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Review of Some Herbs with Haemato-Therapeutic Properties in Use in Nigeria

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Summary
Herbal medicine an integral part of "traditional medicine" (TM) thrives in developing countries. Nigeria has a long and rich history of a significant numbers of herbs that are known to have medicinal properties. In Nigeria, there is widespread use of Herbal medicine. Traditional Medicine has met the health needs of communities particularly in low-income developing countries for centuries. It is seen as cheap and readily available alternative to conventional medicines. The aim of this review was to identify a number of plants and herbs that haemato-protective properties that are used commonly in Nigeria as well as justify the need for the preservation of these flora. The are several drawbacks to the use of these useful therapeutic agents; safety concern, efficacy, toxicity profile, challenge with dosing, standardization, poor quality control, lack of determination of lethal dose $LD_{50,}$ lack of subacute toxicity studies and the fact that these products have not been tested scientifically by way of a randomized controlled clinical trial. Traditional herbal remedies have a role to play in healthcare delivery. Most orthodox drugs are products of herbs that have been scientifically tested by way of clinical trial and toxicity studies. However, formal recognition and integration of traditional medicine into conventional medicine seems the strategic way forward. There is the urgent need for the NAFDAC to regulate the use of these herbal products to prevent the indiscriminate use of these herbal medicines with attendant negative toxic effect on the health of users. There is need for more public awareness to enlighten people particularly in rural areas about the challenges associated with the use of herbal medicines in a bid to minimizing the potential adverse effects associated with these remedies.

Keywords: Herbs, Haemato-Therapeutic, Nigeria

1.0 Introduction

World Health Organization (WHO) postulates that about 80% of the world's population uses medicinal plants in the treatment of diseases and, in African countries, this rate is much higher. Over the past decades, herbal medicine has become a thing of global significance with medicinal and economic implications (WHO, 2008). Nigerians particularly rural dwellers depends largely on crude herbal remedies or traditional medicine. Also called botanical medicines or phytomedicines, refer to herbs, herbal materials, herbal preparations, and finished herbal products that contain parts of plants or other plant materials as active ingredients. Medicinal plants are inexhaustible primary bioresource of drugs for traditional systems of medicine, modern medicines, pharmaceuticals, folklore medicines and chemical entities. In the past few decades, medicinal plants have been used as sources of medicine in virtually all cultures. The use of herbal remedies has expanded globally and is gaining popularity because it has continued to be used not only for primary health care of the poor in developing countries but also in countries where conventional medicine is predominant in the national health care system (Elekwa *et al.,* 2017). During the past decade, the traditional

systems have gained importance in the field of medicine. The World Health Organization estimates that 4 billion people, 80% of the world population, presently use herbal medicine for some aspect of primary health care (Mohammad *et al.,* 2010).

In Nigeria as in other developing countries, there is widespread use of Herbal medicine (Oreagba, et al., 2011). Traditional Medicine has met the health needs of communities particularly in low-income developing countries for centuries. It is seen as cheap and readily available alternative to conventional medicines (Ogbera et al., 2010; Fakeye et al., 2009; Amira and Okubadejo, 2007). In Nigeria, and indeed the entire West Africa, herbal medicine has continued to gain much acceptability for a number of reasons ranging from the low cost, affordability, availability, acceptability and perceived low toxicity (Parmer, 2005; Sofowora, 1993).

Many herbs contain compound that can help treat diseases or help to ease the symptoms. Substances found in medicinal plants, containing the healing property is known as phytochemicals. Phytochemicals are naturally occurring, non-nutritive biologically active chemical compounds in plants, which act as a natural defence system for host plants and provide colour, aroma and flavour. Phytochemicals are broadly classified into two main categories, namely, primary constituents and secondary metabolites. Primary constituents include proteins, amino acids, common sugars and chlorophyll, whereas, secondary metabolites include glycosides, alkaloids, phenolic compounds, flavonoids, saponins, essential oils, tannins and terpenoids. Majority of phytochemicals contain important therapeutic activities and the plants thus find their medicinal importance due to presence of the respective phytochemical constituents. For instance, saponins have the ability to treat different disease conditions and serve as antimicrobial, antidiabetic, cytotoxic, antitumor, antioxidant, antiplasmodiasis and as antihelminthic. Plants also contain other compounds such as morphine, atropine, codeine, steroids, lactones and volatile oils, which possess medical values for the treatment of different diseases. In recent years, these active principles have been extracted and used in different forms such as infusions, syrups, concoctions, decoctions, infused oils, essential oils, ointments and creams (Elekwa *et al.,* 2017).

Herbal remedies can vary in their quality, effectiveness toxicity and safety (Kloucek et al., 2005). The food and Drug Administration (FDA) does not regulate them as closely as regulations and some have little scientific evidence to support their use. Herbal medicine are form of traditional medicine. They consist of the herbs or compound that came from the herbs. They can also contain fungi and algae. The major drawbacks to the use of these sometimes useful therapeutic is that their safety, efficacy toxicity and quality of these products have not been tested scientifically by way of a randomized controlled clinical trial (Nnorom *et al.,* 2006). Traditional medicine is fast becoming highly profitable. Annual revenues in Western Europe were estimated at US$ 5 billion in 2003-2004. In mainland China, the revenue accruable from traditional medicine was estimated at US$ 14 billion in 2005 while in Brazil it was US$ 160 million in 2007 (WHO, 2008). Herbal products come in variety of format including:

- Capsule or tablet
- Whole dried plant parts such as seeds, leaves, flowers, bark or roots.
- Powders that a person can add to liquid or foods
- Tinctures, which people make by soaking plant, part in a liquid such as alcohol to extract compound.
- Herbal teas or tonics (Huizen, 2021).

Historically herbs were one of the main ways people treated disease. Today, they are still part of many types of complimentary medicines such as herbalism, naturopathy, Ayurveda, and traditional Chinese medicine. Different herbs have different properties among which are those with haemato-therapeutic properties. Generally, different methods of preparation of these herbal remedies include: Extraction—this is prepared with solvent on a weight by volume basis. Sometimes, the solvent is evaporated to a soft mass. Infusions are prepared by macerating the crude drug for a short period in cold or hot water. A preservative such as honey may be added to

prevent spoilage. Decoctions are made by boiling woody pieces for a specified period and filtered. Potash may be added to aid extraction and as preservative. Tinctures are alcoholic infusions which if concentrated may be diluted before administration. Ashing—the dried parts are incinerated to ash, then sieved and added as such to water or food. Other types include liniments for external applications in liquid, semi-liquid, or oily forms containing the active substances; lotions, which are liquid preparations, intended for skin application. Poultices are prepared from macerated fresh part of plant containing the juice from the plant and applied to skin. Snuffs are powdered dried plant inhaled through the nostrils. Dried plants may be burnt, and their charcoal is used as such. Gruels are cereals/porridges made from grains, to which dried powdered plant or its ash is added to be consumed orally. Mixtures are sometimes prepared with more than one plant to give synergistic or potentiating effects of the composite plants. There are also different methods and routes of administration of these herbal remedies; oral, rectal, topical, nasal, smoking a crudely prepared dried plant materials or by passive inhalation (Okafor, 2013).

Table 1: Some Selected Plants Used in Nigeria for Their Haemato-Protective Properties

S/N	Botanical Name	Common Name	Medicinal Use	Parts use	References
1	*Nigella sativa*	Black seed/ habbatus sauda	Improves immune system, effect on haematological parameters and haemostasis	Seed	Ekanem and Yusuf (2008); Mohammed *et al*. (2016)
2.	*Unknown*	Ajumbise polyherbal formula	Helps in haemostasis and RBC membrane integrity	Root, leaves, stem and bark	Solomon *et al*., (2019)
3.	*Talinum fruticosum*	Water leaf	Use in the treatment of anaemia	Leaf	1.1 Yilni, 2020
4.	*Telfairia Occidentalis*	Fluted Pumpkin leaf / Ugu	It improves blood clotting in the treatment of anaemia and it is an antioxidant	Leaf	Samson *et al*.,2019
5.	*Cajanus cajan*	Pigeon pea	It has antioxidant and antisickling properties and it also has an effect on immune system	Leaf	Dilipkumar *et al*.,2011
6.	*Trigonella foenum-graecum*	Fenugreek seed / Hulba	It has antisickling and antioxidant activities	Seed	Pradeep & Srinivasan (2018)
7.	*Carica papaya*	Pawpaw	It has antisickling and antioxidant effects	Unripe fruit/leaf	Daagema *et al*., 2020
8.	*Zanthozylum Zanthozyloids*	Senegal prickly-ash	It has effect on immune system and antiplasmodial effect. It relieves pain during crisis in sickle cell disease patients.	Root bark	Innocent *et al.,* 2021
9.	*Citrus sinesis*	Sweet orange	It has antioxidant and antiplasmodial properties and it has an effect on immune system.	Leaf/juice/peel	Carmen *et al.,* 2018

10.	*Persea americana*	Avocado	It has antioxidant activity	leaf	Mohammed *et al.,* (2020)
11.	*Piliostigma thonningii*	Camel's foot leaf	It has erythropoitic effect and it has a tendency to cause thrombocytopenia	Leaf	Asuk *et al.,* (2018)
12	*Cnidoscolus aconitifolius*	hospital too far/ Iyana ipaja leaf	It has antioxidant effect, treats anaemia and boost immunity	Leaf	Ezeigwe, (2020)
13	*Ficus capensis*	Akororo / Opota	It has antisickling property and it is a blood booster	Leaf	Ezeigwe, (2020)
14		Iwedu / Lalo	Blood booster	Leaf	

1.1 Black Seed (*Nigella Sativa*)

Black Seed (*Nigella Sativa*) (https://www.nutritionaloutlook.com/)

The seed of *Nigella sativa* (*N. sativa*) has been used in different civilization around the world for centuries to treat various animal and human ailments. It is a very famous and popular herb used for centuries in many communities. *Nigella sativa* has been shown to possess therapeutic potential to many illnesses (Yimer et al., *2019*). Hypoglycemic effect of Nigella sativa has been studied extensively in the literature (Abdullah, 2016). As stated by Mohammed *et al.,* (2016), Nigella sativa has positive effect on immune system and it has immune potentiating characteristics in-vitro in human T-cells. Its seeds have been shown to have haematoprotective properties because they contain significant levels of iron, copper, zinc, phosphorus, calcium, thiamin, niacin, pyridoxine and folic acid (Ramadan, 2007; Takruri *et al.,* 1998). It has been found to Induce apoptosis, disrupts mitochondrial membrane potential and triggers the activation of caspases 3, 8 & 9 in HL-60 cells in patients with Myeloblastic leukemia (Effenberger et al., 2010). *N. sativa* extract at a dose of 1.25□g/kg prominently lowered *Plasmodium yoelii* infection in mice by 94% compared to 86% with chloroquine and achieved higher parasite clearance and restoration of altered biochemical indicators by *P. yoelii* infection than chloroquine (*Okeola et al., 2011).* The effect of Nigella sativa

against haemoparasites may come handy as chemo preventive agents particularly in the era of emerging antimalarial drug resistance. N*igella sativa* has also been described as the miraculous plant and described by herbal specialists as "The herb from heaven" (Ahmad *et al*., 2013). The Prophet Mohammed (PBUH) had described the curative powers of the black seed as "Hold on to use this black seed, as it has a remedy for every illness except death" (Bukhari, 2018). In a similar study, it was concluded that the seed of Nigella sativa could activate T-lymphocyte by production of interleukin, IL-3, IL-1B. In additional experiment, it was noted that in the purification of protein of the whole seed of Nigella sativa. It has been proven that they have suppressive and other stimulatory properties in lymphocyte culture. It also has haematopoietic effect and haemostatic effect thereby increasing the blood cell parameters and there is also hyperfibrinogenemia, reduction in TT, APTT but there is no significant change in PLT count (Al-Jishi and Abuo Hozaifa, 2003). This was also collaborated by (Ekanem and Yusuf, 2008) that there is an increase in the haematological parameters of Trypanosome burcei- infected rat but contradicted by Sedigheh *et al*., (2012) that there is an increase in PLT count, decrease in WBC count and no effect on RBC, HGB, HTC after they work with hypercholesterolemic rabbits. (Mohammed *et al* 2016*,* Ekenem and Yusuf 2008*). The antiviral properties of N. sativa* seed oil have been reported. Patients with hepatitis C virus (HCV) infection, who were not eligible for IFN-α/ribavirin therapy showed significant improvement in HCV viral load (16.67% became seronegative and 50% showing significant decrement) and proved laboratory parameters (*Barakat et al.,2013) and HIV (Onifade et al.,2013). Similarly,* treatment with 10 mL of black seed twice daily for 6 months resulted in complete regaining and seroreversion of a 46-year-old HIV positive patient. In addition, a 27-year-old HIV infected woman diagnosed of HIV during ante-natal care who was not eligible for antiretroviral therapy initiated on black cumin and honey mixture (10 mL) thrice daily for a year seroconverted becoming negative with undetectable viral load (Onifade *et al*., 2015).

1.2 Ajumbise polyherbal formula

Figure 2: Ajumbise polyherbal formula (*Solomon et al., 2019)*

Ajumbise is a polyherbal used by women in southeast Nigeria to enhance labor, expel retained placenta and blood clots after delivery, relief postpartum and menstrual pains and promote involution of the uterus (Ijeoma *et al*, 2020). It is a combination of the leaves, bark, stems and roots of different species of plant in various proportion. It is composed of parts of six different plants including *Barteria fistulosa, Napoleona vogelli, Euphorbia convolvuloids, Spondias mombine, Uvaria chamae and Ceiba pentandria with* phytocomponents such as flavonoids, steriods, terpenes, phenolic compounds, alkaloids, saponins and tannins. *Ajumbise polyherbal* may be free of haematoxicity and may improve the integrity of the RBC membrane due to it is appreciable antioxidant activity (Solomon *et al., 2019)*.

1.3 Waterleaf (Talinum Fruticosum)

Waterleaf (Talinum Fruticosum) (https://www.johnandbiola.co.uk/fresh-water-leaf-2)

Waterleaf (Talinum triangulare) is an annual herbaceous plant of West Africa seen in most of the states in Nigeria mainly in the South. An edible leafy vegetable belongs to the Portulacea family. It is originally from West Africa before spreading to other parts of the world such as Asia and South America. It is called Gbure in Yoruba, Mgbolodi in Igbo, is regarded as Ebe-dondon by Edo people, and generally refer to as waterleaf. This vegetable improves the blood cells. The crude protein in waterleaf is an important supplement from medicinal and nutritional perspective, playing a significant role in the human blood cell. Its function when it comes to blood cells in the body cannot be overemphasized. It is believed to help in the adequate pumping of blood and its supply and is used in many cases, such as in the treatment of anemia. It generally helps improve the blood cells, which includes both the white and red blood cells, and the content of iron helps in this case. Improves blood clotting, waterleaf has a great effect on the blood, making it one of the vegetables that have to be incorporated into our daily meals due to its effectiveness. It helps improves clotting and prevents new ones from forming, just like a thrombus that might form in one of the blood vessels interfering with blood flow. Though thrombus can be termed healthy when it stops bleeding on injuries by making the blood form a clot, it can be termed unhealthy when the clot formation tends to block the blood vessels. Therefore, the intake of waterleaf in whatever form can help prevent such occurrence and even help improve existing ones due to their anti-inflammatory properties and others (Yilni, 2020). Waterleaf has been shown to enhance activities of antioxidant enzymes and thus can serve as a means of preventing some of major degenerative diseases (Afolabi and Oloyede, 2014). Antioxidant Properties of the Extracts of Talinum Triangulare and its Effect on Antioxidant enzymes in Tissue Homogenate of Swiss Albino Rat. *Toxicology international*, *21*(3), 307–313). *Talinum triangulare* has been shown to contain bioactive molecules including high carotenoids; moderate benzoic acid derivatives, hydroxycinnamates, flavonoids, low terpenes, alkaloids, phytosterols, allicins, glycosides, saponins, and lignans and thus may be a readily available and affordable source of health-promoting substances (Ikewuchi *et al*., 2016).

1.4 Fluted Pumpkin leaf (Telfairia Occidentalis)

Telfairia Occidentalis is a tropical vine grown in West Africa as a leaf vegetable and for its edible seeds. Otherwise known as fluted pumpkin, Ugu and is an indigenous to southern Nigeria. Fluted pumpkin has haematinic properties with high levels of protein and iron; hence, extracts from the leaves can be used to boost blood for anaemia patients. The protein in fluted pumpkin leaves also helps in the improvement and maintenance of the body tissues, which includes the connective tissues, muscles and the nervous systems. Researchers have established that vitamin contents present in this pumpkin vegetable leaves, helps in maintaining healthy tissues, cells, membrane as well as maintaining the skin and vitamin C, treating of wounds. Antioxidants property of pumpkin seed are rich in alkaloids, resins, hydrocyanic acid, tannins and flavonoid. It further reported to have powerful immune system and anti-inflammatory benefits. Pumpkin seeds are rich in antioxidants, known to be effective in the prevention of cancer and other associated health conditions like ulcer (Samson *et al*., 2019). Antioxidant, antimicrobial and antiplasmodic activity of fluted pumpkin has been reported (Oboh *et al*., 2010; Okokon *et al.,* 2018; Oboh *et al*., 2010).

1.5 Pigeon Pea (Cajanus cajan)

Pigeon Pea, Cajanus Cajan (*https://www.caribbeangardenseed.com/products/pigeon-pea-cajanus-cajan-gandules-jamaican-caribbean-gungo-congo-peas).*

Cajanus cajan (L) Millsp. (Sanskrit: Adhaki, Hindi: Arhar, English: Pigeon pea, Bengali: Tur) is a perennial legume from the family Fabaceae. Metabolites produced from Cajanus cajan has found various therapeutic uses in medicine (Pal *et al*., 2011). Since its domestication in the Indian subcontinent at least 3,500 years ago, its seeds have become a common food in Asia, Africa, and Latin America. It has been found to be very powerful antioxidant. The extract from the leaves has radical scavenging activities. It is believed to have anti-sickling property, which helps patients with sickle cell disease (Dilipkumar *et al*., 2011). A previous report indicates that the plant contains a number of flavonoids (Nix et al., 2015). In addition, previous report indicates that pigeonpea, *Cajanus cajan* potentially have hypolipidemic and potential antioxidant properties (Akinloye and Solanke, 2011).

1.6: Fenugreek Seed (Trigonella foenum-graecum)

Fenugreek Seed*: https://www.dentalcare.com/en-us/professional-education/ce-courses/ce549/fenugreek*

*Trigonella foenum-graecum (*Fenugreek Seed) belongs to the family Fabaceae and is indigenous to countries that lie on the eastern shores of the Mediterranean Sea and is also cultivated in India, Egypt and Africa. It is a commonly used medicinal plant that has several therapeutic uses. This plant use for blood lipids and sugar decreasing in diabetic and non-diabetic peoples and have antioxidant and antibacterial activity. The plant contains active constituents such as alkaloids, flavonoids, steroids, Saponins etc. It is an old medicinal plant. It has been commonly used as a traditional food and medicine. Fenugreek is known to have hypoglycemic, and hypocholesterolaemic, effects, Anti-inflammatory effects. Recent research has identified fenugreek as a valuable medicinal plant with potential for curing diseases and also as a source for preparing raw materials of pharmaceutical industry, like in steroidal hormones. Since fenugreek is a self-pollinated crop, a mutation breeding method can be used to generate mutants with a determinate growth habit. Irradiation and chemical mutagens can be used to produce point mutations in fenugreek (Nasroallah *et al*., 2013). Dietary fenugreek seed together with onions (Allium cepa) has the ability of counteracting the oxidative effect of free radicals and the erythrocytes and its membrane. (Pradeep and Srinivasan, 2018). It

also has influence on erythrocyte indices (RBC, HGB, PCV, MCV, MCH, MCHC, and PLT). It also has effect on the osmotic fragility of the erythrocytes (Dilipkumar *et al.,* 2011). Similarly, a previous report indicates the potential protective effect of Trigonella foenum-graecum on thioacetamide induced hepatotoxicity in rats (Zargar S. (2014). Protective effect of Trigonella foenum-graecum on thioacetamide induced hepatotoxicity in rats. *Saudi journal of biological sciences*, *21*(2), 139–145). Other potential use of Trigonella foenum-graecum include; immunomodulatory (Bilal *et al*., 2003), antioxidant (Kaviarasan *et al*., 2007) and anti-neoplastic (Sur *et al*., 2001).

Paw Paw (Carica papaya)

Carica papaya (www.sciencephoto.com)

Carica papaya, one of the 22 accepted species in the genus Carica of the family Caricaceae. It is widely cultivated in tropical and subtropical countries and is used as food as well as traditional medicine to treat a range of diseases including cancer (Imaga, 2013; Nguyen *et al*., 2013 Singh *et al*., 2020). Previous report indicates that it is useful for the therapeutic management of sickle cell anaemia. The leaves have been shown to possess Phenolic compounds (Canini et al., 2007). Papaya, botanical name Carica papaya, is a lozenge tropical fruit often seen in orange-red, yellow-green and yellow-orange hues, with a rich orange pulp. The fruit is not only delicious and healthy, but whole plant parts, fruits, roots, bark, peel, seeds and pulp are also known to have medicinal properties. Papaya is a powerhouse of nutrients and is available throughout the year. It is a rich source of three powerful non- enzymatic antioxidants; Vitamin C, Vitamin A and Vitamin E; the Minerals include; -, Magnesium and Potassium; the B vitamin include; Pantothenic acid and folate, and fibre. In addition, it contains a digestive enzyme papain, aids in remedying causes of trauma, allergies and sport injuries. The nutritional values of papaya help to prevent the oxidation of cholesterol. Papaya is rich in iron and calcium; a good source of Vitamin C (ascorbic acid). The extract of unripe Carica papaya contains terpenoids, alkaloids, flavonoids, carbohydrates, glycosides, saponins and steroids. Dengue fever: Papaya leaf juice helps to increase the number of white blood cells, and platelets which normalizes clotting and repairs the liver. Antimalarial and antiplasmodal activity: Papaya leaves are made into tea as a treatment for malaria. Antimalarial and antiplasmodal activity have been noted in some preparations of the plant as they reduce the number of Schizonts, gametocytes and trophozoites produced by the plasmodium (Dageema *et al*., 2020).

1.8 **Senegal prickly-ash (Zanthoxylum zanthoxyloides)**

Senegal prickly-ash (Zanthoxylum zanthoxyloides)
(https://plants.ces.ncsu.edu/plants/zanthoxylum-simulans/)

Zanthoxylum zanthoxyloides (Rutaceae) is a plant commonly used in the treatment of many diseases in tropical areas including digestive disorders, toothache, abdominal pain, sickle cell disease, snakebites, etc. This article reviews phytochemical, pharmacological and toxicological studies of this plant. Many traditional uses of this plant have been validated with nowadays researches. To date, several bioactive compounds, including tannins, saponins, sterols, glycosides, polyterpenes, polyphenols, flavonoids and alkaloids have been isolated from its extracts. These various compounds possess anti-inflammatory and analgesic, antibacterial, anti-sickle cell, antihypertensive, anti-plasmodic, anthelmintic, and insecticidal effects. However, further studies are needed to document the mechanisms of action of these different compounds and their clinical effects. Several studies have shown that the active ingredients in root bark of Z. zanthoxyloïdes against sickle cell disease are drifts of vanillic acid. Various molecules possessing anti-sickle cell properties such as divaniloylquinic acids, vanillic acid, p-hydroxy benzoic acid, p-fluoro benzoic acid, 2-dihydroxymethylbenzoic acid have been isolated from Z. zanthoxyloïdes. In addition, an anti-inflammatory property due to ortho-hydroxymethylbenzoic acid makes Z. zanthoxyloïdes useful in the treatment of pain in the crisis of sickle cell disease.

The presence of antioxidants has been shown in the methanolic extract of Z. zanthoxyloïdes have shown that this methanolic extract also has an acetylcholinesterase inhibitory activity. Malaria, caused by parasites of the genus Plasmodium, is one of the major infectious diseases in many tropical regions. Many plants have scientifically proven efficacy including Z. zanthoxyloïdes. Fagaronine, another benzo phenanthridine, active compound isolated from Z. zanthoxyloïdes has been described as one of the major antimalarial compounds found in several traditional remedies and plants from different parts of the world. In vitro, an anti-plasmodial activity of Z. zanthoxyloïdes, by its inhibitory action on the growth and development of the erythrocytic phase of Plasmodium falciparum. Same authors reported antimalarial activity attributed to the benzophenanthridine alkaloid, fagaronime from extracts of Z. zanthoxyloïdes roots. Also reported in a study using Z. zanthoxyloïdes trunk bark extracts, the antimalarial activity of the species. (Innocent *et al*., 2021). The genus *Zanthoxylum* has been put on the spotlight by many researchers particularly for its potential activity against cancer, microbial and parasitic infections, and sickle cell disease (Okagu *et al.,* 2021; Tamdem, 2019; Egunyomi *et al.,* 2009).

1.9 Sweet Orange (Citrus sinensis)


Sweet Orange (www.britannica.com)

Over the last few decades, there has been an increasing use of natural remedies to prevent or treat a large number of degenerative diseases including cancer. A significant number of scientific reports has shown that *Citrus* fruits and their juices might have a role in preventing many diseases including cancer (Cirmi *et al*., 2016). Citrus plants derived from the single genus Citrus are largely interbreedable. Among the common named given to the various members of the citrus family, orange often refers to the most popular Citrus sinensis and Citrus aurantium. Chemical composition of Citrus plant is characterized by the presence of several polyphenolic classes, including flavones, flavanones, flavonols, flavans, and anthocyanins. Experimental evidence highlights their pharmacological effect including antioxidant, cardioprotective, anti-proliferative, anticancer, and hypolipidemic activities. Citrus sinensis is a rich source of vitamin C, a natural antioxidant that support the immune system activity (Carmen *et al.,* 2018). Citrus contain a lot of flavonoids and there is growing evidence that indicate the potential protective effects of polymethoxyflavones (PMFs) particularly against the occurrence of cancer (Wang *et al.,* 2014). Anthracyclines are a group of chemotherapeutic agents commonly used in the management of a wide range of haematological malignancies including; leukaemia, lymphoma and multiple myeloma. Previous report indicates that a mix resulting from *Citrus sinensis* and *Vitis vinifera* association in ratio 1:1 was able to reduce cardiomyocytes damage induced by anthracyclines, without significantly interfering with the pro-apoptotic activity of the drug on breast cancer cells (Pepe *et al*., 2020).

2.0 Avocado (Persea americana)

Persea americana *(https://antropocene.it/en/2018/10/15/persea-americana/)*

Persea americana, commonly known as avocado, has recently gained substantial popularity worldwide because of its unique nutritional composition, antioxidant content, and biochemical profile (Bhuyan *et al*., 2019). *Persea americana* (avocado) is a tree that belongs to the laurel family, *Lauraceae*, and is one of the 150 varieties of avocado pear. This plant is indigenous to Central and South America, but it is now cultivated in the United States of America, Asia, parts of Europe, and Tropical Africa and is commonly known as the avocado pear, alligator pear, or Mexican avocado. It is a member of the flowering plant family Lauraceae (*Segovia et al.,* 2018). Previous reports indicates that that different parts of the avocado plants contain potent phenolic antioxidants including; chlorogenic-, quinic-, succinic-, pantothenic-, abscisic-, ferulic-, gallic-, sinapinic-, *p*-coumaric-, gentisic-, protocatechuic-, 4-hydroxybenzoic-, and benzoic- acids, quercetin, quercetin-3-glucoside, quercetin-3-rhamnoside, vanillin, *p*-coumaroyl-D-glucose, catechins, (-)-epicatechin, and procyanidins (*Santana et al., 2019).* Previous report indicates that Avocado has a high vitamin K and that it's extract may have preventive and possible curative values as a potential inhibitor of cardiovascular diseases and in the regulation of blood clotting time (**Gouegni and Abubakar, 2013). Similarly,** the potential of avocado in novel drug discovery for the prevention and treatment of cancer, microbial, inflammatory, diabetes, and cardiovascular diseases has also been highlighted (Bhuyan et al.,2019). Finding from a previous study justifies a pharmacological basis for the folkloric use of the hot-water extract of *P. americana* seeds in the management of diabetes mellitus.

2.1 Camel's foot leaf (Piliostigma thonningii)

Camel's foot leaf (Keyserver.lucidcentral.org)

Piliostigma thonningii (Schumach.) Milne-Redhead. (Leguminosae) is used for various medicinal purposes in African countries (Afolayan *et al*., 2018). *Piliostigma thonningii* is a species of flowering plants in the legume family, Fabaceae. It belongs to the subfamily Cercidoideae. Common names of this tree include camel's foot tree, monkey bread, monkey biscuit tree, Rhodesian bauhinia and wild bauhinia. *Piliostigma thonningii* grows quickly relative to some other tree species it competes with, and relies on rapid re-growth to survive bush fires. It grows up to 5–10 m (16–33 ft) tall, with leaves that are similar to a *bauhinia*, but it differs from *bauhinia* by having separate male and female flowers on separate trees. The flower petals are white and the thick, calyces (or seedpods) are covered in rust-coloured hairs. The pods do not spill (like other tree pods) but fall from the branches, then rot whilst on the ground, releasing the seeds. The inner bark of the tree has been used to make rope. Previous phytochemical studies on *P. thoningii* revealed the presence of diverse chemical classes of compounds that possibly accommodate for the various activities of this medicinal plant. Among the identified chemical classes are flavonoids, tannins, kaurane diterpenes, alkaloids, carbohydrates, saponins, terpenes, and volatile oils (Ighodaro *et al.,* 2012; Egharevba and

Folashade, 2010). Previous report indicates that P. thonningii leaf extract could be useful in the management of anaemic conditions, immune responses as well as bone demineralization relating to drug toxicity. (Dasofunjo *et al.,* 2016). P. thonningii extract encourages erythropoiesis as it was observed to boost the production of WBCs and hence the immune system (Dasofunjo *et al.,* 2013). Similarly, a previous report indicated that P. thonningii extract exhibited the potential to normalize the neutrophils, lymphocytes and the mixed cell count levels in the serum of the gastric induced ulcer mucosa lesions. However, the platelets count was further decreased after administration of the extract on ulcer lesions giving indication of thrombocytopenia (Asuk *et al*., 2018).

2.2: Problems Related to the Use of Herbal Products

The use of herbal products is complicated by numerous problems as summarized below.

- Lack of Scientific Evidence of Safety and Efficacy
- Lack of Regulatory Oversight
- Lack of Quality Control
- Public Misinformation
- Lack of Knowledge about Herb-Drug Interactions by Patients and Health Care Providers
- Underreporting of Adverse Drug Reactions (Ara *et al*., 2010)

3.0 Conclusion

The cost of orthodox health care system is exorbitant, especially when compared with the merger income of majority of the Nigerian population. Therefore, it is imperative that alternate and complimentary medicines are available that are affordable, effective, safe and readily available. There are so many herbs and herbal remedies in use in traditional medical practices but most of them have not been investigated and the phytochemicals not verified. Hence, the need for investigation & verification of their contents, with the view to advising effectively on the doses required to avoid acute & chronic toxicity.

4.0 Recommendation

Although these herbs have haemato-therapeutic properties, care must be taken when using them to avoid toxicity. Some of these herbs (such as carica papaya) can also be harmful to pregnant and lactating women. Others can interfere with other drugs; therefore, expertise advice is needed.

Regulatory policies are also needed to protect persons from unwanted effect on their health and finances. There is the urgent need for the NAFDAC to regulate the use of these herbal products to prevent the indiscriminate use of these herbal medicines with attendant negative toxic effect on the health of users. There is need for more public awareness to enlighten people particularly in rural areas about the challenges associated with the use of herbal medicines in a bid to minimizing the potential adverse effects associated with these remedies.

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