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Cucurbitaceae species used as traditional medicine in West Africa

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Background: The use of some *Cucurbitaceae* species for the treatment of diseases is an ancient practice in traditional medicine systems in Africa and the cucurbitacins among others have been reported to be responsible for most of these healing activities.

Aim: This review discusses the relevance of *Cucurbitaceae* species in traditional medicine in some west African countries.

Methods: A literature search was conducted on electronic databases such as Google Books, Google Scholar, Scopus and Web of Science. The search involved the use of several terms and free text words which include '*Cucurbitaceae* species in West Africa traditional medicine'; 'medicinal plants of the *Cucurbitaceae* family used to treat diseases in west African communities'.

Results: Several *Cucurbitaceae* species are used in the region either in similar ways or different ways for the treatment of different diseases. The leaves are the most utilised plant parts and decoctions are the most common method of preparation. From this study, 18 species of *Cucurbitaceae* used for medicinal purposes were reviewed from Nigeria; 4 from Benin, Ghana, Côte d'Ivoire and Mali, respectively; 1 from Togo; 5 from Senegal; 9 from Cameroon and 3 from Gabon and Burkina Faso, respectively. *Momordica charantia* and *Momordica balsamina* are often utilised for abortion in some west African countries. *Momordica* species and *Lagenaria breviflora* are utilised to treat diabetes, cough related to respiratory infections and viral infections such as measles and chickenpox

Conclusions: In-depth research into these plants could help to develop a natural, novel cure for diabetes and coronavirus (COVID-19) and effective, cheap contraceptive.

Contribution: This review highlights the significant role of Cucurbitaceae species in the treatment of a wide range of diseases and health issues in the WestAfrican traditional medicine system. The information provided could be used as a guide by research scientists for the formulation of natural products to cure a variety of diseases.

Keywords: *Cucurbitaceae* species; traditional medicine; West African countries; *Momordica charantia*; *Lagenaria breviflorus.*

Introduction

Traditional medicine is an integral part of the African culture and essential in every part of human life, ranging from daily living and wholeness of the body, mind and soul. The *Cucurbitaceae* species are highly utilised in Africa for food and medicinal purposes (Olarewaju et al. 2021). It has about 960 species and 130 genera distributed mostly in tropical and subtropical regions of the world (Dhiman et al. 2012; Schaffer & Paris 2003). Several domesticated species of the *Cucurbitaceae* have their centre of origin in tropical Africa (Kirkbride 1993), and this family is one of the most important plant families as a result of its global impact and vast medicinal usage (Olarewaju et al. 2021). The species of the family are often referred to as cucurbits, and the fruit, seeds and leaves of some species are traditionally utilised in various Ayurvedic preparations and confectionaries (Dhiman et al. 2012). The family is amongst the most important plant families which supply humans with edible products and useful fibres (Bisognin 2002).

Several species of *Cucurbitaceae* are considered to have medicinal properties because of the presence of cucurbitacins, a compound of great interest because of its wide range of biological activities in humans and animals (Dhiman et al. 2012). Cucurbitacin is gaining attention as a potential anticancer drug (Lee, Iwanski & Thoennissen 2010). Patents exist for cucurbitacins in preparing medicine used for treating acne (Deng & She 2011) and cancer (Deng & Meixia 2007), amongst several others. Species of *Cucurbitaceae* are used as traditional medicine in different parts of West Africa to treat various diseases and infections. Some *Cucurbitaceae* species are linked to

the history of the Africans (Fajinmi et al. 2022), and their use in the African culture and food has been recorded in literature. However, the relevance of the family in the West African traditional medicine system is not well highlighted in the literature. It is therefore important to document the species, plant parts used and method of preparation as this will highlight species that are highly revered in the traditional medicine system of West Africa and could give impetus to the formulation of natural products that could be of great benefit to the African populace.

Aims and objectives

The study aimed to review the use of *Cucurbitaceae* species in traditional medicine in West African countries. The objectives of the study were to review *Cucurbitaceae* species used to treat diseases in the West African countries, which plant parts are used and the preparation methods, which species or genus is commonly used in West African countries for similar purposes and the safety of using plant species of the Cucurbitaceae family.

Methodology

The literature search was conducted on electronic databases such as Google Books, Google Scholar, Scopus, Web of Science and African Journals Online. The search involved the use of several terms and free text words (which included '*Cucurbitaceae* species in West Africa traditional medicine'; 'medicinal plants of the Cucurbitaceae family used in West Africa'; '*Cucurbitaceae* species used to treat diseases in West African rural communities'; 'record of plants popularly used in communities in West Africa to treat diseases') and appropriately combining them. The search also focused on old literature with crucial information about the medicinal use of *Cucurbitaceae* species in the history of the West Africans. The authors further set inclusion and exclusion criteria to screen for relevant articles. Each of the identified articles was independently reviewed to determine eligibility and extract study information.

Review findings

The family *Cucurbitaceae* is amongst the most frequently mentioned family of plants in several surveys of the plants used for traditional medicine in different parts of West Africa. Several species of *Cucurbitaceae* are recorded in the literature for the treatment of various ailments and diseases in West African countries. Although some information is not available in the literature, Table 1, Table 2, Table 3, Table 4, Table 5, Table 6, Table 7 and Table 8 display the plant parts and preparation methods of some *Cucurbitaceae* family plants used for medicinal purposes.

Table 1 highlights *Cucurbitaceae* species used in traditional medicine in Nigeria. These include *Cucumeropsis mannii*, *Lagenaria breviflora*, *Citrullus colocynthis*, *Citrullus lanatus* and *Momordica charantia*, which are used for the treatment of diabetes. Some of the species, such as *M. charantia*, are used to treat multiple ailments and diseases. For example, *M. charantia* can be used to treat diabetes, female infertility, painful menstruation and to regulate menses, whilst *C. colocynthis* can be used for treating both syphilis and measles. *Lagenaria breviflora* are also used for cough-related respiratory infections and measles. Other species used for medicinal purposes include *C. lanatus*, which can be used to treat gonorrhoea and leucorrhoea in women, as well as *Cucumis metuliferus* and *Momordica balsamina* for treating breast cancer. *Telfairia occidentalis* serves as a blood tonic and is used for the treatment of convulsion, headache and anaemia. *Cucumis metuliferus* and *M. balsamina* are used for malignant ulcers. Hence, about 18 species of *Cucurbitaceae* are used for the treatment of a variety of ailments, as shown in Table 1. Meanwhile, the leaves are the most used plant parts whilst decoction is the most recorded method of preparation.

The *M. charantia* is the most utilised species of the *Cucurbitaceae* in African countries, and its traditional use includes the treatment of measles, chickenpox, diabetes, malaria, stomach pain, urticaria, candidiasis, headaches, diarrhoea, intern parasitosis, stomach ulcer and vomit in cattle in Benin (Table 2). Similarly, the species are used traditionally to treat ailments and diseases such as abdominal pains, fever and measles, gonorrhoea, diabetes, headache, snakebite and mental and nervous system disorders in Ghana (Table 3), Côte d'Ivoire (Table 4), Mali, Togo (Table 5), Senegal (Table 6), Gabon, Burkina Faso (Table 7) and Cameroon (Table 8). Mali has four *Cucurbitaceae* species (*Citrullus vulgaris*, *Cucurbita pepo*, *Lagenaria siceraria* and *M. charantia*) recorded for use as traditional medicine, and their usage involves the treatment of boils and wounds (Table 5). However, to the best of our knowledge, *M. charantia* is the only *Cucurbitaceae* species reported in the literature with traditional medicine application in Togo (Table 5). Therefore, further studies should investigate other species of *Cucurbitaceae* used as natural remedies for various maladies and diseases in the country. Species used as traditional medicine in Senegal include *Cucurbita maxima*, *Luffa acutangula*, *Mukia maderaspatana*, *M. balsamina* and *M. charantia* (Table 6). *Cucurbitaceae* species used as traditional medicine in Cameroon include *C. maxima*, *M. charantia*, *Momordica foetida*, *T. occidentalis*, *Coccinia barteri*, *C. mannii*, *M. maderaspatana* and *Zehneria scabra* (Table 8). However, the most utilised species are *M. charantia* and *M. foetida*, which are mostly used to induce abortion, amongst other uses.

Momordica species have been mentioned in a majority of the West African countries studied (Adelanwa 2014; Aguwa & Mittal 1983; Ajibesin, Bala & Umoh 2012; Beloin et al. 2005; Boadu & Asase 2017; Bonkian et al. 2017; Édouard & Kouassi 2009; Gbekley et al. 2017; Jiofack et al. 2009; Karou et al. 2012; Koffi, Henri & Ouattara 2010; Lagnika et al. 2016; Madingou et al. 2012; Malan, Neuba & Kouakou 2015; Okeke et al. 2009; Ouachinou et al. 2019; Sonibare, Moody & Adesanya 2009; Yemele et al. 2015). In an ethnobotanical survey of three local government areas of the Ijebu area of Ogun State in southwest Nigeria, *Cucurbitaceae* species are the most frequently mentioned for the treatment of measles (Sonibare et al. 2009). The 'musk', *Cucurbita moschata*, is rarely found growing in

TABLE 1: *Cucurbitaceae* species used as traditional medicine in Nigeria.

SN	Species used	Plant part used and method of preparation	Diseases	Region	References
1	*Citrullus colocynthis* (L.) Schrad.	Fruit	Dysentery	Abeokuta, Nigeria Idu, Erhabor and Efijuemue 2010	Idu et al. (2010)
2	*Citrullus colocynthis* (L.) Schrad.	Fruit decoctions are taken orally	Syphilis and stomach ache	-	Ajibesin, Bala and Umoh (2012)
3	*Citrullus colocynthis* (L.) Schrad.	Leaf decoctions are taken orally	Laxative	-	Ajibesin et al. (2012)
4	*Citrullus colocynthis* (L.) Schrad.	Fruit and leaf decoctions, seed and shell powder mixed with palm oil	Skin disease, syphilis, stomach ache and constipation	-	Ajibesin et al. (2012)
5	*Citrullus colocynthis* (L.) Schrad.	Seeds	Measles	Ogun State	Sonibare et al. (2009)
6	*Citrullus lanatus* local race	Seeds are used as part of a decoction, which includes some roots (*epatun*) and onions	Gonorrhoea and leucorrhoea in women	Yorubas	Okoli (1984)
7	*Citrullus lanatus* (Thunb.) Matsum. & Nakai	Fruit decoctions and seed poultices are used externally	Snake bites, scorpion stings and as a vermifuge	Ebonyin State	Essien, Essien Jane and Okocha (2019)
8	*Coccinia barteri* (Hook.f.)	Powdery form, mixed with oil	Body cream	South-west Nigeria	Fred-Jaiyesimi et al. (2015)
9	*Coccinia grandis* (L.)	Juice extract	Body cream	South-west Nigeria	Fred-Jaiyesimi et al. (2015)
10	*Cucurbita maxima* Duch.	Seed	Used as tonic and taenicide	-	Burkill and Dalziel (1985)
11	*Cucurbita pepo* Linn.	Leaves, taken orally	Malaria	South-east	Odoh et al. (2018)
12	*Cucumis metuliferus* E.Mey. ex Naudin	Juice of the leaves and fruit	Anthelmintic	-	Okoli (1984)
13	*Cucumis metuliferus* E.Mey. ex Naudin	Pulverised plant applied externally	Malignant ulcers	-	Okoli (1984)
14	*Cucumis metuliferus* E.Mey. ex Naudin	Leaves	Breast cancers	-	Ayensu (1978)
15	*Cucumis metuliferus* E.Mey. ex Naudin	Whole plants and fruits	Diarrhoea in animals	Plateau State	Offiah et al. (2011)
16	*Cucumis figarei* Naud.	Dried and pulverised taproot	To relieve toothache	Northern Nigeria	Burkill and Dalziel (1985)
17	*Cucumis prophetarum* Linn.	Fresh fruit with the end cut off	Applied on an inflamed finger for relief	Northern Nigeria	Burkill and Dalziel (1985)
18	*Cucumis prophetarum* Linn.	Hausas add it to sodium carbonate (Na_2CO_3)	Horse vermifuge	-	Burkill and Dalziel (1985)
19	*Cucumis prophetarum* Linn.	Mixed with honey and used in small doses	Emetic as a stomachic for children	-	Burkill and Dalziel (1985)
20	*Lagenaria siceraria* (Molina) Standl.	Leaf decoctions	Jaundice	-	Burkill and Dalziel (1985)
21	*Lagenaria breviflora* (Benth.) Roberty	-	Cathartic, vermifuge and to treat headaches	-	Burkill and Dalziel (1985)
22	*Lagenaria breviflora* (Benth.) Roberty	Fruits and roots	Smallpox and chickenpox	Yorubaland	Oladunmoye and Kehinde (2011)
23	*Lagenaria breviflora* (Benth.) Roberty	Whole plant	Measles	Yorubaland	Oladunmoye and Kehinde (2011); Nworgu et al. (2018)
24	*Lagenaria breviflora* (Benth.) Roberty	Whole plant decoctions	Cough related to respiratory infections	Ede South Local Government	Sonibare et al. (2009)
25	*Lagenaria breviflora* (Benth.) Roberty	-	Newcastle disease in fowl	Yorubaland	Oridupa and Saba (2013)
26	*Lagenaria breviflora* (Benth.) Roberty	Fruit infusion baths	Remedy for convulsion	-	Ajibesin et al. (2012)
27	*Lagenaria breviflora* (Benth.) Roberty	Leaves decoctions are taken orally	Laxative	-	Ajibesin et al. (2012)
28	*Luffa cylindrica* (L.) M. Roem	Pounded seeds	Cough related to respiratory infections	Ede South Local Government Area of Osun State	Sonibare et al. (2009)
29	*Momordica charantia* L.	Leaves	Gastric ulcers	Some parts of Kwara State	Kayode, Lawal and Abdullahi (2019)
30	*Momordica charantia* L.	Leaf, complete aerial part	Female infertility, malaria, diabetes, painful menstruation and to regulate menses	Iwo metropolis	Ogunlakina and Sonibare (2019)
31	*Momordica charantia* L.	Fruit and leaves	Laxative	-	Gbile (1981)
32	*Momordica balsamina* Linn.	Fruit is used externally	Balsam	-	Okoli (1984)
33	*Momordica balsamina* Linn.	Decoction	Emetic, purgative and somatic	-	Okoli (1984)
34	*Momordica balsamina* Linn.	Roots	Aphrodisiac	-	Okoli (1984)
35	*Momordica balsamina* Linn.	Leaves	Breast cancer	-	Okoli (1984)
36	*Momordica balsamina* Linn.	Juice is squeezed from leaves	To expel roundworm and threadworm in children	South-west	Burkill and Dalziel (1985)
37	*Momordica charantia* (L.)	Leaves are squeezed with lime, small salt and mixed with water	Fevers during pregnancy	Usen people of Edo	Ogwu, Osawaru and Obahiagbon (2017)
38	*Momordica augustisepala* L.	Bark	Measles	Ogun State	Sonibare et al. (2009)
39	*Momordica charantia* L.	Whole plant	Measles	Ogun State	Sonibare et al. (2009)
40	*Momordica augustisepala* L.	-	Abortifacient	-	Aguwa and Mittal (1983)
41	*Momordica balsamina* Linn.	Leaves are immersed in water	Diarrhoea and dysentery	-	Burkill and Dalziel (1985)
42	*Momordica balsamina* Linn.	A dressing of powdered plant paste	Malignant ulcers, cancer of the breast, scabies and other skin ailment	-	Burkill and Dalziel (1985)

Table 1 continues on the next page →

TABLE 1 (Continues...): *Cucurbitaceae* species used as traditional medicine in Nigeria.

SN	Species used	Plant part used and method of preparation	Diseases	Region	References
43	*Momordica charantia* L.	Leaves or fruit decoction is taken orally	Diabetes	-	Ajibesin et al. (2012)
44	*Momordica balsamina* Linn.	Whole plant decoctions are taken orally	Haemorrhoids	River State	Ajibesin et al. (2012)
45	*Momordica balsamina* Linn. (balsam apple)	Seed is usually soaked in water and then inserted in the neck of the womb	Induce abortion	Mbula tribe in northern Nigeria	Burkill and Dalziel (1985)
46	*Momordica balsamina* Linn.	Root	Aphrodisiac	-	Wickens and Burkill (1986)
47	*Momordica charantia* L.	Fruit decoction is taken orally	Remedy for worm and infertility	-	Ajibesin et al. (2012)
48	*Momordica charantia* L.	Whole plant decoctions	Cough related to respiratory infection	Ede South	Sonibare et al. (2009)
50	*Momordica charantia* L.	Mixed with clay	Malaria	Igbo land	Okeke et al. (2009)
51	*Momordica charantia* L.	Leaves	Calm stomach ache in babies	Northern Nigeria	Adelanwa (2014)
52	*Mukia maderaspatana* (L.) M. Roem.	Root is chewed	To alleviate pains associated with facial neuralgia and toothache	-	Burkill and Dalziel (1985)
54	*Telfairia occidentalis* Hook.f.	Leaves	Serve as a blood tonic and used for the treatment of convulsion	-	Chukwuma, Soladoye and Feyisola (2015)
55	*Telfairia occidentalis* Hook.f.	Leaf decoction and flower poultice are used orally	Headache, anemia and topically for acne	-	Ajibesin et al. (2012)
56	*Telfairia occidentalis* Hook.f.	Young leaves are sliced and mixed with coconut water and salt stored in a bottle	Convulsion	-	Gbile (1986)
57	*Cucumeropsis mannii*, *Lagenaria breviflora* (Benth.) Roberty, *Citrullus colocynthis* (Linn.) Schrad., *Citrullus lanatus* (Thunb) mansf, *Momordica charantia*	-	Diabetes	South-west Nigeria	Soladoye (1985)

Note: Please see the full reference list of the article, Fajinmi, O.O., Olarewaju, O.O., Arthur, G.D., Naidoo, K. & Coopoosamy, R., 2022, 'A review of the Cucurbitaceae species used as traditional medicine in West Africa', *Journal of Medicinal Plants for Economic Development 6*(1), a163. https://doi.org/10.4102/jomped.v6i1.163, for more information.

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TABLE 2: *Cucurbitaceae* species used as traditional medicine in Benin.

SN	Species used	Plant part used and method of preparation	Diseases	Region	References
1	*Kedrostis foetidissima* (Jacq.) Cogn.	Pounded and applied topically	Candidiasis	-	Fanou et al. (2020)
2	*Lagenaria breviflora* (Benth.) Roberty	Taken orally	Internal parasitosis of cattle gastrointestinal disorders	-	Ouachinou et al. (2019)
3	*Momordica charantia* L.	Trituration, decoction, pounded, calcination	Diarrhoea, intern parasitosis, stomach ulcer, vomiting in cattle	-	Ouachinou et al. (2019)
4	*Momordica balsamina* L.	Decoction or maceration, oral	Hypertension management	-	Lagnika et al. (2016)
5	*Momordica charantia* L.	-	Measles and chickenpox	-	Dossou-Yovo et al. (2021)
6	*Momordica charantia* L.	-	Vomiting	-	Dansi, Pasquini and Deleke Kkok (2010)
7	*Momordica charantia* L.	-	Diabetes, malaria, stomach pain, urticaria, chickenpox, measles	-	Ndanikou et al. (2010)
8	*Momordica charantia* L.	-	Candidiasis	Southern Benin	Dossou-Yovo et al. (2021)
9	*Momordica charantia* L.	Decoction of whole plant is taken orally	Headaches	-	Yetein et al. (2013)
10	*Momordica charantia* L.	Whole plant decoction macerated oral + topical	Candidiasis	Southern Benin	Fanou et al. (2020)

Note: Please see the full reference list of the article, Fajinmi, O.O., Olarewaju, O.O., Arthur, G.D., Naidoo, K. & Coopoosamy, R., 2022, 'A review of the Cucurbitaceae species used as traditional medicine in West Africa', *Journal of Medicinal Plants for Economic Development 6*(1), a163. https://doi.org/10.4102/jomped.v6i1.163, for more information.

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the wild but occasionally grows on dumpsites in most parts of south-eastern Nigeria (Agbagwa, Ndukwu & Mensah 2007). Hence, they are often harvested from dumpsites or cultivated fields for use as traditional medicine.

Lagenaria breviflora, referred to as *itagiri* in Yoruba, is a potent antiviral plant whose fruit is used to ward off viral diseases such as chickenpox and measles by placing it under the bed (Oridupa 2011). *Lagenaria breviflora* fruit is a major item of trade in the western region of Nigeria and has a long history of use for the prevention and treatment of viral infections such as human chickenpox, smallpox, measles and Newcastle disease in fowl (Arowosegbe, Olanipekun & Kayode 2015; Oridupa & Saba 2013). In Nigeria, the plant is often used in animal production because of its antimicrobial properties, and it is assumed to improve the immunity of broiler birds against infections (Nworgu et al. 2018). The fruits of *L. breviflora* are used to induce abortion in Nigeria (Elujoba, Olagbende & Adesina 1985). It grows in all parts of Nigeria and is available in the market throughout the year (Nworgu et al. 2018). Similarly, the plants are sold in large quantities in medicinal plant markets and on the ubiquitous roadside stalls in the Benin (Quiroz et al. 2014). This review highlights the use of *M. charantia*, *L. breviflora* and some other *Cucurbitaceae* species for the treatment of viral infections such as chickenpox and measles amongst others.

TABLE 3: *Cucurbitaceae* species used as traditional medicine in Ghana.

SN	Species used	Plant part used and method of preparation	Diseases	Region	References
1	*Cucumeropsis mannii* Naudin.	Fruit juice is mixed with other ingredients and applied to the navel of new-born babies	To hasten the healing process until the cord drops	-	Egunjobi (2004)
2	*Cucurbita maxima* Duch.	Leaves are orally used	To treat lung and head cancer	Ashanti region of Ghana	Agyare et al. (2018)
3	*Momordica charantia* L.	-	Mental and nervous system disorders	Ashanti region of Ghana	Amoateng et al. (2018)
4	*Momordica charantia* L.	Topically applied	Abdominal pains, fever and measles	-	Boadu and Asase (2017)
5	*Momordica charantia* L.	Orally	Gonorrhoea and diabetes	-	Boadu and Asase (2017)
6	*Momordica charantia* L.	-	Headache and snakebite	Ejisu-Juaben Municipality of Ghana	Appiah et al. (2018)
7	*Momordica charantia* L.	Decoction or poultice of the leaves	Mouth sores, gangrenous wounds and gastric ulcers	-	Agyare et al. (2009)
8	*Momordica charantia* L.	-	Abdominal pains, fever, measles, gonorrhoea, headache and snakebite	Ejisu-Juaben Municipality, Southern Ghana	Appiah et al. (2018)
9	*Momordica charantia* L.	Seeds together with black ants and saltpetre are crushed, molded and inserted into the vagina	Abortion	-	Dali, Pappoe and Akotoye (2019)
10	*Momordica charantia* L.	-	Ritual, fever, measles, abortion	-	Dali et al. (2019)
11	*Momordica charantia* L.	Whole plant infusion	Snake bite	-	Boadu and Asase (2017)
12	*Momordica charantia* L.	Whole plant decoction	Diabetes	Communities in Southern Ghana	Boadu and Asase (2017)
13	*Momordica balsamina* Linn.	-	Diarrhoea and dysentery		Burkill and Dalziel (1985)

TABLE 4: *Cucurbitaceae* species used as traditional medicine in Côte d'Ivoire.

SN	Species used	Plant part used and method of preparation	Diseases	Region	References
1	*Lagenaria guineensis* (G. Don) C. Jeffrey.	Sap	Collyrium (eyewash) to treat ophthalmias	-	Wickens and Burkill (1986)
2	*Lagenaria siceraria* (Molina) Standl.	Fruits administered by rectal route	Purgative	Abbey and Krobou people of Agboville	Édouard and Kouassi (2009)
3	*Luffa cylindrica* (L.) M. Roem.	Leaf	Enema during pregnancy	Anyi-Ndenye women (Eastern Côte d'Ivoire)	Malan et al. (2015)
4	*Momordica charantia* L.	Bathing with leaves decoction	Malaria and chickenpox	Ehotile people of Côte d'Ivoire	Malan et al. (2015)
5	*Momordica charantia* L.	Body smeared with mashed leaves, enema with seed smashed and diluted in water	Abortion	Ehotile people of Côte d'Ivoire	Malan et al. (2015)
6	*Momordica charantia* L.	-	Diabetes	Abbey and Krobou people of Agboville (Côte d'Ivoire)	Édouard and Kouassi (2009)
7	*Momordica charantia* L.	Leaf decoction taken orally	Anaemia	Abbey and Krobou populations, in the South of Côte d'Ivoire	Koffi et al. (2010)

Note: Please see the full reference list of the article, Fajinmi, O.O., Olarewaju, O.O., Arthur, G.D., Naidoo, K. & Coopoosamy, R., 2022, 'A review of the Cucurbitaceae species used as traditional medicine in West Africa', *Journal of Medicinal Plants for Economic Development 6*(1), a163. https://doi.org/10.4102/jomped.v6i1.163, for more information.

SN, serial number.

TABLE 5: *Cucurbitaceae* species used as traditional medicine in Mali and Togo.

SN	Country	Species used	Plant part used and method of preparation	Diseases	Region	References
1	Mali	*Citrullus vulgaris* Schrad. ex Eckl. & Zeyh.	Peduncles (fruit stalks) are mixed with butter from the oil of the seeds of *Butyrospermum parkii* to make a paste that is applied topically	Boils	-	Inngjerdingen et al. (2004)
2	Mali	*Cucurbita pepo* Linn.	Calcinated, mixed with butter from the oil of the seeds of *Butyrospermum parkii* to a paste	Applied to treat boils and wounds in West Africa	Dogonland	Inngjerdingen et al. (2004)
3	Mali	*Lagenaria siceraria* (Molina) Standl. and *Momordica charantia* L.	Fruits	Wound healing	Bamako region of Mali	Diallo et al. (2002)
4	Togo	*Momordica charantia* L.	-	Gastrointestinal and viral infections in children	-	Beloin et al. (2005)
5	Togo	*Momordica charantia* L.	-	Gynaecology and to induce abortion	-	Beloin et al. (2005)
6	Togo	*Momordica charantia* L.	-	Fever caused by infections and diabetes	-	Beloin et al. (2005)
7	Togo	*Momordica charantia* L.	-	Management of diabetes mellitus and hypertension	Central region of Togo	Karou et al. (2012)
8	Togo	*Momordica charantia* L.	Seeds	Abortifacient, birth control and to relieve pain after childbirth	-	Beloin et al. (2005)
9	Togo	*Momordica charantia* L.	Orally	Haemorrhoids	-	Karou et al. (2012)
10	Togo	*Momordica charantia* L.	Decoction or powder is taken orally	Liver damage	Maritime region of Togo	Gbekley et al. (2017)

Note: Please see the full reference list of the article, Fajinmi, O.O., Olarewaju, O.O., Arthur, G.D., Naidoo, K. & Coopoosamy, R., 2022, 'A review of the Cucurbitaceae species used as traditional medicine in West Africa', *Journal of Medicinal Plants for Economic Development 6*(1), a163. https://doi.org/10.4102/jomped.v6i1.163, for more information.

SN, serial number.

TABLE 6: *Cucurbitaceae* species used as traditional medicine in Senegal.

SN	Species used	Plant part used and method of preparation	Diseases	Region	References
1	*Cucurbita maxima* Duch.	Sap from the roots	Otitis	-	Burkill and Dalziel (1985)
2	*Luffa acutangula* (L.) Roxb.	Poultice	Cutaneous eruptions and guinea worm sores	-	-
3	*Mukia maderaspatana* (L.) M. Roem.	Fruit	Vermifuge	-	-
4	*Momordica balsamina* Linn.	-	Vermifuge	Fula of Senegal	-
5	*Momordica charantia* L.	Fruits	Purgative and vermifuge	-	-
6	*Momordica charantia* L.	Leaves	Relieve menstrual cramps	-	-
7	*Momordica charantia* L.	Roots	Syphilis and rheumatism	-	-
8	*Momordica balsamina* Linn.	Salt is added to a macerate of the whole plant	Galactagogue to increase the milk yield of cows	-	-
9	*Momordica charantia* L.	Fruit powder	Hypoglycaemics	Wolof of Senegal	Neuwinger (1996)
10	*Momordica balsamina* Linn.	Fruits	Purgative agents	-	Souda et al. (2018)
11	*Momordica balsamina* Linn.	Poultice	Vermifuge	-	Souda et al. (2018)

TABLE 7: *Cucurbitaceae* species used as traditional medicine in Gabon and Burkina Faso.

SN	Country	Species used	Plant part used and method of preparation	Diseases	Region	References
1	Gabon	*Cucumeropsis mannii* Naudin.	Macerated leaves	Purging constipated suckling babies	-	Egunjobi (2004)
2	-	*Luffa cylindrica* (Linn.) M.J. Roem.	Leaves	To promote wound healing	-	Burkill and Dalziel (1985)
3	-	*Luffa cylindrica* (Linn.) M.J. Roem.	Seeds	Cathartics, emetic and anthelmintic effects	-	Burkill and Dalziel (1985)
4	-	*Momordica charantia* L.	Leaf decoction is taken orally	Cardiovascular disease	-	Madingou et al. (2012)
5	Burkina Faso	*Citrullus colocynthis* (L.) Schrad.	Raw fruit	Appetite suppressant for anti-obesity remedy	Seno and Nayala	Pare et al. (2016)
6	-	*Lagenaria siceraria* (Molina) Standl.	-	Used to treat liver disease	-	Tibiri et al. (2020)
7	-	*Lagenaria siceraria* (Molina) Standl.	Charred branches	Otitis	Baskoure, Kourittenga Province	Nadembega et al. (2011)
8	-	*Momordica balsamina* L.	Whole plant decoction, maceration is taken orally and used to bathe	Malaria	Northern Sahel region	Bonkian et al. (2017)

Note: Please see the full reference list of the article, Fajinmi, O.O., Olarewaju, O.O., Arthur, G.D., Naidoo, K. & Coopoosamy, R., 2022, 'A review of the Cucurbitaceae species used as traditional medicine in West Africa', *Journal of Medicinal Plants for Economic Development 6*(1), a163. https://doi.org/10.4102/jomped.v6i1.163, for more information.

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TABLE 8: *Cucurbitaceae* species used as traditional medicine in Cameroon.

SN	Species used	Plant part used and method of preparation	Diseases	Region	References
1	*Cucurbita maxima* Duch.	Leaf decoction	Aphrodisiac, sexual stimulant	Southwest	Jiofack et al. (2008)
2	*Momordica charantia* L.	Whole plant, leafy twigs	Epilepsy, abdominal pains, female infertility and headache	Upper Nyong Valley	Jiofack et al. (2009); Yemele et al. (2015)
3	*Momordica charantia* L.	Fruit, stem and leaf decoction	Calms contraction pains at childbirth	South-west	Jiofack et al. (2008)
4	*Momordica foetida* Schum. and Sond.	Leaf decoction	Abortifacient, gastralgia and female sexual diseases	South-west	Jiofack et al. (2008)
5	*Momordica charantia* and *Momordica foetida* Schum. and Sond.	Seeds are grounded and rolled into a ball and inserted into the vagina	Abortifacients	Beau region of Cameroon	Noumi and Djeumen (2007)
6	*Momordica foetida* Schum. and Sond.	-	Dystocia	-	Neba (2006)
7	*Telfairia occidentalis* Hook.f	Leaves chewed	Intestinal worms	-	Abondo, Mbenkum and Thomas (1990)
8	*Zehneria scabra* (L.F.) Sond.	-	Typhoid fever	Bamboutos	Tsobou, Mapongmetsem and Van Damme (2013)
9	*Coccinia barteri* (Hook.f.) Keay, *Cucumeropsis mannii* Naudin, *Mukia maderaspatana* (L.) M.J. Roem, *Zehneria scabra* (L.F.) Sond.	-	Treatment of ailments occurring during childbearing	Some localities of the Menoua division (Western region of Cameroon)	Yemele et al. (2015)

Note: Please see the full reference list of the article, Fajinmi, O.O., Olarewaju, O.O., Arthur, G.D., Naidoo, K. & Coopoosamy, R., 2022, 'A review of the Cucurbitaceae species used as traditional medicine in West Africa', *Journal of Medicinal Plants for Economic Development 6*(1), a163. https://doi.org/10.4102/jomped.v6i1.163, for more information.

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Beloin et al. (2015) investigated the similarity between the medicinal traditions of the general population as regards the use of *M. charantia* and the knowledge of traditional healers regarding the specialised use of the plant in Togo. The most important usage of this plant was for the treatment of gastrointestinal and viral infections in children (Beloin et al. 2015). In addition to being used in gynaecology to induce abortion, the traditional healers reported that it is often used to treat diabetes and fever caused by infections (Beloin et al. 2015). In Togo, *M. charantia* is one of the most important local medicinal plants utilised for both ritual and medicinal purposes (Beloin et al. 2015). Similarly, *M. foetida* is amongst the medicinal plants used in the Oku Mountain Forest of Cameroon to treat dystocia (Neba 2006).

Momordica charantia and *M. foetida* are used as abortifacients in the Beau region of Cameroon. This is done by grinding the seeds, rolling the pulverised seed into a ball-like structure and then inserting into the vagina. The foetus would be expelled after three days with severe pain and haemorrhage, whilst overdoses lead to death and frequent genital infections (Noumi & Djeumen 2007). *Momordica charantia* seed extract had a significant postcoital anti-implantation and early abortifacient effect in female Sprague–Dawley rats with slight vaginal bleeding (Amah, Yama & Noronha 2012).

Toxicity in *Cucurbitaceae* species

Some poisonous wild species of *Cucurbitaceae* share a close resemblance with the edible species. Many plants in this family are toxic (Watt & Breyer-Brandwijk 1962) and not all member species have been investigated for toxicity and safety for human consumption. Hence, proper identification is needed before the harvesting of *Cucurbitaceae* species for medicinal purposes. Several cases of poisoning in humans and animals because of consumption of poisonous species of *Cucurbitaceae* have been reported (Chan, Zhang & Lin 2012; Goldfain et al. 1989; Khan et al. 2003; Nadkarni, D'Cruz & Sachdev 2010; Njoroge & Newton 1994; Rymal et al. 1984; Verdcourt & Trump 1969). The public should be educated that bitter-tasting bottle gourd juice (Sharma et al., 2012) and bitter fruits of other *Cucurbitaceae* species should not be consumed, as the bitter taste is an indication of the presence of cucurbitacin.

Conclusions

The Cucurbitaceae family has many species of great medicinal value which play vital roles in the traditional medicine systems in Africa. Several *Cucurbitaceae* species are utilised for the treatment of a variety of diseases and infections in West Africa. It is particularly noteworthy that a lot of these species are used as laxatives or purgatives. *Momordica charantia* is used in almost all African countries, thus explaining why it is highly revered in the West African traditional medicine system. Its use as an abortifacient is becoming more popular, especially amongst teenage girls and young women, but could lead to a high mortality rate amongst teenage girls because of indiscriminate use and overdosage. Hence, future research should focus on investigating the number of fresh leaves of *M. charantia* and *M. balsamina* needed to prepare traditional abortifacients and contraceptives. The controlled use of this plant as a contraceptive could help to achieve a low-cost family planning method in the rural communities in West Africa, where women often give birth to more children than they can cater for. A cheap contraceptive of natural origin could further help to reduce the level of poverty, malnutrition and other social ills in rural communities. The use of *Momordica* species for purgative purposes should be avoided amongst pregnant women for the treatment of constipation, which is very common during pregnancy. More research into *Momordica* species could help to develop an effective natural product for constipation and an effective, cheap contraceptive for the African population.

As a result of the use of *M. charantia*, *L. breviflora* and some other *Cucurbitaceae* species for the treatment of viral infections such as chickenpox and measles, it would be worthwhile to investigate the effect of the plants' extracts and their active compounds such as momordicine and lagenin (and others) against the coronavirus disease 2019 (COVID-19). This could lead to the innovative development of a natural compound that could cure the disease or help to manage its symptoms.

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The authors have declared that no competing interest exists.

Authors' contributions

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References

Abondo, A., Mbenkum, F. & Thomas, D., 1991, *Ethnobotany and the medicinal plants of the Korup rainforest project area, Cameroon*, Dar Es Salaam University Press, Tanzania.

Adelanwa, E.B., 2014, 'A study of the medicinal herbs and spices used by the Hausas in Zaria local government area of Kaduna State', *Sci-Afric Journal of Food Science and Dietetics* 1, 8–13.

Agbagwa, I.O., Ndukwu, B.C. & Mensah, S.I., 2007, 'Floral biology, breeding system, and pollination ecology of Cucurbita moschata (Duch. ex Lam) Duch. ex Poir. varieties (Cucurbitaceae) from parts of the Niger Delta, Nigeria', *Turkish Journal of Botany* 31(5), 451–458.

Aguwa, C.N. & Mittal, G.C., 1983, 'Abortifacient effects of the roots of Momordica angustisepala', *Journal of ethnopharmacology* 7(2), 169–173.

Agyare, C., Asase, A., Lechtenberg, M., Niehues, M., Deters, A. & Hensel, A., 2009, 'An ethnopharmacological survey and in vitro confirmation of ethnopharmacological use of medicinal plants used for wound healing in Bosomtwi-Atwima-Kwanwoma area, Ghana', *Journal of Ethnopharmacology* 125(3), 393–403. https://doi.org/10.1016/j.jep.2009.07.024

Agyare, C., Spiegler, V., Asase, A., Scholz, M., Hempel, G. & Hensel, A., 2018, 'An ethnopharmacological survey of medicinal plants traditionally used for cancer treatment in the Ashanti region, Ghana', *Journal of Ethnopharmacology* 212, 137–152. https://doi.org/10.1016/j.jep.2017.10.019

Ajibesin, K.K., Bala, D.N. & Umoh, U.F., 2012, 'Ethno medicinal survey of plants used by the indigenes of Rivers State of Nigeria', *Pharmaceutical Biology* 50(9), 1123–1143. https://doi.org/10.3109/13880209.2012.661740

Amah, C.I., Yama, O.E. & Noronha, C.C., 2012, 'Infecund evaluation of cycling female Sprague–Dawley rats: An aftermath treatment with momordica charantia seed extract', *Middle East Fertility Society Journal* 17(1), 37–41. https://doi.org/10.1016/j.mefs.2011.08.003

Amoateng, P., Quansah, E., Karikari, T.K., Asase, A., Osei-Safo, D., Kukuia, K.K.E. et al. 2018, 'Medicinal plants used in the treatment of mental and neurological disorders in Ghana', *Evidence-Based Complementary and Alternative Medicine* 2018, 1–4. https://doi.org/10.1155/2018/8590381

Appiah, K., Oppong, C., Mardani, H., Omari, R., Kpabitey, S., Amoatey, C. et al. 2018, 'Medicinal plants used in the Ejisu-Juaben municipality, Southern Ghana: An ethnobotanical study', *Medicines* 6(1), 1. https://doi.org/10.3390/medicines6010001

Arowosegbe, S., Olanipekun, M. & Kayode, J., 2015, 'Ethnobotanical survey of medicinal plants used for the treatment of diabetes mellitus in Ekiti South Senatorial district, Nigeria', *European Journal of Botany, Plant Sciences and Phytology* 2(4), 1–8.

Ayensu, E.S., 1978, *Medicinal plants of West Africa*, vol. 55, Reference Publications, Algonac, MI.

Beloin, N., Gbeassor, M., Akpagana, K., Hudson, J., De Soussa, K., Koumaglo, K. et al. 2005, 'Ethnomedicinal uses of Momordica charantia (Cucurbitaceae) in Togo and relation to its phytochemistry and biological activity', *Journal of Ethnopharmacology* 96(1–2), 49–55. https://doi.org/10.1016/j.jep.2004.08.009

Bisognin, D.A., 2002, 'Origin and evolution of cultivated cucurbits', *Ciência Rural* 32(5), 715–723.

Boadu, A.A. & Asase, A., 2017, 'Documentation of herbal medicines used for the treatment and management of human diseases by some communities in Southern Ghana', *Evidence-Based Complementary and Alternative Medicine* 2017(3043061), 1–12. https://doi.org/10.1155/2017/3043061

Bonkian, L., Yerbanga, R., Coulibaly, M.T., Lefèvre, T., Sangaré, I., Ouédraogo, T. et al., 2017, 'Plants against malaria and mosquitoes in Sahel region of Burkina Faso: An ethno-botanical survey', *International Journal of Herbal Medicine* 5(3), 82–87.

Burkill, H.M. & Dalziel, J.M., 1985, *The useful plants of west tropical Africa*, 2nd edn., vol. 1, Royal Botanic Gardens, Kew.

Chan, K., Zhang, H.W. & Lin, Z.X., 2012, 'Treatments used in complementary and alternative medicine, in J.K. Aaron (ed.), *Side effects of drugs annual*. vol. 34, pp. 769–83, Elsevier, Amsterdam.

Chukwuma, E.C., Soladoye, M.O. & Feyisola, R.T., 2015, 'Traditional medicine and the future of medicinal plants in Nigeria', *Journal of Medicinal Plants Studies* 3(4), 23–29.

Dali, G.L.A., Pappoe, A.N.M. & Akotoye, H.K., 2019, 'Plants used as abortifacients and contraceptives in some communities on the fringes of Subri River forest reserve in Ghana', *African Journal of Reproductive Health* 23(4), 92–98.

Dansi, A., Pasquini M.W. & Deleke Kkok, I.K., 2010, 'Medicinal properties and cultural importance of traditional vegetables in Benin', in E.G. Achigan-Dako, M.W. Pasquini, F. Assogba-Komlan S. N'danikou, H. Yédomonhan, A. Dansi, et al. (eds.), *Traditional vegetables in Benin*, pp 70–76, Institut National des Recherches Agricoles du Bénin, Imprimeries du CENAP, Cotonou.

Deng, Y. & Meixia, Z., 2007, *New medical use of cucurbitacin in treating cancer*, Europe PMC, Shenyang Pharmaceutical University, Shenyang.

Deng, Y. & She, Z., 2011, *Application of cucurbitacins in preparing medicine used for treating acnes*, Shenyang Pharmaceutical University, Shenyang.

Dhiman, K., Gupta, A., Sharma, D.K., Gill, N.S. & Goyal, A., 2012, 'A review on the medicinally important plants of the family Cucurbitaceae', *Asian Journal of Clinical Nutrition* 4(1), 16–26. https://doi.org/10.3923/ajcn.2012.16.26

Diallo, D., Sogn, C., Samaké, F.B., Paulsen, B.S., Michaelsen, T.E. & Keita, A., 2002, 'Wound healing plants in mali, the Bamako Region, an ethnobotanical survey and complement fixation of water extracts from selected plants', *Pharmaceutical Biology* 40(2), 117–128. https://doi.org/10.1076/phbi.40.2.117.5846

Dossou-Yovo, H.O., Kindomihou, V., Vodouhè, F.G. & Sinsin, B., 2021, 'Assessment of the diversity of medico-magic knowledge on four herbaceous species in Benin', *The Scientific World Journal* 2021, 6650704. https://doi.org/10.1155/2021/6650704

Édouard, K.K. & Kouassi, K.C., 2009, 'Ethnobotanical study of plants used to treat diabetes, in traditional medicine, by Abbey and Krobou people of Agboville (Côte-d'Ivoire)', *American Journal of Scientific Research* 4, 45–58.

Egunjobi, J.K., 2004, 'Cucumeropsis manni', in G.J.H. Grubben & O.A. Denton (eds.), *Plant resources of tropical Africa 2, vegetables*, p. 236, PROTA Foundation, Wageningen.

Elujoba, A.A., Olagbende, S.O. & Adesina, S.K., 1985, 'Anti-implantation activity of the fruit of Lagenaria breviflora Robert', *Journal of Ethnopharmacology* 13(3), 281–288. https://doi.org/10.1016/0378-8741(85)90073-X

Eseyin, A.O., Igboasoiyi, CA, Oforah, E., Ching, P. & Okoli, B.C., 2005a, 'Effects of extracts of Telfairia occidental is leaves on some biochemical parameters in rat', *Global Journal of Pure and Applied Sciences* 11(1), 85–87. https://doi.org/10.4314/gjpas.v11i1.16466

Eseyin, O.A., Igboasoiyi, AC., Oforah, E., Nkop, N. & Agboke, A., 2005b, 'Hypoglycaemic activity of Telfairia occidentalis in rats', *Journal of Pharmacy & Bioresources* 2(1), 36–42. https://doi.org/10.4314/jpb.v2i1.32059

Essien, B.A., Essien Jane, B. & Okocha, I.O., 2019, 'Homestead horticultural crops: Alternative sources to alternative medicines/therapies in Ebonyi State, Southeastern Nigeria', *GSC Biological and Pharmaceutical Sciences* 9(2), 072–083. https://doi.org/10.30574/gscbps.2019.9.2.0019

Fajinmi, O.O., Olarewaju, O.O., Arthur, G.D., Coopoosamy, R.M. & Naidoo, K., 2022, 'A review of the relevance of bottle gourd in eastern and southern African traditional music, and social life', *Journal of Medicinal Plants for Economic Development* 6(1), a141. https://doi.org/10.4102/jomped.v6i1.141

Fanou, B.A., Klotoe, J.R., Fah, L., Dougnon, V., Koudokpon, C.H., Toko, G. et al. 2020, 'Ethnobotanical survey on plants used in the treatment of candidiasis in traditional markets of southern Benin', *BMC Complementary Medicine and Therapies* 20(1), 288. https://doi.org/10.1186/s12906-020-03080-6

Fred-Jaiyesimi, A., Ajibesin, K.K., Tolulope, O. & Gbemisola, O., 2015, 'Ethnobotanical studies of folklore phytocosmetics of South West Nigeria', *Pharmaceutical Biology* 53(3), 313–318. https://doi.org/10.3109/13880209.2014.918155

Gbekley, H.E., Karou, S.D., Katawa, G., Tchacondo, T., Batawila, K., Ameyapoh, Y. et al. 2017, 'Ethnobotanical survey of medicinal plants used in the management of hypertension in the Maritime region of Togo', *African Journal of Traditional, Complementary and Alternative Medicines* 15(1), 85–97. https://doi.org/10.21010/ajtcam.v15i1.9

Gbile, Z.O., 1981, 'Indigenous and adapted African vegetables', *Acta Horticulturae* 123, 71–80.

Gbile, Z.O., 1986, 'Ethnobotany, taxonomy and conservation of medicinal plants', in A. Sofowora (ed.), *The state of medicinal plants research in Nigeria*, pp. 13–29, University of Ibadan Press, Ibadan, Nigeria.

Goldfain, D., Lavergne, A., Galian, A., Chauveinc, L. & Prudhomme, F., 1989, 'Peculiar acute toxic colitis after ingestion of colocynth: A clinicopathological study of three cases', *Gut* 30(10), 1412–1418. https://doi.org/10.1136/gut.30.10.1412

Idu, M., Erhabor, J.O. & Efijuemue, H.M., 2010, 'Documentation on medicinal plants sold in markets in Abeokuta, Nigeria', *Tropical Journal of Pharmaceutical Research* 9(2), 110–118. https://doi.org/10.4314/tjpr.v9i2.53696

Inngjerdingen, K., Nergård, C.S., Diallo, D., Mounkoro, P.P. & Paulsen, B.S., 2004, 'An ethnopharmacological survey of plants used for wound healing in Dogonland, Mali, West Africa', *Journal of Ethnopharmacology* 92(2–3), 233–244. https://doi.org/10.1016/j.jep.2004.02.021

Jiofack, T., Fokunang, C., Guedje, N. & Kemeuze, V., 2009, 'Ethnobotany and phytomedicine of the upper Nyong valley forest in Cameroon', *African Journal of Pharmacy and Pharmacology* 3(4), 144–150.

Jiofack, T., Fokunang, C., Kemeuze, V., Fongnzossie, E., Tsabang, N., Nkuinkeu, R. et al. 2008, 'Ethnobotany and phytopharmacopoea of the South-West ethnoecological region of Cameroon', *Journal of Medicinal Plants Research* 2(8), 197–206.

Karou, S., Bako, M., Bawa, M., Souza, C., De, Tchacondo, T., Agban, A. et al. 2012, 'Medicinal plants use in central Togo (Africa) with an emphasis on the timing', *Pharmacognosy Research* 4(2), 92–103. https://doi.org/10.4103/0974-8490.94724

Kayode, A.A.A., Lawal, B.A. & Abdullahi, M.A., 2019, 'Medicinal plants used in the treatment of gastric ulcer in Southwestern and North central Nigeria', *Research Journal of Medicinal Plants* 13(4), 119–128. https://doi.org/10.3923/rjmp.2019.119.128

Khan, S.A., Shelleh, H.H., Bhat, A.R. & Bhat, K.S., 2003, 'Colocynth toxicity: A possible cause of bloody diarrhea', *Saudi Medical Journal* 24(8), 904–906.

Kirkbride, J.H., 1993, *Biosystematic monograph of the genus Cucumis (Cucurbitaceae): Botanical identification of cucumbers and melons*, Parkway Publishers, Inc., Boone, NC.

Koffi, N., Henri, K. & Ouattara, D., 2010, 'Plants used to treat anaemia, in traditional medicine, by Abbey and Krobou populations, in the South of Côte-d'Ivoire', *Journal of Applied Sciences Research* 6(8), 1291–1297.

Lagnika, L., Adjileye, R.A.A., Yedomonhan, H., Amadou, B.S.K. & Sanni, A., 2016, 'Ethnobotanical survey on antihypertensive medicinal plants in municipality of Ouémé, Southern Benin', *Advanced Herbal Medicine* 2(3), 20–32.

Lee, D.H., Iwanski, G.B. & Thoennissen, N.H., 2010, 'Cucurbitacin: Ancient compound shedding new light on cancer treatment', *The Scientific World Journal* 10, 413–418. https://doi.org/10.1100/tsw.2010.44

Madingou, N.K., Souza, A., Lamidi, M., Mengome, L.E., Mba, C.E.M., Bayissi, B. et al., 2012, 'Study of medicinal plants used in the management of cardiovascular diseases at Libreville (Gabon): An ethnopharmacological approach', *International Journal of Pharmaceutical Sciences and Research* 3(1), 111.

Malan, D.F., Neuba, D.F. & Kouakou, K.L., 2015, 'Medicinal plants and traditional healing practices in ehotile people, around the aby lagoon (eastern littoral of Côte d'Ivoire)', *Journal of Ethnobiology and Ethnomedicine* 11(1), 1–18. https://doi.org/10.1186/s13002-015-0004-8

Nadembega, P., Boussim, J.I., Nikiema, J.B., Poli, F. & Antognoni, F., 2011, 'Medicinal plants in Baskoure, Kourittenga Province, Burkina Faso: An ethnobotanical study', *Journal of Ethnopharmacology* 133(2), 378–395. https://doi.org/10.1016/j.jep.2010.10.010

Nadkarni, N., D'Cruz, S. & Sachdev, A., 2010, 'Hematemesis due to bitter melon (Momordica charantia) extract-induced gastric ulcerations', *Indian Journal of Gastroenterology* 29, 43–44. https://doi.org/10.1007/s12664-010-0009-0

Ndanikou, S., Assogba, T., Avohou, E. & Achigan-Dako, E., 2010, 'Selected species of traditional vegetable of Benin by family', in E.G. Achigan-Dako, M.W. Pasquini, F. Assogba-Komlan S. N'danikou, H. Yédomonhan, A. Dansi, et al. (eds.), *Traditional vegetables in Benin*, pp. 93–197, Institut National des Recherches Agricoles du Bénin, Imprimeries du CENAP, Cotonou.

Neba, N.E., 2006, 'Degradation of useful plants in Oku tropical montane cloud forest, Cameroon', *The International Journal of Biodiversity Science and Management* 2(2), 73–86. https://doi.org/10.1080/17451590609618100

Neuwinger, H.D., 1996, *African ethnobotany: Poisons and drugs: Chemistry, pharmacology, toxicology*, Champman and Hall, London.

Njoroge, G.N. & Newton, L.E., 1994, 'Edible and poisonous species of Cucurbitaceae in the central highlands of Kenya', *Journal of East African Natural History* 83(2), 101–115.https://doi.org/10.2982/0012-8317(1994)83%5b101:EAPSOC%5d2.0.CO;2

Noumi, E. & Djeumen, C., 2007, 'Abortifacient plants of the Buea region, their participation in the sexuality of adolescent girls', *Indian Journal of Traditional Knowledge* 6(3), 502–507.

Nworgu, F.C., Oladipo, T.A., Nwufoh, O.C., Adeoye, Y.D., Adebayo, M.D. & Ajayi, J.O., 2018, 'Effect of fermented lagenaria (adenopus breviflorus) fruit extract on the heamatological and serum biochemical indices of broiler chickens', *Journal of Biology, Agriculture and Healthcare* 8(22), 11–18.

Odoh, U.E., Uzor, P.F., Eze, C.L., Akunne, T.C., Onyegbulam, C.M. & Osadebe, P.O., 2018, 'Medicinal plants used by the people of Nsukka local Government area, south-eastern Nigeria for the treatment of malaria: An ethnobotanical survey', *Journal of Ethnopharmacology* 218, 1–15. https://doi.org/10.1016/j.jep.2018.02.034

Offiah, N.V., Makama, S., Elisha, I.L., Makoshi, M.S., Gotep, J.G., Dawurung, C.J. et al. 2011, 'Ethnobotanical survey of medicinal plants used in the treatment of animal diarrhoea in Plateau State, Nigeria', *BMC Veterinary Research* 7(1), 36. https://doi.org/10.1186/1746-6148-7-36

Ogunlakina, A.D. & Sonibare, M.A., 2019, 'Ethnobotanical survey of medicinal plants used as remedy for female infertility and menstrual disorder in southwestern Nigeria', *Nigerian Journal of Pharmaceutical Research* 15(2), 205–217. https://doi.org/10.4314/njpr.v15i2.8

Ogwu, M.C., Osawaru, M. & Obahiagbon, G.E., 2017, 'Ethnobotanical survey of medicinal plants used for traditional reproductive care by Usen people of Edo State, Nigeria', *Malaya Journal of Biosciences* 4(1), 17–29.

Okeke, E., Ene-Obong, H., Uzuegbunam, A., Ozioko, A., Umeh, S. & Chukwuone, N., 2009, 'The igbo traditional food system documented in four states in southern Nigeria', *Indigenous People Food Systems*, pp 251–281, FAO, Rome.

Okoli, B.E., 1984, 'Wild and cultivated cucurbits in Nigeria', *Economic Botany* 38(3), 350–357. https://doi.org/10.1007/BF02859015

Oladunmoye, M.K. & Kehinde, F.Y., 2011, 'Ethnobotanical survey of medicinal plants used in treating viral infections among Yoruba tribe of South Western Nigeria', *African Journal of Microbiology Research* 5(19), 2991–3004. https://doi.org/10.5897/AJMR10.004

Olarewaju, O.O., Fajinmi, O.O., Arthur, G.D., Coopoosamy, R.M. & Naidoo, K.K., 2021, 'Food and medicinal relevance of Cucurbitaceae species in Eastern and Southern Africa', *Bulletin of the National Research Centre* 45(1), 208. https://doi.org/10.1186/s42269-021-00659-y

Oridupa, O. & Saba, A., 2013, 'Relaxant effect of lagenaria breviflora roberty fruit pulp and seeds on isolated rabbit ileum', *Sokoto Journal of Veterinary Sciences* 11(2), 21–27. https://doi.org/10.4314/sokjvs.v11i2.4

Oridupa, O.A., 2011, 'Preliminary report on the antiviral activity of the ethanolic fruit extract of lagenaria breviflora roberts on newcastle disease virus', *Tropical Veterinarian* 29(1), 12–12.

Ouachinou, J.M.-A.S., Dassou, G.H., Idohou, R., Adomou, A.C. & Yédomonhan, H., 2019, 'National inventory and usage of plant-based medicine to treat gastrointestinal disorders with cattle in Benin (West Africa)', *South African Journal of Botany* 122, 432–446. https://doi.org/10.1016/j.sajb.2019.03.037

Pare, D., Hilou, A., Ouedraogo, N. & Guenne, S., 2016, 'Ethnobotanical study of medicinal plants used as anti-obesity remedies in the nomad and hunter communities of Burkina Faso', *Medicines* 3(2), 9. https://doi.org/10.3390/medicines3020009

Quiroz, D., Towns, A., Legba, S.I., Swier, J., Brière, S., Sosef, M. et al. 2014, 'Quantifying the domestic market in herbal medicine in Benin, West Africa', *Journal of Ethnopharmacology* 151(3), 1100–1108. https://doi.org/10.1016/j.jep.2013.12.019

Rymal, K.S., Chambliss, O.L., Bond, M.D. & Smith, D.A., 1984, 'Squash containing toxic cucurbitacin compounds occurring in California and Alabama', *Journal of Food Protection* 47(4), 270–271. https://doi.org/10.4315/0362-028X-47.4.270

Schaffer, A.A. & Paris, H.S., 2003, 'Melons, squashes and gourds', in B. Caballero, P. Finglas & F. Toldra (eds.), *Encyclopedia of food sciences and nutrition*, 3rd edn., pp. 3817–3827, Academic Press, Cambridge, MA.

Sharma, S.K., Puri, R., Jain, A., Sharma, M.P., Sharma, A., Bohra, S. et al., 2012, 'Assessment of effects on health due to consumption of bitter bottle gourd (Lagenaria siceraria) juice', *The Indian Journal of Medical Research* 135(1), 49.

Soladoye, M.O., 1985, *A checklist of Nigeria cucurbits (family Cucurbitaceae)*, Forestry Research Institute of Nigeria, Ibadan.

Sonibare, M.A., Moody, J.O. & Adesanya, E.O., 2009, 'Use of medicinal plants for the treatment of measles in Nigeria', *Journal of Ethnopharmacology* 122(2), 268–272. https://doi.org/10.1016/j.jep.2009.01.004

Souda, S., George, S., Mannathoko, N., Goercke, I. & Chabaesele, K., 2018, 'Antioxidant and antibacterial activity of methanol extract of momordica balsamina', *IRA-International Journal of Applied Sciences (ISSN 2455–4499)* 10(2), 7–17. https://doi.org/10.21013/jas.v10.n2.p1

Tibiri, A., Boria, S., Traoré, T.K., Ouédraogo, N., Nikièma, A., Ganaba, S. et al. 2020, 'Countrywide survey of plants used for liver disease management by traditional healers in Burkina Faso', *Frontiers in Pharmacology* 11, 563751. https://doi.org/10.3389/fphar.2020.563751

Tsobou, R., Mapongmetsem, P.M. & Damme, P. Van, 2013, 'Medicinal plants used against typhoid fever in Bamboutos division, western Cameroon', *Ethnobotany Research and Applications* 11, 163–174.

Verdcourt, B. & Trump, E.C., 1969, *Common poisonous plants of East Africa*, Collins, London.

Watt, J.M. & Breyer-Brandwijk, M.G., 1962, *The medicinal and poisonous plants of Southern and Eastern Africa being an account of their medicinal and other uses, chemical composition, pharmacological effects and toxicology in man and animal*, 2nd edn., E. & S. Livingstone, London.

Wickens, G.E. & Burkill, H.M., 1986, *The useful plants of west tropical Africa*, 2nd edn., vol. 41, Royal Botanic Gardens, London.

Yemele, M.D., Telefo, P.B., Lienou, L.L., Tagne, S.R., Fodouop, C.S.P. et al. 2015, 'Ethnobotanical survey of medicinal plants used for pregnant women's health conditions in Menoua division-West Cameroon', *Journal of Ethnopharmacology* 160, 14–31. https://doi.org/10.1016/j.jep.2014.11.017

Yetein, M.H., Houessou, L.G., Lougbégnon, T.O., Teka, O. & Tente, B., 2013, 'Ethnobotanical study of medicinal plants used for the treatment of malaria in plateau of Allada, Benin (West Africa)', *Journal of Ethnopharmacology* 146(1), 154–163. https://doi.org/10.1016/j.jep.2012.12.022