



ETHNOBOTANICAL SURVEY AND ASSESSMENT OF HERBAL DECOCTIONS FOR HELMINTH PARASITE CONTROL SOLD IN THREE LOCAL GOVERNMENT AREAS OF OGUN STATE

Adewoga, T.O.S., Adesuyi, S.O and ²Hamza, A.A

¹Department of Biological Sciences, Tai Solarin Federal University of Education,
Ijagun , Ogun State, Nigeria

²Department of Biological Sciences, Federal University, Kashere, Gombe State, Nigeria
(Corresponding Author, Adewoga, T.O .S, adewogats@tasued.edu.ng , 08034275046)

ABSTRACT

Herbal decoctions are traditional medicines that involve methods such as boiling, soaking in water, coconut water, lime water, or other liquids to extract their active ingredients, and they are a widely practiced method of treating helminthic infections in African communities. The aim of this study was to conduct an ethnobotanical survey and validation of herbal decoctions for helminth control sold by traditional sellers in three local governments of Ogun State, Nigeria..The study adopted quasi-experimental and descriptive survey research designs. A comprehensive collection of local decoctions were carried out Odogbolu, Ijebu-Ode, and Ijebu-North. Data for this study were collected using two primary instruments: questionnaires and interview guides. The collected data were computed on SPSS version 26, and analysed by using descriptive statistics (frequency, percentage, mean and standard deviation), Chi-square and Analysis of Variance (ANOVA).Results showed that local herbal decoctions are widely used for treating roundworm infections, often without standardized preparation or dosage. Herbal sellers generally have good knowledge of these remedies, with roots (40%) and leaves (26%) being the most preferred plant parts. Apocynaceae was the most frequently identified plant family among the twenty found in the samples. Despite reports of side effects (44.4%) and inconsistent safety practices (44.4%), most people consider the decoctions safe and effective..It is therefore recommended that government agencies should develop and promote standardized methods for preparing and using herbal decoctions to ensure safety. Public health campaigns should strengthen and expand community knowledge of herbal remedies based on validated research. Veterinary practitioners should monitor haemoparasites in cattle regardless of breed, given the widespread infection.

Keywords: Ethnobotanical, Anthelmintic potentials, Local decoctions hawked, , Survey Validation



1.0

INTRODUCTION

Helminths, commonly known as parasitic worms, are a group of large, multicellular organisms that live inside their host and derive their nutrition at the host's expense. They are a significant concern in tropical and subtropical regions, particularly in developing countries where access to clean water, sanitation, and healthcare is limited. Helminths are classified into three main groups: nematodes (roundworms), cestodes (tapeworms), and trematodes (flukes). Each group contains species that are responsible for a range of infections that affect human health, with soil-transmitted helminths (STHs) being particularly prevalent in regions with poor sanitary conditions (Rabiu *et al.*, 2024). Among the most widespread helminths are the nematodes, which include species such as *Ascaris lumbricoides* (roundworm), *Trichuris trichiura* (whipworm), and hookworms (*Ancylostoma duodenale* and *Necator americanus*). These soil-transmitted helminths are responsible for intestinal infections that affect millions of people, particularly in sub-Saharan Africa. Cestodes, such as *Taenia solium* (pork tapeworm), cause infections like cysticercosis, which can lead to serious complications, including neurocysticercosis. Trematodes, such as *Schistosoma* species, are responsible for schistosomiasis, a debilitating disease that affects millions of people globally, particularly in areas with contaminated freshwater sources (Rabiu *et al.*, 2024).

Helminth infections are transmitted primarily through the ingestion of contaminated food or water, or through direct contact with contaminated soil. For example, STHs are transmitted when people ingest eggs or larvae found in fecally contaminated soil, often due to poor hygiene practices and inadequate sanitation. Once inside the body, these worms settle in various organs, typically the intestines, where they grow, reproduce, and feed on their host's blood and nutrients, leading to malnutrition, anemia, and other health complications (Rabiu *et al.*, 2024). Helminth diseases are public health challenge, particularly in sub-Saharan Africa and other developing regions, where environmental and social factors contribute to their high prevalence. These infections predominantly affect marginalized and impoverished populations, particularly children, who are more vulnerable due to their exposure to contaminated environments and weaker immune systems. The health challenges posed by helminth infections are vast and multifaceted, as they affect not only the physical health of individuals but also their cognitive development, productivity, and overall well-being. One of the most significant health impacts of helminth infections is malnutrition, which occurs



as a result of the worms' competition for essential nutrients within the host's body. For instance, hookworms feed on blood from the intestinal walls, leading to chronic blood loss and iron deficiency anemia, a condition that is particularly harmful to children and pregnant women. This malnutrition contributes to stunted growth, impaired cognitive function, and reduced resistance to other diseases, exacerbating the cycle of poverty and illness in affected communities (Enogiomwan *et al.*, 2023).

Helminth infections also impose a heavy disease burden in terms of morbidity. Infected individuals often experience symptoms such as diarrhea, abdominal pain, and fatigue, which can lead to decreased physical performance and lower productivity. In children, this reduced physical and cognitive capacity translates into poor academic performance, which can limit future opportunities and perpetuate the cycle of poverty. Moreover, in severe cases, helminth diseases can lead to long-term complications such as intestinal obstruction, organ damage, and in the case of schistosomiasis, bladder cancer (Akinsanya *et al.*, 2021). The social and economic impacts of helminth infections are deeply intertwined with the health challenges they pose. As these infections disproportionately affect the poorest segments of society, they exacerbate existing inequalities and limit economic development in affected regions. Children who suffer from chronic helminth infections are less likely to attend school regularly, and when they do, their performance is often hindered by illness-related fatigue and cognitive impairments. This educational disadvantage leads to diminished employment opportunities later in life, contributing to the perpetuation of poverty (Samweli *et al.*, 2023).

Adults who suffer from helminth infections experience reduced productivity and earnings due to illness and fatigue. In regions where agriculture is the primary economic activity, the physical limitations caused by infections such as schistosomiasis or hookworm can reduce labor capacity, impacting food production and household income. Additionally, the economic burden of treating these infections, either through traditional remedies or biomedical interventions, places further strain on already impoverished families, many of whom lack access to affordable healthcare services (Enogiomwan *et al.*, 2023). In sub-Saharan Africa, where helminth infections are most prevalent, the economic burden of these diseases is staggering. According to recent studies, helminth infections cost affected regions millions of dollars annually in lost productivity, healthcare costs, and educational deficits. The World Health Organization (WHO) estimates that more than 1.5 billion people globally



are affected by soil-transmitted helminths, with the majority living in developing regions (WHO, 2021).

Helminth infections, caused by parasitic worms such as roundworms, tapeworms, and flukes, pose a major health challenge in many developing regions, leading to chronic illness, malnutrition, and impaired cognitive and physical development. Rural populations in particular, often rely on traditional medicines, such as herbal decoctions, for treatment due to the unavailability or high cost of pharmaceutical drugs. A scientific validation of these traditional remedies offers a vital avenue for improving public health, making treatments more accessible and affordable, and supporting the fight against parasitic infections (Obi *et al.*, 2024).

In Africa, plant-based remedies have maintained a strong foothold due to their accessibility, affordability, and cultural acceptance. Traditional medicinal practices are highly valued because they are often more affordable than pharmaceutical drugs, making them a practical option for low-income populations. For instance, in countries like Nigeria, Ghana, and Kenya, traditional herbal medicine is an integral part of the healthcare system, with many people opting for herbal remedies over modern pharmaceuticals. Studies show that traditional healers are often trusted more than conventional doctors, particularly in rural areas where access to formal healthcare is challenging (Jain *et al.*, 2022).

The prevalence of traditional medicinal practices is particularly high in rural communities across Africa and other developing regions, where the majority of the population relies on local herbs and plant decoctions for health management. In these communities, traditional medicine is not only a healthcare solution but also a cultural practice that is intertwined with the community's identity and way of life. People in these regions tend to prefer traditional medicine because it is closely aligned with their beliefs, traditions, and social systems. For many, seeking treatment from traditional healers or using herbal remedies is more than a healthcare choice—it is a practice steeped in cultural and spiritual significance (Abudulahi *et al.*, 2020).

Another reason for the preference for traditional medicine is the perception of its safety and efficacy. Many individuals believe that plant-based remedies are safer than pharmaceutical drugs, which are often perceived as having adverse side effects. This perception is supported by the fact that most traditional remedies are prepared from plants that are locally available



and have been used for generations without significant reports of harm (Ya'aba *et al.*, 2020). Additionally, traditional medicines are often customized to the individual, with healers preparing specific formulations based on the patient's condition, symptoms, and body constitution, a level of personalization that is often lacking in conventional healthcare settings (Achika *et al.*, 2023).

Furthermore, in regions where helminthic infections are prevalent, such as sub-Saharan Africa, traditional herbal decoctions are commonly used to treat these parasitic infections. Helminths, such as roundworms, hookworms, and tapeworms, affect millions of people in these areas, particularly children, and contribute to poor health outcomes and diminished productivity. Local herbal remedies, known for their Anthelmintic properties, are often the first line of defense against these infections (Codruta *et al.*, 2020). In Nigeria, where helminth infections are endemic, studies have shown that up to 25% of children under the age of five are infected with at least one species of soil-transmitted helminth. This figure is even higher in rural areas, where access to clean water and sanitation facilities is limited. In addition to STHs, schistosomiasis is also highly prevalent in the country, particularly in communities that rely on freshwater sources for drinking, bathing, and washing (Okwuzu *et al.*, 2024). A study by Chiejina and Amadi (2020) revealed that in some parts of southeastern Nigeria, up to 40% of the population is infected with *Schistosoma haematobium*, the parasite responsible for urinary schistosomiasis. The high prevalence of helminth infections in Nigeria and other sub-Saharan African countries underscores the urgent need for effective control measures. Current efforts to combat these infections include mass drug administration (MDA) programs, which aim to reduce the worm burden in affected populations through the distribution of Anthelmintic medications such as albendazole and praziquantel. However, these programs are often hampered by logistical challenges, including inadequate funding, poor healthcare infrastructure, and resistance to biomedical treatments in favor of traditional remedies.

In many parts of Africa, particularly in rural areas where access to formal healthcare services is limited, local decoctions derived from medicinal plants are commonly used to treat a variety of ailments, including helminthic infections. These traditional remedies, often passed down through generations, are seen as reliable and effective alternatives to conventional Anthelmintic drugs, especially in communities where pharmaceutical options are scarce or prohibitively expensive. The use of herbal decoctions for treating parasitic infections is



deeply embedded in the cultural practices and knowledge systems of local populations, reflecting a long history of plant-based medicine in African societies (Okwuzu *et al.*, 2024).

Herbal decoctions, a form of traditional medicine involving the boiling of plant materials to extract their active ingredients, are a widely practiced method of treating helminthic infections in African communities. These decoctions are typically made from leaves, bark, roots, or seeds of plants known for their medicinal properties. In many cases, they are taken orally, either as a single herb or as a mixture of several plants, with the aim of expelling or killing intestinal parasites. In some traditions, these remedies are also applied topically, or used as a wash to alleviate symptoms associated with helminthic infections, such as itching or rashes caused by skin-invading parasites (Aung *et al.*, 2022).

The use of these decoctions is guided by indigenous knowledge, which is often specific to certain regions and communities. For instance, in Nigeria and other West African countries, plants like *Vernonia amygdalina* (bitter leaf), *Alstonia boonei* (cheesewood), and *Tithonia diversifolia* (Mexican sunflower) are used in various combinations to treat intestinal worms, especially in children. These plants have been traditionally recognized for their medicinal properties, and their decoctions are prepared through specific processes that have been refined over generations. The decoctions are believed to have potent anti-parasitic effects, acting as both purgatives and vermifuges, which help to either kill or expel the worms from the body (Narayanan *et al.*, 2024).

Several plants are commonly used across Africa for treating helminthic infections, and their usage varies from region to region. In Nigeria, for example, *Vernonia amygdalina* is widely employed in traditional medicine as a remedy for intestinal worms. Known for its bitter taste, this plant is believed to possess strong Anthelmintic properties. Decoctions made from the leaves of *Vernonia amygdalina* are given to both children and adults suffering from worm infestations, and its efficacy has been supported by preliminary scientific studies that indicate its potential to inhibit the growth of intestinal parasites (Kamdem *et al.*, 2022).

Another popular plant used in combating helminth infections is *Alstonia boonei*, known locally as "pattern wood" or "god's tree." The bark of this tree is boiled into a decoction and taken orally to treat intestinal worms. *Alstonia boonei* has long been used in traditional medicine for its anti-parasitic and anti-inflammatory properties. Similarly, *Tithonia diversifolia* has gained recognition as a valuable plant in traditional medicine. The leaves of



this plant are boiled and consumed as a remedy for worms, and it has been shown in laboratory studies to possess significant Anthelmintic activity (Sripa *et al.*, 2022).

In East Africa, *Azadirachta indica* (neem) and *Carica papaya* (pawpaw) are widely utilized for helminthic treatment. Neem leaves are boiled to create a decoction that is commonly used to treat intestinal worms, especially in children. Pawpaw seeds are also used for their anti-parasitic properties, often chewed raw or crushed into a powder and mixed with water or honey. These plants have been scientifically investigated for their medicinal properties, and their anti-parasitic potential is increasingly being recognized (Imam *et al.*, 2019).

The reliance on herbal decoctions for the treatment of helminthic infections is largely grounded in traditional knowledge passed down through generations. This knowledge is often preserved by community elders, herbalists, and traditional healers, who act as custodians of medicinal plant use. The effectiveness of these remedies is based not only on their chemical properties but also on the practices surrounding their collection, preparation, and administration. For instance, certain plants may only be harvested at specific times of the year or prepared in combination with other herbs to enhance their potency. The traditional knowledge surrounding these remedies includes an understanding of which plants are most effective for particular infections, the appropriate dosages, and potential side effects or contraindications (Akinsanya *et al.*, 2021).

In many African cultures, this traditional knowledge is seen as an invaluable resource for health and well-being. Although there has been a gradual shift towards Western medicine in recent years, especially in urban areas, many rural populations continue to rely heavily on traditional remedies. For these communities, herbal decoctions offer an affordable and accessible form of treatment, especially in regions where healthcare infrastructure is weak or nonexistent. Moreover, the use of these remedies is often intertwined with cultural practices and beliefs, making them an integral part of community life and identity (Kache *et al.*, 2020).

The study of phytochemical properties in plants is essential for validating their medicinal uses, particularly in traditional medicine, where herbal remedies have been used for centuries.

The study of locally hawked herbal decoctions offers great potential for the discovery of new, affordable, and accessible treatments for helminthic infections. Many plants used in



traditional medicine contain bioactive compounds that are yet to be fully explored or understood by modern science. Phytochemical analysis has revealed that many of these plants contain compounds such as tannins, alkaloids, and saponins, which possess Anthelmintic properties. The potential for these discoveries is particularly relevant in the context of growing resistance to conventional anti-parasitic medications. Pharmaceutical treatments, while effective, are becoming less reliable due to the increasing prevalence of drug-resistant helminth strains. This is especially problematic in regions with high infection rates, where effective treatments are most needed. Locally-sourced, plant-based medicines could provide a sustainable solution, offering affordable treatments that are less prone to inducing resistance in parasites (Siyabonga & Kokoette, 2023).

Another key benefit of validating the Anthelmintic potential of local decoctions is their affordability. Unlike pharmaceutical treatments, which are often priced beyond the reach of low-income families, herbal medicines derived from local plants are generally cheaper and easier to produce. They can be cultivated, harvested, and prepared with minimal financial outlay, making them a highly accessible option for economically disadvantaged populations (Mapfumari *et al.*, 2022). Hence, this study investigate the phytochemical profiling and in-vivo biological evaluation of local herb decoctions sold by traditional sellers for helminth control in three (3) Local Government Areas of Ogun state.

In many towns, the sale of locally prepared herbal decoctions for medicinal purposes is a common practice; these decoctions are believed to have healing properties, especially for treating helminthic infections, which are widespread in rural and semi-urban areas due to poor sanitation and limited access to modern healthcare. For generations, local communities have relied on these traditional remedies as affordable and accessible alternatives to pharmaceuticals. However, despite the widespread use of these herbal concoctions, there is limited scientific evidence validating their safety and effectiveness, leaving the health outcomes for users uncertain. Many of these hawked decoctions are prepared and sold by herbalists or vendors without any standardization, quality control, or regulatory oversight; this raises several public health concerns, as consumers may unknowingly be ingesting harmful microorganisms or toxic substances present in these herbal remedies.

However, the potential for microbial contamination and toxicity in these decoctions poses serious risks, including poisoning, organ damage, or other adverse health effects. Moreover,



the purported Anthelmintic properties of these herbal treatments have not been rigorously evaluated, which means users may not be receiving the therapeutic benefits they expect, potentially allowing parasitic infections to persist and spread; this situation presents a critical knowledge gap that needs addressing. While traditional medicine plays an essential role in the healthcare practices of many Nigerians, especially in underserved regions, the absence of scientific validation for these remedies undermines their potential contributions to public health. Furthermore, without understanding the phytochemical composition and biological activity of these local decoctions, it is difficult to assess their true medicinal value or identify any risks associated with their use.

Therefore, the problem at hand is twofold: the lack of evidence regarding the Anthelmintic effectiveness of these locally hawked herbal decoctions, and the potential health risks posed by microbial contamination and toxicity. This study therefore investigate the phytochemical profiling and in-vivo biological evaluation of local herb decoctions sold by traditional sellers for helminth control in three (3) Local Government Areas of Ogun state.

Although many people use these local herbal mixtures to treat illnesses, especially worm infections, however, there is not much scientific proof that they are safe and work well. As more people around the world use herbal medicine, it is important to do research to make sure these treatments are both effective and safe for everyone to use. Consequently, rigorous scientific studies are needed to assess the efficacy and safety of these herbal remedies. Helminth infections, such as those caused by roundworms, hookworms, and tapeworms, remain a major public health issue in Nigeria, particularly in regions with poor hygiene and sanitation practices. Local populations often turn to herbal remedies due to the high cost of conventional medications and limited access to healthcare facilities. However, without proper scientific evaluation, these treatments may expose users to potential risks, including harmful side effects or microbial contamination.

Hence, it is therefore imperative to carry out an ethnobotanical survey and validation of herbal decoctions for helminth control sold by traditional sellers in three (3) Local Government Areas of Ogun state.

The broad objective of this study is to conduct an ethnobotanical survey and validation of herbal decoctions for helminth control sold by traditional sellers in three (3) Local



Government Areas of Ogun state. The specific objectives of this study are to:conduct ethnobotanical survey of herbal decoctions sold to cure helminth infection;

The study would be beneficial to local communities, traditional herbalists and vendors, health practitioners (pharmacologists and medical professionals), government and policy makers, public health authorities and regulatory bodies, and academic researchers.

Local communities will benefit from this study as it provides scientific insights into the safety and efficacy of the traditional herbal decoctions they regularly use. By understanding the phytochemical constituents and potential Anthelmintic effects, they can make more informed decisions regarding their health. The study also raises awareness about any toxicity or microbiological contamination, helping to safeguard community health.

Traditional herbalists and vendors will gain credibility from the scientific validation of their remedies if found effective. This could improve their business, as more people would trust and buy their products. The study's findings may also guide them in refining the safety and formulation of their decoctions, helping them avoid practices that could harm their customers.

Health practitioners (pharmacologists and medical professionals) will benefit from the study by gaining insights into natural alternatives for treating helminth infections. The identification of bioactive compounds in local decoctions could lead to the development of new, cost-effective treatments. Additionally, the study will help healthcare providers educate patients on the safe use of traditional remedies alongside conventional medicine.

Government officials and policy makers will use the study's findings to draft informed regulations concerning the sale and use of traditional herbal decoctions. This can help create policies that ensure the safety of the public by regulating herbal medicine use, promoting the integration of safe and effective local remedies into healthcare. The study could also guide public health initiatives aimed at preventing helminth infections in the population.

Public health authorities and regulatory agencies like NAFDAC will benefit by having scientific data to regulate the quality and safety of herbal products in the market. They can use the findings to implement safety standards, monitor toxicity levels, and prevent the sale of harmful or contaminated decoctions. This ensures consumer safety and enhances public trust in traditional medicine practices.



Academic researchers will find the study useful for expanding the body of knowledge on phytochemicals and Anthelmintic compounds derived from traditional medicine. It provides a foundation for further research into the medicinal potential of local plants and could inspire interdisciplinary studies between pharmacology, toxicology, and microbiology. Additionally, the study may lead to collaborations that explore the commercialization or clinical testing of plant-based remedies.

2.0 MATERIALS AND METHODS

2.1 Research Design

The research designs adopted for this study were quasi-experimental and descriptive survey, in order to observe the ethnobotanical survey and validation of herbal decoctions for helminth control sold by traditional sellers in three (3) Local Government Areas of Ogun state, Nigeria.

2.2 Study Area

The study was conducted in Odogbolu, Ijebu-Ode, and Ijebu-North Local Government Areas of Ogun State, Nigeria. This region is characterized by its rich biodiversity and traditional practices, including the use of local decoctions for medicinal purposes. The local markets such as New market, Ijebu-Ode, Oke-Aje market, Ijebu-Ode, Ita Ale market, Ijebu ode, Obode market, Odogbolu, Efirin market, Odogbolu, Ita Ale market, Odogbolu, Obada market, Ijebu Igbo, Atiko market, Ijebu Igbo, and Ita Ale market, Ijebu Igbo are vibrant, with numerous vendors selling herbal remedies that are commonly used in the treatment of various ailments, including helminth infections.*9

2.3 Sample Collection

A comprehensive collection of local decoctions was carried out in in three (3) Local Government Areas of Ogun state, which are Odogbolu, Ijebu-Ode, and Ijebu-North Local Government. Various vendors were approached to ensure a representative sample of the decoctions available in these areas. Each decoction sample was carefully labeled with detailed information, including the location of collection, vendor information, and any claims regarding the therapeutic uses as reported by the vendors. The samples were collected in sterilized containers to prevent contamination and transported to the laboratory for analysis



2.4 Population

The population of the study comprised of traditional medical practitioners and traditional midwives who hawk local decoctions hawked in major towns of Odogbolu, Ijebu-Ode, and Ijebu-North Local Government Areas of Ogun State, Nigeria.

2.5 Sample and Sampling Technique

Simple random sampling technique was used to select the sample size. However, a sample of 9 informants participated in this study, whereby three (3) participants were randomly selected from each local government i.e. Odogbolu, Ijebu-Ode and Ijebu-North, all in Ogun state.

2.6 Procedure of Data Collection

Ethnobotanical data for this study was collected using two primary instruments: questionnaires and interview guides. These tools were carefully designed to complement each other, providing both quantitative and qualitative insights into the preparation, use, and efficacy of local decoctions hawked for helminth care by traditional medical practitioners and midwives in Odogbolu, Ijebu-Ode, and Ijebu-North Local Government Areas of Ogun State, Nigeria.

The questionnaire was structured to collect standardized data from respondents and consists of three sections. The first section gathered socio-demographic information, including the age, gender, and years of experience of the practitioners. The second section focused on the respondents' knowledge of Anthelmintic remedies, exploring the types of plants used, their local names, preparation methods, dosages, and observed efficacy. The third section addressed challenges faced in the practice, such as difficulties in sourcing plants and community perceptions, as well as suggestions for preserving and improving the practice. The questionnaire was designed to be simple and clear, with both closed-ended and open-ended questions to ensure ease of understanding. To enhance clarity, the questions were administered in Yoruba, the local language, allowing respondents to provide detailed and accurate responses.

The interview guide was a semi-structured tool that facilitates deeper exploration of the respondents' experiences and practices. It allows for flexibility, enabling interviewers to probe further into areas of interest during the conversations. The interview began with introductory questions to establish rapport and gather background information on the respondents' involvement in traditional medicine. Subsequent sections delved into their



knowledge of Anthelmintic plants, preparation techniques, perceived efficacy, and safety considerations. Another key focus was on the challenges faced in the practice, including the availability of medicinal plants and knowledge transfer to younger generations. Respondents also provided recommendations for enhancing the use and sustainability of local decoctions. The interviews were conducted one-on-one in Yoruba to ensure confidentiality and a comfortable environment for the respondents. Each session was audio-recorded with the participants' consent and later transcribed and translated into English for analysis.

3.0

RESULTS AND DISCUSSION

3.1 Results

Table 1 presents the background information of the 9 local herbal decoction sellers who took part in the study. The result for gender showed that 5 (55.6%) were male and 4 (44.4%) were female. This means more men participated than women.

Based on their age, 1 (11.1%) was below 30 years, 3 (33.3%) were between 30–40 years, 1 (11.1%) was between 41–50 years, 2 (22.2%) were between 51–60 years, and 2 (22.2%) were above 60. This shows most participants were between 30 and 40 years.

Based on their occupation, 3 (33.3%) were traditional medical practitioners, 3 (33.3%) were traditional midwives, 2 (22.2%) sold herbal decoctions, and 1 (11.1%) had other jobs.

Based on their years of herbal practice, 1 (11.1%) had less than 5 years of experience, 3 (33.3%) had 5–10 years, 3 (33.3%) had 11–20 years, while 2 (22.2%) had more than 20 years. This shows most had been in the practice for several years.

For local government, 3 (33.3%) were from Odogbolu, 3 (33.3%) from Ijebu-Ode, and 3 (33.3%) from Ijebu-North. The same number of people was selected from each location.



Table .1: Demographic information of the respondents

Question	Options	Frequency	Percentage (%)
Gender	Male	5	55.6
	Female	4	44.4
Age	Below 30	1	11.1
	30-40	3	33.3
	41-50	1	11.1
	51-60	2	22.2
	Above 60	2	22.2
Occupation	Traditional Medical Practitioner	3	33.3
	Traditional Midwives	3	33.3
	Herbal Decoction Hawkers	2	22.2
	Others (e.g. farmer)	1	11.1
Years of Experience in Practice	Less than 5 years	1	11.1
	5-10 years	3	33.3
	11-20 years	3	33.3
	Above 20 years	2	22.2
Local Government Area	Odogbolu	3	33.3
	Ijebu-Ode	3	33.3
	Ijebu-North	3	33.3
Total Respondents		9	100.0

Table 2 shows the responses of the 9 participants based on mode of preparation of local herbal decoctions for treating helminth infections.

All 9 participants (100.0%) said they prepare or sell herbal decoctions for helminth care. This means every participant is directly involved in this practice. When asked about the types of helminths treated, 9 (100.0%) mentioned roundworms, 7 (77.8%) mentioned hookworms, and 7 (77.8%) mentioned tapeworms. This shows that roundworms are the most commonly treated, and many also treat hookworms and tapeworms.

Based on herb sellers' knowledge, 4 (44.4%) said it was passed down by elders, 3 (33.3%) said they learnt by trying it themselves, and 2 (22.2%) said they learnt through training or apprenticeship. This means most people inherited the knowledge from elders. On challenges in getting the plants, 2 (22.2%) said yes, there are problems—mainly due to seasonal availability. The other 7 (77.7%) said they do not face problems. Only 1 (11.1%) said some plants are now scarce, while 8 (88.8%) said no, the plants are still available. The study showed that 44% of the respondents claimed that knowledge of the plants is reducing while 55.5% of the respondents had a contrary view.

Hence, herbal decoctions are used to treat helminth infections, mainly roundworms, with varied preparation methods, ingredients, and dosages, but without a standardized practice or restriction.

Table 2: Knowledge sharing, challenges and mode of preparation of local herbal decoctions for treating helminth infections.

Question	Options/Responses	Frequency	Percentage (%)	Open-ended comments
Do you prepare/sell decoctions for helminth care?	Yes	9	100.0	
	No	0	0.0	
Types of helminths treated	Roundworms	9	100.0	
	Hookworms	7	77.8	
	Tapeworms	7	77.8	
Commonly mentioned plant parts used	Roots, leaves, seeds, stems	-	-	
Preparation method	Soaking in water	6	66.7	
	Grinding or cutting herbs	3	33.3	
Dosage - Adult	Glass cup/Schnapp	-	-	
Dosage - Child/Baby	Teaspoon/ cup/Syringe	$\frac{1}{4}$ -	-	
Are there people who shouldn't use it?	Yes (e.g., pregnant, babies, ulcer)	3	33.3	
	No	6	66.7	
How knowledge was acquired	Passed down from elders	4	44.4%	-



Challenges in sourcing plants	Personal experimentation	3	33.3%	-
	Training/apprenticeship	2	22.2%	-
	Other	0	0%	-
	Yes	2	22.2%	Some plants are seasonal
Any plants now scarce or unavailable	No	7	77.7%	-
	Yes	1	11.1%	No specific plant mentioned
Is knowledge of these plants reducing in the community?	No	8	88.8%	-
	Yes	4	44.4%	-
	No	5	55.5%	-

Table 3 presents the profile of plants that respondents in the study claimed they use to treat helminth infections, especially roundworms. A total of 30 plant entries were listed.

From the result, it is clear that roundworms are the most common type of worm treated with these plants, while only a few are used to treat tapeworms and hookworms. Most of the plants were used by only one or two respondents.

Among all the plants mentioned in the study, *Cascabela thevetia* (Yellow Oleander) had the **highest Relative Frequency of Citation (RFC) and Use Value (UV)**, both at **0.44**. This means it was the most commonly mentioned and trusted plant for treating helminth infections, especially roundworms. Following closely is *Monodora myristica* (Ijebu Monodora), which also showed high values with an RFC and UV of **0.33**, which implies that it is fairly well-known and frequently used by people in the area.

On the other hand, several plants had the **lowest RFC and UV values**, both at **0.11**. These include *Dioscorea rotundata* (White Yam), *Amaranthus hybridus* (African Spinach), and *Zingiber officinale* (Ginger). These plants were mentioned by only one respondent each.

Hence, the result reveals a rich knowledge of herbal remedies among the people surveyed. Although some plants are widely used and trusted, many others are used less often, suggesting that individual experience, cultural beliefs, or local availability may influence plant selection.

Table.3: Profile of plants claimed by the respondents

S/N	Family	Scientific name	Local name	Common name	Plant part used	Types of Helminths Treated	Frequency	RFC	UV
1	Annonaceae	<i>Monodora myristica</i>	Egbo Awogba	Ijebu	Seeds	Roundworms	3	0.33	0.33
2	Lamiaceae	<i>Ocimum gratissimum</i>	Arun Ijebu	Monodora	Leaves	Roundworms	2	0.22	0.22
3	Dioscoreaceae	<i>Dioscorea rotundata</i>	Egbo Asin	African Basil	Tubers	Roundworms	1	0.11	0.11
4	Apocynaceae	<i>Cascabela thevetia</i>	Egbo Apa Aran	White Guinea Yam	Leaves,	Roundworms	4	0.44	0.44
5	Fabaceae	<i>Arachis hypogaea</i>	Funfun	Yellow Oleander	Seeds	Roundworms	2	0.22	0.22
6	Piperaceae	<i>Piper guineense</i>	Epo Erin	Peanut	Seeds	Roundworms	2	0.22	0.22
7	Euphorbiaceae	<i>Jatropha curcas</i>	Egbo Ato	African Pepper	Fruits	Roundworms	1	0.11	0.11
8	Meliaceae	<i>Khaya senegalensis</i>	Epo Sapo	Sapo Tree	Leaves, Seeds	Roundworms	1	0.11	0.11
9	Sapotaceae	<i>Chrysophyllum albidum</i>	Madunmaro	African Mahogany	Bark	Roundworms	3	0.33	0.33
10	Meliaceae	<i>Lovoa trichilioides</i>	Aso Feyeye	African Star Apple	Fruits	Roundworms	1	0.11	0.11
11	Rosaceae	<i>Prunus africana</i>	Akogun	African Oak	Bark	Roundworms	1	0.11	0.11
12	Asteraceae	<i>Vernonia amygdalina</i>	Abere	African Cherry	Bark	Roundworms	3	0.33	0.33
13	Fabaceae	<i>Parkia biglobosa</i>	Omi Osan	African Bitters	Leaves	Roundworms	2	0.22	0.22
14	Fabaceae	<i>Pterocarpus erinaceus</i>	Wewe	African Locust Bean	Seeds	Roundworms	2	0.22	0.22
15	Combretaceae	<i>Combretum imberbe</i>	Egbo Oriri	African Rosewood	Bark	Roundworms	2	0.22	0.22
16	Solanaceae	<i>Solanum aethiopicum</i>	Egbo Itapara	African Bush Willow	Bark	Roundworms	2	0.22	0.22
			Egbo Ako	African Eggplant	Fruits	Roundworms	2	0.22	0.22



17	Moraceae	<i>Treculia africana</i>	Egbo Tude	African Breadfruit	Fruits	Roundworms, Tapeworms	1	0.11	0.11
18	Moraceae	<i>Ficus exasperata</i>	Egbo Ipeta	African Fig Tree	Leaves	Roundworms, Tapeworms	1	0.11	0.11
19	Euphorbiaceae	<i>Jatropha gossypifolia</i>	Egbo Aidountoro	African Black Soap Tree	Leaves, Seeds	Roundworms	1	0.11	0.11
20	Fabaceae	<i>Pterocarpus soyauxii</i>	Cafura	African Camwood	Wood	Roundworms	3	0.33	0.33
21	Irvingiaceae	<i>Irvingia gabonensis</i>	Egbo Jedi	African Bush Mango	Seeds	Roundworms, Hookworms, Tapeworms	1	0.11	0.11
22	Amaranthaceae	<i>Amaranthus hybridus</i>	Onafuru	African Spinach	Leaves	Roundworms	1	0.11	0.11
23	Bignoniaceae	<i>Spathodea campanulata</i>	Ariwo	African Tulip Tree	Flowers	Roundworms	1	0.11	0.11
24	Burseraceae	<i>Dacryodes edulis</i>	Aya Leave	African Pear	Leaves	Roundworms	1	0.11	0.11
25	Zingiberaceae	<i>Zingiber officinale</i>	Jinija	African Ginger	Rhizomes	Roundworms	2	0.22	0.22
26	Cucurbitaceae	<i>Citrullus lanatus</i>	Epaku	African Melon	Fruits	Roundworms	1	0.11	0.11
27	Malvaceae	<i>Hibiscus sabdariffa</i>	Sokoro	African Sorrel	Leaves	Roundworms	1	0.11	0.11
28	Malvaceae	<i>Adansonia digitata</i>	Bonu	African Baobab	Fruits, Leaves	Roundworms	1	0.11	0.11
29	Combretaceae	<i>Combretum imberbe</i>	Ako Ogun	African Bushwillow	Bark	Roundworms	1	0.11	0.11
30	Fabaceae	<i>Arachis hypogaea</i>	Groundnut Water	Groundnut	Seeds	Roundworms	1	0.11	0.11



Table.4 shows the ethnobotanical study of local decoctions used against helminths in Ogun state. The result showed that all the 9 participants (from Odogbolu, Ijebu-Ode, and Ijebu-North) prepare or sell decoctions for treating worm infections. The most common helminth treated is roundworm, but many also treat hookworms and tapeworms. Most of the decoctions use roots, leaves, and seeds of various local medicinal plants. Common plants mentioned include Egbo, Abeere, Kafura, Kanafuru, and Ginger. The preparation method is mostly by soaking or mixing the herbs with water, sometimes with lime water or groundnut water. Dosage varies i.e. Some use a schnapp cup or glass shot, while others give specific teaspoon measurements for adults and children. Most participants say anyone can use the decoctions, but some warn pregnant women, babies, ulcer patients, or people under 80 years old to avoid them.



Table 4: Ethnobotanical study of Local Decoctions Used against Helminths

S/N	LGA	Participant	Prepare/Sell Decoction	Types of Helminths Treated	Plant Names (Local)	Plant Parts Used	Preparation Method	Dosage & Administration	Who Should Not Use
1	Odogbolu	P1	Yes	Roundworms, Hookworms, Tapeworms	Egbo Ako Amoje, Egbo Itapara, Egbo Oriri, Ewe Madumaro	Root, Leaves	Mix with water	Schnapp glass cup	No restriction
2	Odogbolu	P2	Yes	Roundworms	Egbo Paran Pupa, Paran Funfun, Egbo Ato, Epo Erin, Madumaro, Asofeyeye, Akogun, Abeere, Cashew, Omu Osan Were	Roots, Leaves, Seeds	Cut roots, soak in lime water for 18 – 24hrs	Adult: 5 tsp, Child: 2.5 tsp before meals	Pregnant women, ulcer patients
3	Odogbolu	P3	Yes	Roundworms	Egbo Awogba Arun Ijebu, Egbo Asin, Egbo Apa Aran Funfun	Roots	Cut into water, add kafura	1 shot morning and night	Below 80 years
4	Ijebu-Ode	P4	Yes	Roundworms, Hookworms, Tapeworms	Abeere, Egbo Awogbarun, Egbo Paran Pupa ati Funfun, Egbo Atapari Obuko, Egbo Tude, Epo Orira, Egbo Ipeta, Egbo Aidan Toro	Roots	No response	Adult: ½ cup, Baby: 1 tsp morning & night	No restriction



S/N	LGA	Participant	Prepare/Sell Decoction	Types of Helminths Treated	Plant Names (Local)	Plant Parts Used	Preparation Method	Dosage & Administration	Who Should Not Use
5	Ijebu- Ode	P5	Yes	Roundworms, Hookworms, Tapeworms	Apere, Groundnut Water, Kafura	Not Specified	Grind Abeere, mix with groundnut water & kafura	Adult: Small cup, Child: ¼ cup	Baby
6	Ijebu- Ode	P6	Yes	Roundworms	Egbo Jedi, Paran Pupa, Awogba Arun, Paran Funfun, Abeere, Ariwo, Boni Seed, Kanafuru, Kafura Kanafuru, Ginger, Ewe Alubosa, Aidan, Soroko, Kafura, Igi Jedi, Isu Baka, Epaku, Bonu, Aya	Roots, Seeds	Wash herbs	Adult: Glass cup, Child: 1 tsp, Baby: Syringe	No restriction
7	Ijebu- North	P7	Yes	Roundworms, Hookworms, Tapeworms	Kanafuru, Ako Ogun, Abeere, Efirin, Kafura, Eru, Madunmaro, Ifun, Epo Ira, Boni	Roots, Leaves, Stem	Soak herbs in water 8 hrs	Take small- small, no fixed dose	No restriction
8	Ijebu- North	P8	Yes	Roundworms, Hookworms, Tapeworms	Kafura, Paran Pupa, Paran Runfun, Ewe Alubosa	Roots, Seeds, Leaves	Soak herbs in bottle	1 schnapp cup early morning	No restriction
9	Ijebu- North	P9	Yes	Roundworms, Hookworms, Tapeworms		Roots, Leaves	Soak in bottle 3 days	Adult: 2 tsp, Child: 1 tsp morning & night	No restriction



Plant Parts Used in the Treatment of Helminths

Figure 4.1 shows the different parts of plants that people use to treat helminth (worm) infections, based on how often each part was mentioned and its percentage out of the total. The result showed that the roots of plants (40.0%) are the most commonly used part, followed by leaves (26.0%), seeds (12.0%), bark (10.0%), fruits (8%), tubers (2.0%) and rhizomes (2.0%).

Hence, different parts of plants are used in traditional treatment of worms, but the roots and leaves are the most preferred by local people.

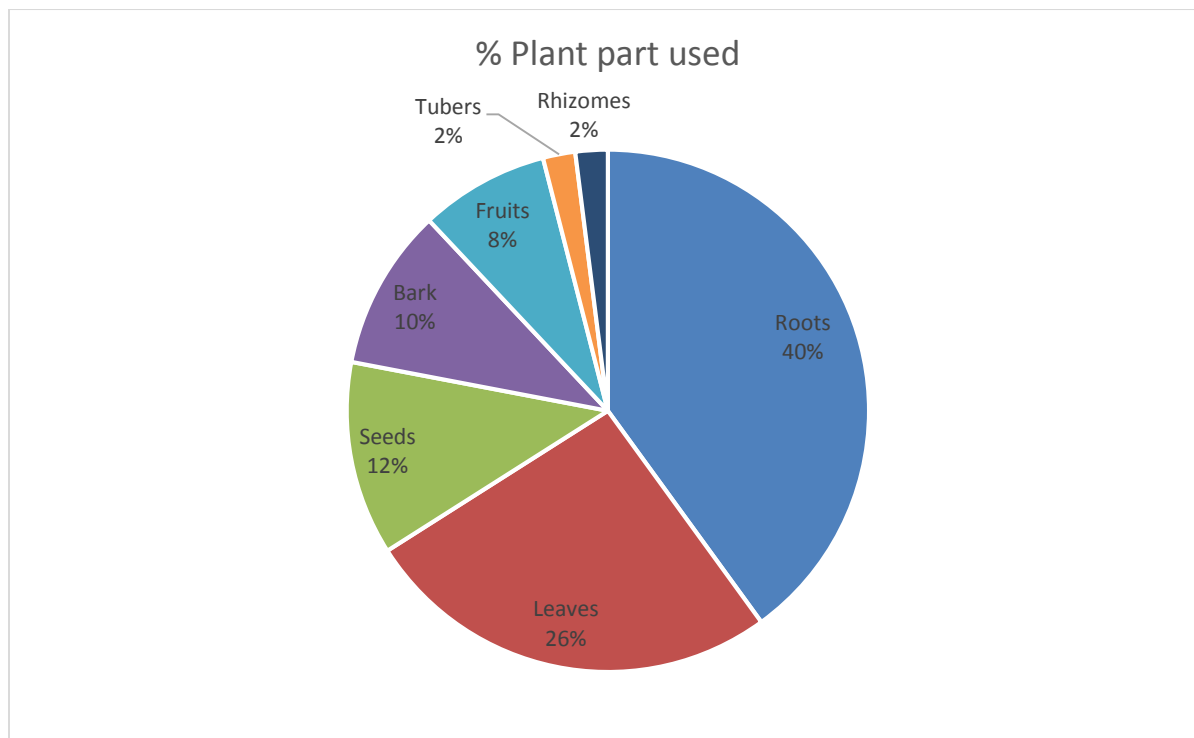


Figure 4.1: Percentage of the different plant part used in the treatment of helminths

Table 5 shows the herb sellers' perception on how effective and safe local herbal decoctions are when used to treat worm infections. The information is based on both their answers to simple questions and the comments they gave.

First, looking at effectiveness, most of the respondents—about 56%—said the decoctions are *very effective*. Another 33% said they are *effective*, while only one person (11%) said they are just *moderately effective*. No one said the decoctions were not effective at all. This means that most people believe these local remedies work well in treating worm infections.

When asked about side effects, about 44% said yes, they had noticed some side effects. The most common problems mentioned were body weakness and stomach ache, especially when the decoctions were taken in large amounts. However, over half (about 56%) of the people said they had *not* experienced any side effects at all. This suggests that while many users find the herbs safe, there is still a risk if not used properly.

As for how people test the safety of the decoctions, 44% of them said they use specific methods to make sure the herbs are clean and safe. Some of the things they do include washing the herbs before



use, storing them in cool places, raising or drying them properly, and covering them to avoid contamination. However, 55% of the people gave *no answer* to this question, which may mean that many users either do not test the safety or are unsure of how to explain their process.

When it comes to overdose or bad reactions, 33% of the respondents said they had noticed such problems. They mentioned symptoms like stooling (diarrhea), body weakness, and even psychological issues. But the majority—around 67%—said they had *not* seen any overdose reactions.

Hence, most people trust local decoctions to be effective in treating worms, and many believe they are safe if used the right way. Still, a few side effects and reactions have been noticed, especially when taken too much. Some people take steps to keep their remedies clean and safe, but others may not be following any clear method.

Table .5: Effectiveness and Safety of Local Decoctions

Question	Option/Response	Frequency	Percentage (%)	Open-ended Comments
Effectiveness	Very effective	5	55.5%	-
	Effective	3	33.3%	-
	Moderately effective	1	11.1%	-
	Not effective	0	0%	-
Side Effects	Yes	4	44.4%	<i>Too much can cause body weakness, stomach ache</i>
	No	5	55.5%	-
How Safety is Tested	Given a method	4	44.4%	<i>Wash before use, store in cool place, raise it, cover to avoid contamination</i>
	No response	5	55.5%	-
Observed Overdose or Reaction	Yes	3	33.3%	<i>Stooling, body weakness, psychology problem</i>
	No	6	66.7%	-



3.2 Discussion of Findings

The study showed that herbal decoctions are used to treat helminth infections, mainly roundworms, with varied preparation methods, ingredients, and dosages, but without a standardized practice or restriction. This finding aligns with the study of Codruta *et al.* (2020) who asserted that local herbal remedies are commonly used as the first line of defense against helminthic infections in sub-Saharan Africa. It also aligns with Jain *et al.* who observed that many people in Africa rely on plant-based remedies due to their cultural acceptance and affordability, even when standardization is lacking. Similarly, Ssenku *et al.* (2022) found that most traditional healers in Eastern Uganda use a wide range of plants with varying preparation methods and dosages, often relying on oral traditions instead of scientific measurements. Fusong *et al.* (2023) also reported that among the Gelao people, herbal decoctions were made from different plant parts and lacked hygienic and dosage controls.

The study showed that herbal decoctions made from local plants are used mainly for treating roundworms, using varied preparation methods and dosages, with some cautioning against use by vulnerable groups. This finding is consistent with the study of Rabiou *et al.* (2024) who explained that soil-transmitted helminths such as roundworms are a major public health challenge in poor areas, and many people turn to traditional remedies, often administered without strict control. Similarly, Ya'aba *et al.* (2020) emphasized that people believe herbal remedies are safer than pharmaceutical drugs, though dosages are often inconsistent and not regulated. This finding also aligns with Fusong *et al.* (2023) who observed that while some Gelao elders were cautious with vulnerable groups, the lack of hygiene and dosage regulation remained a challenge. Furthermore, Achika *et al.* (2023) supported this by noting that traditional medicines are often personalized based on symptoms but lack standard dosing systems.

The study showed that people have good knowledge of herbal remedies; although some plants are widely used and trusted, many others are used less often. This finding is in support with the study of Abudulahi *et al.* (2020) who emphasized that traditional medicine is deeply rooted in cultural and spiritual knowledge, passed down through generations. It also agrees with Ssenku *et al.* (2022) who found that rural herbalists demonstrated high consensus on the most commonly used remedies, showing rich traditional knowledge. Similarly, Fusong *et al.* (2023) reported that the Gelao people had extensive herbal knowledge, but certain herbs were more prominent than others due to their perceived effectiveness. Furthermore, Jain *et al.* (2022) confirmed that although



traditional medicine is widespread, trust is often placed on only a few familiar plants, while others are less popular due to lack of proven results or awareness.

The study showed that different parts of plants are used in traditional treatment of worms, but the roots and leaves are the most preferred by local people. This finding is consistent with the study of Ssenku *et al.* (2022) who found that leaves (80%) and roots (15%) were the most commonly used parts of medicinal plants in Eastern Uganda, especially for decoctions. Similarly, Fusong *et al.* (2023) revealed that among the Gelao people, the roots, rhizomes, and whole plants were the most used for treating illnesses including digestive issues and helminths. Ya'aba *et al.* (2020) also reported that people preferred using parts of plants they were familiar with and had passed down through generations, often roots and leaves due to perceived effectiveness. Enogiomwan *et al.* (2023) supported this finding by emphasizing that different plant parts are used to treat parasitic infections, with roots and leaves being prominent due to their accessibility and therapeutic belief systems. Thus, the preference for roots and leaves in traditional worm treatment is well-supported in literature.

The study revealed that most people believe local herbal decoctions are effective and generally safe for treating worm infections, though some report side effects and few follow clear safety measures. This finding aligns with the study of Omotayo *et al.* (2022) who asserted that traditional medicine, especially herbal decoctions, remains a primary healthcare solution in many rural areas, often trusted for its effectiveness. Similarly, Adamu *et al.* (2019) emphasized that bioactive compounds in local herbs such as saponins and flavonoids have proven Anthelmintic properties, which likely reinforce public confidence in their use. However, this finding also partially aligns with Tchetan (2022), who reported that while herbal treatments are often effective, certain extracts exhibited cytotoxicity, indicating that some side effects and safety concerns exist. In addition,) confirmed the strong Anthelmintic effects of plant-based decoctions but also highlighted the need for dose regulation, reinforcing concerns about improper use or lack of safety measures. Hence, while the perception of effectiveness is widespread and supported by scientific findings, reported side effects underline the importance of standardized preparation and awareness of potential risks.



4.0 CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

This study has revealed several important aspects of local herbal decoctions used in the treatment of helminth infections. Firstly, the use of herbal decoctions is common among local populations, especially for treating roundworms, but the absence of standardized preparation, dosage, and quality control poses potential risks. Secondly, while many of the decoctions are prepared using local plants with varied techniques, some users are aware of the risk to vulnerable groups such as children and pregnant women, though these precautions are not always strictly followed. Thirdly, community members demonstrate considerable knowledge of herbal remedies, but while a few plants are widely used and trusted, others are known but rarely used, possibly due to limited evidence or cultural preferences. Roots and leaves are the most commonly used plant parts in worm treatment, likely because they are believed to contain more active compounds. From a botanical perspective, the Fabaceae family was the most represented, emphasizing its popularity and possible bioactivity. The general belief in the effectiveness and safety of these decoctions remains high, although reports of side effects and poor adherence to safety measures raise concern.

4.2 Recommendations

Based on the findings, the following recommendations were made:

- i. Government agencies should develop and promote standardized methods for preparing and using herbal decoctions to ensure safety.
- ii. Herbal practitioners should clearly guide consumers, especially vulnerable groups, on dosage and use restrictions.
- iii. Public health campaigns should strengthen and expand community knowledge of herbal remedies based on validated research.
- iv. More attention should be given to sustainable harvesting and proper processing of roots and leaves, as these are the most used parts.
- v. Researchers should investigate the Apocynaceae family further for possible development of standardized Anthelmintic products.
- vi. Public awareness should be raised about potential side effects of herbal decoctions and the importance of observing safety precautions.



- vii. Veterinary practitioners should monitor haemoparasites in cattle regardless of breed, given the widespread infection.
- viii. All three regions should be considered equally viable for sourcing decoctions, given the consistent phytochemical levels.
- ix. Farmers and producers should be encouraged to cultivate and process plants that provide essential minerals in herbal preparations.
- x. Health researchers should evaluate the long-term haematological effects of these decoctions at varying dosages to determine safe limits.
- xi. Herbal mixtures should be tested for their impact on liver and kidney functions before human consumption to avoid organ damage.
- xii. Traditional herbal sellers should be trained on proper dosage levels to reduce the risk of potential long-term organ stress or toxicity.
- xiii. Further long-term studies should be conducted to assess the chronic effects of these herbal decoctions on organ functions.

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