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Taxonomic identification and documentation of polyherbal antidiabetic herbal formulations used by traditional herbalists in North Rift region, Kenya

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Abstract

Traditional herbalists in Kenya's North Rift region extensively use polyherbal formulations to manage diabetes mellitus, yet scientific documentation and taxonomic authentication of the constituent medicinal plant species remain limited. This study aimed to identify and document polyherbal antidiabetic formulations used by traditional herbalists in the North Rift region of Kenya. A cross-sectional ethnobotanical survey involving purposively selected experienced herbalists was conducted using semi-structured interviews, guided field walks, direct observation, and plant specimen collection. Collected specimens were authenticated through standard taxonomic procedures using morphological characters, herbarium reference collections, and international botanical databases, with voucher specimens deposited at the University of Eldoret Herbarium. Five commonly used polyherbal antidiabetic formulations comprising twenty-two medicinal plant species belonging to fourteen plant families were documented from Uasin Gishu, West Pokot, Timboroa, and Marakwet. Frequently recorded species included *Conyza schimperi*, *Conyza hypoleuca*, *Leonotis nepetifolia*, and *Croton macrostachyus*. Leaves, bark, roots, shoots, and tubers constituted the principal plant parts utilized in the formulations. Botanical authentication confirmed the identity of all documented species, reducing the risk of misidentification and adulteration. The study provides a scientifically validated inventory of indigenous antidiabetic medicinal plants that forms a valuable foundation for future phytochemical, pharmacological, quality assurance, conservation, and drug development research in Kenya.

Keywords: *Conyza schimperi*, Ethnobotany, Medicinal plants, Polyherbal formulations, Taxonomy

1. Introduction

Diabetes mellitus is one of the fastest-growing non-communicable diseases worldwide and remains a major public health concern due to its increasing prevalence, associated complications, and economic burden. The International Diabetes Federation estimated that approximately 537 million adults were living with diabetes in 2021, with the number expected to increase substantially over the coming decades [7]. The rapid rise in diabetes prevalence has been attributed to population ageing, urbanization, sedentary lifestyles, unhealthy dietary habits, obesity, and genetic predisposition. As the disease continues to expand globally, there is increasing interest in complementary and alternative medicine, particularly medicinal plants and polyherbal formulations, as affordable and accessible options for diabetes management [14, 20].

Globally, medicinal plants have played a significant role in primary healthcare for centuries, and approximately 80% of the world's population relies partly on traditional herbal medicine for the management of various diseases [20]. Emphasized that scientific documentation and taxonomic authentication of medicinal plants are fundamental requirements for ensuring the safety, efficacy, reproducibility, and quality of herbal medicines [5]. The study noted that proper botanical identification, voucher specimen preparation, and documentation provide the foundation for phytochemical, pharmacological, and clinical investigations. Similarly, [6] reported that integrating classical taxonomy with DNA-based identification techniques improves the accuracy of medicinal plant authentication and minimizes errors associated with species misidentification.

In Europe, considerable progress has been made in the taxonomic documentation and standardization of medicinal plants used in herbal formulations [6]. Observed that botanical authentication has become an essential quality assurance requirement in herbal medicine research because incorrect identification can compromise therapeutic efficacy and patient safety. Likewise, [19] reported that combining taxonomic identification with advanced phytochemical profiling has significantly improved the discovery of bioactive compounds and facilitated the development of standardized herbal products. These studies demonstrate that accurate taxonomic documentation is critical for supporting evidence-based utilization of medicinal plants.

In Asia, medicinal plant authentication has increasingly incorporated molecular and taxonomic approaches to improve the quality of herbal medicines [10]. Demonstrated that DNA barcoding provides reliable identification of medicinal plant species and reduces adulteration in commercial herbal products. Similarly [11], reported that proper taxonomic identification of medicinal plants forms the basis for phytochemical investigations and natural product drug discovery by ensuring that bioactive compounds are consistently associated with correctly identified species. These findings indicate that botanical authentication is indispensable for the scientific validation of traditional herbal formulations.

In the Middle East and North Africa, researchers have increasingly focused on documenting medicinal plants used in traditional healthcare systems [15]. Reported that taxonomic identification combined with phytochemical characterization provides reliable information for evaluating medicinal plant efficacy and safety. Similarly [3], found that several medicinal plants traditionally used for diabetes management contain flavonoids, phenolics, terpenoids, alkaloids, tannins, and saponins with demonstrated antioxidant and antidiabetic activities. The studies emphasized that accurate documentation of medicinal plant species is necessary for preserving traditional knowledge and supporting pharmaceutical development.

In Africa, traditional medicine continues to provide essential healthcare services, particularly in rural communities where access to conventional healthcare is limited [4]. Reported that African medicinal plants are widely used in the management of diabetes and other chronic diseases, yet many herbal formulations remain poorly documented and inadequately authenticated. The study recommended systematic taxonomic identification and documentation of medicinal plant species to improve the quality, safety, and conservation of indigenous medicinal knowledge. Similarly [13], observed that numerous African medicinal plants possess significant therapeutic potential, although many remain scientifically under-investigated due to inadequate botanical documentation and limited phytochemical characterization.

In East Africa, the use of polyherbal formulations for diabetes management has become increasingly common among traditional herbal practitioners [16]. Documented several medicinal plant species belonging to the family Asteraceae, including species of *Conyza*, that are traditionally used for treating diabetes and other ailments. The study reported that many of these species contain biologically active secondary metabolites but remain insufficiently characterized taxonomically and chemically [14]. Further noted that traditional herbal medicines continue to complement diabetes treatment in Kenya because they are affordable, culturally acceptable, and readily available, although scientific documentation and authentication of the medicinal plant species remain limited.

In Kenya, medicinal plants constitute an important component of traditional healthcare, with numerous herbalists utilizing polyherbal formulations for diabetes management. However, documentation of these formulations, including accurate botanical identification of constituent plant species, remains inadequate [17]. Reported that although several Kenyan medicinal plants have demonstrated promising antidiabetic properties, inconsistencies in taxonomic identification and insufficient voucher specimen documentation hinder reproducibility and scientific validation. Similarly [14], emphasized the need for comprehensive botanical authentication and documentation of medicinal plants used by traditional herbalists to facilitate phytochemical studies, pharmacological evaluation, conservation, and future drug development.

Despite the increasing utilization of polyherbal antidiabetic formulations, many studies have concentrated primarily on evaluating biological activities and phytochemical composition, with limited emphasis on comprehensive taxonomic identification and documentation of the medicinal plant species incorporated in these formulations. Furthermore, information on the diversity, botanical authentication, and documentation of polyherbal antidiabetic formulations used by traditional herbalists in Kenya's North Rift region remains scarce. Therefore, the current study sought to undertake the taxonomic identification and documentation of polyherbal antidiabetic herbal formulations used by traditional herbalists in the North Rift region of Kenya as a basis for preserving indigenous knowledge, supporting scientific validation, promoting quality assurance, and facilitating future phytochemical and pharmacological investigations.

2. Materials and Methods

2.1 Research design

The study adopted a cross-sectional ethnobotanical survey combined with laboratory-based taxonomic verification and botanical documentation. The design was considered appropriate because it enabled the collection of information on polyherbal antidiabetic formulations from traditional herbalists at a single point in time while allowing scientific authentication of the constituent medicinal plant species. The study integrated qualitative ethnobotanical approaches with quantitative botanical documentation to generate comprehensive information on medicinal plant identity, formulation composition, preparation methods, dosage, and conservation status. Laboratory procedures were undertaken to authenticate plant species and prepare voucher specimens for long-term herbarium preservation.

2.2 Study area

The study was conducted in the North Rift region of Kenya, which comprises Uasin Gishu, Elgeyo-Marakwet, Trans Nzoia, West Pokot, Turkana, Nandi, and Baringo Counties. The region experiences diverse ecological conditions ranging from highland forests and agricultural landscapes to semi-arid and arid ecosystems that support rich medicinal plant diversity. The area is inhabited by several indigenous communities, including the Kalenjin, Pokot, Turkana, and Marakwet, who possess extensive traditional knowledge regarding the use of medicinal plants for diabetes management. These ecological and cultural characteristics made the region suitable for documenting polyherbal antidiabetic formulations.

2.3 Study population

The study population consisted of registered and experienced traditional herbalists practicing within the North Rift region of Kenya. Herbalists who had actively treated diabetic patients for at least five years and were recognized by their communities or local traditional medicine associations were purposively selected. Key informants included practicing herbalists, community elders with indigenous medicinal knowledge, and experienced collectors of medicinal plants. Only herbalists who voluntarily consented to participate were included in the study.

2.4 Sampling procedure

Purposive sampling was employed to identify knowledgeable traditional herbalists with extensive experience in the preparation and administration of polyherbal antidiabetic formulations. Snowball sampling was subsequently used whereby interviewed herbalists identified other experienced practitioners within their localities. Recruitment continued until information saturation was achieved and no additional unique formulations were being reported. Each participating herbalist was interviewed individually to minimize information bias and ensure independent reporting of medicinal plant formulations.

2.5 Ethnobotanical data collection

Ethnobotanical information was collected using semi-structured questionnaires, key informant interviews, guided field walks, and direct observation. Interviews were conducted in local languages with assistance from trained interpreters where necessary. Information collected included local plant names and plant parts utilized of the medicinal plants.

Guided field excursions were conducted together with herbalists to locate medicinal plants in their natural habitats. Geographic coordinates of collection sites were recorded using a handheld Global Positioning System (GPS) receiver while digital photographs of whole plants and diagnostic morphological characteristics were taken to facilitate subsequent identification.

2.6 Collection of plant specimens

Representative specimens of every medicinal plant species reported in the documented polyherbal formulations were collected during guided field surveys. Healthy specimens bearing leaves, flowers, fruits, or other diagnostic reproductive structures were preferentially collected to facilitate accurate taxonomic identification. Multiple duplicate specimens were prepared for each collection. Collection information including collection date, locality, GPS coordinates, altitude, habitat description, vernacular name, collector's name, voucher number, and medicinal use was recorded in standardized field notebooks.

Fresh specimens were temporarily stored in ventilated plant presses lined with newspaper sheets and transported to the herbarium for processing. Plant materials intended for further laboratory studies were separately collected, placed in clean paper bags, properly labelled, and transported under appropriate conditions to minimize deterioration.

2.7 Preparation of voucher specimens

Collected specimens were carefully arranged in standard botanical presses between absorbent newspaper sheets and corrugated ventilators. The specimens were tightened using plant press straps and dried under continuous ventilation with regular replacement of damp newspapers until complete dehydration was achieved. After drying, specimens were mounted on standard herbarium sheets using archival-quality adhesive and linen tape.

Each herbarium sheet contained complete collection information including scientific name, family, vernacular name, voucher number, collection locality, GPS coordinates, habitat description, altitude, collector, collection date, and documented medicinal use. Voucher specimens were deposited in the University of Eldoret Herbarium, where duplicate specimens were retained for future scientific verification and reference.

2.8 Taxonomic identification of medicinal plants

Taxonomic identification of collected medicinal plants was undertaken using standard botanical procedures. Preliminary identification was performed in the field by experienced herbalists based on indigenous knowledge and vernacular nomenclature. Scientific identification was subsequently conducted through detailed examination of vegetative and reproductive morphological characters using standard taxonomic keys, regional floras, and authenticated herbarium reference specimens.

Diagnostic characters examined included leaf arrangement, leaf morphology, stem characteristics, inflorescence architecture, floral morphology, fruit type, seed morphology, and other distinguishing taxonomic features. Scientific names were verified according to currently accepted botanical nomenclature using internationally recognized taxonomic databases including the World Flora Online and Plants of the World Online. The identities of all specimens were confirmed by qualified plant taxonomists before voucher deposition.

2.9 Documentation of polyherbal formulations

Each polyherbal antidiabetic formulation was comprehensively documented following ethnopharmacological reporting standards. Information recorded included botanical identity of constituent species (local name), plant families, plant parts used in polyherbal antidiabetic herbal formulations by the traditional herbalists in the North Rift region, Kenya.

2.10 Botanical characterization

Each identified medicinal species was botanically characterized using standard taxonomic descriptors. Growth form, habitat preference, phenological stage, bark characteristics, leaf arrangement, leaf morphology, flower colour, fruit morphology, seed characteristics, and diagnostic field characters were recorded. Photographic documentation was undertaken for all medicinal species, including whole plant habit, leaves, stems, flowers, fruits, bark, and underground organs where applicable. Botanical descriptions were prepared using internationally accepted taxonomic terminology to facilitate future identification.

2.11 Quality assurance

To ensure accuracy of botanical identification, each specimen was independently verified by at least two experienced plant taxonomists. Herbarium specimens were compared with authenticated reference collections, while scientific names were cross-checked against current international taxonomic databases. Interviews were conducted using standardized questionnaires administered by trained researchers to minimize interviewer bias. Field observations were verified through repeated visits whenever inconsistencies in plant identity or medicinal use were observed.

2.12 Ethical considerations

Ethical approval for the study was obtained from the appropriate institutional ethics review committee before commencement of fieldwork. Research authorization was obtained from the National Commission for Science, Technology and Innovation (NACOSTI), while permission to conduct the study was granted by County Commissioners and County Governments within the North Rift region.

Prior informed consent was obtained from all participating herbalists before interviews and specimen collection. Participants were informed of the objectives of the study, voluntary nature of participation, confidentiality of information, and their right to withdraw from the study at any stage without penalty. Intellectual property rights relating to indigenous medicinal knowledge were respected throughout the research process, and all ethnobotanical information was handled confidentially in accordance with internationally accepted ethical guidelines for ethnobiological research.

2.13 Data analysis

Data on medicinal plants was summarized according to plant local names, families, botanical names, localities, and plant parts used in polyherbal antidiabetic herbal formulations by traditional herbalists.

3. Results

3.1 Identification of documentation of polyherbal antidiabetic herbal formulations used by traditional herbalists in North Rift region

The study sought to collect and identify *C. schimperi* used in antidiabetic herbal formulations. These included the plant local names, families, botanical names, localities, and plant parts used (Tables 1- 5).

3.1.1 Plant materials used in antidiabetic herbal formulation one

The formulation comprised of *Solanum mauritianum* (Solanaceae) (bark) from Uasin Gishu, *Conyza macrostachyus* (Euphorbiaceae) (bark) from Timboroa, and *Momordica foetida* (Cucurbitaceae) (leaves) from Uasin Gishu (Table 1).

Table 1: Plant species in antidiabetic formulation 1

S/N	Local Name	Family	Botanical Name	Locality	Part used
1	Singoruet	Solanaceae	*Solarium mauntianum*	Uasin Gishu	Bark
2	Cheptebes	Euphorbiaceae	*Croton macrostychus*	Timboroa	Bark
3	Chabesia	Cucumbataceae	*Momordica faetida*	Uasin Gishu	Leaves

3.1.2 Plant materials used in antidiabetic herbal formulation two

The documented plant species included Konochon (*Psiadia arabica*, family Asteraceae), Lokiriai (*Syzygium guineense*, family Myrtaceae), Aruruyol (*Osyris quadripartita*, family Santalaceae), and Tipospos (*Maesa lanceolata*, family Euphorbiaceae), all collected from West Pokot County, Kenya. The parts utilized comprised roots (*P. arabica*), bark (*S. guineense* and *O. quadripartita*), and bark/root (*M. lanceolata*) (Table 2).

Table 2: Plant species in antidiabetic formulation 2

S/N	Local Name	Family	Botanical Name	Locality	Part used
4	Konochon	Asteraceae	*Psiadia arabica*	West Pokot	Roots
5	Lokiriai	Myrtaceae	*Syzygium guineense*	West Pokot	Bark
6	Aruruyol	Santalaceae	*Osyris quadripartite*	West Pokot	Bark
7	Tipospos	Euphobiaceae	*Maesa lanceolata*	West Pokot	Bark/Root

3.1.3 Plant materials used in antidiabetic herbal formulation three

Plant species documented from Timboroa included *Conyza hypoleuca* (Compositeae; local name: Sergutiat, leaves), *Leonotis nepetifolia* (Lamiaceae; Chuchuniat, leaves), *Grewia similis* (Malvaceae; Siryat, roots/leaves), *Conyza schimperi* (Asteraceae; Ketungutiet, leaves/shoots), *Leucas calostachys* (Lamiaceae; N'gechebchat, leaves), and *Clutia abyssinica* (Peraceae; Turmanyat, leaves), all traditionally utilized in selected herbal formulations (Table 3).

Table 3: Plant species in antidiabetic formulation 3

S/N	Local Name	Family	Botanical Name	Locality	Part used
8	Sergutiat	Compositeae	*Conyza hypoleuca*	Timboroa	Leaves
9	Chuchuniat	Lamiaceae	*Leonotis nepetifolia*	Timboroa	Leaves
10	Siryat	Malvaceae	*Grewia similis*	Timboroa	Root/Leaves
11	Ketungutiet	Asteraceae	*Conyza schimperi*	Timboroa	Leaves/Shoot
12	N'gechebchat	Lamiaceae	*Leucus calostachys*	Timboroa	Leaves
13	Turmanyat	Perraceae	*Clutia abyssinica*	Timboroa	Leaves

3.1.4 Plant materials used in antidiabetic herbal formulation four

The medicinal plants included Chebilil (*Markhamia lutea*, family Bignoniaceae) collected from West Pokot (roots used); Sintar (*Leonotis nepetifolia*, family Lamiaceae) from Timboroa (leaves used); Kiboril (*Conyza hypoleuca*, family Compositae) from Timboroa (roots used); and Kusum (*Allophylus africanus*, family Sapindaceae) from Timboroa (roots used) (Table 4).

Table 4: Plant species in antidiabetic formulation 4

S/N	Local Name	Family	Botanical Name	Locality	Part used
14	Chebilil	Bignoniaceae	*Markhamia lutea*	West Pokot	Roots
15	Sintar	Lamiaceae	*Leonitis nepetifolia*	Timboroa	Leaves
16	Kiboril	Compositaea	*Conyza hypoleuca*	Timboroa	Roots
17	Kusum	Sapindaceace	*Allophylus africanus*	Timboroa	Roots

3.1.5 Plant materials used in antidiabetic herbal formulation five

The antidiabetic medicinal plants from Marakwet included *Toddolia asiatica* (Rutaceae), locally known as Ketemwet, with bark used; *Vernonia amygdalina* (Asteraceae), locally known as Mororuet, with roots used; *Croton macrostachyus* (Euphorbiaceae), locally known as Tebeswet, with bark used; *Rhoicissus tridentata* (Vitaceae), locally known as Torwet/Torotwet, with tubers used; and *Prunus africana* (Rosaceae), locally known as Tendwet, with bark used (Table 5).

Table 5: Plant species in antidiabetic formulation 5

S/N	Local Name	Family	Botanical Name	Locality	Part used
18	Ketemwet	Rutaceae	*Toddolia asiatica*	Marakwet	Bark
19	Mororuet	Asteraceae	*Vernonia amygdalina*	Marakwet	Root
20	Tebeswet	Euphorbiaceae	*Croton macrostachyus*	Marakwet	Bark
21	Torwet/torotwet	Vitaceae	*Rhoicissus tridentata*	Marakwet	Tuber
22	Tendwet	Rosaceae	*Prunus Africana*	Marakwet	Bark

4. Discussion

Taxonomic identification and documentation of *C. schimperi* plant species used in antidiabetic formulations

The documented plant materials used across the five selected antidiabetic herbal formulations reflect a broad ethnobotanical knowledge base that aligns with contemporary scientific evidence on plant-derived antidiabetic agents. For example, *Momordica foetida*, included in formulation one alongside *Solanum mauritianum* and *Croton macrostachyus*, represents a lineage of bitter melon species widely reported for hypoglycemic properties mediated through multiple mechanisms including enhanced glucose uptake, insulin mimetic action, and modulation of carbohydrate metabolism enzymes [1]. *C. schimperi*, used in formulations one and five, has also been documented in Kenyan ethnomedicine for management of diabetes and related ailments, with presence of bioactive phytochemicals such as phenolics and terpenoids that are commonly associated with glycemic control [14].

In formulation two, *Psiadia arabica* co-occurs with *Syzygium guineense, Osyris quadripartita*, and *Maesa lanceolata*. Although few studies have investigated *P. arabica's* antidiabetic properties specifically, recent GC-MS profiling of *P. arabica* has revealed a spectrum of bioactive constituents with reported metabolism-modulating activities, supporting its inclusion in metabolic-related traditional formulations [9]. *Syzygium guineense* is closely related to other *Syzygium* species that exhibit antidiabetic and antioxidant activities via enzyme inhibition and free radical scavenging [18], and phytochemical investigations underscore the presence of polyphenols and terpenoids that could contribute to glycemic regulation [12]. While *O. quadripartita* has stronger evidence for antimalarial efficacy, its rich catechin content suggests potential ancillary bioactivities relevant to oxidative stress and metabolic modulation [8].

Formulation three highlighted *C. schimperi* alongside plants such as *Conyza hypoleuca*, *Leonotis nepetifolia, Grewia similis, Leucas calostachys*, and *Clutia abyssinica*. The inclusion of *C. schimperi* is supported by recent Kenyan phytochemical reviews identifying multiple Asteraceae species with promising antidiabetic phytoconstituents (e.g., terpenoids and phenolics) that correlate with enzyme inhibitory and glucose modulatory effects [14]. Similarly, *Leonotis nepetifolia* and *Grewia* species have traditional and preliminary experimental support for glycemic lowering activity, partly attributable to their polyphenolic profiles.

In formulation four, *Markhamia lutea, Leonotis nepetifolia, Conyza hypoleuca*, and *Allophylus africanus* are presented. Although fewer explicit antidiabetic studies exist for *M. lutea* and *A. africanus*, the pattern of use in combination with known glycemic-modulating species reflects a polyherbal strategy consistent with contemporary research showing enhanced antidiabetic efficacy in multi-herb preparations due to synergistic phytochemical interactions [2].

Finally, formulation five's inclusion of *Toddalia asiatica*, *Vernonia amygdalina, Croton macrost[achyus, Rhoicissus tridentata*, and *Prunus africana* corresponds with multiple studies identifying these taxa as sources of secondary metabolites (e.g., alkaloids, terpenoids, flavonoids) implicated in antidiabetic mechanisms such as α-glucosidase inhibition, antioxidant activity, and insulin sensitization [14]. Collectively, these findings not only document the ethnopharmacological selection of plant species in the study area but also align with contemporary phytochemical and pharmacological evidence supporting their roles in diabetes management through diverse biological pathways.

5. Conclusion

The study successfully documented and taxonomically identified *Crassocephalum schimperi* and the associated medicinal plant species used in five traditional antidiabetic herbal formulations.

C. schimperi is a recurrent component of indigenous antidiabetic remedies, highlighting its ethnomedicinal significance in the management of diabetes mellitus. The documented formulations comprised diverse plant species belonging to different botanical families, reflecting extensive indigenous knowledge and the use of polyherbal therapies to achieve complementary therapeutic effects.

The majority of the identified plant species possess phytochemicals such as phenolics, flavonoids, terpenoids, alkaloids, tannins, and saponins, which have been associated with antidiabetic mechanisms including enhanced insulin secretion, improved glucose uptake, inhibition of carbohydrate-hydrolyzing enzymes, antioxidant activity, and modulation of glucose metabolism. The recurrence of *C. schimperi* in several formulations, together with scientific evidence supporting the bioactivity of companion species, provides a strong ethnopharmacological basis for its continued traditional use.

Traditional knowledge guiding the selection of *C. schimperi* and associated medicinal plants is largely supported by contemporary phytochemical and pharmacological evidence. Thus, there is need to conserve indigenous medicinal knowledge and biodiversity while providing a scientific foundation for future development of safe, effective, and affordable plant-based antidiabetic therapeutics.

6. Recommendations

- Comprehensive phytochemical investigations should be undertaken on *C. schimperi* to isolate, identify, and characterize the bioactive compounds responsible for its antidiabetic activity.
- Controlled in vitro, in vivo, and clinical studies should be conducted to validate the efficacy, safety, dosage, toxicity, and mechanisms of action of *C. schimperi* and the documented polyherbal formulations before their integration into complementary healthcare systems.
- Standardization of the documented herbal formulations should be pursued through the development of quality control protocols, including botanical authentication, phytochemical fingerprinting, and dosage standardization to ensure consistency, safety, and therapeutic effectiveness.
- Conservation strategies should be implemented to protect *C. schimperi* and other medicinal plant species used in antidiabetic formulations through sustainable harvesting practices, cultivation programmes, and habitat conservation to prevent overexploitation.
- Indigenous knowledge associated with the preparation and use of antidiabetic medicinal plants should be systematically documented and protected through collaborative initiatives involving local communities, researchers, and government institutions to preserve this valuable ethnobotanical heritage.
- Further studies should investigate possible synergistic interactions among the plant species within the documented polyherbal formulations to determine whether combined preparations provide greater antidiabetic efficacy than individual plant extracts.
- Collaboration between ethnobotanists, taxonomists, phytochemists, pharmacologists, and healthcare professionals should be strengthened to facilitate the translation of traditional medicinal knowledge into evidence-based phytomedicines for diabetes management.

7. Conflict of Interest

“The author(s) declare(s) that there is no conflict of interest.” There was no role of the funding sponsors in the design of the study; in the collection, analyses or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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References

1. Al Raish SM, Almasri RS, Bedir AS, Elkahwagy AA. Phytochemical composition, bioactive compounds, and antidiabetic potential of four medicinal plants native to the UAE: Capparis spinosa, Citrullus colocynthis, Morus alba, and Rhazya stricta. Biology. 2025;14(9):1146.
2. Bao M, Yang D, Qiburi Q, He M, Temuqile T, Baigude H. Antidiabetic effects of a polyherbal formulation of Nigella sativa, Origanum vulgare, and Malus asiatica in STZ-induced type 2 diabetic rats. J Funct Foods. 2025;135:107111.
3. Barhoumi LM, Shakya AK, Al-Fawares O, Al-Jaber HI. Conyza canadensis from Jordan: phytochemical profiling, antioxidant, and antimicrobial activity evaluation. Molecules. 2024;29(10):2403.
4. Chinsembu KC. Diabetes mellitus and nature’s pharmacy of putative antidiabetic plants. J Herb Med. 2019;15:100230.
5. Heinrich M, Appendino G, Efferth T, Fürst R, Izzo AA, Kayser O, et al. Best practice in research—overcoming common challenges in phytopharmacological research. J Ethnopharmacol. 2020;246:112230.

6. Hollingsworth PM, Li DZ, van der Bank M, Twyford AD. Telling plant species apart with DNA: from barcodes to genomes. Philos Trans R Soc Lond B Biol Sci. 2016;371(1702):20150338.
7. International Diabetes Federation (IDF). IDF Diabetes Atlas. 10th ed. IDF, 2021.
8. Kemal T, Feyisa K, Bisrat D, Asres K. In vivo antimalarial activity of the leaf extract of Osyris quadripartita Salzm. ex Decne and its major compound (-) catechin. J Trop Med. 2022;2022:3391216.
9. Kumosani TA, Alnefayee A, Barbour E, Qari M, Ahmed T, Moselhy SS. Identification of bioactive ingredients of traditional medicinal plants including Psiadia arabica Jaub. by GC-MS analysis. Pharmacogn Res. 2024;16(3):570-573.
10. Li X, Yang Y, Henry RJ, Rossetto M, Wang Y, Chen S. Plant DNA barcoding: from gene to genome. Biol Rev Camb Philos Soc. 2015;90(1):157-166.
11. Lodhi R, Mohanty PK. Traditional uses, phytochemistry and pharmacology of Croton bonplandianum—a review. Int J Ayurvedic Med. 2021;12(2):185-189.
12. Lulu M. Phytochemical investigation and isolation of chemical constituents from the root extract of Syzygium guineense in South Ethiopia. Anal Sci Adv. 2025;6(2):e70047.
13. Maroyi A. Ethnopharmacological uses, phytochemistry, and pharmacological properties of Croton macrostachyus Hochst. ex Delile: a comprehensive review. Evid Based Complement Alternat Med. 2017;2017:1694671.
14. Muema FW, Nanjala C, Oulo MA, Wangchuk P. Phytochemical content and antidiabetic properties of most commonly used antidiabetic medicinal plants of Kenya. Molecules. 2023;28(20):7202.
15. Mustafa I, Irfan S, Hussain G, Ijaz MU, Ullah MI, Nisar J, et al. Conyza bonariensis (L.) impact on carbohydrate metabolism and oxidative stress in a type 2 diabetic rat model. Bioinform Biol Insights. 2024;18:11779322241292239.
16. Opiyo SA. A review of chemical compounds and bioactivity of Conyza species. IOSR J Appl Chem. 2023;16(6):36-48.
17. Opiyo SA, Njoroge PW, Kuria KM. Chemical composition and biological activity of extracts from Conyza species. IOSR J Appl Chem. 2023;16(4):61-71.
18. Widodo A, Sulastri E, Ihwan I, Zubair MS. Antidiabetic activity, phytochemical analysis, and acute oral toxicity test of combined ethanolic extract of Syzygium polyanthum and Muntingia calabura leaves. Sci World J. 2024;2024:3607396.
19. Wolfender JL, Litaudon M, Touboul D, Queiroz EF. Innovative omics-based approaches for prioritisation and targeted isolation of natural products—new strategies for drug discovery. Nat Prod Rep. 2019;36(6):855-868.
20. World Health Organization (WHO). WHO Global Report on Traditional and Complementary Medicine 2019. WHO, 2019.