

# Evaluation of Medicinal Plants Used in the Treatment and Management of HIV/AIDS in Uganda

**Masembe Francisco and Ssegane Jude**

**Faculty of Clinical Medicine and Dentistry, Kampala International University, Uganda.**

**Email: francisco.masembe@studwc.kiu.ac.ug; jude.ssegane@studwc.kiu.ac.ug**

---

## ABSTRACT

For so many years traditional medicinal practices (TMPs), particularly the use of medicinal plants, have been widely employed in Uganda for managing HIV/AIDS-related symptoms and supporting immune function. Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS) continue to be major global health concerns, particularly in sub-Saharan Africa, where Uganda remains one of the countries most affected by the epidemic. Despite significant advancements in antiretroviral therapy (ART), access to conventional medicine remains limited in resource-constrained regions like Uganda thus prompting the exploration of alternative approaches to complement antiretroviral therapy (ART) which includes medicinal practices, especially the use of medicinal plants in the management of HIV/AIDS. This review aims to compile and critically assess the existing literature on the medicinal plants employed in the treatment and management of HIV/AIDS in Uganda. We conducted a comprehensive literature search of PubMed, ResearchGate and Google Scholar databases from January 2023 to July 2023. The search key words used were medicinal plants used in management of HIV/AIDS in Uganda to extract full-text research articles and proceedings from International Conferences published only in English. Many medicinal plants were identified during this review however data supporting their role in the management of HIV/AIDS in Uganda is still scanty yet with a few documented cytotoxicities warranting further investigation. However it's important to note that the mechanism of action of majority of these medicinal plants used in the management of HIV/AIDS in Uganda remains unknown in the world of science and yet many more medicinal plants used remain unknown since those that had knowledge about their location didn't document, thus Collaboration between traditional healers, scientists, and healthcare professionals is essential to maximize the potential benefits of these medicinal plants in combating HIV/AIDS in the region.

**Key words:** HIV/AIDS, TMPs, ART, Cytotoxicity, Medicinal Plants.

---

## INTRODUCTION

Uganda has a rich history of traditional medicine, and medicinal plants play a crucial role in the management of various health conditions, including HIV/AIDS. This section introduces the prevalence of HIV/AIDS in the world and Uganda including its origin, the significance of traditional medicinal practices, and the rationale for exploring medicinal plants as potential adjunct therapies for HIV management [1].

### ORIGIN OF HIV

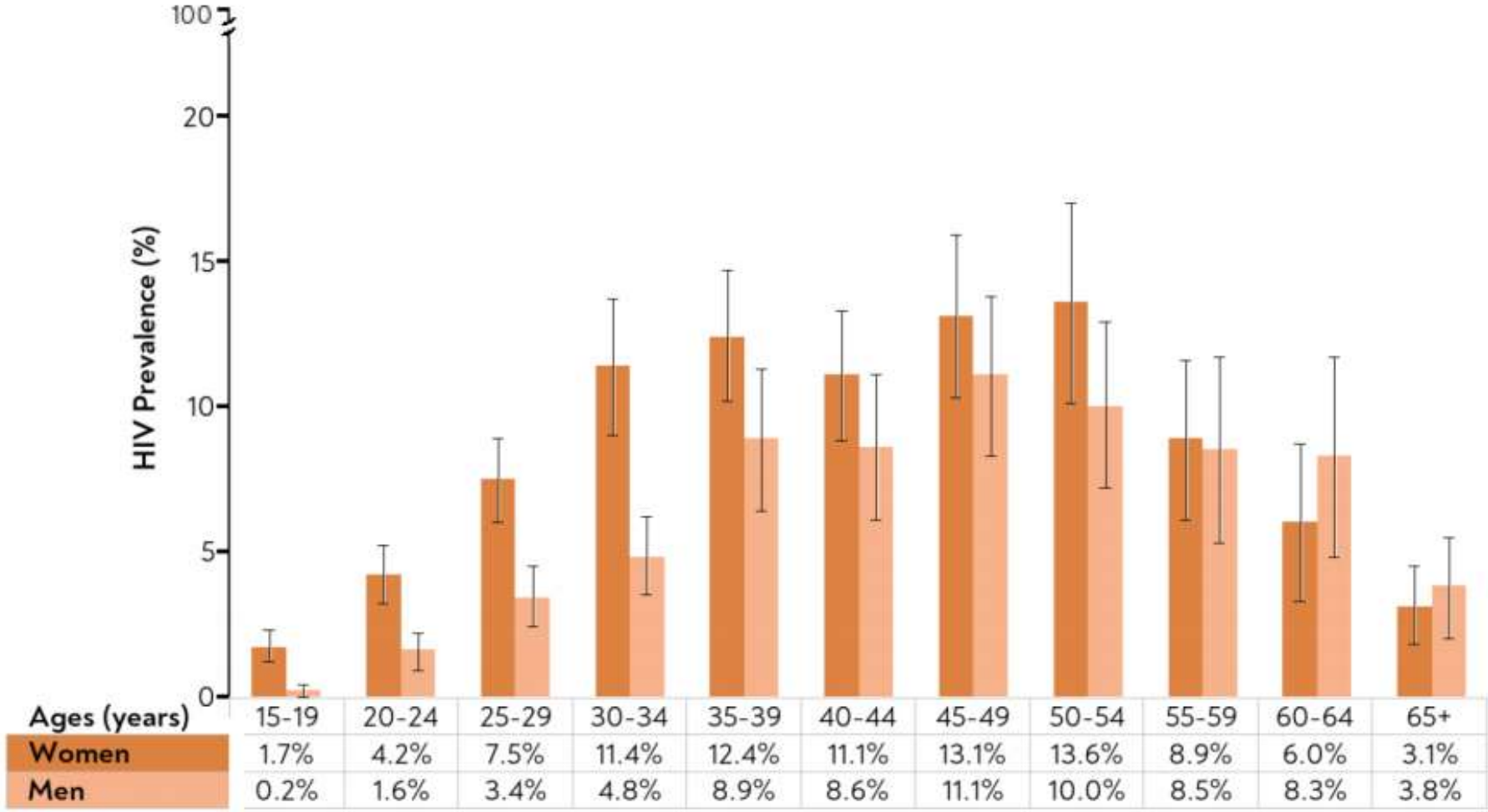
Acquired immunodeficiency syndrome (AIDS) is a chronic and potentially fatal disease of the immune system caused by the human immunodeficiency virus (HIV). The virus attacks a specific type of white blood cells known as T-lymphocytes which are critical to the normal functioning of the human immune system that defends the body against all types of illnesses [2]. These cells are measured in the blood as CD4 count, and the lower the CD4 count, the weaker the immune system. Healthy people have between 600-1200 cells/mm<sup>3</sup> of blood. When CD4 cells count is less than 200 cells/mm<sup>3</sup>, this is considered an advanced stage of HIV called AIDS. Therefore, CD4 cells act to control and direct the immune response and are used to monitor the progress of HIV infection [3, 4, 5]. The consequences of a weak immune system in HIV/AIDS include the manifestations of opportunistic infections of which skin diseases form a large portion. Opportunistic infections involve multiple systems of the body such as immune, gastrointestinal, genitourinary, endocrine, dermatological and nervous system. HIV belongs to the lentivirus, subfamily of the retroviridae and is a single-stranded RNA virus. AIDS in humans is caused by two lentiviruses, HIV-1 and HIV-2, identified in 1983 and 1986 respectively. HIV-1 has long been suspected to be of chimpanzee origin. Both HIVs are a result of multiple cross species transmissions of simian immunodeficiency virus (SIV) naturally infecting African primates. However, one transmission event, involving SIVcpz from chimpanzees in southeastern Cameroon gave rise to HIV-1 group M; the principle cause of the AIDS pandemic, which has infected millions of people worldwide and is found in virtually every country on the globe. In humans, HIV can be transmitted through infected blood, semen, vaginal secretions, breast milk, and during pregnancy or delivery of a new born. The first AIDS case was diagnosed in 1981 in the United States, when cases of rare diseases caused by unknown virus among homosexual men were reported. Such can include pneumonia caused by *pneumocystis carinii* and Kaposi sarcoma, a rare skin cancer caused by a virus. Since then, the disease has spread to epidemic proportions around the world [6, 7, 8]. HIV/AIDS affects mankind globally, but the highest prevalence is in Sub-Saharan Africa (with 68% of all cases of HIV/AIDS and a prevalence above 15% in some regions), and in some areas of South-East and Central Asia. In 2013, about 35 million people globally were living with the HIV infection, 2.1 million people became newly infected with HIV, while 1.5 million people died from AIDS-related illnesses. However, treatment is not available globally and UNAIDS still estimates that there are currently 5000 AIDS – related deaths worldwide per day. In Uganda, the first case was identified in 1982 along the shores of Lake Victoria. Consequently, the epidemic spread very fast to all parts of the country initially concentrating in urban and semi-urban centers. By the end of 1992, the national prevalence rate was estimated at 18.3% with some centers registering rates above 30%. This was followed by a steady decline in prevalence rates from the mid 1990s to 2000 to around 6% attributable to favourable prevention policies. Uganda's HIV seroprevalence rate of 7.3% among adults and 0.7% among children is among the world's highest 2, with an estimated 1.3 million people living with HIV. About 43% of new infections occur among married people in monogamous heterosexual relationships. The HIV pandemic is currently the most socio-economic challenge that faces the most economic productive sectors of society – the young and women. The western region of Uganda has the most marked variability and antenatal HIV prevalence, with Mbarara district recording the highest HIV prevalence rate of 13.7% in the region. Poverty, underdevelopment and illiteracy contribute to the spread of HIV in the developing world, yet HIV/AIDS is also observed to aggravate the poverty situation thus hindering development efforts. This calls for a fast mechanism of intervention by applying all forms of remedy, to combat the alarming rates [9].

### Global HIV STATISTICS

- 39.0 million [33.1 million–45.7 million] people globally were living with HIV in 2022.
- 1.3 million [1 million–1.7 million] people became newly infected with HIV in 2022.
- 630 000 [480 000–880 000] people died from AIDS-related illnesses in 2022.
- 29.8 million people were accessing antiretroviral therapy in 2022.
- 85.6 million [64.8 million–113.0 million] people have become infected with HIV since the start of the epidemic.
- 40.4 million [32.9 million–51.3 million] people have died from AIDS-related illnesses since the start of the epidemic.

### HIV PREVALENCE, IN UGANDA BY AGE AND SEX

Among adults (ages 15 years and older), HIV prevalence ranged from 1.7% among older adolescent girls aged 15-19 years to 13.6% among women aged 50-54 years, and from 0.2% among older adolescent boys aged 15-19 years to 11.1% among men aged 45-49 years. HIV prevalence was more than twice as high among women than among men in each 5-year age group from ages 15-19 years through 30-34 years and to a lesser extent among men, from ages 15-19 to 35-39 years.

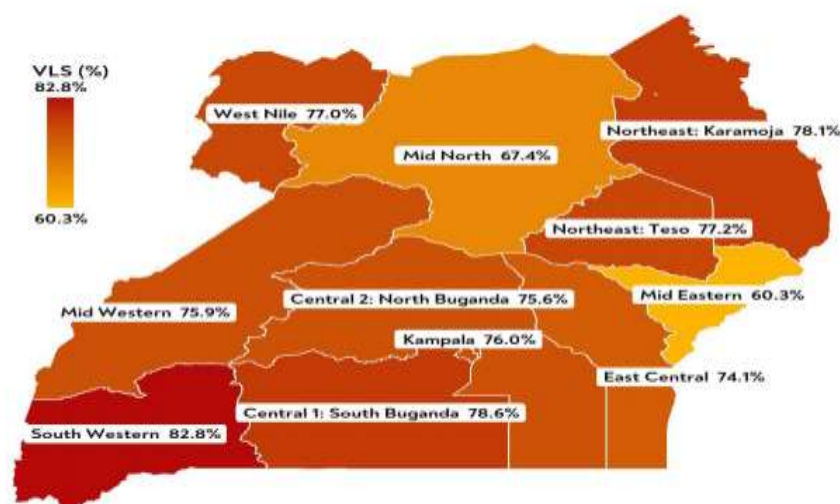


Error bars represent 95% CIs.

## PREVALENCE OF HIV VIRAL LOAD SUPPRESSION IN UGANDA BY REGION

Region	VLS Prevalence (%)	95% CI
Central 1: South Buganda	78.6	73.7-83.6
Central 2: North Buganda	75.6	67.3-83.9
East Central	74.1	61.2-87.1
Kampala	76.0	68.8-83.3
Mid Eastern	60.3	50.3-70.3
Mid North	67.4	58.3-76.5
Mid Western	75.9	66.7-85.0
Northeast: Karamoja	78.1	68.6-87.6
Northeast: Teso	77.2	71.8-82.6
South Western	82.8	76.0-89.6
West Nile	77.0	66.4-87.6

VLS=Viral load suppression.



### People living with HIV.

- In 2022, there were 39.0 million [33.1 million–45.7 million] people living with HIV.
  - 37.5 million [31.8 million–43.6 million] adults (15 years or older).
  - 1.5 million [1.2 million–2.1 million] children (0–14 years).
  - 53% of all people living with HIV were women and girls.
- 86% [73– >98%] of all people living with HIV knew their HIV status in 2022.
- About 5.5 million people did not know that they were living with HIV in 2022.

### People living with HIV accessing antiretroviral therapy

- At the end of December 2022, 29.8 million people were accessing antiretroviral therapy, up from 7.7 million in 2010.
- In 2022, 76% [65–89%] of all people living with HIV were accessing treatment.
  - 77% [65–90%] of adults aged 15 years and older living with HIV had access to treatment, as did 57% [44–78%] of children aged 0–14 years.

- o 82% [69–95%] of women aged 15 years and older had access to treatment; however, just 72% [60–84%] of men aged 15 years and older had access.
- 82% [64–98%] of pregnant women living with HIV had access to antiretroviral medicines to prevent transmission of HIV to their child in 2022.
- New HIV infections have been reduced by 59% since the peak in 1995.
- o In 2022, 1.3 million [1 million–1.7 million] people were newly infected with HIV, compared to 3.2 million [2.5 million–4.3 million] people in 1995.
- o Women and girls accounted for 46% of all new infections in 2022.
- Since 2010, new HIV infections have declined by 38%, from 2.1 million [1.6 million–2.8 million] to 1.3 million [1 million–1.7 million] in 2022.
- Since 2010, new HIV infections among children have declined by 58%, from 310 000 [210 000–490 000] in 2010 to 130 000 [90 000–210 000] in 2022.

#### **AIDS-related deaths**

- AIDS-related deaths have been reduced by 69% since the peak in 2004 and by 51% since 2010.
- In 2022, around 630 000 [480 000–880 000] people died from AIDS-related illnesses worldwide, compared to 2.0 million [1.5 million–2.8 million] people in 2004 and 1.3 million [970 000–1.8 million] people in 2010.
- AIDS-related mortality has declined by 55% among women and girls and by 47% among men and boys since 2010.

#### **Key Populations**

- Globally, median HIV prevalence among the adult population (ages 15–49) was 0.7%. However median prevalence was higher among key populations
  - o 2.5% among sex workers
  - o 7.7% among gay men and other men who have sex with men
  - o 5.0% among people who inject drugs
  - o 10.3% among transgender persons
  - o 1.4% among people in prisons.

#### **Women and girls**

- Globally 46% of all new HIV infections were among women and girls (all ages) in 2022.
  - In sub-Saharan Africa, women and girls (all ages) accounted for 63% of all new HIV infections.
- In all other geographical regions, over 70% of new HIV infections in 2022 occurred among men and boys.
- Every week, 4000 adolescent girls and young women aged 15–24 years became infected with HIV globally in 2022. 3100 of these infections occurred in sub-Saharan Africa.

#### **Testing and treatment targets (95–95–95)**

- In 2022, 86% [73–>98%] of all people living with HIV knew their HIV status. Among people who knew their status, 89% [75–>98%] were accessing treatment. And among people accessing treatment, 93% [79–>98%] were virally suppressed.
- Among children ages 0–14 years the 95–95–95 targets were 63% [49%–86%], 91% [71%–>98%], 81% [63%–>98%]. Among women, the 95–95–95 targets were: 90% [76–>98%], 91% [77–>98%], and 93% [79–>98%].
- Among men, the 95–95–95 targets were: 83% [70–98%] of adult men living with HIV knew their HIV status, 86% [72–>98%] were accessing treatment and 94% [79–>98%] were virally suppressed.
- Among all people living with HIV, 86% [73–>98%] knew their status, 76% [65–89%] were accessing treatment and 71% [60–83%] were virally suppressed in 2022.

### Investments

- At the end of 2022, US\$ 20.8 billion (in constant 2019 United States dollars) was available for the AIDS response in low- and middle-income countries—around 60% was from domestic sources.
- UNAIDS estimates that US\$ 29 billion (in constant 2019 United States dollars) will be required for the AIDS response in low- and middle-income countries, including countries formerly considered to be upper-income countries [10-11].

### Medicinal Plants Used in HIV/AIDS Management

Medicinal plants can be defined as the plants that possess therapeutic properties or exert beneficial pharmacological effect on the human or animal body (Namdeo, 2018). In this section, we present an extensive list of medicinal plants commonly used in Uganda for managing HIV/AIDS. The plants are classified based on their reported effects, such as antiretroviral activity, immunomodulatory properties, and management of opportunistic infections. Examples of these plants include but not limited to:

- a. *Cryptolepis sanguinolenta*: Known for its antiviral properties and immune-enhancing effects, this plant has shown promise in HIV/AIDS management.
- b. *Zanthoxylum chalybeum*: Traditionally used to alleviate HIV-related symptoms and strengthen the immune system.
- c. *Bidens pilosa*: Reported to possess antiretroviral properties and aid in the management of opportunistic infections.
- d. *Aloe vera*: Known for its immunomodulatory effects and potential benefits in wound healing, beneficial for people living with HIV/AIDS.
- e. *Ocimum gratissimum* (African Basil): Used in managing opportunistic infections and boosting the immune system.

### Evidence-Based Studies

To support the use of medicinal plants in HIV/AIDS management, this section reviews relevant scientific studies that have investigated the efficacy and safety of these plants. It discusses both in vitro and in vivo studies, clinical trials, and observational reports, providing a comprehensive analysis of the available evidence. This review highlights the importance of ethnomedicinal practices in Uganda and examines the scientific evidence supporting the use of medicinal plants for managing HIV/AIDS-related symptoms and supporting immune function.

### Ethnomedicinal Practices in Uganda

This section provides an overview of the traditional medicinal practices in Uganda, focusing on the use of medicinal plants. It explores the historical context and cultural significance of these practices and how they have evolved over time to include HIV/AIDS management.

### Medicinal Plants with Antiretroviral Properties

Here, we present a comprehensive compilation of medicinal plants reported to exhibit antiretroviral properties. These plants have been traditionally used in Uganda to alleviate HIV/AIDS-related symptoms and potentially inhibit viral replication. We discuss the chemical constituents responsible for their antiretroviral activity and explore the mechanisms of action.

### Immunomodulatory Medicinal Plants

The immune system plays a crucial role in combating HIV and maintaining overall health. This section reviews medicinal plants known for their immunomodulatory effects, which can bolster the immune response against the virus and enhance general well-being in people living with HIV/AIDS.

- a) *Cryptolepis sanguinolenta*: Known for its antiviral properties and immune-enhancing effects, this plant has shown promise in HIV/AIDS management.
- b) *Zanthoxylum chalybeum*: Traditionally used to alleviate HIV-related symptoms and strengthen the immune system.
- c) *Aloe vera*: Known for its immunomodulatory effects and potential benefits in wound healing, beneficial for people living with HIV/AIDS.
- d) *Ocimum gratissimum* (African Basil): Used in managing opportunistic infections and boosting the immune system.

### Medicinal Plants for Opportunistic Infection Management:

HIV/AIDS weakens the immune system, making individuals vulnerable to opportunistic infections. Many medicinal plants in Uganda have been used to manage these infections and improve the overall health of people living with HIV/AIDS. This section provides an analysis of such plants and their reported efficacy. There were 103 species of medicinal plants identified in this survey. Priority plants identified include *Aloe* spp., *Erythrina abyssinica*, *Sarcocephalus latifolius*, *Psorospermum febrifugum*, *Mangifera indica* and *Warburgia salutaris*. There was low consensus among TMPs on the plants used. Decoctions of multiple plant species were commonly used except in Gulu where mono-preparations were common. Plant parts frequently used were leaves (33%), stem bark (23%) and root bark (18%). About 80% of preparations were administered orally in variable doses over varied time periods. The TMP had insufficient knowledge about packaging and preservation techniques [6-9]. On the other hand, a total of 52 plants

were identified in Njeru used in the management of opportunistic infections ” A total of 52 plants species used in the management of HIV/ AIDS opportunistic infections belonging to 49 genera and 31 families were identified. The families Lamiaceae and Leguminosae had the highest number of species recorded each having 6 and 5 plant species 9 respectively, followed by Moraceae and Verbanaceae in that order. Lamiaceae was used by traditional healers to manage HIV/AIDS infections; including urinary tract, wounds, kidney infection and stomach ache, members of this family contain terpenoids. Terpenoids are biological compounds that can enhance and maintain the body immunity. “The study recorded 324 plant species distributed in 75 families, with potential to treat ailments associated with immunocompromised people living with HIV/AIDS in western Uganda. The study revealed that folk medicine is still widely practiced. Fidelity level values indicated the most preferred plant species for particular ailments. The high consensus values indicated that there was high agreement in the use of plants for various ailments. The selected preferred plant species were subjected to chemical screening to ascertain their pharmacological activities and they could be prioritized for conservation. The study allows for identifying high value medicinal indicating high potential for economic development’

Table Continued....

Family	Specie	Infection treated	Part used	Mode of application	Growth form	Freq.
Myrtaceae	<i>Callistemon citrinus</i> (Curtis) Skeels.	Chronic Cough	Leaves	Decoction drunk	Tree	9
	<i>Psidium guajava</i> L.	Tuberculosis; Diarrhea	Leaves; Stem bark	Decoction drunk	Tree	2
Phyllanthaceae	<i>Flueggea virosa</i> (Roxb. ex Wild) Royle.	Dysentery; skin infection	Leaves; Roots	Decoction drunk	Shrub	3
Phytolaccaceae	<i>Phytolacca decandra</i> L.	Skin infection; swollen limbs	Leaves	Crushed and smeared on affected part	Shrub	1
Polygonaceae	<i>Rumex usambarensis</i> Dammer.	Skin infection; oral candidiasis	Leaves	Crushed and smeared on affected part	Herb	1
Rutaceae	<i>Zanthoxylum chalybeum</i> Engl.	Chronic Cough; Tuberculosis	Roots; Stem bark	Decoction drunk	Tree	2
solanaceae	<i>Solanum lycopersicum</i> L.	Skin infection	Whole part	Crushed and smeared on affected part	Herb	3
	<i>Solanum nigrum</i> L.	Joint pain; chronic headache	Leaves	Decoction drunk	Herb	2
Verbenaceae	<i>Lantana camara</i> L.	Chronic Cough	Leaves	Decoction drunk	Shrub	1
	<i>Clerodendrum myricoides</i> (Hochst) R. Br. ex. Vatke.	Stomach infections; Warts	Stem bark; Roots	Concoction drunk	Shrub	1
	<i>Lantana trifolia</i> L.	Tuberculosis; skin infections	Leaves	Concoction drunk	Herb	3
Xanthorrhoeaceae	<i>Aloe vera</i> (L.) Burm f.	Skin infections	Leaves	Sap mixed with jelly smeared on skin	Herb	3



CONTINUATION OF MEDICINAL PLANTS USED IN THE MANAGEMENT OF OPORTUNISTIC INFECTIONS IN HIV

Family Scientific Name Voucher No.	Local Name (Luganda)	Habit	Management status	Parts Used	Ailment treated	Method of Preparation	Mode of administration	Reported relevant ethnomedicinal uses elsewhere
<b>ACANTHACEAE</b>								
<i>Acanthus pubescens</i> Engl. CN 008	Amatovu	S	W	L	Wounds Genital warts	Dry the leaves and make powder	Sprinkle the powder onto the Wound	
<i>Justicia betonica</i> L. CN 020	Nalongo	H	C	L,R	Fungal infections  Fever	Leaves are crushed, roots cleaned, dried and pounded. Decoction of leaves	Powder rubbed into the affected area  Drink a glassful twice a day	
<b>ALLIACEAE</b>								
<i>Allium sativum</i> L. CN 023	Katungul ucumu	H	C	B	Wounds Boils	Pound garlic cloves. Cut slices of garlic	Swab the affected area. Bandage them onto the area	
<b>ALOEACEAE</b>								
<i>Aloe vera</i> L. CN 001	Kigaji	H	C	L	Burns Wounds  Fungal infections	Cut the leaves to obtain sap  Liquid extract	Smear the sap onto the burnt area or wound Rubbed onto the area	
<b>AMARANTHACEAE</b>								
<i>Aerva lanata</i> (L) Juss ex Schult. CN 009	Olweza	H	C	L	Skin rashes	Squeeze the leaves in water	Take a bath	
<b>APIACEAE</b>								
<i>Daucus carota</i> L. CN 004	Carrot (English)	H	C	R	Wounds Cancer	Clean the roots	Eat raw roots frequently	
<b>ASTERACEAE</b>								
<i>Ageratum conyzoides</i> L. CN 007	Namirem be	H	W	L	Skin rashes	Pound the leaves	Rub the affected area	
<i>Aspilia africana</i> C.D Adams (Pers.) CN 015	Makayi	H	W	Ar	Ringworm	Pound the aerial parts	Rub the infected area	

<i>Bidens pilosa</i> L. CN002	Ssere	H	W	L	Wounds	Pound the fresh leaves	Apply the liquid extract onto the wound to effect healing and quick clotting	
<i>Conyza floribunda</i> Kunth. CN 003	Kafumbe	H	W	L	Ringworm	Crush the leaves	Rub the infected area	
<i>Erlangea tomentosa</i> S.Moore (Oliv & Hiern) CN 012	Ettwatwa	H	W	L	Promotes a healthy skin	Squeeze leaves in water	Take a bath	
<i>Vernonia auriculifera</i> Hern. CN 011	Kikokoo ma	S	W	L	Fights skin infections	Squeeze leaves in water	Take a bath occasionally	
<i>Vernonia cinerea</i> (L.) Less. CN 010	Kayayan a	Sh	W	L	Skin infections	Pound the fresh leaves	Rub the infected area	
<b>BIGNONIACEAE</b>								
<i>Spathodea campanulata</i> P. Beav. CN 005	Kifabaka zi	T	W	L,B	Skin rash  Genital warts	Decoct the leaves and bark. Add some salt	Drink regularly  Compress the affected area	
<b>BRASSICACEAE</b>								
<i>Brassica oleracea</i> L. CN 013	Cabbage	H	C	L	Wounds	Pound the leaves	Put sap onto the wound	
<i>Cardamine trichocarpa</i> Hochst. ex.A. Rich. CN 014	Magereg ankoko	H	W	L	Wounds Boils	Pound the leaves	Apply Compress	
<b>BURSERACEAE</b>								
<i>Canarium schweinfurthii</i> Engl. CN 006	Omuwafu	H	C	SP	Scabies	Cut the bark to get the viscous resin	Rub the affected area. Applied as ointment	
<b>CAPPARACEAE</b>								

<i>Cleome gynandra</i> L. CN 019	Ejobyo	H	C,W	F	Fungal infections	Squeeze the flowers	Rub the affected area	
<b>CARICACEAE</b>								
<i>Carica papaya</i> L. CN 018	Epapari	H	C	Fr	Fungal infections  Burns  To soften the skin	Cut the unripe fruit to extract the latex A few drops of the pawpaw sap is boiled in water Cut the unripe fruit into pieces. Boil the cut pieces Mix the resultant liquid with Vaseline	Rub the affected area with the latex  Use the resulting water to wash the burn Smear body parts especially, hands Apply the sap to wounds	
<b>CLUSIACEAE</b>								
<i>Psorospermum febrifugum</i> Sprach CN 021	Akanziro nziro	T	W	B	Skin rashes	Dry the bark. Pound into powder. Mix the powder with Vaseline	Smear all over the skin	
<b>CRASSULACEAE</b>								
<i>Kalanchoe pinnata</i> L. CN 022	Ekiyondo	H	W,C	L	Wounds  Burns	Pound 1 handful of washed leaves, add 1 teaspoon of sugar, heat up the mass until it turns brown Pounded leaves are boiled for a short time in a little water	Use as a wound dressing  Apply as a poultice	
<b>CURCUBITACEAE</b>								
<i>Cucumis sativus</i> L. CN 052	Akatanga	H	W	L	Skin blemishes	Squeeze the leaves in water	Take a bath	

<i>Mormodica foetida</i> K.Schum CN 029	Ebombo	H	W	L	Body odours Itching skin	Squeeze the leaves in water	Bathe the whole body	
--	--------	---	---	---	-----------------------------	--------------------------------	-------------------------	--

<i>Dracaena steudneri</i> Engl.CN 027	Ekkajjoly enjovu		W	L	Good luck	Squeeze leaves in water	Take a bath	
--	---------------------	--	---	---	-----------	----------------------------	-------------	--

<b>DRACAENACEAE</b>								
<i>Dracaena steudneri</i> Engl.CN 027	Ekkajjoly enjovu		W	L	Good luck	Squeeze leaves in water	Take a bath	
<b>EUPHORBIACEAE</b>								
<i>Acalypha bipartita</i> Mull. Arg. CN 028	Ejerenge sa	H	W	L,R	Wounds Headache	Boil clean roots Burn the leaves	Wash the wound Inhale the smoke	
<i>Euphorbia tirucalli</i> L. CN 030	Enkoni	S	W	Sp	Warts	Break the stem joints to obtain sap	Apply the sap onto the wart 3 times a day	
<i>Jatropha curcas</i> L. CN 026	Ekiroowa	S	C,W	L	Wounds	Boil two handfuls of fresh leaves with one l of water. Filter	Use it for washing the wound	
<i>Sapium ellipticum</i> (Hochst,) Pax. CN 035	Omusasa	T	W	L	Abscess	Pound fresh leaves. Add a little salt	Apply as a poultice	
<i>Manihot esculenta</i> Crantz CN 034	Muwogo	Sh	C	L	Fungal infections	Dry the leaves. Pound and Mix powder with vaseline	Smear the infected area	
<b>FABACEAE</b>								
<i>Albizia coriaria</i> Oliv. CN 031	Omugav u	T	W	L,B	Skin rashes Wounds	Pound the leaves and bark separately	Compress the affected area	
<i>Entada abyssinica</i> Steud ex. A. Rich. CN 032	Omwolol a	T	W	B	Promotes proper skin growth	Bark is boiled	Used in a bath	

<i>Erythrina abyssinica</i> Lam. CN 033	Ejirikiti	T	W	B	Clears skin infections	Decoct the bark	Take a bath of the whole body	
<i>Phaseolus lunatus</i> L. CN 040	Kayindiya ndi	H	W,C	L, Fl	Skin diseases	Dry the leaves and flowers. Pound to get powder.	Mix powder with Vaseline and smear the body	
<i>Tamarindus indica</i> L. CN 036	Omukoo ge	T	W	L	Wounds	Decoct the leaves	Drink regularly	

<b>LAMIACEAE</b>								
<i>Hoslundia opposita</i> Vahl. CN 037	Kamunye	Sh	W	L	Wounds  Toothache	Squeeze leaves  Squeeze a handful in quarter litre of boiled water. Add some salt	Compress the wound Use as a garble	
<i>Leonotis nepetifolia</i> (L.) R. Br. CN 038	Kifumufu mu	H	W	L, Fl	Wounds	Dry leaves. Make into powder	Sprinkle powder to the wound to effect quick healing	
<i>Plectranthus barbatus</i> Andr. CN 039	Kibwank ulata	H	W,C	L	Wounds    Ulcers	Squeeze the leaves. Dry leaves under shade for four days. Then dry under direct sunlight for a few hours and pound Squeeze the leaves Make a decoction	Apply the liquid extract to the wounds till it heals  Mix with Vaseline and smear Drink regularly	
<b>LAURACEAE</b>								

<i>Persea americana</i> Mill. CN 042	Vakedo	T	C,W	Fr	Nourishes the skin	Cut up the ripe fruit	A dressing of the avocado flesh works as a natural emulsion and nourishes infected or dry skin	
<b>MORACEAE</b>								
<i>Ficus ovata</i> Vahl CN 041	Omukoko owe	T	W	Sp	Warts	Detach fresh leaves from the stem to get the white sap	Apply the sap onto the wart till it breaks off the skin	
<b>MORINGACEAE</b>								
<i>Moringa oleifera</i> Lam CN 043	Mulinga	T	C	Se, L F, R	Wounds ,	Pound the fresh leaves. Dry fresh leaves and pound.	Smear the wound. Powder is added to	

					Fungal infections	A paste is made from seeds	Vaseline and smeared to clear the skin.	
					Boosts good health	Boil the roots Powder is obtained from flowers. Fresh leaves are prepared as vegetable	Drink regularly. Taken as tea	
<b>MUSACEAE</b>								
<i>Ensete ventricosum</i> ( Welw) Cheesman CN 044	Ekitembe	H	W	Ps, Fr	Skin ulcers	Boil the pseudo stem thoroughly	Drink frequently	
<b>MYRTACEAE</b>								
<i>Maesopsis eminii</i> Engl. CN 050	Musizi	T	W	B	Boosts skin growth	Boil the bark	Take a bath	
<b>PHYLLANTHACEAE</b>								

<i>Bridelia micrantha</i> (Hochst) Baill. CN 049	Katazami t	S	W	L	Skin infections Rashes	Dry the leaves. Pound into powder	Rub powder into the rash	
<b>PHYTOLACACEAE</b>								
<i>Phytolacca dodecandra</i> L' Hér CN 045	Oluwoko	H	W	Se, L, R	Burns  Wounds	Squeeze ripe seeds. Crush leaves to get a foam  Burn the leaves to ash. Dry the roots, make powder	Spread the paste over the burn. Topically apply the foam  Sprinkle the ash and root powder onto the burn and wound	
<b>PIPERACEAE</b>								
<i>Piper guineense</i> Schumach.Thonn. CN 046	Kigaman sole	V	W	R, L	Skin infections  Venereal diseases, Cough	Decoct leaves.  Make a brew from roots	Take a bath.  Take orally	
<b>POACEAE</b>								
<i>Cymbopogon citratus</i> ( D.C) Stapf. CN 047	Ekisubi	G	C,W	L	Skin care	Distill the leaves	Scented product is added into skin care products	
<b>SOLANACEAE</b>								
<i>Nicotiana tabacum</i> L. CN 048	Taaba	H	W, C	L	Ringworm	Harvest clean insect free leaves	Rub affected areas with leaves	
<i>Lycopersicon esculentum</i> Mill. CN 049	Nyanya	H	C	L, Fr	Fungal infections	Pound the leaves, harvest ripe fruits	Rub affected area Eat as a vegetable	
<i>Solanum nigrum</i> L. CN 050	Ensugga	H	W, C	L	Nourishes skin	Harvest young aerial parts, steam them	Eat as a vegetable	
<b>ZINGIBERACEAE</b>								

<i>Aframomum angustifolium</i> K. Schum. CN 051	Matungulu	H	W	Fr, R	De-wormer	Fruits and roots are washed	Eaten as a snack	
---	-----------	---	---	-------	-----------	-----------------------------	------------------	--

### Safety and Efficacy Considerations:

In this section, we critically assess the safety and efficacy of medicinal plants used in HIV/AIDS management in Uganda. We discuss potential risks, side effects, and herb-drug interactions to highlight the importance of informed and responsible use of traditional medicinal practices. Some species such *W. ugandensis* and *A. coriria* extracts were both highly cytotoxic, their high cytotoxic levels in vitro correlated with the toxic effects experienced by people who incorrectly used them as reported by herbalists [8]. With increasing access to ARVs in Uganda, an important consideration is the potential for interactions between TM and ARVs when they are administered concurrently. Some classes of ARVs have great potential for unwanted herbal-drug interactions and some African medicinal plants have shown potential for unfavorable drug-herbal interactions with ARVs in laboratory studies. Although it is recommended that clinicians collect information on TMs used by patients on ARVs, patients may not know the actual medicinal plants being used or may underreport the use of TM during their ARV clinic visits. Ethnobotanical studies are therefore crucial to identify the panel of medicinal plants being used in order to facilitate pharmacologic studies to characterize the potential of these agents to affect the metabolism and activity of ARVs. Nevertheless, positive roles have been identified for TM in Uganda's HIV/AIDS response. The Ugandan government highlights TM as a key resource for the expansion of prevention and treatment services for opportunistic infections. This is because TMPs cater to health needs of the general community and are well positioned to provide primary health care services relevant to HIV/AIDS. In order to prevent the spread of HIV/AIDS to the community, public health officials should engage TMPs in order to equip the TMPs with the skills for disseminating prevention messages to their patients. Also, improved referral systems between TMPs and ARV clinics can increase HIV/AIDS testing and treatment efforts. Furthermore, research collaborations between TMPs may promote research and development of new treatments from medicinal plant sources. In order to take advantage of these opportunities, TMPs must be reassured that their intellectual property rights will be protected during collaborations with other stakeholders. An ongoing dialogue between the Ugandan government and TMP Associations are therefore needed to share information on the safety of TM, potential for interactions with ARVs and to delineate the role of TMPs in the HIV/AIDS response. (Lamode, Medicinal plants used by traditional medicine practitioners for the treatment of HIV/AIDS and related conditions in Uganda, 2010)

### Future Perspectives:

Based on the review's findings, we provide insights into potential future directions for research and the integration of traditional medicinal practices into mainstream HIV/AIDS management in Uganda. We highlight the importance of a holistic and multidisciplinary approach to address this pressing public health concern.

### CONCLUSION

The use of medicinal plants in HIV/AIDS management is deeply rooted in Ugandan culture and traditional medicine. While many plants have demonstrated promising properties in HIV/AIDS management, more rigorous scientific studies are required to establish their safety and efficacy. Integrating traditional medicinal practices with evidence-based conventional therapies could offer a comprehensive and culturally relevant approach to support individuals living with HIV/AIDS in Uganda. However it's important to note that the mechanism of action of majority of these medicinal plants used in the management of HIV/AIDS in Uganda remains unknown in the world of science and yet many more medicinal plants used remain unknown since those that had knowledge about them didn't document, thus Collaboration between traditional healers, scientists, and healthcare professionals is essential to maximize the potential benefits of these medicinal plants in combating HIV/AIDS in the region.

### REFERENCES

1. Lamode, M. (2010). Medicinal plants used by traditional medicine practitioners for the treatment of HIV/AIDS and related conditions in Uganda. *Journal of ethnopharmacology*, 18-19.
2. Lamode, M. (2010). Medicinal plants used by traditional medicine practitioners for the treatment of HIV/AIDS and related conditions in Uganda. *Journal of ethnopharmacology*, 18-19.
3. Mohammed Lamorde, John R.S. Tabuti, Celestino Obua, Collins Kukunda-Byobona, Hindam Lanyero, Pauline Byakika-Kibwika, Godfrey S. Bbosa, Aloysius Lubega, Jasper Ogwal-Okeng, Mairin Ryan, Paul J. Waako, Concepta Merry. (2010, February 12).



<https://www.sciencedirect.com/science/article/abs/pii/S0378874110002357>. Retrieved July 2023, from [https://doi.org/10.1016/j.jep.2010.04.004](https://www.sciencedirect.com/science:https://doi.org/10.1016/j.jep.2010.04.004)

4. Mustapha W Shehu, 1. I. (2018).
5. Mustapha W Shehu, 1. I. (2018).
6. Mustapha W Shehu,1 Idris Bello,2 Nafi'u Abdulkadir,3 Abdulazeez Shehu,1 Ssenku Ediris Jamil,1 Sadiya A Waziri4. (2018). Retrieved july 2023
7. Savina, A. (2015). Retrieved from <http://www.diva-portal.org/smash/record.jsf?pid=diva2%3A854066&dswid=3023>
8. Savina, A. (2015).
9. UNAIDS. (2023). *UNAIDS Fact Sheet 2023*. UNAIDS.
10. UPHIA. (2022). *The Uganda Population-based HIV Impact Assessment (UPHIA 2020- 2021)*. Ministry of Health - Uganda. Kampala: UPHIA.
11. UPHIA. (2022). *The Uganda Population-based HIV Impact Assessment (UPHIA 2020- 2021)*. Ministry Of Health - Uganda. Kampala: UPHIA.

**Masembe Francisco and Ssegane Jude 2023. Evaluation of Medicinal Plants Used in the Treatment and Management of HIV/AIDS in Uganda. Eurasian Experiment Journal of Public Health, 4(2):90-106.**