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COMPARATIVE STUDY ON THE PHYTOCHEMICAL CONSTITUENTS AND HAEMATOLOGICAL PARAMETERS OF ETHANOL EXTRACT OF *TELFAIRA OCCIDENTALIS* AND *JUSTICIA CARNEA* ON PHENYLHYDRAZINE ANAEMIA INDUCED WISTAR ALBINO RATS.

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ABSTRACT

This study comparatively investigated the phytochemical constituents, antioxidant vitamins and haematological parameters of the ethanol extracts of *Telfairia occidentalis* and *Justicia carnea* leaves on phenylhydrazine anemia-induced wistar albino rats. In this study, phytochemical compositions and hematological analysis were all carried out using standard analytical procedures. Thirty-five male wistar albino rats were used for haematological study. The rats were randomly distributed into seven groups of five rats each with Group A as normal control, Group B was anemia induced untreated, Group C was anemia induced, treated with 0.5ml/kg of Ferovital, then Group D and F were anemia induced treated with 100mg/kg body weight of ethanol extract of *T.occidentalis* and *J. carnea*. Group E and G were anemia induced and treated with 400mg/kg of *T.occidentalis* and *J. carnea*. Treatment lasted for fourteen days. At the end of the fourteen days blood samples were collected from the animals and were used for haematological analysis. The investigation showed the richness of aqueous extract in phytochemicals with *J.carnea* contents slightly higher than *T.occidentalis* contents.The major phytochemicals being flavonoids (8.02 ±0.00% in *T.occidentalis* and 12.01±0.00% in *J.carnea*),alkaloids (3.62±0.00% in *T.occidentalis* and 4.38±0.00% in *J.carnea*), saponins(3.40±0.00% in *T.occidentalis* and 5.28±0.00% in *J.carnear*),phenol(4.10±0.00mg/g in *T.occidentalis* and 1.03±0.00mg/g in *J.carnea*).The significant ($p<0.05$) reduction in the levels of haematological indices observed in anemic rat were significantly ($p<0.05$) reverted within few days of treatment with extracts when compared with group A. These investigations suggest that aqueous extracts of *J.carnea* and *T .occidentalis* possess anti anemic effects due to their blood boosting and replenishing properties with *J.carnea* having slightly higher blood boosting properties than *T.occidentalis.*

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Telfaira occidentalis, Justicia carnea, Phytochemicals, Anaemia, Blood and haematology

INTRODUCTION

Anaemia is a major public health issue that is linked to a higher risk of morbidity and death, particularly in developing nations in Africa like Nigeria.

It can be defined as a decrease in the ability of the blood to carry oxygen due to a decrease in the total number of erythrocytes or a combination of both that affects the blood capacity to transport oxygen (Bull and Breton, 1995). Anaemia is one of the most prevalent avoidable causes of mortality in children under five years old and pregnant women in poorer malaria-endemic countries (WHO, 2006), and as such, it presents a serious danger to global health care (Ashour, 2014).According to Kenifer and Nicol (1997), this illness is indicated by a haemoglobin level of less than 12g/dl or 13g/dl in females.

Because they have been found to contain bioactive substances called phytochemicals (Fasuyi, 2006) and secondary metabolites that can protect humans from disease (Kumar *et al*., 2009), medicinal plants have been documented as having beneficial properties used for the management of various illnesses.

In Nigeria, *Telfaria occidentalis*, also known as the "fluted pumpkin," is a common and widely grown vegetable crop, especially in the country's eastern (Anambra, Imo, Abia, and Ebonyi States), midwestern (Edo, and Delta States), and to a significant extent, western (Ondo, Ogun, Ekiti, Oyo, and Lagos States) regions (Okoli and Mgbeogu, 1983). It has straight forward, dark green veined leaves that may reach up to 18 cm broad and 35 cm long and is a member of the Curcubitaceae family.

Numerous researchers in Nigeria have noted *Telfaria occidentalis*' therapeutic properties. Anaemia, chronic fatigue syndrome, and diabetes have all been treated using the plant's herbal preparation (Alada, 2000; Dina *et al*., 2006; Kayode and Kayode, 2011).The roots include cucubitacine, sesquiterpene, and lactones; the leaves contain essential oils and vitamins (Iwu, 1983).

Justicia carnea belongs to the Acanthaceae family consisting of about 600 species of herbs, shrubs, and tender perennials native to the tropics and subtropics. Justicia carnea. Flamingo flowers, Jacobinia, Pink Jacobinia, King crown, and cardinal's guard are some of its common names in Brazil and South America (Orjiakor *et al*., 2019). It is often seen as a plant used for ornamentation (Parker and Pearson, 2012).

Numerous varieties of *Justicia carnea* are often used in folk medicine to treat gastrointestinal disorders, respiratory problems, and inflammation (Correa, 2012). According to Uroko *et al*. (2017), the bioactive elements of this plant extract, namely phenols and flavonoids, are responsible for the majority of its therapeutic capabilities, which include antibacterial, antioxidant, hypocholesteocemic, and anti-cancerous effects.The phytochemical constituents of *Telfaira occidentalis* and *Justicia carnea* extract on haematological and liver function parameters of phenylhydrazine-induced anaemia in rats will be compared in this research.

Phytochemical

Phytochemicals are biologically active non-nutrient plant chemical compounds naturally occuring in plant foods with potential health benefit to reduce the risk of chronic diseases.

Antioxidant effects, modulation of enzyme actions, immune system stimulation, modulation of hormone metabolism, anti-bacterial and antiviral effect, interference with DNA replication, and physical action, whereby some phytochemicals may bind physically to cell walls thereby preventing the adhesion of pathogens to human cell walls, are just a few of the complementary and/or overlapping mechanisms of action that phytochemicals can have in the body (Ngoci *et al*., 2011). These are some examples of these phytochemicals;

Alkaloids:A plant-derived substance known as an alkaloid is poisonous or physiologically active. According to Ogunwenmo *et al*., (2007), some alkaloids, such as isopteropodine and pteropopine, exhibit anti-microbial effect by encouraging white blood cells to eliminate dangerous micro organisms and cell debris. Along with treating hypertension, neuralgia, rheumatism and motion sickness, they also work as narcotics, antimalarials, topical anaesthetics for ophthalmology, and they may lengthen the half-life of hormones (Ngoci *et al*., 2011). They are used to treat pain in situations of boils, infected wounds, and complaints including headaches, stomach discomfort, and eye disorders since they have analgesic effect. However, certain alkaloids are deadly, addictive, and hallucinogenic, and as a result, they are employed as arrow poison while hunting wild animals (Ngoci *et al*., 2011; Ogunwenmo *et al*., 2007).

Tannins :Plant polyphenols called tannins are astringent and bitter; they either attach to and precipitate proteins or shrink them. According to Navarro *et al*. (2003), Vit *et al*. (2008), and Ngoci *et al*. (2011), they play a physiological

role by acting as antioxidants through free radical scavenging activity, chelation of transition metals, inhibition of prooxidative enzymes, and lipid peroxidation, thereby modulating oxidative stress and preventing degenerative diseases. They also prevent the development of tumours by causing apoptosis (Scalbert *et al*., 2005) and reducing the ability of carcinogens to cause mutations (Ngoci *et al*., 2011; Okuda,2005). Additionally, they build up/complex metal ions (such as cobalt, manganese, iron, copper, etc.) required for microbial development as co-factors and enzyme activators. According to Biradar *et al*. (2007), Ngoci *et al*. (2011), Ogunwenmo *et al*. (2007), and Okuda (2005), they also block viral reverse transcriptase. They interact with oestrogen receptors and have an endocrine function. They are also used to stop bleeding, speed up wound healing, and improve vascular health by inhibiting peptides that harden arteries. They also have antidiarrheal, antiseptic, anti-fungal, anti-parasitic, and anti-irritant properties (Awoyinka *et al*., 2007; Ngoci *et al*., 2011; Ogunwenmo *et al*., 2007).

Flavonoids They are phenolic and naturally water soluble structural derivatives of flavones that include conjugated aromatic systems and are often attached to sugar (s) as glycosides (Harborne, 1973). They perform their functions as antioxidants, hence preventing degenerative illnesses. Quercetin and other flavonoids work as chain-breaking antioxidants by inhibiting copper- and macrophage-mediated oxidation of low-density lipoprotein. Thus, the oxidative stress is decreased (Ngoci *et al*., 2011). According to Ngoci *et al*. (2011) and Ogunwenmo *et al*. (2007), they also serve as "nature's biological modifiers" by acting as anti-allergens, anti-inflammatory agents, and by inducing phase two enzymes that destroy mutagens and carcinogens. According to studies by Dong *et al*. (2005) and Ngoci *et al*. (2011), flavonoids are also known to boost coronary flow, decrease myocardial oxygen use, and lower arterial pressure. They are also used to treat asthma and nasal bleeding because they are anti-allergic, anti-spasmodic, and decrease capillary fragility (Harborne, 1973; Ngoci *et al*., 2011).

Saponins: These are service-active substances that resemble soap and may be identified by their capacity to haemolyse blood cells and generate foaming (Harborne, 1973). They play a variety of biological purposes, such as enhancing the respiratory system by acting as an expectorant, which results in action against coughing. Additionally, they exhibit anti-protozoa action, which results in cell lysis by interacting with the cholesterol in protozoal cell membranes. According to Ngoci *et al*. (2011), they contain anti-bacterial, antiviral, antifungal, insecticidal, molluscicidal, anti-inflammatory, and emetic properties. They have anti-cancer action without destroying healthy cells. This is accomplished by interacting with the cholesterol-rich cancer cell membranes and causing mitotic arrest, which results in cell death (Ngoci *et al*., 2011). Cell division and expansion are constrained by this. Additionally, they attach to main bile acids, which colon bacteria convert into secondary bile acids. Colon cancer is encouraged by a few secondary bile acids. They are valuable economically as a source of affordable, green cosmetics and detergents (Ngoci *et al*., 2011).

Phytosteroids: Plant steroids called phytosteroids may or may not function in the body as active hormones. They are not identical to animal steroids despite having a similar fundamental ring structure (Ngoci *et al*., 2011); instead, they have distinct chemical groups linked to the primary ring in various places. They are mostly used to address reproductive issues, such as the treatment of venereal infections, to ensure a simple delivery during pregnancy, and to encourage fertility in women and desire in men. They may be metabolised to either androgen or estrogen-like compounds, acting as sex hormone derivatives, making them a potential source of contraceptives (Edeoga *et al*., 2005; Ngoci *et al*., 2011). Additionally, they have anti-microbial, analgesic, and anti-inflammatory properties. They may also be used to treat gastrointestinal problems and lower blood cholesterol levels (Ngoci *et al*., 2011). They may also be used as immunosuppressive drugs, particularly the physalins, since they have been shown to be strong inhibitors of macrophage activation, preventing the generation of pro-inflammatory cytokines and LPS-induced mortality (Ngoci *et al*., 2011; Soares *et al*., 2005).

Terpenoids: These are isoprene derivatives with a carbon skeleton composed of one or more C15 units (Harborne, 1973). They perform their functions as immune system boosters, anti-allergens, anti-bacterial, anti-fungal, anti-viral, anti-protozoan, and antineoplastic (Ngoci *et al*., 2011; Roberts, 2007). These lipophilic chemicals are thought to disrupt membranes as part of their mechanism of action (Cowan, 1999; Ngoci *et al*., 2011; Ogunwenmo *et al*., 2007; Samy&Gopalakrishnakone, 2008). These phytochemicals have the ability to traverse cell membranes, allowing them to interact with intracellular targets essential for antibacterial action within the cell (Trombetta *et al*., 2005). According to Ngoci *et al*. (2011), they are also used to treat acute bronchial illness, epilepsy, and colds, flu, and coughs. Due to the observed effects on the levels of adrenocorticotropic hormone and corticosterone, it has been proposed that the hypothalamus-pituitary-adrenal axis may be the focus of laboratory research of ginseng terpenes (Briskin, 2000; Ngoci *et al*., 2011).

Cardiac glycosides: Cardiac glycosides, also known as cardenoloids, are found in a complex combination in the same plant. Although many of them have pharmacological effects, particularly on the heart, many of them are poisonous (Harborne, 1973). They are employed to treat congestive heart failure by blocking the Na+/K+-ATPase

pump, which results in favorable ionotropic effects and electrophysiological alterations. This increases the heart's muscular strength and systolic blood pressure's ability to combat congestive heart failure (Ngoci *et al*., 2011; Ogunwenmo *et al*., 2007). They also function as diuretics and emetics and are used to treat atrial fibrillation (Awoyinka *et al*., 2007; Harborne, 1973; Ngoci *et al*., 2011).

Haemotology

Haematology is the study of blood and diseases associated to blood. The term is derived from the Greek words "heme" and "ology," which both indicate "blood" and "the study of" or "the science of," respectively. Blood delivers waste items away from the cells as well as nutrients and oxygen to the cells. Blood's role in the body is crucial to keeping the body healthy.

A haematology test is a blood test. Haematology tests are any procedures involving blood or blood components. Numerous disorders involving blood and its constituent parts can be assessed using hematology testing. In addition to many other conditions, they can be used to identify inflammation, anaemia, infections, hemophilia, blood-clotting issues, leukemia, and chemotherapeutic response. For instance, luekemia results in aberrant CBC components. An illness or pregnancy may be indicated by an increase in white blood cells. Hematocrit and hemoglobin tests are used to detect anaemia. The complete blood count (CBC), which examines the amounts of hemoglobin, hematocrit, platelets, white blood cells, and red blood cells, is the most used haematological test.

MATERIALS AND METHODS

Materials.

The materials and equipments for the study were of analytical grade and were obtain from applied biochemistry department of Nnamdi Azikiwe University,and Delight Medical Laboratory.

Important dietry anti oxidants includes;

Plants.

The plant materials used for this study were leaves of fruited pumpkin (*Telfaira occidentalis*) and hospital to far (*Justicia carnea*). Fresh leaves of *Telfaira occidentalis* and *Justicia carnea* were obtained from a farm in Adazi-Enu, Anambra State. The plant was identified by a taxonomist in the department of botany Nnamdi Azikiwe University Awka.

Equipment used.

The equipments used for this studies were obtain from Applied Biochemistry Department of Nnamdi Azikiwe University Awka and Delight Medical Laboratory Awka.

Chemical reagents.

All chemicals and reagents used were of analytical grade and were obtain from reputable manufacturers.

Study site

The preliminary studies were conducted at Docchy analytical laboratory Awka..The animal studies was conducted at Chris Experimental Laboratory Awka while heamatology and liver function test were carried out at De-light medical laboratory Onitsha

Sample processing.

The leaves of Telfaira occidentalis and Justicia carnea were removed from the stem,sorted ,washed and pulverized into powder using electric blender after air drying.The powdered leaves were stored in air tight container until use

Extraction

Extraction was performed using 211.2g and 203.1g of *T.occidentalis and J.carnea* in 1.5l of 70% ethanol for 24 hours and stirred at 2 hours interval to ensure complete extraction.At the end of 24 hours,the samples

were separately sieved with muslin cloth and filtered using Whatman filter paper.The filterates were concentrated using water bath at 50C.

The weight of the extract after extractionand concentration were as follows;

T .occidentalis=13.40g

J.carnea=10.53g

Animals

The animal study was carried out with thirty five (35) male wistar albino rats weighing between 100g- 130g. These animals purchased from Chris Experimental laboratory Awka were acclimatizatized for one week and fed daily for a period of fourteen days.

Induction Of Anemia

Anemia was induced intraperitoneally in the rats using 20mg/kg of phenylhydrazine for three consecutive days. Blood was collected by *retro orbital sinus* for haematological analysis to monitor the animals for the symptoms of anemia before the commencement of treatment.

Grouping of Animals for antianemic study

The rats were divided into seven groups of five animals each. The study was carried out for fourteen days. All treatment groups were induced with hemolytic anemia using phenylhydrazine. The groups were as follows:

Group A: Normal control: This group received only food and water. Anemia was not induced into this group.

Group B:Negative control This group of animal was induced with anemia but without treatment.

Group C:Positive control This group was induced with anemia and was treated with standard drugs (0.5ml/kg ferovital).

Group D: This group was induced with anemia and was treated with 100mg/kg bodyweight of ethanol extract of *T. occidentali.s*

Group E: This group was induced with anemia and was treated with 400mg/kg bodyweight of ethanol exteact *T. occidentalis.*

Group F: This group was induced with anemia and were treated with 100mg/kg bodyweght of ethanol extract *J. carnea.*

Group G: This group was induced with anemia and were treated with 400mg/kg bodyweight of ethanol extract *J. carnea.*

Indices of growth parameters assessed: Following acclimation, the animals' starting weight was recorded. This was used to determine the doses for each. Following introduction, the weight was assessed 48 hours later and then once a week after that.

Blood was drawn from the animals after they had been given a chloroform anesthesia and sacrificed. In EDTA vials, the samples for hematological analysis were put. The liver function test samples were put in universal bottles, given time to coagulate, and then centrifuged for 10 minutes at 4000 rpm. The collected sera were put into a different set of test tubes.

Phytochemical Analysis.

Some of the phytochemicals investigated in the leaves include phenols,saponins,steroids,flavonoids,alkaloids and tannins using standard procedure (Harborne,1998).

Heamatological parameters

Determination of packed cell volume

Principle: When whole blood sample is subjected to a centrifugal force for maximum RBC packing, the space occupied by the RBCs is measured and expressed as percentage of the whole blood volume.

Procedure: Using micro haematocrit method, a well-mixed anticoagulated whole blood was allowed to enter capillary haematocrit tubes until appropriately 2/3 filled with blood. Blood filling was done for each tube. One end of each tube

was sealed with Bunsen flame and placed in the medial grooves of the haematocrit centrifuge head exactly opposite each other, with the open end towards the center. The lid was replaced and centrifuged for five minutes at 11,000rpm. The tubes were removed as soon as the centrifuge had stopped spinning. And the value of the packed cells was read off using the microhaematocrit reader.

Determination of haemoglobin concentration

Principle: When whole blood is added to Drabkin's reagent: a solution containing KCN (Potassium cyanide) and (Potassium ferricyanide) K3Fe(CN)6, KCN converts Hb-Fe2+ (ferrous) to Hb-fe3+ (ferric) state to form methaemoglobin which then reacts with KCN to form a stable pigment, cyanmethaemoglobin complex. The colour intensity of this mixture is measured in a spectrophotometer at a wavelength of 540nm (or using a yellow-green filter). The optical density (OD) of the solution is proportional to the haemoglobin concentration.

Procedure: Using Cyanmethaemoglobin method, exactly 5.0ml of Drabkin's reagent was pipette into two test tubes 1 and 2. A well mixed sample of EDTA blood (0.02ml) was pipette into the tubes, rinsing the pipette five times with the reagent, until all the blood was removed from the pipette. The solutions were well mixed and allowed to stand at 25℃ for 10 minutes in order to allow the formation of Cyan – met- haemoglobin. The mixtures were transferred into cuvettes and read in a spectrophotometer at a wavelength of 540nm. The Drabkin 's reagent in tube 1 was used as the blank (setting the percentage transmittance at 100%). The readings from each tube were recorded and the actual Hb values in g/dl were determined from a pre- calibrated chart.

Determination of white blood cells (WBCS)

Principle: When whole blood is mixed with weak acid solution such as glacial acectic acid solution, it dilutes the blood and haemolyses the RBCs, enabling the WBCs to be counted.

Procedure
The blood specimen was mixed approximately for one minute, using the white blood cell pipette, blood will be drawn to the 0.5mark in the pipette. Blood was removed from the outside of the pipette with clean gauze. The tip of the pipette was placed into the counting diluting fluid to draw it slowly until it reached the 11 mark. The counting chamber and the cover glass were cleaned with a cloth. The counting chamber was filled with diluted blood. The four corners of the chamber was visualised under a low power (10X) objective and the cells were counted in all the four marked corner squares.

Determination of red blood cells (RBCs)

Principle: To facilitate counting, whole blood is diluted with Gower's solution which hemolyzed white blood cell and prevent red blood cell lysis.

Procedure

A 1:200 dilution was made by diluting 20µl of EDTA anticoagulated blood in 3.98ml of Gower's solution and mixed for 3minutes. The counting chamber and cover glass was cleaned appropriately. A 10µl of the diluted fluid was used to both chambers of the haemocytometer avoiding air bubble; it was allowed to stand for 3minutes prior to counting. The haemocytometer was carefully placed on the microscope stage, the condenser on the microscope was lowered and the chamber was scanned using 10X objective lens. The cells were counted using the 40X objective lens.
NOTE: Gower's solution contains sodium sulphate 12.5g, glacial acetic acid 33.3ml and distilled water 100ml

Determination of differential cells
Principle: A drop of blood is smeared on a slide, stained and examined under the microscope, to establish the morphology of red blood cells, leucocytes and platelets and the relative frequency of different leucocytes. The slide is stained with one of the Romanowsky stains (Leishman stain).

Procedure
A drop of well mixed anticoagulated blood was placed on a clean, grease free slide, using a spreader the blood was smeared on the slide and allowed to air dry. The slide was flooded with Leishman stain and allowed to stand for 2minutes. The stain was diluted with twice its volume of buffered distilled water. It was mixed by blowing air gently on the stain to ensure uniform mixing. The stain was allowed to stand for 8minutes. Excess stain were rinsed off with buffered distilled water, the back of the slide was wiped to remove all traces of the stain. The slide was drained and

stood upright in a draining rack to dry. The slide was examined microscopically with 100X oil immersion objective lens.

RESULTS

Result of the Phytochemical analysis of *Telfairia occidentalis* and *Justicia carnea* expressed as mean ± SEM.

Phytochemicals	*Telfairia occidentalis*	*Justicia carnea*
Flavonoids (%)	8.02 ± 0.00	12.01 ± 0.00
Alkaloids (%)	3.62 ± 0.00	4.38 ± 0.00
Saponins (%)	3.40 ± 0.00	5.28 ± 0.00
Cardiac glycosides (%)	1.49 ± 0.00	6.71 ± 0.00
Tannin (%)	3.08 ± 0.00	3.81 ± 0.00
Steroid (mg/g)	4.30 ± 0.00	3.71 ± 0.00
Phenol (mg/g)	4.10 ± 0.00	1.03 ± 0.00

The results of the phytochemical analysis revealed that flavonoids, alkaloids, saponins, cardiac glycosides and tannin, were observed to be more in *J. carnea* leave compared with *T. occidentalis*.*T. occidentalis* contains more cyanogenic glycosides, steroid and phenol, compared to *J. carnea*

Comparism of the effect of ethanol extracts of *Telfairia occidentalis* and *Justicia carnea*on the haematological parameters of phenylhydrazine-induced anemic rats expressed as mean ± SEM.

Groups	**Hemoglobin (g/dl)**	**Packed Cell Volume (%)**	**White Blood Cell (mm^3 x 10^3)**	**Red Blood Cell (mm^3x10^{12})**
Group A-Normal Control	12.50 ± 0.10	37.67 ± 0.33	4.27 ± 0.03	4.10 ± 0.00
Group B-Anemic untreated	9.20 ± 0.10b	27.67 ± 0.33b	5.20 ± 0.06a	2.07 ± 0.03b
Group C-Anemia + 0.5ml/kg Ferovite	13.77 ± 0.23ac	41.33 ± 0.67ac	4.30 ± 0.00d	5.83 ± 0.27ac
Group D-100mg/kg ethanol extract of *T. occidentalis*	14.30 ± 0.68ac	43.00 ± 2.08ac	4.20 ± 0.06d	5.17 ± 0.30ac
Group E-400mg/kg ethanol extract of *T. occidentalis*	15.87 ± 0.13ac	47.67 ± 0.33ac	4.33 ± 0.09d	5.93 ± 0.17ac
Group F-100mg/kg ethanol extract of *J. carnea*	16.63 ± 0.20ac	50.00 ± 0.58ac	4.17 ± 0.07d	6.67 ± 0.47ac
Group G-400mg/kg ethanol extract of *J. carnea*	16.63 ± 0.20ac	50.00 ± 0.58ac	4.17 ± 0.07d	6.67 ± 0.47ac

DISCUSSION AND CONCLUSION

Discussion

According to the findings of the phytochemical examination, *J. carnea* leaves were found to have more flavonoids, alkaloids, saponins, cardiac glycosides, tannin, and oxalate than *T. occidentalis* leaves. In comparison to *J. carnea, T. occidentalis* has higher levels of phytate, cyanogenic glycosides, steroid and phenol

Fruits and vegetables benefit greatly from the taste and colour of flavonoids, one of the major categories of plant phenols (Tanwar and Modgril, 2012). This might be explained by the crimson tint that was generated when its green leaves were cooked. According to reports, flavonoids have antibacterial, antiprotozoal, and antiviral properties. The ability to neutralise free radicals, which assault the majority of body cells and cause diseases like cancer, heart disease, and even ageing, gives them antioxidant capability as well (Ekanayeke *et al*., 2000). These green vegetables are used medicinally for analgesic, anti-cancer, and antibacterial properties since they contain alkaloids (Stary, 1998).

Saponins are phytochemicals with a variety of structural forms and biological functions (Eleknofehinti, 2015). They have been shown to have anti-diabetic, anti-oxidant, anti-obesity, anti-microbial, and anti-hyperlipidemic effects.

According to their phenol components, saponins and alkaloids have been claimed to have anti-anemic activity. The phenolic components of the leaves may be responsible for their antioxidant potentials, which makes them healthy (Aberoumand, 2012).

Conclusion

The findings of this study indicate that the aqueous extract of *T. occidentalis* and *J.carnea* leaves are both rich in nutritive components with trace amount of anti-nutritional factors. They possesses blood boosting and replenishing properties that enables them to effectively restore blood levels of anemic rats to normalcy within very short period of treatment. These findings validates claims by local consumers that it possesses anti anemic effects that boost blood level in anemic patients, pregnant women and replenishes blood lost through menstrual cycle when consumed in adequate amount.

Comparatively, the investigation shows that the extracts of *J.carnea* leave boost blood slightly higher than *T.occidentalis*. This could be as a result of higher phytochemical components (flavonoids, alkaloids,saponin) present in *J. carnea*.

Recommendations

Research institute and other fellow researchers should carry out more research to find out more easier and improved ways of extraction and use of this extract.

Government at all level should help and provide funds for researchers to carry out this investigation in a larger scale in other to have enough of this extracts which helps in curing of anaemia.

Contribution to Knowledge

This work contributed to existing knowledge by revealing that both *Justicia carnea* and *Telfaira occidentalis* leaves possess bioactive compounds called phytochemicals.It also reveals that *J. carnea* leaves could boost blood level slightly higher than *T. occidentalis* and this could be as a result of its high content of some phytochemicals like flavonoid,alkaloid and saponins.

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