

# Review of Medicinal Plants with Antianaemic Activity Found in Nigeria

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## Abstract

Plants have been used as a source of medicinal substances for centuries and the utilization of these plants for this purpose are on the increase. There has been a growing concern on the lack of database of some of these medicinal plants therefore; the present study aims to provide an index of Nigerian plants with antianaemic potentials. The methodology employed involves extensive search and literature review of various local and international peer-reviewed journals that focused on Nigeria plants with antianaemic activity used by the people in different parts of the country. The scientific search engines used in this study included the Google scholar, (<https://scholar.google.com>) and PubMed ([www.ncbi.nlm.nih.gov/pubmed](http://www.ncbi.nlm.nih.gov/pubmed)). The study database were research articles and other scientific write-ups known for their academic importance, covering different aspects of the plant species (Botany, places where the plants are commonly found, parts of the plant used and the type of anaemia it ameliorates) dating from 2005 to 2017.

**Keywords:** Medicinal plants, antianaemic, database, literature review, search engines.

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## INTRODUCTION

Plants have been used as a source of medicinal substances for centuries and the utilization of these plants for this purpose is on the increase. It is believed that about 80% of the world population depends on herbal preparations to meet their health demands [1]. From time immemorial millions of Nigerian inhabitants have been using closer to 8,000 species of medicinal herbs for their health care demands [2] and about 13,000 plant species have been used in form of teas, extracts, or pure substances worldwide [3]. Plants are generally believed to be safe and attest to be effective against certain diseases [1]. The medicinal importance of these plants is due to the presence of some active chemical components that generates a distinct physiological effect on the body. The extremely valuable of these active chemical components of plants are alkaloids, tannins, flavonoids, and phenolic compounds [4].

Anaemia is one of the conditions that were claimed to be treated using herbal extracts because they are readily available and safer as compared to synthetic drugs and may be used without or with minimum side effects [5]. Anaemia is a condition characterized by a decreased amount of circulating red blood cells or in the

hemoglobin level and an associated reduced ability to ferry oxygen [6]. It has many precipitating risks factors that can develop independently but most of the times co-occur. These factors may be hereditary, such as hemoglobinopathies; or heavy blood loss due to menstruation, infections like malaria, intestinal parasites and chronic infection like tuberculosis, cancer and AIDS, it can also be diet related, which includes iron insufficiency as well as insufficiencies in other vitamins and minerals, such as folic acid, vitamins A and B12, riboflavin and copper [7].

Also, the use of non-steroidal anti-inflammatory drugs and other hemotoxic drugs for a longer duration as well as exposure to poisonous chemicals such as phenyl hydrazine have also been associated with the development of anemia [8]. Susceptibility increases in pregnant women due to increased need for the growing fetus [9] Deficiency of well-functioning red blood cells leads to a decreased oxygen-carrying capacity which manifest as body weakness, fatigue, pallor, exertional dyspnea, increased cardiac output, vasodilation, increased morbidity and mortality, and decreased quality of life. The cardiovascular adaptations to chronic anemia,

tachycardia, increased cardiac output, and vasodilation can worsen the condition of patients with underlying cardiovascular disease [10].

Anaemia generates a grievous health problem in many tropical countries including Nigeria due to the high prevalence of malaria and other parasitic infections which could lead to decrease hemoglobin [11]. Millions of people have anemia because any disease that can cause blood deficit or loss is most of the times connected with anemia [11]. Current orthodox treatments available for treating Anaemia are associated with numerous limitations including Gastro-intestinal disturbances, delayed absorption associated with iron therapy, hypertension and thrombotic complications associated with erythropoietin etc. [12]. The aim of this review is to provide an index of Nigerian plants with antianaemic potentials.

## METHODOLOGY

Literature in various local and international peer-reviewed journals that focused on Nigeria plants with antianaemic activity that are used by the people in any part of the country was extensively searched. The

scientific search engines used in this study were the Google scholar (<https://scholar.google.com>) and PubMed ([www.ncbi.nlm.nih.gov/pubmed](http://www.ncbi.nlm.nih.gov/pubmed)). The study database included research articles and other scientific write-ups, known for their academic importance, covering different aspects of the plant species (Botany, places where the plants are commonly found, parts of the plant used and the type of anaemia) dating from 2005 to 2017. The search strategy used, as employed by Félix-Silva *et al.* contained one or a combination of the following terms “Antianaemic Nigerian plants” or “Nigerian antianaemic plants”. “Nigerian hematinic plants”, Hematinic Nigerian plants”, “plants use in treating anaemia in Nigeria” “Plants use in treating anaemia in southern Nigeria”, “Nigerian antianaemic plants” or “Antianaemic plants” Search results were screened for relevance in the study. Only literature published in English that reported antianaemic effects (including human, animal, and in vitro studies) of medicinal plants that can be found in Nigeria were included. Information on antianaemic effect of the plants and type of anaemia was extracted from the consulted literature [Table 1].

**Table-1: Result of the literature search**

S/N o	FAMILY NAME	BOTANICAL NAME	OTHER NAMES	PLACE COMMONLY FOUND	PART(s) USED	TYPE OF ANAEMIA	REFERENCES
1	Poaceae	<i>Cymbopogon citrates</i>	Lemon grass	Widely distributed	aqueous extract of leaves	Plasmodium Berghei induced anemia in mice	Abubakar <i>et al.</i> [13]
2	Anacardiaceou s	<i>Mangifera indica</i>	Mango, mangwaro	Widely distributed	stem bark aqueous extract	PHZ induced hemolytic anaemia in rats	Sani <i>et al.</i> [14].
3	Poaceae	<i>Sorghum bicolor (L.) Moench stem bark</i>	Guinea corn, dawa	North	stem bark aqueous extract	Iron deficiency anemia in rats	Oladiji <i>et al.</i> [15].
4	Caesalpiniaceae	<i>Detarium microcarpum</i>	sweet detar, sweet dattock or tallow tree	Widely distributed	Stem bark dried, powdered and taken in pap	Traditional use	Gbadamosi <i>et al.</i> [16]
5	Myrtaceae	<i>Psidium guajava</i>	Guava	Widely distributed	aqueous extract of leaves	Plasmodium Berghei induced anemia in mice	Abubakar <i>et al.</i> [13]
6	Moraceae	<i>Ficus sur</i>	bloom cluster fig or cape fig	Widely distributed	methanolic stem bark and fruit extracts	PHZ induced hemolytic anaemia in rats	Adebayo <i>et al.</i> [17]
7	Euphorbiaceae	<i>Jatropha tanjorensis Ellis &amp; Saroja</i>	hospital too far, lapalapa.	Widely distributed	aqueous leaves extract	PHZ induced hemolytic anaemia in rabbits	Idu <i>et al.</i> [8].
8	Sterculiaceae	<i>Theobroma cacao</i>	cocoa	South	The bark is boiled and mixed with hot pap	Traditional use	Gbadamosi <i>et al.</i> [16]
9	Combretaceae	<i>Terminalia glaucescens</i>			aqueous extract of leaves	Plasmodium Berghei induced anemia	Abubakar <i>et al.</i> [13]
10	Asteraceae	<i>Vernonia amygdalina Del.</i>	Bitter leave, Shuwaka	Widely distributed	leaves	Sickle cell anemia (Review article)	Kunle <i>et al.</i> [18]
11	Meliaceae	<i>Khaya senegalensis</i>	Madaci, African mahogany,	Widely distributed	stem bark aqueous extract	PHZ induced hemolytic anaemia in rats	Sanni <i>et al.</i> [14]
12	Apocynaceae	<i>Parquentina nigrescens</i>			aqueous extract of leaves	Plasmodium Berghei induced anemia	Abubakar <i>et al.</i> [13]

13	Zingiberaceae	<i>Zingiber officinale</i>	Ginger, citta	North	aqueous extract of rhizome	Plasmodium Berghei induced anemia	Abubakar <i>et al.</i> [13]
14	Joliffieae	<i>Telfairia occidentalis</i>	Fluted pumpkin	South /south	aqueous leaves extract	PHZ induced hemolytic anaemia in rats	
15	Sterculiaceae	<i>Waltheria indica</i>			leaves are squeezed with water and little honey is added to the preparation.	Ethnobotanical survey	Gbadamosi <i>et al.</i> [[16]
16	Euphorbiaceae	<i>Phyllanthus amarus</i> Schum.	Stone breaker	Widely distributed	Leaves and seeds	Sickle cell anaemia (Review article)	Kunle <i>et al.</i> [18]
17	Zingiberaceae	<i>Curcuma longa</i> L. Tumeric <i>Atale pupa</i>	Turmeric, kurkur, Atale pupa	Widely distributed	Rhizome	Sickle cell anaemia (Ethnobotanical survey)	Gbadamosi <i>et al.</i> [19]
18	Amaranthaceae	<i>Amaranthus hybridus</i>	green amaranth, alehu	Widely distributed	Aqueous extract of leaves	PHZ induced hemolytic anaemia in rats	Ogbe <i>et al.</i> [20]
19	Zingiberaceae	<i>Aframomum melegueta</i>	alligator pepper, gorar yaji	North ans south	Fruits are dried and ground into powder.	Ethnobotanical survey	Gbadamosi <i>et al.</i> [16]
20	Menispermaceae	<i>Cissampelos owariensis</i>			Root, whole plan	Ethnobotanical survey	Olowokudejo <i>et al.</i> [21].
21	Asteraceae	<i>Vernonia colorata</i>	Eriro-Ijebu	Widely distributed	Leaves, roots	Ethnobotanical survey	Olowokudejo <i>et al.</i> [21].
22	malvaceae	<i>Hibiscus sabdariffa</i>	Roselle, sure	Widely distributed	flower	PHZ induced haemolytic anaemia in rabbits	Ologundudu <i>et al.</i> [22].
23	Combretaceae	<i>Terminalia catappa</i>	tropical-almond,tuwon biri	Widely distributed	Fallen leaves and leaves of Parquentina Nigrescens are boiled in water.	Ethnobotanical survey	Gbadamosi <i>et al.</i> [19]
24	Zingiberaceae	<i>Aframomum melegueta</i>	Aligator pepper		fruits	Ethnobotanical survey	Gbadamosi <i>et al.</i> [19]
25	Euphorbiaceae	<i>Jatropha curcas</i>		Widely distributed	Ethanolic extract of leaves	Chloroform induced anaemia in rats	Nwaka <i>et al.</i> [1]
26	Annonaceae	<i>Xylopia aethiopica</i>	bitter wood		Fruits H. madagascariensis bark and are boiled in water.	Ethnobotanical survey	Gbadamosi <i>et al.</i> [16]
27	Euphorbiaceae	<i>Manihot esculenta</i> Crantz	Cassava, rogo	Widely cultivated	Fresh leaves	Ethnobotanical survey	Bayengue <i>et al.</i> [23]
28	Fabaceae	<i>Pterocarpus erinaceus</i>	barwood		Aqueous extract of steam bark	PHZ induced haemolytic anaemia in rats	Modibbo <i>et al.</i> [24].
29	Hypericaceae	<i>Harungana madagascariensis</i>			Steam bark 70:30 ethanol water extract	PHZ induced haemolytic anaemia in rats	Olugbenga <i>et al.</i> [25]
30	Dilleniaceae	<i>Tetracera alnifolia</i>			Bark boiled in water.	Ethnobotanical survey	Gbadamosi <i>et al.</i> [25]
31	Convolvulaceae	<i>Ipomea sp.</i> Linn		Widely distributed	Fresh leaves	Ethnobotanical survey	Bayengue <i>et al.</i> [23]
32	Clusiaceae	<i>Garcinia kola</i> Heckel	Bitter cola,Orogbo	south	Fruits	Sickle cell anaemia (Ethnobotanical survey)	Gbadamosi <i>et al.</i> [19]
33	Moringaceae	<i>Moringa oleifera</i> Lam		Widely distributed	Fresh/dry leaves or seed	Ethnobotanical survey	Bayengue <i>et al.</i> [23]
34	Amaranthaceae Herb	<i>Amaranthus cruentus</i> Linn.		Widely distributed	Fresh leaves	Ethnobotanical survey	Bayengue <i>et al.</i> [23]
35	Rhamnaceae	<i>Zizyphus jujuba</i> Mil		North west	Aqueous leaves extract	PHZ induced haemolytic anaemia	Gumalla <i>et al.</i> [5]
36	Cannabaceae	<i>Trema orientalis</i>	pigeon wood		Bark of the plant and H. madagascariensis bark are Boiled with water.	Ethnobotanical survey	Gbadamosi <i>et al.</i> [5]

37	<i>Amaryllidaceae</i>	<i>Allium cepa L. Allium</i>	Onion Albasa	North west	Bulb	Sickle cell anaemia (Ethnobotanical survey)	Gbadamosi <i>et al.</i> [19]
38	<i>Apocynaceae</i>	<i>Rauwolfia vomitoria Afzel</i>			50:50 ethanol/water leaves extract	Sickle cell anaemia	Abere <i>et al.</i> [2].
39	<i>Leguminosae</i>	<i>Abrus precatorius</i>	ju-ologbo		Root, leaves, seeds.	Ethnobotanical survey	Olowokudejo <i>et al.</i> [21]
40	<i>Amaryllidaceae</i>	<i>sativum L.</i>	Garlic	North west	Bulb	Sickle cell anaemia (Ethnobotanical survey)	Gbadamosi <i>et al.</i> [16]
41	<i>Acanthaceae</i>	<i>Brillantaisia nitens Lindau</i>			Methanol leaves extract	PHZ induced haemolytic anaemia	Akah <i>et al.</i> [26]
42	<i>Rutaceae</i>	<i>Zanthoxylum xanthoxyloide</i>	Orin ata		Bark, root	Ethnobotanical survey	Olowokudejo <i>et al.</i> [21].
43	<i>Plantaginaceae</i>	<i>Scoparia dulcis</i>	Goat weed	Widely distributed	Aqueous whole plant extract	Trypanosoma brucei induced anaemia	Orhue <i>et al.</i> [27]
44	<i>Fabaceae</i>	<i>Mucuna pruriens</i>	Velvet bean (Agbala)	south	Aqueous leaves extract	Nomal rats	Obeagu <i>et al.</i> [28].
45	<i>Meliaceae</i>	<i>Khaya ivorensis</i>			Steam,root,bark	Ethnobotanical survey	Olowokudejo <i>et al.</i> [21].
46	<i>Acanthaceae</i>	<i>Eremomastax speciosa(Hochst)</i>			Ethanol leaves extract	Normal rats	Okokon <i>et al.</i> [29]
47	<i>Caricaceae</i>	<i>Carica papaya L.</i>	Pawpaw Ibepe Gonda	Widely distributed	Leaves	Sickle cell anaemia (Ethnobotanical survey)	Gbadamosi <i>et al.</i> [19]
48	<i>Fabaceae</i>	<i>Cajanus cajan</i>	pigeon pea, waken turawa	Widely cultivated	Ciklavit	Sickler patients	Akinsulie <i>et al.</i> [30]
49	<i>Fabaceae</i>	<i>Sphenostylis stenocarpa (Hoschst ex. A. Rich) Harms,</i>	African yam bean		methanol seed extract	Phlebotomy induced anaemia	Okonkwo [29]
50	<i>Xanthorrhoeaceae</i>	<i>Aloe vera (L.) Burm. f.</i>	Medicinal aloe (Eti erin in yoruba)	Widely distributed	Leaves	Antisickling effect	Gbadamosi <i>et al.</i> [16]
51	<i>Tiliaceae</i>	<i>Corchorus oltorus L</i>	. (Y – ewedu, I – ahuhara)	Widely distributed	leaves	Ethnobotanical survey	Gbadamosi <i>et al.</i> [16]

## DISCUSSION

The above table shows various medicinal plants native to Nigeria that were found to have antianaemic effects to either humans or animals at certain concentrations (where specified) according to different scholarly articles reviewed by this research. 51 plants from 35 families were documented in this review article. *Euphorbiaceae*, *Zingiberaceae* and *Fabaceae* family had the highest number in this research (7.84%) then *Poaceae*, *Asteraceae*, *Maliaceae*, *Apocynaceae*, *Amaryllidaceae*, *Amaranthaceae* and *Acanthaceae* (3.92% each) with the rest having 1.9% each.

The parts of the plants reported to have antianaemic properties in this article includes the leaves (46%), steam bark (22.6%) roots (13.2%), seeds (5.7%), fruits (7.5%), whole plant (3.8%), flower (1.9%), and bulb (3.8%), The identified plant parts were extracted using either organic solvents (ethanol, methanol, hexane, acetone, and petroleum ether) or water (aqueous).

The types of anaemia documented in this study includes hemolytic anaemia (35.3%) induced either by chemicals or parasitic infection (*Berghei* or *Brucei*), Sickle cell anaemia (21%), iron deficiency and blood loss anaemia (1.96%), others not specified (39%).

The resultant antianaemic effect may be due to the ability of the plant phytochemicals to protect or reverse the chemically induced oxidative damage on erythrocytes [14]. It can also be due to the ability of the plants to stimulate or accelerates the erythropoietic machinery in d bone marrow [18]. In case of sickle cell anaemia it might be due to the ability of the antioxidant in the plants to inhibit sickle cell hemoglobin polymerization, the time course for red blood cell sickling and improve the oxidant status of sickled erythrocyte [24]. Some of the plants antianaemic property might also be due to high iron content [15].

Most of the plants documented in this article are widely distributed in the country and all are traditionally used in treating various ill healths including anaemia. This could be due to the present of active compounds found distributed in various parts of the plants that acts on various targets in d body.

## CONCLUSION

The findings of this study reveal that many indigenous plants around us has antianaemic potentials and most are widely distributed in the country but only a small fraction has been proven scientifically hence these potentials needs to be explored for therapeutic purposes.

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