Vol. 19(5), pp. 46-51, September 2025
DOI: 10.5897/AJPP2025.5439
Article Number: 23AA4BA73678
ISSN 1996-0816
Copyright ©2025
Author(s) retain the copyright of this article
http://www.academicjournals.org/AJPP

ACADEMIC JOURNALS
expand your knowledge

African Journal of Pharmacy and Pharmacology

Full Length Research Paper

Ethnopharmacological study of an antidiabetic remedy used in traditional Ivorian medicine

Effo K. E.*, Odoh A. E., Essoh B., Amichia M., Adehouni Y. A., Silué G. A., Djadji A. T. L., Kouakou S. L., Irié-N'Guessan A. G. and Kouakou-Siransy N. G.

Department of Pharmaceutical Sciences, Faculty of Pharmaceutical and Biological Sciences, Félix Houphouët-Boigny University, Abidjan, Côte d'Ivoire.

Received 3 July, 2025; Accepted 28 August, 2025

Traditional medicine is becoming an increasingly popular therapeutic alternative. This study involved an ethnopharmacological investigation into two remedies, "Diabetes Free" and "Pancreas Free", which were combined by an Ivorian traditional practitioner for the treatment of diabetes. The traditional practitioner was interviewed. The study involved semi-structured interviews, which were based on a questionnaire that covered the composition of the remedies, their organoleptic characteristics, indications, methods of administration, dosage, and duration of treatment. In addition, a phytochemical study of the remedies was carried out. "Diabetes Free" is said to contain six plants, including *Allium sativum* (garlic) and *Cinnamomum verum* (cinnamon). "Pancreas Free" is said to contain four plants, including *Panax ginseng* (ginseng) and *Gymnema sylvestre* (gurmar). The remedies are available in the form of round white tablets with a smooth texture, no odor, and a bland taste for "Diabetes Free" and a salty taste for "Pancreas Free". "Diabetes Free" is said to have an antihyperglycaemic effect, and "Pancreas Free" is said to regulate pancreatic function. The dosage was based on blood sugar levels and the duration of treatment, which was three months for initial treatment and an additional three months for maintenance treatment. Clinical and biological monitoring were used to assess the effectiveness of the treatment. Phytochemical screening revealed the presence of sterols, polyterpenes, alkaloids, and saponins. The remedies "Diabetes Free" and "Pancreas Free" are improved traditional medicines. They are industrially produced. Dosages are prescribed by the traditional medicine practitioner according to biological and clinical monitoring.

Key words: Diabetes, plants, ethnopharmacology, traditional medicine.

INTRODUCTION

Diabetes is indeed a heterogeneous metabolic disorder characterized by chronic hyperglycemia, resulting from impaired insulin secretion, which can lead to long-term complications affecting both small and large blood vessels (Drouin et al., 1999). In just a few years, diabetes has become an epidemic that continues to grow beyond

*Corresponding author. E-mail: effoet@yahoo.fr; Tel: (+225) 07 07 19 24 76 / 01 01 41 42 63.

Author(s) agree that this article remain permanently open access under the terms of the Creative Commons Attribution License 4.0 International License

experts' predictions (World Health Organization [WHO], 2016). In low- and middle-income countries, the prevalence of diabetes has increased to a greater extent than in high-income countries. According to the International Diabetes Federation, an estimated 451 million people worldwide (aged 18 to 99) had diabetes in 2017. This figure is expected to reach 693 million by 2045 (Cho et al., 2018). In Côte d'Ivoire, the national diabetes prevalence rate in 2019 was estimated at 5.7% (Abodo et al., 2019). The disease requires lifelong treatment, good follow-up, and regular self-monitoring using either monotherapy or combination therapies. This management mainly involves drugs that can sometimes cause serious adverse effects, such as cardiovascular toxicity with glitazones and gliptins (Nguyen, 2016), severe weight loss with biguanides, and obesity due to insulin (Chaudhury et al., 2017). In this sense, traditional medicine becomes a potential alternative for low-income populations, as it uses natural, bioactive ingredients, mainly of plant origin, which are believed to be free of such effects. In fact, the WHO (2002) estimates that around 80% of people living in rural areas of developing countries rely on traditional medicine for healthcare. A herbal remedy developed by an Ivorian traditional practitioner is used by the Ivorian population. It is in this context that this study was conducted to carry out an ethnopharmacological investigation into this remedy.

MATERIALS AND METHODS

Survey and study location

This descriptive, cross-sectional study was conducted at the traditional medicine practitioner's office and at the Faculty of Pharmaceutical and Biological Sciences at Félix Houphouët-Boigny University in Abidjan.

Interview with the traditional medicine practitioner

The interviews were conducted between September and December 2023. It consisted of semi-structured interviews based on a questionnaire. The questionnaire covered the identification of the traditional practitioner and their practice, as well as information about the remedy (its composition, manufacturing method, and usage method), and treatment follow-up (timeframe and recovery criteria, and recovery assessment).

Study of the organoleptic characteristics of the remedy

These correspond to the characteristics of a powdered substance that can be perceived by the senses of taste, smell, and sight. For the taste test, a small amount of the remedy was placed on the tip of the tongue. The smell test consisted of directly sniffing the remedy, and the sight test consisted of simply observing the remedy.

Phytochemical screening of the remedy

This involved using qualitative methods to screen for chemical groups responsible for pharmacological activities. The following phytochemical groups were investigated: polyphenols (including flavonoids, catechins, and gallic tannins), alkaloids, quinonic substances, and saponins (Bekro et al., 2007; Macheix et al., 2005; Roux and Catier, 2007; Wagner and Bladt, 1996). To do this, 5 g of each tablet was ground in a mortar. The resulting powder was then dissolved in 50 mL of distilled water in a beaker. The aqueous extracts obtained were then used to test for the presence of plant secondary metabolites in the tablets through colouration and/or precipitation reactions. These characterization tests are limited to detection and are only informative (Bekro et al., 2007; Macheix et al., 2005; Roux and Catier, 2007; Wagner and Bladt, 1996). The results were classified as follows: Positive reaction (+) and negative reaction (−).

RESULTS

Practitioner

The traditional practitioner who promotes the antidiabetic remedy is a male from central Côte d'Ivoire. He works in a clinic called 'ONG Santé' (Health NGO), established in 2003, in the city of Grand-Bassam. The staff is composed of the traditional practitioner and a secretary. The clinic has a reception area and a consultation room. The practitioner claims that his knowledge was acquired through revelations.

Remedies

To treat diabetes, the traditional practitioner uses a combination of two tablets named “Diabetes Free” and “Pancreas Free”.

“Diabetes Free“ is a 250 ml white plastic bottle containing 500 tablets. For security reasons, the primary packaging does not have a label (Figure 1).

"Diabetes Free" is said to be composed of six plants, two of which were revealed to us by the traditional medicine practitioner. In fact, one tablet of the remedy contains: 160 mg of garlic (*Allium sativum*) and 130 mg of cinnamon (*Cinnamomum verum*) (Table 1). "Pancreas Free" is also available in a primary packaging in a 500 ml white plastic bottle containing 400 tablets. As mentioned earlier, the primary packaging does not have a label. (Figure 2).

"Pancreas Free" is made up of four plants, two of which were revealed by the traditional practitioner. Each tablet of this remedy contains 100 mg of ginseng root (*Panax ginseng*) and 150 mg of gurmar leaf (*Gymnema sylvestre*) (Table 2).

Organoleptic characteristics of tablets

"Diabetes Free" tablets are white, round, small,

Table 1. Partial composition of 'Pancreas free'.

Common name	Scientific name/family	Part used	Quantity (mg)
Garlic	*A. sativum* (Lilliaceae)	Pod	160
Cinnamon	*C. verum* (Lauraceae)	Bark	130

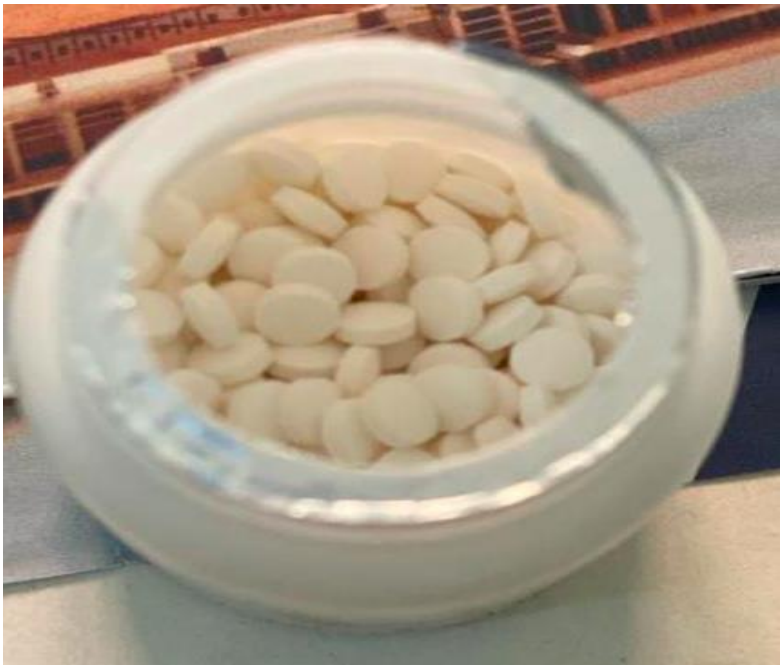

Figure 1. Tablets of " diabetes Free".

Figure 2. “Pancréas free” tablets.

Table 2. Partial composition of “Pancreas free”.

Common name	Scientific name/family	Part used	Quantity (mg)
Ginseng	*P. ginseng* (Araliaceae)	Root	100
Gurmar	*G. sylvestre (*Apocynaceae)	Leaf	150

Table 3. Dosage of “Diabetes Free” and “Pancreas Free”.

Blood sugar level (g/L)	“Diabetes Free”	“Pancreas Free”
1.26 to 1.60	2 tablets, twice a day	1 tablet, twice a day
1.60 and 2	2 tablets, twice a day	2 tablets, twice a day
Above 2	2 tablets 3 times a day	2 tablets 3 times a day

odourless, tasteless, and smooth in texture (Figure 1). The "Pancreas Free" tablets are white, round, medium-sized, odourless, salty in taste, and smooth in texture (Figure 2).

Method of preparation of remedies

According to the practitioner, “Diabetes Free” and “Pancreas Free” are manufactured by its partners in Hong Kong (China). They are imported in bulk and packaged at his office.

Use of remedies

According to information gathered from the traditional practitioner, treatment for diabetic patients is carried out in several stages. First, a medical examination of the patient is requested, including blood sugar, glycated haemoglobin, and other biochemical parameters that may reflect the patient's general health state (renal and liver function). Based on the blood sugar level, he adjusts the dosage of the two remedies shown in Table 3.

Treatment monitoring

Treatment monitoring is carried out in two main areas, which are clinical monitoring and biological monitoring.

Biological monitoring enables the traditional practitioner to adjust the dosage and manage the disease effectively. This involves measuring fasting blood sugar levels weekly for 3 months, while clinical monitoring consists of reporting any adverse effects observed by patients during treatment. The main adverse effects observed by patients were diarrhea at the start of treatment, polyphagia, and dizziness when maximum doses were administered.

Recovery assessment

After three months of treatment, another medical examination is carried out (blood sugar, glycated hemoglobin, kidney function, liver function). When the patient's glycated hemoglobin level is below 6.5%, they are declared cured according to the traditional practitioner.

In this case, the traditional practitioner prescribes maintenance treatment for the patient during the second trimester (“Diabetes Free” 1 tablet, twice a day, and “Pancreas Free” 1 tablet, twice a day). At the end of the second trimester, glycated hemoglobin, liver function, and kidney function are measured again. Normal results confirm the patient's recovery.

Phytochemical screening

The chemical groups that could be responsible for the pharmacological activity of the various remedies have been identified in the tablets. The results of the phytochemical screening revealed the presence of alkaloids in both “Diabetes Free“ and “Pancreas Free“. Sterols, polyterpenes, and saponins were present only in “Diabetes Free“, while polyphenols, flavonoids, tannins, and quinones were absent from both tablets (Table 4).

DISCUSSION

Despite advances in medical research, diabetes remains a major public health issue worldwide. Populations in sub-Saharan Africa, in particular, relied on traditional

Table 4. The phytochemical composition of 'Diabetes Free' and 'Pancreas Free'.

Samples	Secondary metabolites							
	Sterols and polyterpenes	Polyphenols	Flavonoids	Tannins		Quinones	Alkaloids	Saponins
				Cat	Gal			
"Diabetes-free"	+	-	-	-	-	-	+	+
"Pancreas free"	-	-	-	-	-	-	+	-

Positive reaction: + ; Negative reaction: -.

medicine. It is in this framework that this study was conducted with the aim of carrying out an ethnopharmacological investigation on an anti-diabetic remedy used in traditional Ivorian medicine. The interview with the traditional practitioner provided us with valuable information about his therapeutic practice in the management of diabetes. However, some limitations were noticed, which is the preparation method remains unknown, as the remedy is supplied to the traditional practitioner in finished form; only a partial composition of the remedies was provided.

The traditional practitioner received his knowledge from a recognised traditional practitioner and has extensive experience. This has enabled him to select the most suitable combination of plants for treating diabetes. In addition, his high level of education enables him to monitor the treatment and manage the disease effectively.

Unlike most traditional medicine remedies, which are generally improved traditional medicines in categories 1 or 2, “Diabetes Free” and “Pancreas Free” are industrially manufactured tablets, allowing them to be classified in categories 3 or 4. The benefit of this is that it helps to have control over the quantity of active ingredients, the dosage, and ensures that the remedy remains stable over time. However, it should be noted that the primary packaging is a white plastic box with no label. This means that patients must memorize the dosage and do not have sufficient information about the remedy they are taking in case of an overdose or adverse effects.

“Diabetes Free” and “Pancreas Free” are herbal remedies already used by the population, according to data in the literature highlighting the routine use of medicinal plants for therapeutic purposes by African populations (Eddouks et al., 2002; Denver et al., 2016). The garlic and cinnamon in the tablets are foods and are therefore not toxic. In addition, there is data in the literature on the preclinical oral toxicity of ginseng and gumar. However, the preclinical toxicity of the combination of “Diabetes Free” and “Pancreas Free” has not yet been evaluated. Furthermore, the incomplete knowledge about the remedies' composition does not help to predict potential interactions. Scientific studies have demonstrated the antidiabetic activity of the active ingredients found in these two tablets. In fact, a methanolic extract of *G. sylvestre* (gurmar) leaves has been shown to have antidiabetic activity by stimulating beta cell regeneration in treated rats (Ahmed et al., 2010). Another study showed that 3 g of *C. verum* (cinnamon) bark administered as an infusion for 15 days to diabetic subjects reduced serum glucose in type 2 diabetics (Amira and Zahra, 2012). Another study proved that silver nanoparticles synthesized from *A. sativum* (garlic) exhibit significant antidiabetic activity. These nanoparticles reduce hyperglycemia by increasing glucose absorption in cells through hepatic glucose reduction and inhibition of alpha-amylase and beta-glucosidase enzymes (Jini et al., 2022). Garlic extract has also been shown to have cytoprotective activity in the pancreas by preserving insulin secretion capacity (Douaouya, 2009).

The combination of these different plants, such as garlic, cinnamon, ginseng, and gurmar, found in the combination of “Diabetes Free” and “Pancreas Free” could have a synergistic effect (Nguefack et al., 2012).

The use of medicinal plants by the population is becoming increasingly important. The use of plant-based treatments and the search for new substances with biological activity are among the most important scientific concerns. Phytochemical analysis has highlighted the properties of garlic, cinnamon, ginseng, and gurmar, which are thought to be found in the tablets. This study revealed the presence of secondary metabolites, namely alkaloids, saponosides, sterols, and polyterpenes, in the “Diabetes Free” tablet. These chemical compounds, generally detected in this study, confirm previous work carried out on garlic powder (Bacar and Meskine, 2014; Batah Safa Saaidia Meryem, 2016) but differ from those performed on cinnamon powder (Gaber et al., 2020). For “Pancreas free”, this study revealed only the presence of alkaloids. There was a total absence of tannins, quinones, flavonoids, and polyphenols.

A study conducted on gurmar powder showed the presence of alkaloids (Farzana et al., 2019). “Diabetes Free” and “Pancreas Free” are therefore plant-based remedies.

Conclusion

The remedies "Diabetes Free“ and ”Pancreas Free" are improved traditional medicines. They are prepared industrially. The two remedies are combined to treat diabetes. They are used according to a dosage based on blood sugar levels. Clinical and biological monitoring is carried out by the traditional practitioner to assess patient recovery. However, studies need to be conducted to provide scientific evidence of the efficacy and safety of these remedy combinations.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

Abodo J, Wafo M, Koffi-Dago P, Yao A (2019). Caractéristiques gérontologiques des patients diabétiques hospitalisés en Côte d'Ivoire. Médecine des Maladies Métaboliques 13(7):632-636.

Ahmed A, Roa A, Roa M (2010). *In vitro* callus and *in vivo* leaf extract of *Gymnema sylvestre* stimulate ß cells regeneration and anti-diabetic activity in Wistar rats. Phytomedecine 17:1033-1039.

Amira B, Zahra O (2012). Evaluation de l'effet hypoglycemiant et protecteur de la cannelle (*Cinnamomum verum*) contre les comlications cardiaques chez les diabetiques. http://dspace.univ-guelma.dz:8080/xmlui/handle/123456789/5702.

Bacar E, Meskine H (2014). Contribution à l'étude de l'activité antibactérienne de l'ail (*Allium sativum* L). http://dspace.univ-guelma.dz:8080/xmlui/handle/123456789/1571.

Batah Safa Saaidia Meryem YS (2016). Etude de l'effet antimicrobien de l'extrait méthanolique de l'ail «*Allium sativum L»*. http://dspace.univ-guelma.dz:8080/xmlui/handle/123456789/1199

Bekro YA, Mamyrbekova JA, Boua BB, Tra Bi F, Ehilé E (2007). Etude ethnobotanique et screening phytochimique de *Caesalpinia benthamiana* (Baill.) Herend. et Zarucchi (Caesalpiniaceae). Sciences and Nature 4(2):217-225.

Chaudhury A, Duvoor C, Reddy Dendi VS (2017). Clinical Review of Antidiabetic Drugs: Implications for Type 2 Diabetes Mellitus Management. Frontiers in Endocrinology 8:1-12.

Cho NH, Shaw JE, Karuranga S, Huang Y, Da Rocha Fernandes JD, Ohlrogge AW and Malanda B (2018). IDF Diabètes Atlas: Global estimâtes of diabetes prevalence for 2017 and projections for 2045. Diabetes Research and Clinical Practice 138:271-281.

Denver D, Gibson D, Quinton J (2016). Ethnobotanical survey of medicinal plants used to manage High Blood Pressure and Type 2 Diabetes Mellitus in Bitterfontein, Western Cape Province, South Africa. Journal of Ethnopharmacology 194:755-766.

Douaouya L (2009). Contribution à l'étude de l'effet de l'ail. Thèse Université Badji Mokhtar 135 p.

Drouin P, Blickle JF, Charbonnel B, Eschwege E, Guillausseau PJ, Plouin PF, Daninos JM, Balarac N, Sauvane JP (1999). Diagnostic et classification du diabète sucré: les nouveaux critères. Diabetes and Metabolism 25:72-83.

Eddouks M, Maghrani M, Lemhadri A, Ouahidi ML, Jouad H (2002). Ethnopharmacological survey of medicinal plants used for the treatment of diabetes mellitus, hypertension, and cardiac diseases in the south-east region of Morocco (Tafilalet). Journal of Ethnopharmacology 82(2):97-103.

Farzana K, Moklesur S, Long M, Isa M, Chao Z, Bassem Y, Hiew T, Mohammad A (2019). Comprehensive Review on Phytochemicals, Pharmacological and Clinical Potentials of *Gymnema sylvestre*. Frontiers in Pharmacology 10:1-19.

Gaber B, Amany B, Azirwan G, Azirwan G, Arifin N, Tserendorj M, Mohamed M, Juan M, Ikuo I (2020). Phytochemical Characterization and Chemotherapeutic Potential of *Cinnamomum verum* Extracts on the Multiplication of Protozoan Parasites *In Vitro* and *In Vivo*. Molecules 25:1-19.

Jini D, Sharmila S, Anitha A, Pandian M, Rajapaksha R (2022). *In vitro* and *in silico* studies of silver nanoparticles (AgNPs) from *Allium sativum* against diabetes. Scientific Reports 12:22109.

Macheix JJ, Fleuriet A, Jay-Allemand C (2005). Les composés phénoliques des végétaux: un exemple de métabolites secondaires d'importance économique. Presses polytechniques et universitaires romandes, collection biologie, Lausanne 216 p.

Nguefack J, Tamgue O, Dongmo JBL, Dakole C, Leth V, Vismer H, Zollo PHA, Nkengfack AE (2012). Synergistic action between fractions of essential oils from *Cymbopogon citratus*, *Ocimum gratissimum,* and *Thymus vulgaris* against *Penicillium expansum*. Food Control 23(2):377-383.

Nguyen T (2016). Keeping Up With Safety Warnings of Oral Antidiabetic Drugs. Journal for Nurse Practitioners 12(1):61-62.

Roux D, Catier O (2007). Botanique, pharmacognosie, phytothérapie. 3ème édition. Rueil-Malmaison: Wolters Kluwer 141 p.

Wagner H, Bladt S (1996). Plant drug analysis: a thin-layer chromatography atlas. 2nd edition. Berlin; Springer 384 p.

World Health Organization (WHO) (2016). World Diabetes Report. Genève 86 p.

World Health Organization (WHO) (2002). WHO Strategies for Traditional Medicine for 2002-2005 78 p. https://iris.who.int/bitstream/handle/10665/67163/WHO_EDM_TRM_2002.1_eng.pdf