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Phytochemical and vitamin constituents of *Senna occidentalis Linn* (Uzaki Mma)

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Abstract

This study dealt with the phytochemical and vitamin constituents of Sennaoccidentalis (Uzakimma). The qualitative analysis of the plant indicated the presence of high presence of flavonoids, glycosides, alkaloids, terpenoids and, moderate presence of tannins, saponin, steroids, and phenol. The quantitative results were tannins 1.4775 ± 0.0495 mg/g, alkaloids 2.2280 ± 0.0283 mg/g, saponin 1.5830 ± 0.0141 mg/g, glycosides 2.1295 ± 0.1909 mg/g, terpenoids 2.7560 ± 0.1414 mg/g, flavonoids 2.1755 ± 0.0212 mg/g, steroids 1.1030 ± 0.1273 mg/g, phenol 1.3290 ± 0.0283 mg/g. The results of vitamin contents were vitamin A (0.6545 ± 0.0778 mg/g), vitamin B (1.5600 ± 0.0283 mg/g), vitamin B1 (0.8145 ± 0.9405 mg/g), vitamin B2 (0.2325±0.1202 mg/g), vitamin B3 (0.1200 ± 0.0566 mg/g), vitamin B6 (0.2390 ± 0.0283 mg/g), vitamin B9 (1.2280 ± 0.3536 mg/g), vitamin C (1.0610 ± 0.8061 mg/g), vitamin D (0.3430 ± 0.1273 mg/g), vitamin E (0.5285 ± 0.0212 mg/g) and vitamin K (0.6170 ± 0.000 mg/g). The result indicates that there are phytochemicals and vitamins in Uzakimma that could be useful in medicine.

Keywords: Phytochemical; Vitamin; Flavonoids; Glycosides; Alkaloids; Terpenoids

1. Introduction

Plant's constituents have been used in treatment of sickness, infection, genetic disorder and auto-immune disease. There is the need to understand the phytochemical constituents and the vitamin components of plants.

Phytochemicals are chemical components found in plant and are secondary metabolites produced by the plant [1]. Some of the phytochemicals in plants are flavonoids, alkaloids, saponins, glycosides, terpenoids, tannins, steroids, lignin, anthraquinone, quinones, coumarin,emodins, betacyanin [2]. Phytochemical can function as anti-oxidants, anti-cancerous, cytotoxicant, antimicrobial, vaso-dilatin and detoxifying agents; strengtheners, anti-rheumatics, anti-malaria, hepaticidal, neuro-pharmaceuticals, sedatives, insecticidal, and immuno-stimulants [1]. Oxidative stress isarises from the release of free radicals like: superoxide anions, hydrogen peroxide, hydroxyl, nitric oxide and peroxy-nitrate. These free radicals play an important role in the pathogenesis of neurodegenerative disorders, atherosclerosis, diabetes, inflammation, aging, cancer, coronary heart disease and Alzheimer's disease. Antioxidants found in plants act as radical scavengers when added to the food products. These antioxidants prevent radical chain reaction of oxidation, delay or inhibit the oxidative processes, and increase the shelf life by retarding the process of lipid peroxidation [3].

Vitamin A, vitamin B- carotene, vitamin B1, vitamin B2, vitamin B3, vitamin B6, vitaminB9, vitamin C, vitamin D, vitamin E and vitamin K can be obtained from some plants [4] Vitamins differ from the other biologicalcompounds, relatively small quantities are needed to complete their functions. The functions of vitamins are catalytic or regulatory in nature, facilitating or controlling vital chemical reactions in the body's cells [5]. If any vitamin is absent from the diet or

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is not properly absorbed by the body, a specific deficiency disease may develop [6]. These roles of individual vitamins include: part of an enzyme needed for energy metabolism;nerve function, normal vision and skin health, digestive system,helps make red blood cells, making of DNA and new cells and antioxidant; part of an enzyme is needed for protein metabolism, immunity, system health; iron absorption, proper absorption of calcium; stored in bones andblood clotting [5].

Cassia occidentalis, a native plant of South India, commonly called as Coffee Senna belongs to the family Caesalpiniaceae [7]. Their roots, leaves and seeds were used for fever, menstrual problems, tuberculosis, diuretic, anemic, liver complaints and as a tonic for general weakness and illness. This plant is also used to cure sore eyes, hematuria, rheumatism, typhoid, asthma, disorder of haemoglobin, leprosy. The seeds are brewed into a coffee like beverage for asthma, malaria, fevers and stomach complaint. This study was to determine the phytochemicals and vitamin contents of *Senna Occidentalis Linn* (UzakiMma).

2. Methodology

2.1. Collection and Preparation of the Samples

Fresh leaves of *SennaoccidentalisLinna*were obtained from Obe in Nkanu West Local Government of Enugu State, Nigeria. It was identified and named in Department of Botany, UNIZIK Akwa with code NAUH-202A. The Leaves were air-dried and ground into fine powder.

2.2. Extraction

A quantity, (73.08 g) of ground powder were percolated with 500 ml of solvent (400 ml Ethanol and 100 ml of water) for extraction and kept at Soxhlet 150 °C temperature for 36 hours. After extraction, the extracts obtained were filtered and concentrated. The extracts were used for qualitatively and quantitative phytochemical as well as determination of the vitamin contents.

2.3. Qualitative Phytochemical Analysis

The qualitative phytochemical analysis were done following [8];[9] protocols. The preliminary analysis involved testing for the presence of flavonoids, terpenoids, steroids, saponins, alkaloids, tannins, glycosides and phenols.

2.4. Test for Tannins

Extract (0.1 g) was stirred with 10 ml of distilled water and then filtered. Few drops of 1 % ferric chloride solution were added to 2 ml of each filtrate. The presence of a blue-black or blue-green precipitate indicated the presence of tannins [9].

2.5. Test for the Alkaloids

A quantity of the extract (0.1 g) was dissolved individually in dilute Hydrochloric acid and filtered.Hager's Test: Filtrates were treated with Hager's reagent (saturated picric acid solution). Presence of alkaloids was confirmed by the formation of yellow coloured precipitate [9].

2.6. Test for Saponins

A quantity of each extract (0.1 g) was boiled with 5 ml of distilled water and filtered. To each filtrate, about 3 ml of distilled water was further added and shaken vigorously for about 5 minutes. Frothing which persisted on warming was taken as an evidence for the presence of saponins [10].

2.7. Test for Glycosides

Each extract (0.1 g) was mixed with 30 ml of distilled water and heated on a water bath for 5 minutes. To 5ml of each of the filtrates, 0.2 ml of Fehling's solution A and B were added until it turned alkaline. The solutions were heated on a water bath for 2 minutes. A brick-red precipitate indicated the presence of glycoside [10].

2.8. Test for Terpenoids

Each extract (0.1 g) was dissolved in ethanol. Acetic anhydride (1 ml) was added, followed by the addition of concentrated H_2SO_4. A change in colour from pink to violet showed the presence of terpenoids [10].

2.9. Lead Ethanoate Test for Flavonoids

A quantity (0.1 g) of each extract was dissolved in water and filtered. To 5 ml of each of the filtrates, 3 ml of lead ethanoate solution was added. Appearance of a buff – coloured (pale yellow-brown) precipitate indicated the presence of flavonoids [9].

2.10. Liebermann-Buchard Test for Steroids

To 0.1 g of each extract, 2 ml of acetic acid was added. The solution was cooled well in ice followed by the careful addition of concentrated tetraoxosulphate (VI) acid (H_2SO_4). Colour development from violet to blue or bluish-green indicated the presence of a steroidal ring [10].

2.11. Ferric Chloride Test for Phenols

About 0.1 g of each extract was boiled with distilled water and then filtered. To 2 ml of each filtrate, few drops of 10 % ferric chloride solution were then added. A green-blue or violet colouration indicated the presence of a phenolic hydroxyl group [9].

2.12. Quantitative Phytochemicals Analysis

2.12.1. Determination of Alkaloids [8]

The sample was weighed (1.0 g) using electric weighing balance into a 250 ml beaker; 100 ml of 10 % acetic acid in ethanol was added to the sample and covered. The mixture was allowed to stand for four hours for proper extraction to take place. The sample was filtered with filter paper and the extract was concentrated on a water bath to one quarter of the original volume. A volume, 20 ml of ammonium hydroxide was added drop wisely to form precipitate of the alkaloid in the filtrate. The filtrate was weighed with NH_4OH and filtered. The filter paper was weighed before using it to filter. After filtering, the filter paper and the precipitate were dried in an oven at 40 ^{0}C and weighed. The alkaloid content was determined using the following formula.

$$\text{Concentration of alkaloid } = \frac{W2 - W1}{W3}$$

Where;
W_1 = weight of empty filter paper;
W_2 = weight of the alkaloid and filter paper;
W_3 = weight of sample used.

2.12.2. Determinations of Saponins

A quantity of (1.0 g) of the sample was weighed using an electric weighing balance into 250 ml conical flask and soaked with 100 ml of 20 % ethanol for three (3) minutes and heated for three (3) hours at 55 ^{0}C for proper extraction then filtered. The residue was re-extracted with another 100 ml of 20 % ethanol. The two extracts were combined and heated to 40 ml at 90 ^{0}C on a water bath. The concentrate was transferred into a 500 ml separating funnel and 20 ml of diethylether was added and shaken vigorously, the upper layer was discarded. The purification process was repeated and 60 ml of n-batanol was added, the lower layer was discarded while the upper layer was collected. The combined n-butanol extract was washed with 10 ml of 5 % aqueous NaCl and the lower layer was discarded while the upper layer was collected in a weighed beaker and heated to dryness. The beaker is allowed to cool in desiccators and re-weighed. The saponin content was determined using the following formula.

$$\text{Concentration of saponin } = \frac{W2 - W1}{W3}$$

Where;
W_1 = weight of empty beaker;
W_2 = weight of beaker + sample after heating;
W_3 = weight of sample used.

2.12.3. Determination of Tannins

Extract of the sample was weighed (1.0 g) into a plastic bottle and 50 ml of distilled water was added and shaken for 3 hours in a vibrator. The sample was filtered into a 50 ml volumetric flask and made up to mark. A volume, 5 ml of the filtrate was dispensed into a test tube and mixed with 2 ml of 0.1m $FeCl_2$ in 0.1N HCl and 0.008 M potassium ferrocyamide, the absorbance was measured at 120 nm for 10 mins. The tannin concentration was determined using the following relation.

$$\text{Concentration of tannin} = \frac{Abs\ x\ Path\ length}{100\ x\ weight\ of\ sample\ used}$$

Where;

Abs = value of absorbance read;
D.F = dilution factor.

2.12.4. Determination of Flavonoid

Extract (1.0 g) was repeatedly extracted with 100 ml of 80 % aqueous methanol at room temperature; the solution was shaken for 30 mins and filtrate was transferred into a weighed beaker and evaporated to dryness over a water bath and weighed again. The time for the first extraction was 1 hour, 45 mins for the second extraction and 30 mins for the third extraction. Flavonoid was determined using the following formula.

$$\text{Concentration of Flavonoid} = \frac{W2 - W1}{W3}$$

Where;

W_1 = weight of empty beaker
W_2 = weight of beaker + sample after drying
W_3 = weight of sample used.

2.12.5. Determination of Steroids

Extract (1.0 g) was dispersed in 100 ml of distilled water into a conical flask; the mixture was shaken for 3 hours and allowed to stand overnight. It was then filtered, the filtrate was eluted with 10 ml normal ammonium hydroxide solution, 2 ml of the elute was put into a test tube and mixed with 2ml of chloroform and also 3 ml of acetic hydride was added to the mixture, followed by 2ml of concentrated H_2SO_4 drop wisely. The absorbance was measured in a Spectrophotometer at 420 nm. The steroid concentration was determined using the following relationship.

$$\text{Concentration of steroids} = \frac{Abs\ x\ Path\ length}{100\ x\ weight\ of\ sample\ used}$$

2.13. Quantification of Terpenoid Content [8]

A quantity (0.1 g) of the extract was weighed out separately, macerated with 20 ml of ethanol and filtered through Whatman No. 1 filter paper. The filtrates (1 ml) were pipetted out and 1 ml of 5 % phosphomolybdic acid solution was added and shaken. Gradually 1 ml of concentrated H_2SO_4 was added to each. The mixtures were left to stand for 30 minutes. Ethanol (2 ml) was added and absorbance was measured at 700 nm.

$$\text{Concentration of terpenoid} = \frac{Abs\ x\ Path\ length}{100\ x\ weight\ of\ sample\ used}$$

2.14. Quantification of Glycoside Content [8]

The extract (0.1 g) was weighed out separately, macerated with 20 ml of distilled water and 2.5 ml of 15 % lead acetate was added and filtered. Chloroform (2.5 ml) was added to the filtrates, shaked vigorously and the lower layer collected and evaporated to dryness. Glacial acetic acid (3 ml) was also added together with 0.1 ml of 5 % ferric chloride and 0.25 ml of concentrated H_2SO_4. The mixture was shaken and put in the dark for 2 hours. Absorbance was measured at 530 nm.

$$\text{Concentration of glycoside} = \frac{Abs\ x\ Path\ length}{100\ x\ weight\ of\ sample\ used}$$

2.15. Determination of the Vitamin Contents

The vitamin contents of the samples were determined using the modified method of [11].

2.15.1. Determination of vitamin A (Retinol) Concentration

A quantity (1 g) of sample was macerated with 200 ml of petroleum ether for 10 min, and allowed to stand for 1 hour with intermittent shaking at every 1 min. The mixture was centrifuged for 5 min and 3 ml of the supernatant was transferred into triplicate test tubes. Each supernatant in the test tube was evaporated to dryness and the residue re-dissolved wit 0.2 ml of acetic anhydride/chloroform (1:1) and 2 ml of 50 % trichloroacetic acid (TCA) in chloroform. The absorbance of the resulting solution was taken at wavelength of 620 nm at 15 seconds and 30 seconds against the corresponding blank.

$$\text{Concentration (mg/g)} = \frac{absorbance\ x\ dilution\ x\ pathlength}{Extraction\ coefficient}$$

Path-length =1(constant).

2.15.2. Determination of Beta Carotene Concentration

A quantity (5 g) of the sample was weighed into the test tube and 20 ml of petroleum spirit was added and shaken for 5 min. The supernatant was decanted into another test-tube and the absorbance read at 450 nm.

$$\text{Concentration (mg/g)} = \frac{absorbance\ x\ dilution\ x\ pathlength}{Extraction\ coefficient}$$

Path-length =1(constant).

2.15.3. Determination of vitamin C (Ascorbic Acid)

A quantity (1 g) of each sample was macerated with 20 ml of 0.4 % oxalic acid for 10 min and centrifuged for 5 min. The supernatant (1 ml) was transferred into test tubes to which 9 ml of 2,6-dichlorophenol indophenols (12 mg/l) had been mixed thoroughly by shaking. The absorbance of the resulting solution was taken at 520 nm at 15 sec and 30 sec against corresponding blank.

$$\text{Concentration (mg/g)} = \frac{absorbance\ x\ dilution\ x\ pathlength}{Extraction\ coefficient}$$

Pathlength =1(constant).

2.15.4. Determination of vitamin E (α- Tocopherol)

A quantity (1 g) of each sample was macerated with 20 ml of petroleum ether for 10 min and allowed to stand for 1 hour with intermittent shaking at every 1 min, and centrifuged for 5 min. supernatant (3 ml) was transferred into triplicate test tubes, evaporated to dryness and the residue re-dissolved with 2 ml ethanol and shaken. A known volume, 1 ml of 0.2 % ferric chloride in ethanol and 1 ml of 0.5 % α-dipyridyl in ethanol were added to the resulting solution and then made up to 5 ml with ethanol. The mixture was thoroughly shaken and the absorbance taken at a wavelength of 520 nm against corresponding blank.

$$\text{Concentration (mg/g)} = \frac{absorbance\ x\ dilution\ x\ pathlength}{Extraction\ coefficient}$$

Path-length =1(constant).

2.15.5. Determination of vitamin B1 (Thiamine)

A quantity (1 g) of the sample was homogenized with 50 ml of ethanolic sodium hydroxide solution and filtered into a 100 ml flask. Filtrate (10 ml) was pipette into a beaker and 10 ml potassium dichromate added for color development.

A blank sample was prepared and the absorbance was taken at 560 nm. The concentration of each sample was extrapolated from a standard curve.

$$\text{Concentration (mg/g)} = \frac{absorbance\ x\ dilution\ x\ pathlength}{Extraction\ coefficient}$$

Path-length =1(constant).

2.15.6. Determination of vitamin B2 (Riboflavin)

Each sample (5 g) was extracted with 100 ml of 50 % hydrogen peroxide and allowed to stand for 30 min. Thereafter, 2 ml of 40 % sodium sulphate was added to makeup to 50 ml mark. The absorbance at a wavelength of 510 nm was read in a spectrophotometer.

$$\text{Concentration (mg/g)} = \frac{absorbance\ x\ dilution\ x\ pathlength}{Extraction\ coefficient}$$

Path-length =1(constant).

2.15.7. Determination of vitamin B3 (Niacin)

Each sample (5 g) was added 50 ml sulphuric acid and shaken for 30 min. Thereafter, 3 drops of ammonia solution were added to the mixture and filtered. Potassium cyanide (5 ml) was added to 10 ml volumetric flask and the mixture acidified with 0.02 M H_2SO_4. The absorbance was read at a wavelength of 470 nm in a spectrophotometer.

$$\text{Concentration (mg/g)} = \frac{absorbance\ x\ dilution\ x\ pathlength}{Extraction\ coefficient}$$

Path-length =1(constant).

2.15.8. Determination of vitamin B6 (Pyridoxine)

A quantity (1 g) of each sample was extracted with 500 ml of distilled water for 1 hour and filtered. Then, 2 ml of distilled water, 0.4 ml of 50% sodium acetate, 0.1 ml of diazotized reagent and 0.2 ml of 5.5 Sodium Carbonate was added to 1 ml of the filtrate and mixed thoroughly. The absorbance of the solution was read at a wavelength of 540 nm.

$$\text{Concentration (mg/g)} = \frac{absorbance\ x\ dilution\ x\ pathlength}{Extraction\ coefficient}$$

Path-length =1(constant).

2.15.9. Determination of vitamin B9 (Folic Acid)

A quantity, 1 g of each sample was weighed into a beaker and extracted with 100 ml of distilled water with slight heat. The mixture was shaken thoroughly and filtered after cooling. The absorbance of the filtrate was read spectrophotometrically at a wavelength of 325 nm.

$$\text{Concentration (mg/g)} = \frac{absorbance\ x\ dilution\ x\ pathlength}{Extraction\ coefficient},$$

Path-length =1(constant).

2.15.10. Determination of vitamin D

A quantity (1 g) of each sample was weighed into a beaker and macerated with 20 ml ethanol for 10 min and filtered. Thereafter, 0.5 ml of Conc. Sulphuric acid was added over a period of 1 min of the filtrate and diluted to 2.5 ml with ethanol. Then, 1 ml Concentrated Sulphuric acid was added over a period of 1 min and mixed thoroughly. The absorbance was read after 2 min at a wavelength of 525 nm.

$$\text{Concentration (mg/g)} = \frac{absorbance\ x\ dilution\ x\ pathlength}{Extraction\ coefficient}$$

Path-length =1(constant).

2.15.11. Determination of Vitamin K

A quantity (1 g) of each sample was dissolved in 10 ml of distilled water and filtered. To 1 ml of the filtrate, 2 ml of distilled water and 1 ml of 0.04% in 1:5 hydrochloric acids were added. The mixture was heated in boiling water for 45 min and cooled. The mixture was then diluted with 10 ml 1:3 ammonium hydroxide and the absorbance of the mixture read at a wavelength of 635 nm against a blank.

$$\text{Concentration (mg/g)} = \frac{absorbance\ x\ dilution\ x\ pathlength}{Extraction\ coefficient}$$

Path-length =1(constant).

2.16. Statistical Analysis

Data obtained from the laboratory were analyzed using Statistical Product and Service Solutions (SPSS), version 18. The results were expressed as mean ± standard deviation (SD). One-way analyses of variance (ANOVA) with Dunnet test for multiple comparisons were used to compare means across the groups. Mean values with $P < 0.05$ were considered statistically significant and non-significant at $P>0.05$.

3. Results

3.1. Phytochemical Constituents

S/N	Phytochemicals	Abundance
1	Tanin	++
2	Alkaloids	+++
3	Saponin	++
4	Glycosides	+++
5	Terpenoids	+++
6	Flavonoids	+++
7	Steroids	++
8	Phenols	++

Key: + -low concentration; ++ - moderate concentration; +++ -high concentration.

3.2. Quantitative Analysis

S/N	Phytochemicals	Concentration (M±SD) (mg/g)
1	Tannins	1.478 ±0.005
2	Alkaloids	2.228 ±0.003
3	Saponin	1.583 ±0.001
4	Glycosides	2.130±0.019
5	Terpenoid	2.756 ±0.014
6	Flavonoids	2.176 ±0.002
7	Steroids	1.103±0.013
8	Phenol	1.329 ±0.003

3.3. Vitamin Concentrations

S/N	Vitamins	Concentrations (M±SD) (mg/g)
1	A	0.655±0.008
2	B	1.560±0.003
3	B1	0.815±0.094
4	B2	0.233±0.012
5	B3	0.120±0.006
6	B6	0.239±0.003
7	B9	1.228±0.035
8	C	1.061±0.081
9	D	0.343±0.013
10	E	0.529±0.002
11	K	0.617 ±0.000

4. Discussion

As seen from the result of the study, the ethanolic extract of Senna occidentalis has high concentration of Alkaloids, Glycosides, Terpenoids and flavonoid and moderate tannins, saponins, steroids and phenol. This result obtained is in agreement to the result obtained by [12]. This result in table is totally in agreement with the work by [13] which showed the presence of all the phytochemicals. High concentration of Alkaloid in leaf Indicates that Senna Occidentalis is a good source of Alkaloid in inducing a stress response and apoptosis in human breast cancer cell [8]. Alkaloids which are nitrogen-containing naturally occurring compounds commonly found to have anti-microbial properties [14]. Alkaloids are used as a central nervous system stimulante as well as powerful pain relievers.

The result obtained revealed a moderate level of tannin, Senna occidentalis leaf may have antimicrobial activities [15]. Tannins can also be effective in curbing hemorrhages and as well restrict bare swelling [16]. Moderate levels of phenols were obtained, phenols in the leaf could account for its traditional uses in the treatment of rheumatism and painful swelling. Phenols are strong antioxidants which prevent oxidative damage to biomolecules such as deoxyribonucleic acid (DNA), lipid and proteins [16]. Phenols can be used in reduction of risk for infection in minor skin irritations, kills germs; effective at relieving of itching, constituents of lotion for the relief of insect bites and sun burn [17, 18].

Senna occidentalis is a good source of flavonoids which could be used in the management of cardiovascular diseases and oxidative stress [15]. Flavonoids provide protection against these disease by supplying antioxidants vitamins and enzyme like glutathione peroxidase, superoxide dismutase, catalase, to the total antioxidant defense system to human body [15]. Flavonoids possess substantial anti-mutagenic and anti-carcinogenic activities due to its antioxidant and anti-inflammatory properties [19].

Saponins content could justify the use of the extract for this plant to stop bleeding and in the treatment of wound. Saponin has the properties of precipitations and coagulating red blood cells. Saponin has been reported to cause the reducing of blood cholesterol by preventing its re-absorption [9]. Saponins inhibit sodium ion (Na^+) efflux by the blockage of the entrance of Na^+ out of the cell [20]. This leads to higher Na^+ concentration in the cells, by activity the Na^+ Ca^{2+} anti-porter in cardiac muscle which strengthens the contraction of heart muscle [21]. Saponins have antioxidant, anti-inflamatory, anti-apoptosis and immuno-stimulant and anti-neurodegenerative properties and therefore could delay neural aging [22].

Moderate amount of glycoside was obtained. Cyanogenic glycosides in plant based food can improve glucose metabolism and can enhance the overall health of diabetic patients by improving the lipid metabolism, antioxidant status, also in improving capillary functions and lowering of cholesterol level. Glycosides contribute in the modification of tumorigenesis and also inhibit carbohydrate mediated in tumor growth [23].

Terpenoid protect the cellular membranes from lipid peroxidation, which is important for the maintenance of the integrity of epithelia against external peroxidant agents, such as UV rays, drugs and air pollutants, as well as endogenous reactive oxygen species and other radicals produced as a result of cellular metabolism. It is extensively applied as species, fragrances, flavors and in perfumes, cosmetics in the industrial sector [24].

Steroids obtained from the samples possess many interesting medicinal, pharmaceutical and agrochemical activities like anti-tumor, immune suppressive, hepatoprotective antibacterial, plant growth hormone regular, sex hormone, anti-helminthic, cytotoxic and cardiotonic activity [25].

Vitamin A, B1, B2, B3, B6, B9, C, D, E, and K were dectatable in the Senna occidentalis Linn. Fat soluble vitamins (Vitamin A, D, E and K) are stored in the fat tissues and liver. When the body requires them, they are transported to the area where they are required within the body with the help of special carriers. Water soluble vitamins (B-vitamins and Vitamin C) are stored in the body like the fat-soluble ones. They travel in the blood stream and need to be replenished everyday (Womb, 2005). Vitamin A has been found to enhance immune system function by supporting and promoting activities of white blood cells as well as other immune related cells. It also helps to inhibit free radicals and their damaging effects. Vitamin A is essential for vision and immune system health. Vitamin C (Ascorbic Acid) is water soluble anti-oxidant essential for human health. It has been proven necessary for health responses, wound healing, non-hemi iron absorption (coming from grains and vegetable), reduction in allergic responses and development connective tissue components such as collagen and for the prevention of disease [26]. Vitamin C is important forcardiovascular health, reducing free- radicals production and free radical damage, good cognitive health and performance[27].

Vitamin B1 (Thiamine) can be found in a variety of food; pork, sunflower, seeds, yeast, peas and wheat [28]. Very little thiamine is stored within the body and must be consumed on a regular bases. A deficiency may result in weakness, loss of appetite, nerve degeneration and irritability. It serves as component of a coenzyme in carbohydrate (known as Thiamine Pyrophosphate) metabolism and supports normal nerve function [29]. VitaminB2 (Riboflavin) works with the other B vitamins. It is important for body growth and the production of red blood cells [28]. While Vitamin B3 (Niacin) is a B vitamin that helps maintain healthy skin and nerves. It also has cholesterol-lowering effects at higher doses [27]. Vitamin B6 (pyridoxine) helps form red blood cells and maintain brain function. The vitamin also plays an important role in the proteins that are part of chemical reactions in the body. The more protein one takes the more pyridoxine one requires [25]. Vitamin B9 (Folate) works with vitamin B12 to help form red blood cells. It is needed for the production of DNA which controls the tissue growth and cell functions. Vitamin D helps the body absorb calcium which is needed for normal development and maintenance of healthy teeth and bones .Vitamin E is an antioxidant also known as Tocopherol. It helps the body form red blood cells and use vitamin K [27]. Vitamin K is also needed for coagulation of blood [29]. The result of the vitamin contents obtained was greater than the results obtained from the work conducted by [28]. But the values are below WHO/FAO acceptable limit. Therefore, consumption of adequate quantities of this plant will help to meet the daily requirement for both adult and children [30].

5. Conclusion and Recommendations

The results of the study showed that the extract of Senna occidentalis Linn contains some phytochemicals and vitamins, it could be useful medicinally.

Compliance with ethical standards

Disclosure of conflict of interest

There is no conflict of interest.

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