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REVIEW PAPER

A REVIEW ON PHARMACOLOGICAL ACTIVITIES AND MEDICINAL USES OF *ANISOPUS MANNII* N.E.Br.

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A B S T R A C T:
New plants with medical potential are being researched all around the world. *Anisopus mannii* is a herb currently utilized in traditional Northern Nigerian medicinal formulations. Various plant elements are used to treat diabetes, Analgesics, Antiparasitic Inflammation, Hypertension, Anti-microbial Infertility, Breast milk enhancement, and jaundice in infants. The ethnopharmacological importance of the species necessitated the need to compile the findings of previously published work on *A. mannii*, highlighting the potential utility of the species. Valuable information from original scientific research papers was extracted using electronic databases such as ScienceDirect, PubMed, Wiley, Google Scholar, and Springer. Antioxidant, antimicrobial, antidiabetic, antibacterial, pharmaceuticals, antiviral, traditional medicine, ethnopharmacology, toxicity, cytotoxic activity, chemical composition, mineral elements, Gas Chromatography Mass Spectrometry (GCMS) analysis, and any other related terms were used to discover studies. Exclusion criteria: This analysis rejected the following data from dubious online sources, as well as thesis reports and review publications. *A. mannii* has been found to be a medicinal plant that has antidiabetics, anti-inflammatory, antioxidant, and analgesic qualities. People's health is greatly impacted by the plant. These findings back up the plant's traditional use and show its enormous potential as a source of antidiabetics.

KEY WORDS: Analgesics, Antidiabetics, Antimicrobial, Antioxidants, Chemistry, Compounds, Ethnobotany, Medicinal plants
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1.INTRODUCTION :

The use of the natural plant for human disease management begins from the earliest civilization of Chinese and Indian (Mahmoud et al., 2020). The current focus and interest in producing medicinal agents have shifted to the field of phytochemistry (Dogara et al., 2021). Plants play an essential role in human food production. Medicinal plants have long been used as therapeutic medicines and consequently have significant commercial value (Dogara et al., 2021). Diverse plant varieties have been studied, analyzed, and characterized for medicinal values based on their major biological compounds present .

Living things depend relatively on the plant to meet their basic survival needs. All over the globe, 85% of the modern medicines used for healthcare are derived directly or indirectly from plants. Medicinal plants are a significant source of medication for about 70-80% of people worldwide (Kayfi and Abdulrahman, 2021). Cultural diversity is enhanced through the use of medicinal herbs around the world (Mahmoud and Abba, 2021). Throughout the world, traditional medicine is the most commonly accepted form of medicine since it is practised by people of all cultures and beliefs (Dogara et al., 2021). Traditional medicine has long taken advantage of the medicinal properties of herbal plants (Kayfi and Abdulrahman, 2021). This tradition has gained considerable recognition in health care delivery in developed nations. Nevertheless, despite its acceptability, the traditional medicinal system

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faces numerous difficulties worldwide. A lack of quality assurance to verify the authenticity of plant materials, the necessity for traditional medical practitioners to be registered, and pharmacognostic testing of plant parts to develop safe and effective medicines are some of the challenges that hinder conventional medicine. The exploration of endless health drove the early man to investigate his immediate natural surroundings, which led to many plants (Alebie et al., 2017). Presently, the world is witnessing a vast deal of public interest in the use of herbal remedies (Kayfi and Abdulrahman, 2021). Out of the total number of higher plant species on earth, more than 80,000 plants are medicinal species (Javed et al., 2013). Despite the potentialities of medicinal plants. There have been numerous papers on the plant's biological activities and chemical profile. There is a need to thoroughly review the articles and aggregate the key findings that highlight the species' potential utility. This research aimed to look at the ethnopharmacology, biological evaluation, and chemical composition of *A. mannii*is.

2. METHODOLOGY

Electronic databases such as ScienceDirect, PubMed, Wiley, Google Scholar, and Springer extracted valuable information from original scientific research papers. ***Inclusion criteria:*** Antioxidant, antimicrobial, antidiabetic, antibacterial, medications, antiviral, traditional medicine, ethnopharmacology, toxicity, cytotoxic action, chemical composition, mineral elements, Gas Chromatography Mass Spectrometry (GCMS) analysis, and any other related phrases were used as filters to find studies. ***Exclusion criteria:*** The following data from questionable online sources, as well as thesis reports and review publications, were excluded from this investigation (Dogara, 2022).

3.RESULTS AND DISCUSSION

3.1. Ethnopharmacological Uses

The perennial herb *A. mannii* is used in traditional Northern Nigerian medicinal compositions (Tsopmo et al., 2009). Because of its availability and cost, a considerable section of the rural population relies on herbs as medicine to treat ailments (Sani et al., 2010). According to a review of the scientific literatures, various traditional remedies were reported for *A. mannii*. Ethnomedical applications of different portions of the plant were reported. Traditionally, the plant is used in Nigeria to treat and manage high blood pressure. Similarly, the leaf of the plant is used to treat jaundice in children. Extracts of the leaves, stem, bark, and roots are used to control diabetes (Abdulrahman, 2021; Musa et al., 2015; Sani et al., 2019). Gastrointestinal disorders and diabetes, both of which have biological oxidation as a significant etiological factor, are treated with *A. mannii* alone or with other herbs (Atawodi et al., 2014). *Sakayau* and *Kashe Zaki,* which literally "sweet murderer" or "killing sweetness" in Hausa, a Hausa language prevalent in Northern Nigeria, were given to the plant because of its antidiabetic qualities (Manosroi et al., 2011; Musa et al., 2009; Sani et al., 2009). Decoctions of the whole plant, leaves, and stem are used to address antiparasitic, analgesic, inflammation, hypertension, antimicrobial, and infertility (Ezuruike and Prieto, 2014). The powdered root is consumed to enhance breast milk (Kankara et al., 2015). Moreover, we treat infectious diseases such as piles, diarrhea, and others (Musa et al., 2015).

3.2. Taxonomic classification and geographical distribution

Anisopus N.E. Br. (Asclepiadaceae) is only found in tropical Africa's lowland rainforests (Goyder, 1994). The existence of a corolline corona, rather than inflorescence traits, encouraged N.E. Brown (1895) to propose the genus and place *A. mannii* (Goyder, 1994). Taxonomically, it is classified as follows: Angiosperms, Gentianales Juss. ex Bercht. and J.Presl, Apocynaceae Juss, Anisopus N.E. Br, *Anisopus mannii* N.E.Br is Synonyms with *Anisopus batesii* S.Moore, *Marsdenia rhynchogyna* K.Schum, *Marsdenia batesii* (S.Moore) S.Moore, and *Anisopus bicornatus* (K.Schum.) N.E.Br. The species is native to Africa, with robust central and western tropical regions (Bullock, 1956). *A. mannii* can be found in modern-day Cameroon, Equatorial Guinea, Ghana, Liberia, Gabon, Ivory Coast, Nigeria, the Democratic Republic of the Congo, the Central African Republic, and Senegal. Anisopus is typically found in limited rainforest environments (Bullock, 1956).

3.3. Morphological Description

There are 5.7 to 7.6 long blades,1.3 to 2 long petioles and twining stems that grow to a height of 3.7 to 4 cm respectively (Un published). The plant has a conspicuous gland at the tip of its petiole. Greenish flowers in globose, lateral umbelliform cymes and horizontally opposed follicles 6-8 long and about ½ thick, tapering to a hooked point at the apex characterize this robust climber. It is a perennial plant (WFO, 2022).

3.4. Biological Evaluation

Natural products have got a lot of attention recently, not just in terms of health promotion and disease treatment, but also in terms of medication discovery and development. Natural product drug discovery and development remains one of the most important avenues for developing therapies for a variety of disorders. Numerous biological evaluations was carried out on *A. mannii* including antioxidants, anti-inflammatory, antibacterial, antifungal, antiviral, anticancer, cancer, and many more (Table 1and figure 1).

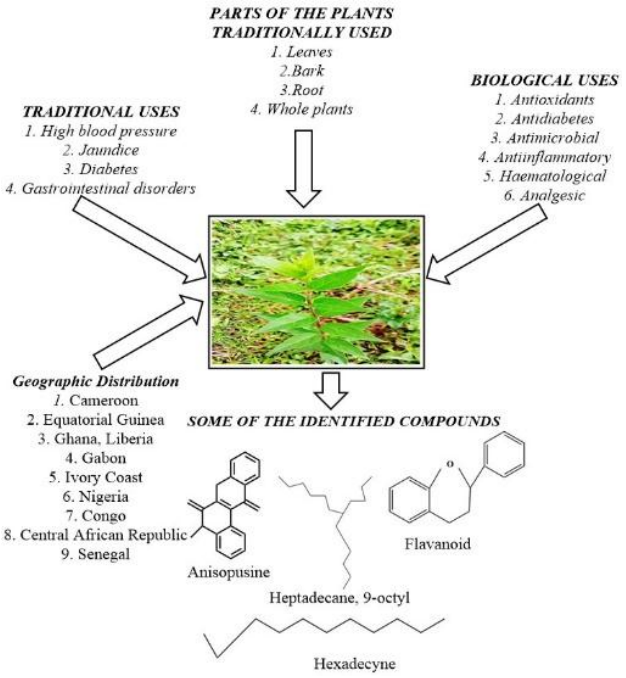


Figure 1. Pictorial presentation of *A. mannii* with it biological evaluation, traditional uses and distribution

3.4.1. Antioxidant

Antioxidants are chemicals that aid in delaying or preventing degenerative diseases caused by free radical oxidative damage to living cell components (Qader et al., 2011). Human systems are designed to have a wide range of cells, each containing different chemicals (Abdulrahman et al., 2019). The molecules are made up of chemically bonded together atoms (Abdulrahman et al., 2019). Under normal circumstances, the bonds between the atoms do not split so that the molecules are left with only an odd unpaired electron (Mahmoud, 2021). On the other hand, free radicals are created when a weak link is broken. Because these unpaired free radicals' electrons are so unstable, they must seek out any substance to react with to gain stability (Losada et al., 2017). Several methods were used to evaluate the antioxidant potential of *A. mannii* (Table 1). The antioxidant activity of crude methanol extract, ethyl acetate, and n-butanol fractions was 94.1, 94.3, and 88.7%, respectively, when free radicals were scavenged at 250 gmL-1 (Aliyu et al., 2010). With an IC_{50} of 0.31 mg/mL, the activity of free radical scavenging was demonstrated (Manosroi et al., 2011). At IC_{50} µL/3mL, no activity was identified (Table 1).

3.4.2. Diabetes

Besides, the (aqueous) bulb extract illustrated low antioxidant potential (higher EC50 values of DPPH and ABTS) and also low content of total phenols as compared to the other bulb extracts produced with methanol and 80 % ethanol solvents. Similar results have been reported during the extraction of antioxidant compounds from other raw materials such as mango peel and seed (Dorta et al., 2012), grape by-products (Lapornik et al., 2005). Diabetes mellitus is a metabolic disorder that can cause nephropathy, retinopathy, impotence, stroke, and heart attack, among other complications (Agofure et al., 2020). It is the fourth leading cause of death in the most prosperous countries, and it is commonly accepted that it is widespread in many developing and newly industrialized countries (Naveen et al., 2021). Diabetes mellitus (DM) is spreading at an alarming rate worldwide (Zaruwa et al., 2013). Drugs now used to treat diabetes include a variety of side effects, ranging from organ damage to inefficacy after long-term use (Zaruwa et al., 2013). Hyperglycemia is common in diabetic patients due to excessive glucagon secretion or inadequate insulin secretion or insulin resistance (Ismail and Ahmad, 2019). They gained weight after taking different doses of the plant extract for 28 days, however it was not statistically significant (P>0.05). Repeated administration of graduated extract dosages resulted in significant (P > 0.05) blood sugar

levels in the treatment groups compared with their respective day zero values for the extract. Both the extract and glibenclamide (0.6 mg/kg) had an adverse effect on glucose homeostasis and lipid profile in streptozotocin-induced diabetic mice. It demonstrated a substantial dosage-dependent hypoglycaemic and antidiabetic effects at doses of 200, 400, 600, and 800 mg/kg at P >0.05 and P> 0.01 (Tijjani et al., 2012). Fasting blood glucose (FBG) was lowered by 27.36 and 65.57 %, respectively, when the methanolic subfraction at 400 mg/kg body weight was administered to diabetic and nondiabetic mice. In this study, the conventional use for diabetes mellitus was verified (Zaruwa et al., 2013). Manosrin is a novel chemical that will be included in the list of authorized pharmacological hypoglycaemic drugs, marking a significant step forward in the treatment of diabetes (Zaruwa et al., 2018).

3.4.3. Antimicrobial

Medicines widely used to treat pathogenic microorganisms are becoming less effective as they become more resistant (Doughari et al., 2009). Traditional medical systems in both developing and developed countries have long employed the use of whole plants and plant parts to treat a wide range of diseases (Dogara 2022). Thousands of useful chemicals with therapeutic potential are found in medicinal plants. If standardized in vitro procedures can validate traditional herbalist claims, ethnobotany's value cannot be overstated (Atanasov et al., 2015). The highest inhibitory zones (29 mm) were found in Streptococcus pyogenes, followed by Bacillus cereus (28 mm). Enterococcus faecalis (27 mm), Proteus vulgaris (26 mm), and MRSA all showed significant inhibition (25 mm). MBC/MFC ratios ranged from 2.5 mg/mL to 5.0 mg/mL, whereas MIC values ranged from 0.625 mg/mL to 1.25 mg/mL (Musa et al., 2015). The least bactericidal concentration (M.B.C) for E. coli, S. aureus, S. gallinarium, and P. aeruginosa was 50 mg/mL, 100 mg/mL for S. pyogenes, and 200 mg/mL for K. pneumoniae (Sani et al., 2009b). The saponin fraction had the most significant inhibitory at 30 mg/mL-1 and the lowest bactericidal inhibitory at 40 mg/mL-1 in tests against S. aureus, S. pyogenes, C. ulcerans, E. coli, S. dysenteriae, and P. aeruginosa indicating that it could be used as antimicrobial (Aliyu et al., 2011). The antimicrobial impact of the A. mannii extract may be due to secondary metabolites present in plant parts that have a greater ability to injure or disrupt cell membrane permeability. These data suggest that the extract may have therapeutic promise in treating bacterial-induced diseases (Table 1).

3.4.4. Anti-inflammatory

Inflammation is a defence response to injured tissue caused by physical trauma, unpleasant chemicals, or microbial infections. Invading pathogens are inactivated or eliminated, irritants are removed, and tissues are prepared for repair (Yu and Abbott, 2007). At a 20 mg/kg dosage, there was a significant anti-inflammatory effect at P > 0.01(Table 1). These findings imply that the extract could be helpful in the treatment of Anti-inflammatory infections.

3.4.5. Analgesic

The use of non-steroidal anti-inflammatory drug (NSAIDs) and opiates as analgesics has not always been successful due to negative side effects such as gastrointestinal ulcers and tolerance and dependence (Dogara 2022). Analgesic effects of the extract (40 mg/kg) were found to be statistically significant (P>0.01) (Table).

3.4.6. Toxicity Evaluation (Side effects and Toxicity)

Scientific study into the therapeutic potential and safety of these herbs has also increased, giving clinicians data to assist patients in making informed decisions regarding their usage (Sani et al., 2010). Because it is difficult for traditional practitioners to detect or monitor delayed effects, frequent adverse effects, and unfavorable effects resulting from long-term usage. A history of traditional use is not always a reliable guarantee of safety (Ferdous, 2016). There was no toxicity or fatality after oral administration of *A. mannii* aqueous stem extract at a dose limit of 3000mg/Kg (Tijjani et al., 2012). In acute toxicity testing at 2,000 and 5,000 mg/kg bw, there were reductions in blood urea nitrogen and creatinine levels and rises in aspartate transaminase, alanine transaminase, and total bilirubin levels, as well as body weights (Zaruwa et al., 2013). The different dosages utilized had no effect (Table 1).

Table 1. Biological Evaluation of *A. mannii*

S/N	Activity	Methods	Plant Part	Solvents	Major finding	Reference
	Antioxidant	DPPH	Leaf	Aqueous	The free radical scavenging activity was demonstrated with IC_{50} of 0.31 mg/mL.	(Manosroi et al., 2011)
		DPPH	Leaf	Ethyl acetate, methanol, and n-butanol	When free radicals were scavenged at 250 gmL^{-1}, the antioxidant activity of the methanolic, n-butanol crude extract and ethyl acetate was 94.1, 94.3, and 88.7%, respectively.	(Aliyu et al., 2010)
		(DPPH)	Leaf, stem, and roots	de-ionized water	The activity was not detected at IC_{50} µL/3mL	(Ene et al., 2010)
	Antidiabetic	*In Vivo*	Stem	Aqueous	Compared to the traditional medicine (glibenclamide) used to manage diabetes mellitus, all dosages of crude stem extract utilized were hypoglycaemic, and 600mg/Kg had an excellent antidiabetic impact.	(Tijjani et al., 2012)
		In Vivo	Leaves and Stem	Aqueous	The test groups had significantly lower ($P<0.05$) fasting blood glucose, lipid profile, serum urea, creatinine, bilirubin, alanine transaminase, and aspartate transaminase activities than the untreated diabetic group. The extract at 200 mg/kg effectively reduced LDL and total cholesterol.	(Matazu et al., 2017)
		In Vivo	Leaves	Aqueous or methanolic	In both normal and alloxan diabetic animals, 400 mg/kg was found to have a hypoglycaemic impact, proving the traditional assertion.	(Shehu et al., 2014)
		In Vivo	Stem	Methanolic/ Aqueous	Metformin (50 mg/kg) and methanolic extract (200 mg/kg) was found to have a possible negative effect on each other's favourable effects on glucose homeostasis and lipid profile in diabetic rats in this study.	(Chika et al., 2019)
		B16 melanoma cells	Leaf		All compounds inhibited melanogenesis; however, compound 5 had the most potent activity (Melanin content (27. 43.5%) and Cell Viability (54.95.5%) at a concentration of 30 mol/L), suggesting that it might be further developed.	(Ye et al., 2018)
		In Vivo	Stem	Aqueous	From week one to week three, the extract reduced fasting blood glucose levels in diabetes-treated rats by a substantial amount ($P>0.05$) compared to diabetic controls. No significant ($P>0.05$) effect was detected in the fourth week. It appears to have hypolipidemic and antihyperglycemic properties, according to the research.	(Osibemhe et al., 2017)
		In Vivo	stem	methanolic	In streptozotocin/nicotinamide-induced diabetic mice, the extract (200 mg/kg) and glibenclamide (0.6 mg/kg) counteracted each other's beneficial effects on glucose homeostasis and lipid profile.	(Chika and Yahaya, 2019)
		In Vivo	Stem	Aqueous	Doses of 200, 400, 600, and 800 mg/kg, it showed significant at $P < 0.05$, $P < 0.01$ dose dependant of antidiabetic action.	(Tijjani et al., 2012)
		In Vivo	Leaf	Methanolic	The extract at 400 mg/kg bw resulted in a significant ($P>0.05$) drop in	(Zaruwa et

				fasting blood glucose (FBG) of 27.36 and 65.57 % in normoglycemic and diabetic mice, respectively. In this study, the conventional use for diabetes mellitus was verified.	al., 2013)
	In Vivo	Leaf	Aqueous	The discovery of Manosrin is a new molecule that will be added to the list of recognized pharmaceutical hypoglycaemic substances and will mark a significant advancement in the treatment of diabetes mellitus.	(Zaruwa et al., 2018)
	In Vivo	Leaf	Aqueous	In alloxan-induced diabetic mice, all extracts had potent hypoglycemic effects, with *A. mannii* extract having the most significant fasting blood glucose decrease of 70.39%, which was 1.54 and 0.98 times that of glibenclamide and human insulin, respectively.	(Manosroi et al., 2011)
	In Vivo	Stem	Aqueous	Doses of 200, 400, 600, and 800 mg/kg, it showed significant at $P<0.05$, $P<0.01$ dose dependant of hypoglycaemic and antidiabetic action.	(Tijjani et al., 2012)
	In Vivo	Stem	Aqueous	They gained weight after taking different doses of the plant extract for 28 days; however, it was not statistically significant ($P>0.05$). The extract's folkloric use as a potential hypoglycaemic medication is substantiated by repeated administration of graduated extract dosages, resulting in significant ($P >0.05$) blood sugar levels in the treatment groups compared to their respective day zero values.	(Sani et al., 2009a)
Antimicrobial	Disc diffusion and broth microdilution	Leaf	Hexane	*Streptococcus pyogenes* exhibited the highest inhibitory zones (29 mm), *Proteus vulgaris* (26 mm), *Enterococcus faecalis* (27 mm), *Bacillus cereus* (28 mm), and MRSA (25 mm). Significant inhibition was seen in the values ranging from 0.625 to 1.25 mg/mL, whereas MBC and MFC values are from 2.5 to 5.0 mg/mL, respectively.	(Musa et al., 2015)
	MIC, MBC	Stem	Aqueous	The minimum bactericidal concentration (M.B.C) for *S. gallinarium*, *E. coli*, *S. aureus*, and *P. aeruginosa* was 50 mg/ml; for S. pyogenes, it was 100 mg/ml, and for K. pneumoniae, it was 200 mg/ml. These data suggest that the extract may have therapeutic promise in treating bacterial infections.	(Sani et al., 2009b)
	Disc		Saponin fraction	The fraction of the saponin had the least inhibition concentration at 30 mg/mL^{-1} and the lowest minimum bactericidal concentration (MBC) of 40 mg/mL^{-1} in tests against *S. pyogenes*, *S. aureus*, *E. coli*, *C. ulcerans*, *P. aeruginosa*, *S. dysenteriae* indicating that it could be used as	(Aliyu et al., 2011)
	Agar well diffusion, MIC	whole plants	Ethanol	No activity was shown against the tested microorganisms	(Sani et al., 2021)
Anti-inflammatory	*In Vivo*	Aerial parts	Methanol	Significant inflammatory effect exhibited at a dose of 20 mg/kg when $P < 0.01$.	(Musa et al., 2009)
Haematological	*In Vivo*	stem extract	Aqueous	On the 21^{st} and 28^{th} days after extract therapy, repeated administration of graded extract dosages resulted in a substantial ($P>0.05$) dosage-dependent increase in packed cell volume (PCV) and red blood cell count.	(Sani et al., 2009)

				In either of the treatment groups of rats, there was no significant (P>0.05) difference in total white blood cell count or differential leukocyte count compared to the respective day zero and control groups.	
Analgesic	*In Vivo*	Aerial parts	Methanol	The extract (40 mg/kg) had a substantial (P<0.01) analgesic effect, according to the findings.	(Musa et al., 2009)
Toxicological	*In Vivo*	stem	Aqueous	All the tested parameters were unaffected by repeated administration of the extract at 400, 300, 200, and 100 mg/kg, respectively, for 28 days.	(Sani et al., 2010)
	In Vivo	Stem	Aqueous	No effect was found on the different dosages used	(Tijjani et al., 2012)
	In Vivo	Leaf	Methanolic	At 5, 000 and 2,000 mg/kg bw, there were reductions in creatinine and blood nitrogen urea and rise of alanine transaminase, aspartate transaminase, and bilirubin levels as body weights.	(Zaruwa et al., 2013)
	In Vivo	Stem	Aqueous	Oral administration of *A. mannii* aqueous stem extract at a dose limit of 3000mg/Kg resulted in no toxicity or death.	(Tijjani et al., 2012)

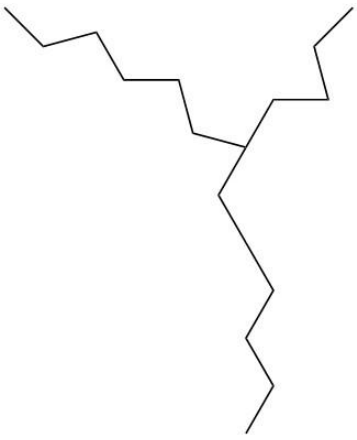
Note: bw = Body Weight, DPPH = 6.4.1.2 1, 1-Diphenyl-2-Picryl Hydrazyl (DPPH) Radical Scavenging Activity, MBC = Minimum Bactericidal Concentration, MIC = Minimum Inhibitory Concentration, mg/kg = Milligrams per kilograms

3.5 CHEMICAL COMPOSITION

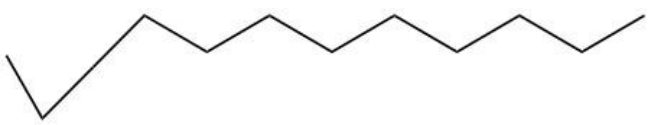
Natural chemicals with therapeutic properties are excellent source of pharmaceutically active molecules. Medications, agrochemicals, flavourings, perfumes, colours, biopesticides, and food additives are all made from secondary metabolites produced from plants (Dogara, 2022). Higher plants account for two-thirds of all new chemicals (Al-Snafi, 2017). Plants and their active ingredients have a critical role in preventing a wide range of diseases (Meena et al., 2011). Hexadecanoic acid, an ethyl ester, was the dominant compound in the leaf with an area composition (34.0%) (Figure 2 and Table 2). The plant was found to contain high contents of phenolic and flavonoids contents (Table 2). Anisopusine was also a new compound derived from the plant (Table 2). These compounds contain a wide range of bioactive qualities

3.6 MINERAL ELEMENTS CONTENTS

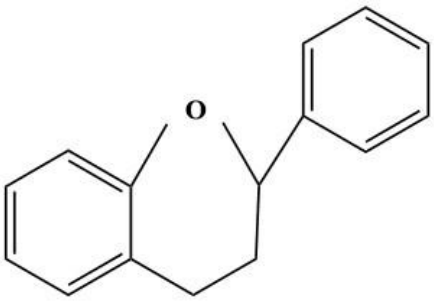
Heavy metals can bioaccumulate in the tissues of some plant species consumed as food or utilized as raw materials in the manufacture of herbal products, resulting in heavy metals entering the food chain (Mulaudzi et al., 2017). Even in meagre quantities, heavy metal ingestion (through contaminated herbal products) with a low excretion rate through the kidney could cause hazardous effects. The mineral analyses conducted were determined to be within the World Health Organization's recommended consumption limits. (Table 2).



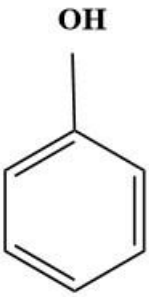
Heptadecane, 9-octyl



3-Hexadecyne

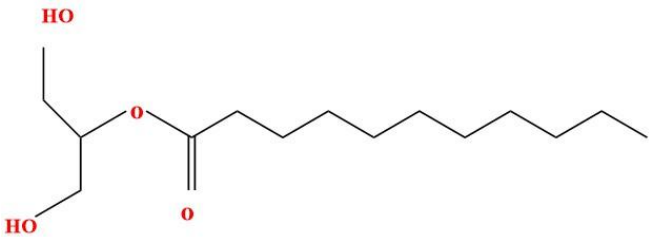


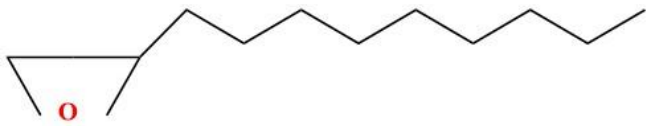
Flavanoid



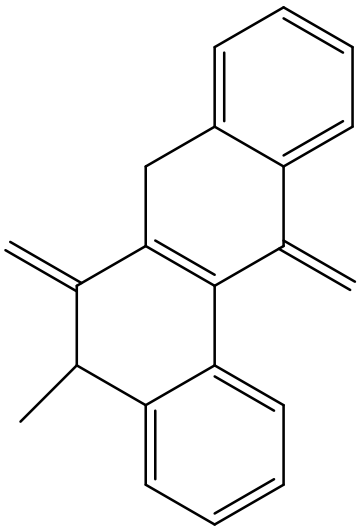
Phenol

Hexadecanoic acid ethyl ester





Oxirane, hexadecyl-



Anisopusine

Figure 2. Chemical Structures found in *A. mannii*

Table 2. Chemical composition and Mineral Content of *A.mannii*

S/N	Compound	Formular	Composition %	Plant Part	Solvents	Analysis	Reference
1	Tetradecanoic acid, ethyl ester	$C_{16}H_{32}O_2$	1.5	Leaf	Hexane	GCMS	(Musa et al., 2015)
	Ethyl tetracosanoat	$C_{26}H_{52}O_2$	2.6				
	Heptadecane, 9-octyl	$C_{25}H_{52}$	3.3				
	Ethyl 9-hexadecenoate	$C_{18}H_{34}O_2$	1.5				
	Eicosane	$C_{20}H_{42}$	1.3				
	9, 12, 15-octadecatrienoic	$C_{18}H_{30}O_2$	9.6				
	Oxirane, hexadecyl-	$C_{18}H_{36}O$	11.0				
	Hexadecanoic acid ethyl ester	$C_{18}H_{36}O_2$	34.0				
	Phytol	$C_{20}H_{40}O$	2.0				
	acid, ethyl ester, (Z, Z, Z)-	$C_{20}H_{38}O_2$					
	3-Hexadecyne	$C_{16}H_{30}$	10.0				
2	Moisture	Nill	8.41	Whole plant	Not applicable	Proximate (g/100g)	(Aliyu et al., 2009)
	Total carbohydrate		72.57				
	Crude fibre		89.64				
	Ash		10.36				
	Fat		8.67				
	Crude protein		8.4				
	Soluble carbohydrate		7.94				

3	Phytates		0.017	Whole plant		Antinutritional (g/100g)	(Aliyu et al., 2009)
	Free cyanide		6.5				
	Soluble oxalate		0.34				
	Tannins		10.55				
	Total cyanide		12.4				
	Total oxalate		0.79				
4	K		1700	Whole plant	Not applicable	Mineral element (mg/100g)	(Aliyu et al., 2009)
	V		102				
	Mn		14.30				
	Cu		36.60				
	Ca		1280				
	Cr		53.90				
	Pb		17.60				
	Fe		156				
	Zn		8.74				
5	Saponins		Qualitative	Stem	aqueous	phytochemical	(Sani, et al., 2009b)
	Alkaloids						
	Flavonoids						
	Terpenes and Steroid						
	Glycosides						
	Tannins						
	Anthraquinones						
6	Anisopusine	$C_{17}H_{12}N_2O_2$	0.0001	Bark	Acetone	Column chromatography	(Tsopmo et al., 2009)
	5α-hydroxy-lup 20(29)-en-3β-eicosanoate						
	6-gingerdione						
	6-dehydrogingerdione						
	Ferulic acid						
7	Alkaloids		Qualitative	Whole plant	Methanol	Phytochemicals	(Aliyu et al., 2008)
	Flavonoids						
	Tannins						
	Glycosides						
	Saponins						
	Alkaloids		0.966± 0.030	Whole plant	Methanol	Phytochemicals (g/100g)	
	Flavonoids		8.766±0.020				
	Saponins		2.500±0.014				
	Phenols		1.250±0.009				
8	K		100.700	Whole plant	Methanol	mg/100g of dry weight	(Aliyu et al., 2008)
	Ca		21.500				
	Na		12.600				
	Mg		96.000				
	Cu		0.000				
	Mn		0.167				
	Pb		0.002				
	Fe		11.300				
	Zn		1.555				

Note: GCMS = Chromatography Mass Spectrometry (GCMS) analysis

4.CONCLUSIONS AND FUTURE DEVELOPMENTS

Ethnomedicinal plants are one of the essential sources for drug discovery. In Nigeria, A. mannii is a prominent ethnomedicinal plant with many pharmacological effects. There have been several studies on the plant, the bulk of which have concentrated on the leaves. Literature has shown A. mannii can be found in modern-day Cameroon, Equatorial Guinea, Ghana, Liberia, Gabon, Ivory Coast, Nigeria, the Democratic Republic of the Congo, the Central African Republic, and Senegal. Still, the articles found the studies were carried out in Nigeria. This review found that many of the studies carried out on the plant are with antidiabetic potential, which confirms the report of the ethnobotanical studies on the plant. However, to date, there have been few investigations on the chemical contents of the plants. Therefore, the following review recommends thorough research; (1) Identification of species based on micromorphology and anatomy, (2) Potential usage of the leaves as antidiabetic, (3) Studies on the chemical contents of the plant to ascertain the compound responsible for the activity of the plant (4) Mechanism of action of the isolated compounds (5) Standard dose and safety of the plant extract.

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Conflict of Interest

The authors do not have any potential conflicts of interest to declare.

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