International Journal of Engineering Applied Sciences and Technology, 2021
Vol. 6, Issue 6, ISSN No. 2455-2143, Pages 31-35
Published Online October 2021 in IJEAST (http://www.ijeast.com)

TREATMENT OF DIABETES MELLITUS BY USING VEGETABLES IN PAKISTAN

Israr Maqbool (PhD Researcher)
Muhammad Ashraf, Abdul Qadeer Saad , Muhammad Abdul Ghaffar , Mujeeb UL Naeem , Attique nawaz, Zain UL Abideen , Mujahid Hussain.
Department of Zoology Cholistan University of Veterinary Animal Sciences, Bahawalpur Pakistan

Abstract

Background Diabetes mellitus is a significant metabolic illness that affects people all over the world. Because existing synthetic medications have various limits and negative effects, the search for novel drugs continues. Traditional botanicals have long been used to cure diabetes around the world. **Objective** The goal of this study is to compile a list of commonly available medicinal vegetables from various parts of Pakistan that have antidiabetic and related therapeutic properties. **Methods** This study was conducted for the purpose of providing broad information on common medicinal vegetables found in Pakistan, that are used to cure diabetes**. Results** This review identified and characterized six generally available medicinal vegetables, demonstrating the importance of vegetables, in the treatment of diabetes. **Conclusion** Only a few vegetables have been thoroughly researched by scientists**.**

Key words: Diabetes mellitus, Punjab, Bitter gourd, Spinach, Broccoli, Eggplant, Ginger, Lady finger.

I. INTRODUCTION

In history, man has used a variety of natural materials as a cure for a variety of ailments. Most natural products have been supplanted in recent decades by synthetic medications based on modern chemistry and biotechnology (1). The use of entire plant treatments for the promotion of healing and health maintenance is referred to as herbal medicine (2). Despite the fact that man has been eating vegetables since the dawn of time, in terms of pharmacological effect, identification, purity, and efficacy are important. Quality has always been a point of contention. Alternative medicine (AM) has recently grown in popularity, attracting the attention of numerous scholars throughout the world. Actually plants vegetables and seeds of some plants is using as (AM) This interest has been heightened by concerns that, despite their apparent innocuity, such treatments could be harmful to patients.

The global diabetes population is estimated to be over 150 million individuals, with this figure expected to rise to 300 million or more by 2025 (3). Diabetes is a condition in which your blood glucose, commonly known as blood sugar, is too high . Diabetes mellitus is a metabolic disorder with a variety of consequences. Diabetes mellitus (DM) is one of the most common chronic metabolic illnesses. DM is usually linked to vascular, metabolic, neuropathic, and nephropathic problems. The major clues for diagnosing DM metabolic problems are hyperglycemia and abnormal lipid profiles**.** Hyperglycemia is caused by the cells' inability to use glucose and/or the skeletal muscles and liver's failure to store glycogen. Furthermore, oxidative stress was enhanced in DM by the generation or release of reactive oxygen species (ROS) and the depletion of antioxidant reserves. Insulin is the most important hormone in blood glucose regulation (4). Insulin increases the entry of glucose into skeletal muscles and, to a lesser extent, liver and adipose tissue through specific transporters after it is released into the bloodstream, thereby maintaining glucose homeostasis (5).

II. MATERIAL AND METHOD

This research was carried out for the purpose of providing broad information about common medicinal vegetables used to treat diabetes in Punjab, Pakistan. Because Punjab has so many different kinds of food. Most important thing about Punjab we can enjoy four weathers. Medicinal vegetables that have not yet been discovered to treat diabetes. Bitter ground, Lady finger, Eggplant, Ginger Spinach and Broccoli some examples. As a result of our basic research, we discovered that we can inspire more researchers to investigate additional medicinal vegetables that help treat diabetes (5).

III. ETHNO - NEUTRAL STUDY

A survey was conducted some areas of Punjab in order to acquire ethnomedical knowledge. The information covers the vegetables local name, scientific name, and the components of the vegetables that were used. With

International Journal of Engineering Applied Sciences and Technology, 2021
Vol. 6, Issue 6, ISSN No. 2455-2143, Pages 31-35
Published Online October 2021 in IJEAST (http://www.ijeast.com)

the use of traditional methods, they were recognized based on their vernacular names. Healers, herbalists, and those who live in rural areas (5).

Table No:1 Common and Scientific Names of Vegetables

Sr no	Common name	Scientific Name	Local name	Family	Parts that use for diabetes treatment
1	Bitter gourd	*Momordica charantia*	Karela	Cucurbitaceae	Juice , fruit
2	Eggplant	*Solanum melongena*	Baingan	Solanaceae	Fruit
3	Lady finger	*Abelmoschus esculentus*	Bindi	Malvaceae	Pod/fruit
4	Ginger	*Zingiber officinal*	Adrak	Zingiberaceae	Root
5	Broccoli	*Brassica oleracea*	Broccoli	Brassicaceae	Flower
6	Spinach	*Spinacia oleracea L*	Palak	Amaranthaceae	Leaf

1) Bitter gourd

Bitter gourd, bitter melon, balsam pear, bitter apple, and bitter, or wild cucumber are some of the English names. *Momordica charantia* is its botanical name. Known as "karela" in Pakistan and India. Flavorings such as fruits, flowers, and new shoots are also employed. Bitter gourd is a vegetable that grows all over the world. One of the foods with anti-diabetic properties is bitter gourd. It includes anti-diabetic compounds including charantin, vicine, and polypeptide-p, as well as non-specific bioactive components like antioxidants. Another study discovered that bitter gourd may aid in the regeneration or recovery of beta cells (6).

When administered orally as a single dosage, the bitter gourd fruit has been proven in most trials to decrease blood glucose levels. Fresh bitter gourd juice was found to dramatically lower plasma glucose concentrations and improve the response to an oral glucose load in diabetic individuals. Bitter gourd juice formulations have been shown to be more efficient than the dry fruit products in reducing blood sugar and HbAa-c levels (7). The presence of viable beta -cells (i.e., those capable of generating insulin) appears to be required for bitter gourd's hypoglycemic action, according to study. Ethanolic plant extracts, fresh fruit extracts, and acetone extracts of whole fruit powder all had further glucose-lowering benefits. Bitter gourd, on the other hand, has the potential to become a diet or dietary supplement for diabetic and prediabetic individuals (8).

2) Eggplant

Common name is Eggplant and scientific name is *Solanum melongena*. Widespread plant found in Asian and Middle Eastern nations(9). Eggplant is a member of the Solanaceae family. Eggplant is divided into three varieties based on the shape of the fruit: egg-shaped, long slender shape, and dwarf types. It's also known as aubergine, and it's high in fiber, minerals, and vitamins (10).

Several illnesses, including asthma, bronchitis, diabetes, arthritis, and hypercholesterolemia, have been treated with eggplant (11). Eggplant may offer anti-hyperlipidemia and anti-obesity properties. According to this research, eggplant can help to manage diabetes by having anti-oxidant characteristics and inhibiting the activities of -amylase and -glucosidase (12)**.**

Several natural substances, such as eggplant , has been shown to benefit the health of diabetic patients (13). The effects of a methanol extract of African eggplant leaves (100, 200, and 300 mg/kg, orally for 20 days) on alloxan-induced diabetes in rats were examined in research. In diabetic rats, eggplant was found to decrease excessive blood glucose levels (14).

3) Lady's finger

Abelmoschus esculentus is the scientific name for lady's finger. In English, it's called a lady's finger, while in Urdu, it's called a Bindi. It's mostly grown in tropical, subtropical, and warm temperate climates. It features a greenish capsule with a length of 10–30 cm and a diameter of approximately 1–4 cm, a six-chambered fibrous pod containing seeds and mucilage, and a diameter of about 1–4 cm. Several researches have shown that lady's finger and its oligosaccharide have anti-diabetic effects, although the mechanism is unknown (15). Bhindi aids in the management of diabetes and also aids in weight loss. Pectin, a soluble

International Journal of Engineering Applied Sciences and Technology, 2021
Vol. 6, Issue 6, ISSN No. 2455-2143, Pages 31-35
Published Online October 2021 in IJEAST (http://www.ijeast.com)

fiber found in lady's finger, aids in cholesterol reduction and thus helps to avoid heart disease (16).

Animal research and in vitro investigations have shown that *Abelmoschus esculentus* has anti-diabetic properties. This vegetable is also well-known for its high antioxidant content (17). It has also been shown that dried ladies finger extract inhibits -amylase and -glucosidase, as well as the influence of mucilage in pods on sugar levels (18). The additional antioxidant chemicals found in ladies' finger that protect the -cell from oxidative stress-induced histopathological damage Ladies finger is a unique beneficial tool for the treatment of diabetes mellitus in a more natural friendly approach due to its high concentration of polysaccharide, which delays glucose absorption(19).

4) Ginger

Ginger is the English name for this plant. In Urdu, it's called Adrak. *Zingiber officinale* is its scientific name. It is native to Southeast Asia and is grown there. Ginger is still present in virtually every meal (20). Almost all Asian nations utilize it as a natural medication. Ginger includes a variety of bioactive compounds, including gingerols, shogaols, zingerone, and paradol (21).

It has been proven to have anti-inflammatory, antidiabetic, anticlotting, and analgesic effects, and it has long been used as an herbal medication to treat a variety of symptoms including vomiting, pain, and cold symptoms (22). Ginger powder's impact on the management of hyperglycemia in Type 2 diabetic individuals Supplementing with ginger significantly reduced fasting blood glucose and HbA1c levels, but had no effect on fasting blood insulin levels (23).

5) Broccoli

Broccoli is its common name. *Brassica oleracea* is its scientific name. It is a member of the Brassicaceae family. Broccoli is a short-lived annual that tends to be 60-90 cm tall. They are endemic to Asia Minor and the eastern Mediterranean**.** Broccoli is one of the few vegetables that has been claimed to have anti-diabetic properties and is widely consumed in India (24). In both experimental animals and people, *Brassica oleracea* has been found to have a hypoglycemic effect (25). Broccoli sprouts have been shown to improve insulin resistance and reduce problems in type 2 diabetics.

Broccoli is high in flavonoids, which have anti-inflammatory and antioxidant properties and help to prevent diabetes. Flavonoids have been linked to a lower risk of developing diabetes(26). In hyperglycemic and oxidative circumstances, sulforaphane has the ability to activate certain peroxisome proliferators-activated receptors, which contribute to glucose homeostasis. Sulforaphane is a great alternative for type 2 diabetic supplementation (27).

6) Spinach

Spinach (*Spinacia oleracea L.*) is a leafy green vegetable that originated in southern Asia and is now produced in almost every country(28). Spinach leaves, which are wide and smooth and approximately ten inches long, are a strong source of folic acid, especially when fresh. Spinach leaves are also high in antioxidant vitamins C and E (29) .

A phytochemical study of methanolic extract of plant material extract was carried out. The result showed that Alkaloid, saponin, and tannin kinds of chemicals were found in *Spinacia oleracea L.* Spinach methanolic extract had no antioxidant effect but excellent anti-diabetic effects (30).

Table No :2 pH Nature of selected vegetables

Sr No	Name of selected	Acidic Ph	Alkaline Ph
1	Bitter ground	Acidic	
2	Eggplant	Acidic	
3	Ladyfinger	Slightly acidic	
4	Ginger	Mildly acidic	Mildly alkaline
5	Broccoli	Acidic	
6	Spinach	Acidic	

IV. CONCLUSION

According to a study conducted in Pakistan, various medicinal vegetables are utilized by people to treat diabetes. In Pakistan, several medicinal properties containing vegetables are widely available. Hypoglycemic medications, which can be used to treat diabetes. In our research, we discovered that different components of vegetables can be used to treat various ailments**.** Because of their chemical qualities, certain vegetables have the same antidiabetic effect as humans. Only a few vegetables have been thoroughly examined. However, more pharmacological and biological research is needed. Clinical toxicology investigations are still ongoing. It was necessary to confirm the vegetables ' potential.

V. REFERENCES

1. Jantan, I. (2004). Medicinal plant research in Malaysia: scientific interests and advances. Jurnal Sains Kesihatan Malaysia (Malaysian Journal of Health Sciences), 2(2).
2. Tsabang, N., Ngah, N., Estella, F. T., and Agbor, G. A. (2016). Herbal medicine and treatment of diabetes in Africa: Case study in Cameroon. Diabetes Case Rep, 1(112), 2.
3. Kook, S., Kim, G. H., and Choi, K. (2009). The antidiabetic effect of onion and garlic in experimental diabetic rats: meta-analysis. Journal of medicinal food, 12(3), 552-560.
4. Abdelrazek, H., Kilany, O. E., Muhammad, M. A., Tag, H. M., and Abdelazim, A. M. (2018). Black seed thymoquinone improved insulin secretion, hepatic glycogen storage, and oxidative stress in streptozotocin-induced diabetic male wistar rats. Oxidative medicine and cellular longevity, 2018.
5. Sekar, M., Zulhilmi, M., Hamdi, A. Y., Nabila, N., Zahida, Z., and Shafiq, M. (2014). Ten commonly available medicinal plants in Malaysia used for the treatment of diabetes-a review. Asian J Pharm Clin Res, 7(1), 1-5.
6. Cummings, E., Hundal, H. S., Wackerhage, H., Hope, M., Belle, M., Adeghate, E., and Singh, J. (2004). Momordica charantia fruit juice stimulates glucose and amino acid uptakes in L6 myotubes. Molecular and cellular biochemistry, 261(1), 99-104.
7. Basch, E., Gabardi, S., and Ulbricht, C. (2003). Bitter melon (Momordica charantia): a review of efficacy and safety. American Journal of Health-System Pharmacy, 60(4), 356-359.
8. Krawinkel, M. B., and Keding, G. B. (2006). Bitter gourd (Momordica charantia): a dietary approach to hyperglycemia. Nutrition reviews, 64(7), 331-337.
9. Cericola, F., Portis, E., Toppino, L., Barchi, L., Acciarri, N., Ciriaci, T., and Lanteri, S. (2013). The population structure and diversity of eggplant from Asia and the Mediterranean Basin. PloS one, 8(9), e73702.
10. Daunay, M. C. (2008). Eggplant. In Vegetables II (pp. 163-220). Springer, New York, NY.
11. Mahdian, D., Abbaszadeh-Goudarzi, K., Raoofi, A., Dadashizadeh, G., Abroudi, M., Zarepour, E., and Hosseinzadeh, H. (2020). Effect of Boswellia species on the metabolic syndrome: A review. Iranian Journal of Basic Medical Sciences, 23(11), 1374.
12. Cohrs, C. M., Panzer, J. K., Drotar, D. M., Enos, S. J., Kipke, N., Chen, C., and Speier, S. (2020). Dysfunction of persisting β cells is a key feature of early type 2 diabetes pathogenesis. Cell reports, 31(1), 107469.
13. Wang, W., Liu, S., Qiu, Z., He, M., Wang, L., Li, Y., and Huang, W. (2020). Choroidal thickness in diabetes and diabetic retinopathy: a swept source OCT study. Investigative ophthalmology & visual science, 61(4), 29-29.
14. Sanati, S., Razavi, B. M., and Hosseinzadeh, H. (2018). A review of the effects of Capsicum annuum L. and its constituent, capsaicin, in metabolic syndrome. Iranian journal of basic medical sciences, 21(5), 439.
15. Basharat, S., Junaid, A., Masood, I., Azhar, N., Imran, S., Basit, A. A., and Saleem, M. (2021). Beneficial effects of okra in diabetes mellitus. Asian Journal of Allied Health Sciences (AJAHS), 67-77.
16. Ali, A., Murad, S., Aslam, H., and Niaz, K. (2018). Effects of ladyfingers on blood lipids and blood glucose. Медицинский журнал Западного Казахстана, (1 (57)).
17. Junv, R., Elthry, T., Tomoda, M., Shimizu, N., Gonda, R., Kanari, M., ... and Hikino, H. (2012). Anticomplementary and hypoglycemic activity of okra. MJFU, 8(4), 89-87.
18. Soghaat, R. E., Sutra, V. F., Sawji, D. S., and Urla Yu, P. R. (2015). Antioxident effects of ladyfinger. LTRU, 8(4), 55-9.
19. Fulturru, T., and Tandon, V. (2016). Antidiabetic activity of Ladyfingers. IJHS, 7(8), 77-9.
20. Islam, M. S., and Choi, H. (2008). Comparative effects of dietary ginger (Zingiber officinale) and garlic (Allium sativum) investigated in a type 2

diabetes model of rats. Journal of medicinal food, 11(1), 152-159.
21. Daily, J. W., Yang, M., Kim, D. S., and Park, S. (2015). Efficacy of ginger for treating Type 2 diabetes: A systematic review and meta-analysis of randomized clinical trials. Journal of Ethnic Foods, 2(1), 36-43.
22. Li, Y., Tran, V. H., Duke, C. C., and Roufogalis, B. D. (2012). Preventive and protective properties of Zingiber officinale (ginger) in diabetes mellitus, diabetic complications, and associated lipid and other metabolic disorders: a brief review. Evidence-Based Complementary and Alternative Medicine, 2012.
23. Shalaby, M. A., and Hamowieh, A. R. (2010). Safety and efficacy of Zingiber officinale roots on fertility of male diabetic rats. Food and chemical toxicology, 48(10), 2920-2924.
24. Ravikumar, C. (2015). Therapeutic potential of Brassica oleracea (broccoli)–A review. Int J Drug Dev Res, 7, 009-010.
25. Platel, K., and Srinivasan, K. (1997). Plant foods in the management of diabetes mellitus: vegetables as potential hypoglycaemic agents. Food/Nahrung, 41(2), 68-74.
26. Nettleton, J. A., Harnack, L. J., Scrafford, C. G., Mink, P. J., Barraj, L. M., and Jacobs Jr, D. R. (2006). Dietary flavonoids and flavonoid-rich foods are not associated with risk of type 2 diabetes in postmenopausal women. The Journal of nutrition, 136(12), 3039-3045.
27. Bahadoran, Z., Mirmiran, P., and Azizi, F. (2013). Potential efficacy of broccoli sprouts as a unique supplement for management of type 2 diabetes and its complications. Journal of medicinal food, 16(5), 375-382.
28. Morelock, T. E., and Correll, J. C. (2008). Spinach. In Vegetables I (pp. 189-218). Springer, New York, NY.
29. Shaheen, S. M. (2017). Phytochemical profiling and evaluation of antioxidant and antidiabetic activity of methanol extract of spinach (Spinacia oleracea L.) leaves. Int J Pharm Sci Scient Res, 3, 8-24.
30. Wild, S., Roglic, G., Green, A., Sicree, R., and King, H. (2004). Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. Diabetes care, 27(5), 1047-1053.