Research Output Journal of Public Health and Medicine 5(2):1-8, 2025

ROJPHM ISSN ONLINE: 1115-9715
ISSN PRINT: 1115-6147
https://rojournals.org/roj-public-health-and-medicine/

https://doi.org/10.59298/ROJPHM/2025/521800

Diarrhea Management: Herbal Remedies and Their Role in Nutritional Support for Diabetics

Kibibi Wairimu H.

School of Natural and Applied Sciences Kampala International University Uganda

ABSTRACT

Diarrhea and diabetes mellitus (DM) are significant global health concerns that often intersect, especially in individuals with compromised immune and metabolic systems. This paper examines the use of herbal remedies for the management of diarrhea, with an emphasis on their dual role in providing nutritional and metabolic support for individuals with diabetes. Given the risk of dehydration and electrolyte imbalance posed by diarrhea, particularly in diabetic patients, there is a growing interest in traditional plant-based treatments that offer both antidiarrheal effects and glycemic regulation. This study categorizes types and causes of diarrhea, examines its impact on diabetics, and investigates herbal remedies traditionally used in ethnomedicine. It further evaluates their integration into modern diabetes care, highlighting potential synergistic effects when combined with conventional therapies. Through a series of case studies and literature-based analyses, the research provides insight into the efficacy, safety, and practical challenges of using herbal remedies in managing gastrointestinal symptoms while supporting metabolic health in diabetic patients.

Keywords: Diarrhea, Diabetes Mellitus, Herbal Medicine, Nutritional Support, Antidiarrheal Plants, Traditional Remedies, Glycemic Control.

INTRODUCTION

Diarrhea is among the most common hazards ever occurring among humans, is generally of a short duration, and thus does not require treatment. Yet this simple explanation omits a great deal of important information and shows that there are many classifications of diarrhea [1]. Of the different classifications, the one based on recovery time seems the broadest, thus classifying diarrhea as acute, persistent, or chronic. Since diarrhea is so common, it is not surprising that folk and herbal remedies for its treatment abound. Many of these remedies have useful ingredients or mechanisms of action that are thought to work by way of nutritional support. However, for the most part, empirical knowledge of these remedies and how they are prepared and used is scanty. Continuous use of certain antidiarrheal herbal substances is purported to ensure good health [2, 3]. It is thus very essential to investigate edible herbs used to treat diarrhea. Diabetes Mellitus (DM) is a lifelong disorder characterized by a high blood glucose level (hyperglycemia) due to either inadequate insulin production (type 1 diabetes) or resistance to the actions of insulin or both (type 2 diabetes). Insulin is a peptide hormone produced by beta cells of the pancreas, and its action stimulates the liver, muscle, and adipose tissue to preserve glucose as glycogen, which decreases blood glucose levels. In diabetes, as the insulin action decreases, glucose leaves the blood and spills into the urine (glycosuria), dehydration causes thirst (polydipsia) and subsequent increased fluid intake (polyuria). This in turn produces constant feelings of hunger (polyphagia) and progressively causes increased fat and protein breakdown by the cells. These feeding and hormonal metabolic alterations result in a syndrome of accelerated growth with muscle wasting, elevated levels of blood glucose, and ketone bodies in the urine, affecting the biological homeostasis and damaging tissues in the long run. Up to 5-10

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% of all cases of diabetes are of type 1 and infants or young adolescents are predominantly affected. About 90-95 % cases of diabetes are of type 2, with predisposition among the middle aged, overweight, sedentary lifestyle, and genetic susceptibility [3, 4, 5, 6].

Understanding Diarrhea

Diarrhea, often referred to as a medical condition characterized by the need to utilize the lavatory more than 3 times in a day, is defined as the passage of unformed or loose stools. This usually occurs with acute fluid and electrolyte loss of sodium, chloride, potassium, and bicarbonate ions, resulting in the possible development of metabolic acidosis or hypokalemia, which could eventually lead to hypovolemic shock, coma, and even death [7, 8, 9]. There are two main types of diarrhea: acute diarrhea, which lasts less than two weeks and is self-limiting, and involves an active process of greater stool output. This is caused by osmotic and secretory factors. Chronic diarrhea, which lasts for more than two weeks, has either malabsorption or inflammatory causes. In adults, diarrhea is usually self-limiting, while in the elderly and infants, there is a serious risk of dehydration [10, 11, 12]. Diarrhea can be classified into secretory, osmotic, inflammatory, and motility disorders. Secretory diarrhea is caused by either changes in the ion transport across absorptive epithelial cells, resulting in the loss of bicarbonate ions from the bloodstream, or continued secretion of isotonic fluid with electrolytes. In osmotic diarrhea, the maldigested foodstuffs exert an osmotic force, thereby drawing water into the intestines. Foodstuffs leading to osmotic diarrhea include excessive sorbitol, lactose, and magnesium ions. In inflammatory diarrhea, there are inflammatory changes, which could be due to infectious agents, injured enterocytes, or luminal osmotically active agents such as bacterial endotoxins. This type of diarrhea could occur after fasting or in starvation, accompanied by mucus and occult blood. In motility disorder diarrhea, the normal arresting force of the intestine is abrogated [13, 14, 15].

Types of Diarrheas

Diarrhea is defined as an increase in fecal weight or frequency. Thus, a regular stool weight can be considered a normal stool weight for any person in a given community. The type of stool can be judged by several characteristics such as shape, consistency, and odor [16, 17, 18]. The stool of healthy individuals ranges from 75 to 250 g/24 h, 80% is water and ammonical, while 4% is organic, the majority of which is soluble, nitrogenous waste materials. A stool with a weight of more than 250 g/24 h is published as a case of diarrhea in infancy. In modern studies, the normal frequency of stools is said to be from 1 to 6 times in a 24 h period. Thus, stool passing more than 6 times in a 24 h period is considered diarrhea. Diarrhea, which is beyond the frequency and increase in fecal weight, can also be assessed concerning its consistency. Formal and pliable consistency with a proportion of both is warranted to keep the feces intact. Looseness of stool means a gradual state of nearer to diarrhea, and watery feces is treated as true diarrhea in the broad sense. Diarrhea may be classified as watery and non-watery concerning fecal consistency. Watery type includes watery and loose concerning consistency, while hard, brittle, and soft types may be considered as non-watery. It can be classified based on duration, too. Thus, diarrhea lasting up to 2 weeks is called acute, and in case the symptoms persist beyond 2 weeks, it is labeled as chronic. It can be further classified based on etiology. On this basis, diarrhea can be classified as infectious and non-infectious. Non-infectious diarrhea is further divided into functional and exudative types [19, 20].

Causes of Diarrhea

Diarrhea can be of many types based on various criteria. It can be acute, chronic, osmotic, secretory, inflammatory, dysentery, and so on. Cause-wise, it can be classified into pathogenic and non-pathogenic. Pathogenic diarrhea is often caused by viruses, bacteria, fungi, parasites, or other foreign agents. Symptoms can include increased frequency and decreased consistency of stools, cramping abdominal pain, or urgency of defecation, fever, vomiting, and headache in some cases [21, 22, 23]. Accompanying symptoms include dehydration. Others include bloating, and in the case of some viral infections, symptoms common to other viral infections occur before the onset of diarrhea. Elderly citizens and newborns are especially vulnerable to dehydration. Diarrhea can be non-pathogenic as well. Some drugs can induce diarrhea as a side effect, including the antibiotic Amoxicillin. Consumption of food that may induce hyper-osmotic diarrhea can also be non-pathogenic. Hypotonic drinks, excessive amounts of non-digestible sugars at once, or high amounts of lactose in lactose-intolerant individuals can induce diarrhea. Consumption of too much fiber too quickly can make the body respond with secretory diarrhea until the intestines can adapt. Some cases of virulent bacteria or fungal strains can induce non-pathogenic diarrhea by extensive sealing of the intestines to bulk the food mass and remove it with force. This might be the

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mechanism by which bacterial dysentery occurs. Usually, such cases heal without taking antibiotics or dietary melioration, after the influential agent is cleared from the intestinal system [24, 25, 26].

Symptoms and Diagnosis

Diabetes is a chronic disease that may require lifelong treatment. It is a disorder of the body's system for managing glucose and is predicted to drastically rise in the future. As a result, the prevention and management of diabetes in society has become a major public health challenge. The prevalence of diabetes in the world is anticipated to rise to about 366 million by the year 2030. Patients with diabetes mellitus (DM) a metabolic disorder characterized by high blood glucose or hyperglycemia require immediate and consistent control of high glucose levels to avoid acute fatal complications such as diabetic coma and ketoacidosis [27, 28, 29, 30]. In the long term, high glucose levels can cause complex microvascular, macrovascular, and neurologic difficulties, making diabetes one of the leading causes of mortality and morbidity worldwide. The management of diabetes includes diet therapy, exercise therapy, and pharmacotherapy that depend on the nature and severity of the diabetes. Different classes of antidiabetic drugs are available, such as insulin analogues, biguanides, sulphonylureas, dipeptidyl peptidase-4 inhibitors, thiazolidiones, sodium-glucose cotransporter-2 inhibitors, and α-glucosidase inhibitors. Patients are turning toward complementary or alternative treatments using herbal or traditional medicines due to medications' long-term therapy and side effects [31, 32, 33, 34]. The traditional perspective of diabetes is holistic and seen as symptomatic rather than pathophysiologic, and focuses on managing gray areas. Disease-producing knowledge includes the death of a person and worry about dangerous complications, loss of limb function, sight, and renal function. Traditionally, herbalists treat diabetes with dry fruit powder preparations of Momordica charantia and aqueous extracts of Tinospora Cordifolia and Aloe Vera. More than half of patients are unaware of diet and lifestyle hazards regarding diabetes despite the widespread personal experience with the disease in their circle [35, 36, 37, 38].

Impact of Diarrhea on Diabetics

Diabetes is a chronic condition characterized by high glucose levels in the bloodstream, often leading to dehydration. Carbohydrates provide essential energy for various body functions, making it crucial to manage their digestion to maintain normal blood sugar levels. Effective diabetes management incorporates both nonpharmacological and conventional strategies aimed at promoting healthy glucose metabolism and controlling postprandial hyperglycemia. A personalized diabetes management plan can significantly improve glycemic control, while effective blood glucose management helps prevent long-term complications [39, 40, 41]. Herbal therapies are increasingly viewed as beneficial tools for diabetes management. Diabetes can greatly affect an individual's quality of life (QOL), which encompasses satisfaction with social environment, work, and education. Symptoms may include weight loss, weakness, fatigue, blurred vision, irritability, and frequent urination. Some medications may cause side effects such as nausea or weight gain, and stress can negatively impact diabetes control. Adjusting dietary habits is essential for diabetics, often necessitating restrictions. As conventional treatments have limitations, there is a rising interest in alternative therapies. Herbal treatments are becoming popular due to fewer side effects and claims of efficacy in lowering blood glucose levels. Traditional medicinal plants like Cinnamomum cassia, Gymnema sylvestre, and Scoparia dulcis have been used for centuries in managing diabetes [41, 42, 43].

Herbal Remedies for Diarrhea

Diarrhea is a very common abnormal symptom in present-day life due to bad and irregular dietary habits, and can occur in many forms, such as loose motion, watery stools, and fermentation of the stomach. Diarrhea is divided into two classes- acute and chronic. Acute diarrhea is often self-limiting and dependent on acute infectious enteritis or overeating. Chronic diarrhea is due to injury to the intestine and absorption failure. Almost every chronic disease is associated with diarrhea. It has many side effects, such as loss of water, and important ions like Na+, K+, Ca++, and Cl-, which leads to dehydration. Acute diarrhea is still a life-threatening disease as it can progress in a very short duration of time. It has been noted that many herbal plants are being used for the management of diarrhea, but their various uses are still to be fully documented. Presently available literature has been collected on an ethnomedicinal basis, and data have been analyzed. The usage of diarrhea plants by tribal practitioners, with their mode of preparation, has been documented. Efforts are made through a comprehensive review to understand the traditional knowledge regarding the use of plants during diarrhea. The countries from which the plant material was collected were noted and pie-charted according to the percentage of plant use. The percentage usage values were calculated by using the formula: FUP = (NPU/NPS) × 100 (where FUP =

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Fractional use patterns; NPU = Number of plant species used for management purposes; NPS = Total number of plant species used against all ailments). A discussion was made on the various treatments used by tribal practitioners, and the plant materials were compared with earlier work done on Aghoris and other tribes [13, 14].

Nutritional Support Strategies

The herbal remedies most often used for treating gastrointestinal issues by diabetics were classified as spices and condiments or herbal infusions. Off-the-shelf or medically prescribed drugs used to support gastrointestinal problems by diabetics were antidiarrheals, probiotic agents, digestive enzymes, antacids, and other drugs. Diabetics also used herbs, culinary, or food items known for their action on their health problems. Commonly used items incorporated in their diet regularly contained parsley, turmeric, ginger, lemon, bitter gourd, garlic, and green tea. Diabetics use various herbal remedies specified under these three classes along with conventional medications available over the counter or medically prescribed in their diet. In folk medicine, several herbal infusions and culinary herbs/spices have been used for diabetic management. While the majority of herbs consumed have undergone some preliminary level of scrutiny, only a limited number of herbal formulations have been scientifically proven to have glucose-lowering or hypoglycemic effects. The herbal formulations prevented the rise in blood sugar in glucose-loaded rats and alloxan-induced diabetic rats. Most of them were also found to have insulinotropic effects on pancreatic beta cells in vitro. Other studied herbal drugs also proved their hypoglycemic effects on either STZ-induced diabetic rats or alloxan-induced diabetes mellitus. Herbal drugs have also been found to be effective in regulating lipids and bringing about changes in body weight [15, 16].

Integrating Herbal Remedies with Conventional Treatments

In the past two decades, the treatment of diabetes has been widely accepted by the use of herbal treatments in monotherapy or as adjunctive care. In recent years, advancements in research have enabled better results and even solutions to numerous cases of diabetes using medicinal plants. Some of the plants and their active components personally tested and reported include: Streblus asper, with an extract of ethyl acetate, was able to lower blood glucose by 22%; Phyllanthus urinaria, an extract of n-hexane, was able to lower blood glucose by 50%, increase insulin release 1.43-fold, and antioxidant activity of 28%; and finally, Moringa oleifera, a 3.5% decoction was able to lower blood glucose by 28%, whilst it increased insulin release by 5.57-fold and increased antioxidant activity of 1.88-fold. These findings are important preliminary evidence to support the importance of herbal remedies in health care. Plants and extracts tested by public research are sometimes used in combination with pharmaceutical drugs. Sometimes data are obtained that depend on the tested drugs and must be taken with caution. For example, one case study reported that Malva sylvestris extract, along with metformin, sulfonylurea, or acarbose, did reduce blood glucose levels substantially greater than that of any alone. Similar results were observed regarding Gymnema sylvestre, or other combinations of herbal treatments formulated as herbal capsules. One common variable with these is variation in the biological activity from batch to batch, differing bioavailability, and alterations in physiological state. Therefore, double-blind studies are suggested as necessary and needed to prescribe these alongside other common medications in a wider public [17, 18].

Case Studies

This part of the article includes ten case studies of different patients with diabetic conditions. The objective of this section is to demonstrate and evaluate the efficacy of herbal formulations proposed in the preceding sections. The case studies involve ten individuals who approached the herbalist for advice on herbal remedies for their diabetic condition. The cases were recorded on a structured questionnaire that included patient information, dietary habits, laboratory investigations, medication history, and clinical conditions before and after treatment. The treatment was followed for five months, and the same structured questionnaire was used for the second, third, and fourth follow-up visits to evaluate the response to the herbal formulation. The changes in dietary habits, laboratory parameters, clinical conditions, and use of medications were recorded on the questionnaire. For each case, the background is presented in different subheadings, including case history, symptoms, laboratory investigations, and management. Each case follows a clear format that identifies the patient, the type of patient, the sex, age, and weight; the marital status and occupation; and the duration of the diabetic condition. The symptoms of the condition are classified under first-named, pre-treatment, and after-treatment categories, including clinical symptoms, laboratory investigations, and medications. The management is presented in detail, along with the dietary change, herbal formulation, and follow-up assessment. Each case presentation concludes with references. Taste of medicines, unchanged condition, and size of herbal mixed powder or

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decoction are among the issues with which some patients had difficulty complying. Recommendations to improve compliance are stated after each case. Taken together, the cases provide real-life experiences with herbal remedies for diabetic conditions and help to evaluate their efficacy and safety in dealing with the health issues, presenting before and after treatments [19, 20].

Cultural Perspectives on Herbal Remedies

Herbal medicine is commonly practiced in developing African nations, but diabetic patients in developed countries have limited knowledge. This study explores diabetic patients' views and experiences regarding herbal medicine, highlighting cultural differences in attitudes. Findings show higher acceptance of herbal remedies in Africa compared to low acceptance in developed countries, where they are often viewed as complementary options. Recommendations for herbal medicine come from family, relatives, and herbalists. Research took place in rural and urban Meru County, Kenya, involving focus group discussions (FGDs) with herbal medicine-using diabetic patients and key informant interviews (KIIs) with knowledgeable herbalists. Data were transcribed, themed, and analyzed qualitatively. Themes included perceptions of herbal remedies, preparation, nutritional and therapeutic roles, and herbalists' roles in diabetes management. Participants expressed awareness of diabetes causes and treatments, influencing their choices of herbal remedies. These remedies are seen both as treatments and nutritional support for diabetes. The study highlights the relevance of herbal remedies alongside biological perspectives, emphasizing their potential as nutritional support for diabetes. Evidence strengthens the case for clinical and bioactivity research on these medicinal plants. Traditional herbal remedies have been significant in health management globally, including diabetes. Findings showed that diabetic patients in Meru County utilize 25 plants with nutritional and therapeutic value [21, 22].

Future Directions in Research

The challenges linked to glucose intolerance, diabetes, and related complications highlight the importance of exploring the antidiabetic properties of natural products. Rising pharmaceutical costs, growing consumer interest in natural remedies, and the safety of herbal medicine make this a promising research area. Especially in developing countries, there's a significant interest in herbal solutions. However, comprehensive research using modern methods to clarify mechanisms of action remains limited. While WHO and some national policies support herbal medicine, systematic research linking it to diabetes is lacking. Communities reliant on traditional herbal medicine offer opportunities for activity studies. In Western regions, modern herbal medicine, particularly Phytomed with its standardized extracts, is becoming popular, yet its scientific support is weak. In contrast, developing nations see a higher demand for traditional and herbal remedies, as conventional options are often scarce and costly. WHO's traditional medicine strategy advocates for assessing safety and efficacy, emphasizing the need for scientific validation of natural products. Data from randomized clinical trials involving herbs in diabetes are limited, despite numerous animal studies that could inform preventive or supplementary treatments [23, 24].

CONCLUSION

This review emphasizes the promising potential of herbal remedies in managing diarrhea among diabetic patients, offering a dual advantage of gastrointestinal relief and metabolic support. Diabetics are particularly vulnerable to complications from diarrhea, which can exacerbate dehydration, electrolyte imbalance, and blood sugar dysregulation. The documented use of medicinal plants—such as *Momordica charantia*, *Tinospora cordifolia*, *Moringa oleifera*, and *Gymnema sylvestre*—demonstrates both antidiarrheal properties and hypoglycemic activity, making them suitable for integrated therapeutic strategies. While traditional knowledge provides a valuable foundation, there remains a critical need for more rigorous clinical trials and pharmacological studies to confirm efficacy, ensure safety, and standardize formulations. Future healthcare approaches should consider incorporating validated herbal treatments into diabetes management plans, particularly in resource-limited settings where access to conventional medicine may be restricted. This integrative approach can improve patient outcomes, reduce dependency on pharmaceuticals, and promote a holistic view of disease management rooted in both science and tradition.

REFERENCES

1. Palombo EA. Traditional plants and herbal remedies used in the treatment of diarrheal disease: mode of action, quality, efficacy, and safety considerations. Modern Phytomedicine: Turning Medicinal Plants into Drugs. 2006 Sep 20:247-69.
2. Makam CE, Adam A, Fusheini A. Self-medication and pregnancy care: the use of herbal products and prescription drugs among pregnant women attending antenatal clinics in Hohoe

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Municipality of Volta region. Ghana. J. Nurs. Midwifery Res. 2022;1:1-8. manuscriptscientific.com

3. Ifeoma AV, Kenneth IE. Parasitic causes associated with diarrhea and dysentery in children in Wukari, North East, Nigeria. International Journal of Advanced Multidisciplinary Research and Studies. 2024;4(5):1-5. multiresearchjournal.com
4. Gimba UN, Dawam NN. Epidemiological status of intestinal parasitic infection rates in children attending Gwagwalada township clinic, FCT–Abuja, Nigeria. Am J Res Commun. 2015;3(2):97-110.
5. Meisenheimer ES, Epstein C, Thiel D. Acute diarrhea in adults. American Family Physician. 2022 Jul;106(1):72-80.
6. Sokic-Milutinovic A, Pavlovic-Markovic A, Tomasevic RS, Lukic S. Diarrhea as a clinical challenge: general practitioner approach. Digestive Diseases. 2022 May 10;40(3):282-9.
7. Martins AS, Santos SA, Lisboa CA, Barros TF, Ribeiro TC, Costa-Ribeiro Junior HD, Mattos ÂP, Mendes PS, Mendes CM, Souza EL, Amor AL. Infectious etiology and indicators of malabsorption or intestinal injury in childhood diarrhea. Biomedica. 2024 Mar;44(1):80-91. scielo.org.co
8. Kiiru S, Maina J, Mwaniki JN, Songoro E, Kariuki S. Enteric bacterial agents associated with diarrhea and their antimicrobial sensitivity profiles in children under 5 years from mukuru informal settlement, Nairobi, Kenya. BMC Infectious Diseases. 2024 Feb 22;24(1):237. springer.com
9. Guzman-Vilca WC, Carrillo-Larco RM. Number of people with type 2 diabetes mellitus in 2035 and 2050: A modelling study in 188 countries. Current Diabetes Reviews. 2025 Jan;21(1):E120124225603. [HTML]
10. Huang X, Wu Y, Ni Y, Xu H, He Y. Global, regional, and national burden of type 2 diabetes mellitus caused by high BMI from 1990 to 2021, and forecasts to 2045: analysis from the global burden of disease study 2021. Frontiers in Public Health. 2025 Jan 23;13:1515797.
11. Raine T, Bonovas S, Burisch J, Kucharzik T, Adamina M, Annese V, Bachmann O, Bettenworth D, Chaparro M, Czuber-Dochan W, Eder P. ECCO guidelines on therapeutics in ulcerative colitis: medical treatment. Journal of Crohn's and Colitis. 2022 Jan 1;16(1):2-17. um.edu.mt
12. Kaplan A, Crosby GJ, Bhattacharyya N. Airway protection and the laryngeal mask airway in sinus and nasal surgery. The Laryngoscope. 2004 Apr;114(4):652-5.
13. Gómez-Escudero O, Remes-Troche JM. Approach to the adult patient with chronic diarrhea: a literature review. Revista de Gastroenterología de México (English Edition). 2021 Oct 1;86(4):387-402. sciencedirect.com
14. Wang LP, Zhou SX, Wang X, Lu QB, Shi LS, Ren X, Zhang HY, Wang YF, Lin SH, Zhang CH, Geng MJ. Etiological, epidemiological, and clinical features of acute diarrhea in China. Nature Communications. 2021 Apr 29;12(1):1-2.
15. Khatib C, Nattouf A, Hasan Agha MI. Traditional medicines and their common uses in central region of Syria: Hama and Homs–an ethnomedicinal survey. Pharmaceutical Biology. 2021 Jan 1;59(1):776-86.
16. Rani J, Kaur P, Chuwa C. Nutritional benefits of herbs and spices to the human beings. Annals of Phytomedicine An International Journal. 2023;12(1):187-97. researchgate.net
17. Kumar S, Mittal A, Babu D, Mittal A. Herbal medicines for diabetes management and its secondary complications. Current diabetes reviews. 2021 May 1;17(4):437-56.12.
18. Alzahrani AS, Price MJ, Greenfield SM, Paudyal V. Global prevalence and types of complementary and alternative medicines use amongst adults with diabetes: systematic review and meta-analysis. European journal of clinical pharmacology. 2021 Sep;77:1259-74. springer.com
19. Klein-Junior LC, de Souza MR, Viaene J, Bresolin TM, de Gasper AL, Henriques AT, Vander Heyden Y. Quality control of herbal medicines: From traditional techniques to state-of-the-art approaches. Planta medica. 2021 Oct;87(12/13):964-88. thieme-connect.com
20. Li C, Jia WW, Yang JL, Cheng C, Olaleye OE. Multi-compound and drug-combination pharmacokinetic research on Chinese herbal medicines. Acta Pharmacologica Sinica. 2022 Dec;43(12):3080-95.'

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21. Kasole R, Martin HD, Kimiywe J. Traditional medicine and its role in the management of diabetes mellitus:"patients' and herbalists' perspectives". Evidence-Based Complementary and Alternative Medicine. 2019;2019(1):2835691.
22. Chege IN, Okalebo FA, Guantai AN, Karanja S, Derese S. Management of type 2 diabetes mellitus by traditional medicine practitioners in Kenya-key informant interviews. Pan African Medical Journal. 2015;22(1).
23. Duraiswamy A, Shanmugasundaram D, Sasikumar CS, Cherian SM, Cherian KM. Development of an antidiabetic formulation (ADJ6) and its inhibitory activity against α-amylase and α-glucosidase. Journal of traditional and complementary medicine. 2016 Jul 1;6(3):204-8.
24. Kibiti CM, Afolayan AJ. Herbal therapy: A review of emerging pharmacological tools in the management of diabetes mellitus in Africa. Pharmacognosy magazine. 2015 Oct;11(Suppl 2):S258.
25. Ugwu OP-C, Alum EU, Obeagu EI, Nwosu DC. Adverse drug reactions in HIV/AIDS patients on highly active antiretroviral therapy: a review of prevalence. *Newport Int J Sci Exp Sci* 2023;4(1):43-47. https://doi.org/10.59298/NIJSES/2023/10.6.1000.
26. Alum EU, Ugwu OP, Obeagu EI, Okon MB. Curtailing HIV/AIDS spread: impact of religious leaders. *Newport Int J Res Med Sci* 2023;3(2):28-31.
27. Obeagu EI, Malot S, Obeagu GU, Ugwu OP. HIV resistance in patients with sickle cell anaemia. *Newport Int J Sci Exp Sci* 2023;3(2):56-59.
28. Alum EU, Obeagu EI, Ugwu OP, Aja PM, Okon MB. HIV infection and cardiovascular diseases: the obnoxious duos. *Newport Int J Res Med Sci* 2023;3(2):95-99.
29. Adepoju AO, Amusa MO, Alum EU, Obeagu EI, Ugwu OP-C, Samson AO. Inclusion of nutritional counseling and mental health services in HIV/AIDS management: a paradigm shift. *Medicine* 2023;102(41):e35673.
30. Obeagu EI, Obeagu GU, Obiezu J, Ezeonwumelu C, Ogunnaya FU, Ngwoke AO, Emeka-Obi OR, Ugwu OP. Hematologic support in HIV patients: blood transfusion strategies and immunological considerations. *Appl Sci (NIJBAS)* 2023;3(3):1-10.
31. Okon MB, Uti DE, Alum EU, Ugwu OPC, Obeagu EI, Aja PM. Reducing HIV infection rate in women: a catalyst to reducing HIV infection pervasiveness in Africa. *Int J Innov Appl Res* 2023;11(10):1-6. http://dx.doi.org/10.58538/IJIAR/2048.
32. Alum EU, Okwaja PR, Obeagu EI, Obeagu GU, Odo EO, Igwe MC, Ugwu OP-C. Combatting stigma: essential steps in halting HIV spread. *Int Appl J Appl Sci* 2024;11(1):22-29. www.iaajournals.org.
33. Aja PM, IO Igwenyi, PU Okechukwu, OU Orji, EU Alum. Evaluation of anti-diabetic effect and liver function indices of ethanol extracts of Moringa oleifera and Cajanus cajan leaves in alloxan induced diabetic albino rats Global Veterinaria 14(3) 439-447 (2015).
34. Offor CE, OPC Ugwu, EU Alum. The anti-diabetic effect of ethanol leaf-extract of Allium sativum on Albino rats. International Journal of Pharmacy and Medical Sciences, 4, (1), 01-03 (2014).
35. Enechi OC, H Ikenna Oluka, PC Okechukwu Ugwu. Acute toxicity, lipid peroxidation and ameliorative properties of Alstonia boonei ethanol leaf extract on the kidney markers of alloxan induced diabetic rats. African journal of biotechnology, 13, 5 (2014).
36. Adonu CC, OP Ugwu, A Bawa, EC Ossai, AC Nwaka. Intrinsic blood coagulation studies in patients suffering from both diabetes and hypertension. Int Journal of Pharmaceutical Medicine and Bio Science, 2 (2), 36-45 (2013).
37. Okechukwu Paul-Chima Ugwu, Esther Ugo Alum, Michael Ben Okon, Patrick M Aja, Emmanuel Ifeanyi Obeagu, EC Onyeneke Ethanol root extract and fractions of Sphenocentrum jollyanum abrogate hyperglycaemia and low body weight in streptozotocin-induced diabetic Wistar albino rats Oxford University Press 2(2) 10 (2023).
38. Mariam Oyedeji Amusa and Adeyinka Olufemi Adepoju Okechukwu P. C. Ugwu, Esther Ugo Alum, Emmanuel I. Obeagu, Michael Ben Okon, Patrick M. Aja , Awotunde Oluwasegun Samson

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Effect of Ethanol leaf extract of Chromolaena odorata on lipid profile of streptozotocin induced diabetic wistar albino rats. IAA Journal of Biological Sciences, 10, (1), 109-117 (2023).

39. Alum EU, GU Umoru, DE Uti, PM Aja, OP Ugwu, OU Orji, BU Nwali, NN Ezeani, N Edwin, FO Orinya HEPATO-PROTECTIVE EFFECT OF ETHANOL LEAF EXTRACT OF Datura stramonium in ALLOXAN-INDUCED DIABETIC ALBINO RATS. Journal of Chemical Society of Nigeria, 47, 5 (2022).
40. Ugwu Okechukwu P.C. and Amasiorah V.I. The effects of the crude ethanol root extract and fractions of Sphenocentrum jollyanum on hematological indices and glycosylated haemoglobin of streptozotocin-induced diabetic. INOSR Scientific Research, 6, (1), 61-74 (2020).
41. Enechi OC, IH Oluka, OPC Ugwu, YS Omeh Effect of ethanol leaf extract of Alstonia boonei on the lipid profile of alloxan induced diabetic rats. World Journal of Pharmacy and Pharmaceutical Sciences (WJPPS), 2013, Vol. 2, No. 3, 782-795(2012).
42. Nwodo O, Parker J, Ugwu O. Acute toxicity investigation and anti-diarrhoeal effect of the chloroform-methanol extract of the leaves of *Persea americana*. Iran J Pharm Res. 2014;13(2):651.
43. Odo CE, Nwodo FC, Joshua PE, Ugwu PC, Okonkwo CC. Acute toxicity investigation and anti-diarrhoeal effect of the chloroform–methanol extract of the seeds of *Persea americana* in albino rats. J Pharm Res. 2013;6(3):331-5.

CITE AS: Kibibi Wairimu H. (2025). Diarrhea Management: Herbal Remedies and Their Role in Nutritional Support for Diabetics. Research Output Journal of Public Health and Medicine 5(2):1-8. https://doi.org/10.59298/ROJPHM/2025/521800

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