinia indica; Cucurbitaceae accesses pectin and Beta sitosterol which are bioactive supplies and studies have shown that pectin substances reason a giant decrease in blood glucose and Extended hepatic glycogen due to extended passive hepatic glycogen synthetase and an associated activity cap. C ethanolic release hypoglycemic effect of *C. Indica* is due in part to the suppression of the main gluconeogenic enzyme (glucose-6-phosphatase), but alanine aminotransferase and aspartate amino transferase has not had any effect at this moment. The position of *Coccinia* performs a key position in the management of diabetes. Diabetes nephropathy is one of the 2nd diabetic complications characterised by adjustments in the outer components of the matrix that lead to endogenous renal failure. Diet plays a vital role in diabetes control. The effect of the use of *Coccinia indica* on diabetic renal damage was

previously determined in the current research. Both mice and diabetes are manipulated with a nutritional diet AIN-76 supplemented by *C. For* a period of 2 months, fruit and leafy veggies are respectively 10% and 5%, respectively. For different editions a number of parameters have been enhanced with the addition of *C*, such as fasting blood glucose, urine sugar, release of albumins, renal Index and glomerular level. Food indica. Diabetic rats were fed a *C*-supplemented diet. In contrast to regulation of diabetic rats, signs of fruit or leaves showed increased sugar tolerance. The effect of important antioxidant enzymes on the kidney have also proved to be recommended. In indica-infected mice, there is also a drop in the amount of laminin and fibronectin due to diabetes. These outcomes indicate that the use of *C. indica* is advisable for content material that carries negative outcomes of kidney diabetes.

How it works:

- i. It suppresses glucose-6 phosphatase.
- ii. It promotes glycogen synthase endeavor and decreases phosphorylase activity.

3) *Carica Papaya* Leaves

Carica papaya leaves are one of the most broadly used typical redress for diabetes that has shown activity in the last few decades. Therefore, the purpose of this learn about was once to consider the hypoglycemic impact of fluid extract of *C.papaya* leaves on diabetic mice. Numerous studies have pronounced that some components of the papaya plant have hypoglycemic outcomes on animals and humans. In addition, leaf extract has a high quality impact on the integrity and feature of the liver and pancreas. New plant-based hypoglycemic capsules have proven hypoglycemic motion and the capacity to improve some of the issues of diabetes such as kidney damage, fatty liver, and oxidative stress. Recent lookup has located that the phytochemicals in papaya leaves act to exhibit sturdy antioxidants and immunity. Alkaloids and phenolic compound are responsible for their herbal effects. Research from northern Nigerians indicates that papaya leaves complement to reduce the hazard of kind two diabetes, a mixture of extracts helps to minimize the second issues of type 2 diabetes such as fatty liver, kidney damage, oxidative stress and speed up wound healing, recuperation process can heal different problems.

The Role of Papaya Leaves in Management of Diabetes Mellitus

It is clear that many antimicrobial, antimicrobial, and exercise functions are filled with chemicals in a variety of sections of the papaya, and papaya may be an incurable fruit of diabetes and related complications. due to the fact wound recovery is believed to have its basis in its papal material, a practical statute, which has the effect of defending the wound. Papain, which is enzyme-induced, can also promote enzymatic reduction when used topically. Papain is a cysteine proteinase that with the aid of destroying eschar, digests necrotic tissue, thus advertising the movement of energetic cells from the wound to the wound cavity. Additionally, Papain helps to reduce bacterial load, decrease exudates, and increase the development of granulation tissue. Due to its antibacterial and fibrinolytic properties, papain isolated from the latex of unripe papaya pulp is claimed to be one of the first uses for wound care and continuous treatment of skin ulcers.

How it works

- i. Improves insulin sensitivity.
- ii. Reduce type two diabetes.
- iii. It speeds up wound healing.

4) Onions (*Allium cepa*); Alliaceae and garlic (*Allium sativum* L.)

Increased the amount of hyperglycemia for 30 days, weight loss and glycogen from the liver were decreased by oral administration of the onions and garlic (*A. cepa* L.) to alloxane-induced rats. Anti-diabetic vaccinations, *Cepa* L. The two parties involved respectively *S*-methylcysteine sulfoxide (SMCS) and *S*-allylcysteine sulfoxide (SACS). Studies have shown that SMCS and SACS use their anti-diabetic homes for non-insulin responsive areas in the liver by inducing insulin secretion and competing with insulin. Specifically, in the liver, SACS inhibits gluconeogenesis. SACS from *A. sativum* L., due to its antioxidant and secretagogue activities, prevents lipid peroxidation. Energetics of *A. Cepa* L, *A. sativum* L. In comparison to diabetic mice treated with glibenclamide and insulin, elimination of DM in experimental mice. Research further states that SMCS & SACS have contributed to a massive spike, for 30 days, in oral onion (*A. Cepa* L.) and garlic (*A. Sativum* L.) supplies in alloxane-induced rats, in acetate biosynthesis of LDL cholesterol within the liver, suggesting that altered weight loss and liver glycogen are used. Diabetics vaccines. *Strapa Sativum* L. *S*-Methylcysteinesulfoxide(SMCS) and *S*-allylcystenesulfoxide (SACS) respectively are No-A, No-A. *Sativum* L. *Sativum* L. Studies have shown that SMCS and SACS use their anti-diabetic homes by inducing insulin secretion in non-insulin-sensitive areas of the liver and competing with insulin. In particular, SACS inhibits liver gluconeogenesis. SACS from *A. sativum* L. Moreover. The antioxidant and secretagogous effects of *sativum* L prevent peroxidation in lipids. The *A. sativum* L. No-A. Yeah, no-A. *Sativum* L. *Sativum* L. Experimental mice elimination of DM in comparison to glibenclamide and insulin-treated diabetic mice. The learn about additionally noted that SMCS and SACS brought about a massive increase in LDL cholesterol biosynthesis from acetate in the liver, which was once an indication of Low efficiency of allium merchandise to shield mice from DM-related damaging resources.

The Role of Onions (*Allium cepa*); Alliaceae and garlic (*Allium sativum* L.) in Management of Diabetes Mellitus

New research suggests the ability to reduce blood sugar levels and provide more benefits in treating metabolic disorders through ingestion of garlic in people with type 2 diabetes. Whilst literature indicates that garlic is used with your daily insulin and dietary therapy to minimize your blood sugar levels only under the supervision of a nurse/physician, it gives diabetics more than a few advantages in total. It is estimated that garlic has more than 400 chemical compounds. Allizin, allylpropyl disulfide and *S*-Lilyl cysteine sulfoxide are compounds, many of which are likely to help prevent and deal with a number of health problems. Insulin to get more insulin from your body.

How it works

- i. It improves insulin resistance.

- ii. Its competition with the insulin of the insulin-resistant sites in the liver.
- iii. It inhibits the manufacturing of glucose via the liver.

Conclusion

Based on the on hand literature, these reviews suggest that the therapeutic plant life listed above have an antidiabetic effect primarily based on evidence, such as stimulating and / or regenerating power in the adjacent cells and extrapancreatic effects that are advantageous in reducing blood glucose ranges in diabetic patients. medicinal flowers in Nigeria, high ranges of diabetes, medicinal plant life with anti-diabetic houses as outlined in this learn about need to be evaluated to strengthen into amazing capsules or as dietary supplements in existing therapeutic tablets for diabetes management. This is proper of many present day medicines used in conventional medicinal drug these days with the beginning of natural plants. The findings of this learn about additionally supplied a range of therapeutic plants that can be traced to their medical significance in human practices used for the administration of diabetes in Nigeria. Additional research must be conducted to look into the antidiabetic activity of different untreated plant species, and bioactive compounds responsible for antidiabetic pastime be evaluated.

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