American Journal of Bioscience and Clinical Integrity
https://biojournals.us/index.php/AJBCI
ISSN: 2997-7347

Comparative Evaluation of Aqueous Leaf Extracts and Latex of *Eleaphorbia Drupifera*

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Received: 2024, 15, Oct
Accepted: 2024, 21, Oct
Published: 2024, 19, Nov

Annotation: This study investigated the comparative evaluation of aqueous leaf extracts and latex of Eleaphorbia drupifera, and analysis was carried out both qualitatively and quantitatively. The crude extract of the leaves and latex from Eleaphorbia drupifera were prepared using standard methods. The phytochemical constituents and mineral composition of the leaves and latex of Eleaphorbia drupifera were determined qualitatively and quantitatively with the view to assess their therapeutic potential or potency as well as safety/toxicity of the plant in traditional Medicine (ethnomedicine). The results of elemental analysis of the leaf extract revealed the presence of Mg (34.66mg/L), Na (56.42mg/L), Ca (135.37mg/L), Zn (106.22mg/L), Mn (94.32mg/L), Fe(77.45mg/L), Pb(0.003mg/L), Co and Hg were in trace amount while Cd was not detected. The elemental analysis of the latex showed the presence of Mg (21.72mg/L), Na (33.22mg/L), Ca (116.60mg/L), Zn (97.22mg/L), Mn(72.32mg/L), Fe(77.18mg/L), Co (3.56mg/L), Pb(25.18mg/L), Hg in trace amount and Cd not detected. However, the proximate analysis carried out on the aqueous leaf extract indicated moisture content (65%), ash (6%), crude fibre (3%), crude fat (2.5%), crude protein (1.8%), available carbohydrate (21.70%). Whereas latex indicated moisture content (77%), ash (4.5%), crude fibre (2%), crude fat (3.5%), crude protein (2.45%), available carbohydrate (14.55%), Anti-nutrient contents of the leaf extract were oxalate (0.81mg/100g), hydrogen cyanide (0.42mg/100g) and phytate (0.0062mg/100g) whereas latex had oxalate (0.73mg/100g), hydrogen cyanide (0.42mg/100g) and Phytate (0.005mg/100g). However, the quantitative estimation of the phytochemical compositions of the latex showed, the concentration of alkaloid (0.15mg/100g), saponin (0.3mg/100g), polyphenol (0.08mg/100g), while the leaf indicated flavonoids (0.21mg/100g), cardiac glycoside (0.055mg/100g) and reducing sugar (0.03mg/100g). Tannins, phlobatannins, anthranoids and anthraquinones were absent. It is concluded that the aqueous leaf extracts and latex of Eleaphorbia drupifera are made up of useful bioactive compounds that could play remarkable role in health and treatment of disease.

Keywords: Evaluation, Aqueous leaf extracts, latex of Eleaphorbia drupifera.

INTRODUCTION

A wide range of plants are used traditionally for the treatment and management of diseases of which *Eleophorbia drupifera* is one. *Eleophorbia drupifera* plant is from the family of *Euphorbiaceae* which has found wide application in indigenous medicinal practice. The plant has been revealed to possess several pharmacological properties such as anti-hypertensive, anti-bacterial, anti-tumor etc. (Schiff, 1970). The latex is commonly used traditionally as pains reliever by applying topically against ring worm, insect stings, scorpion stings and snake bites. It applied to the gums for the treatment of toothache. A mixture of the ground *Eleophorbia drupifera* leaves with onions and salt are used for the extraction of worm from guinea worm sore. The root bark sap of the plant is also used in the dressing of skin rashes wounds (Schiff, 1970).

A decoction of *Eleophorbia drupifera* leaves is used for the treatment of common cough and whooping cough, and it is also useful in cleaning of leprosy sores. .Ingenol has been also isolated from the leaves of *Eleophorbia drupifera (*Kinghorn and Evans, 1975; Abo, 1990). *Eleophorbia drupifera* latex contains lectins, which agglutinate erythrocytes *in vitro* (Lynn and Radford, 1986). The root extract of the *E. Drupifera* in a dose-dependent pattern reduced both the heart rate and blood pressure in anaesthetized rats.

Statement of the problem

A plethora of publications exist on the physiological effects as well as its pharmacological usage of *Eleophorbia drupifera* plant. The knowledge of plant phytochemical constituents and toxic components is expedient for the understanding of the group of metabolites responsible for an observed physiological as well as biochemical action either adverse or beneficial. Consumption and utilization of *E. drupifera* leaf extract for medicinal purposes is very common in most communities in Nigeria and other West African Countries due to its easy accessibility and affordability. It has been reported that consistent consumption of *E. drupifera* leaves may result in severe toxic effects such as loss of appetite, drowsiness, swelling of jaw and intestine (Akpiri *et al*., 2013). It has also been reported that the latex promotes inflammatory reactions (Abo, 1994). The increasing incidence of complications associated with the use of *E. drupifra* resulting from generation of free radicals and other toxic metabolites as reported by Abo (1994) calls for serious concern and further evaluation of the toxic components of the plant.

There is a dearth of report on the determination of the chemical compositions (i.e proximate composition, toxicants, elemental and phytochemical compositions) of the leaf extract and latex of *E. Drupifera* despite its numerous reported uses, hence the need for this study.

Selected Area of Study/ Collecttion of leaf sample

Fresh leaves of *Eleophorbia drupifera* was obtained from the botanical garden, University of Calabar, Calabar. These leaves were authenticated by a botanist in the department of Botany, University of Calabar, Calabar, Cross River State, Nigeria.

Methodology

Preparation of crude extract of *Eleophorbia drupifera* leaves

The fresh leeaves of *E. drupifera* were washed with running tap water and rinsed with distilled water to remove debris and other contaminants. The leaves were dried in the oven at 40^{o}C for two hours to prevent Charring. The dried sample was blended using the electric blender, hundred grammes of ground samples was obtained and weighed, loaded into Soxhlet-extractor and fitted into a round bottom flask that contained 200ml absolute ethanol, petroleum ether, and water fitted into a heating mantle using the method of *Parry et al.* (1987). The extraction was done for 6 hours at 60^{o}C as also reported by Osabor (2009).

Chemical Analysis of the leaf and latex of *Eleophorbia drupifera*

The samples (both leaf extract and latex) were screen for proximate compositions such as moisture, crude protein, crude fat, ash, crude fibre and total carbohydrate content. The samples were also screened for its anti-nutrient content like oxalate, phytate, hydrogen cyanide and tannin while elemental compositions such as magnesium, sodium, calcium, manganese, iron, cobalt, lead cadmium and mercury were also analysed. The phytochemical properties such as cardiac glycoside, alkaloids, saponins, flavonoids, polyphenol, phlobatannins, anthranoids, anthraquinones and reducing compounds. All laboratory analysis done is according to standard laboratory methods as approved by the Association of Official Analytical Chemist (AOAC, 2000).

Statistical analysis

The data obtained were expressed as Mean ± SEM and analysis carried out by using Statistical Package for Social Scientist (version 21.0) between groups. Value at $P < 0.05$ were regarded as significant.

RESULTS

Elemental composition of the leaf and latex of *Eleophorbia drupifera*

Table 1 results shows that both the leaf and latex of *Eleophorbia drupifera* contains essential elements like magnesium, sodium, calcium, zinc, manganese, and iron. Among these elements, iron (99.18± 0.90mg/l) was found to be higher in the latex compared to the content of the iron (77.45± 0.02mg/l) in the leaf, and both concentrations were above WHO permissible standard of 0.5-50mg/l. Also, the concentration of lead in the latex (25.18± 2.10mg/l) was found to be above the WHO permissible standard (1-3mg/l) and also above the concentration (0.003±0.01mg/l) in the leaf. However, the concentration of lead in the leaf was lower than the WHO permissible standard (as shown in the table 1 below). Cobalt was found to be present in detectable levels only in the latex. Trace amount of mercury was found in both latex and leaf extract while cadmium was not detected. From the results, both latex and leaf extract contain essential elements (magnesium, sodium, zinc, manganese, and iron) in amounts higher than the WHO standards.

Proximate compositions of *Eleophorbia drupifera* leaf and latex.

Table 2 indicates the proximate composition of *Eleophorbia drupifera* leaf and latex. Proximate analysis shows the presence of moisture (65±0.12 percent), ash (6±0.42 percent), crude protein (1.8±0.13 percent), fats (2.5±0.22percent), crude fibre (3±0.22percent), and available carbohydrates (21.7±0.56 percent) in the leaf. In the latex, analyses show moisture (73±0.11 percent), ash (4.5±0.5 percent), crude protein (2.45±0.21percent), fats (3.5±0.21percent), crude fibre (2±0.11percent), and available carbohydrates (14.55±0.67percent). Apart from available carbohydrate, the proximate components of the leaf were higher than those of the latex.

Phytochemical composition of *Eleophorbia drupifera* leaf and latex

Tables 3 and 4 show the result of the qualitative and quantitative determination of the phytochemical composition of the leaf and latex of *Eleophorbia drupifera,* respectively. Analysis of the leaf revealed the presence of flavonoids (0.21± 0.10g) and reducing compounds (0.03± 0.00g) only in the water extract and absence of cardiac glycosides, tannins, alkaloids, saponins, polyphenols, phlobatannins, anthranoids, anthraquinones whereas only cardiac glycosides (0.055±0.00g) was present in the petroleum ether extract. In the latex, results show the presence of alkaloid (0.15±0.02g), saponin (0.30 ± 0.10g) and polyphenols (0.08±0.12g) only. Other phytochemicals were not detected.

Anti-nutrient composition of *Eleophorbia drupifera* leaf and latex

Table 5 shows the anti-nutrient composition of the leaf and latex of *E. drupifera*. Quantitatively, the leaf contained oxalate (0.81± 0.001mg/100g), hydrogen cyanide (0.46± 0.00mg/100g) and phytate (0.0062± 0.00mg/100g) while the latex contained oxalate (0.73± 0.02mg/100g), hydrogen cyanide (0.42± 0.00mg/100g) and phytate (0.0058± 0.00mg/100g) while tannin was not detected in both samples.

Elements/ Symbols	Magnesium (Mg)	Sodium (Na)	Calcium (Ca)	Zinc (Zn)	Manganese (Mn)	Iron (Fe)	Cobalt (Co)	Lead (Pb)	Cadmium (Cd)	Mercury (Hg)
Concentration (leaf) mg/L	34.66±1.12	56.42±0.62	135.33±0.89	106.22±1.78	94.32±2.10	77.45±0.02	Trace	0.003±0.001	Not detected	Trace
Concentration (latex) mg/L	21.72±0.99	33.22±3.18	116.16±2.00	97.22±1.00	72.32±2.32	99.18±0.90	3.56±0.03	25.18±2.10	Not detected	Trace
WHO standard mg/L	-	4-5	360-800	15-50	-	0.5-50	0.002	1-3	10-35	1-2

TABLE 1: Results of Elemental composition of *Eleaphorbia drupifera* leaf and latex: Values are expressed as Mean± Standard Error Mean (SEM)

Component	Moisture content	Ash	Crude fibre	Crude fat	Crude protein	Total carbohydrate
Leaf (%)	65±0.12	6±0.42	3±0.22	2.5±0.22	1.8±0.13	21.70±0.56
Latex (%)	73±0.11	4.5±0.5	2±0.11	3.5±0.21	2.45±0.21	14.55±0.67

TABLE 2: Results of proximate composition of *Eleaphorbia drupifera* leaf and latex: Values are expressed as Mean± Standard Error Mean (SEM)

Parameters	Cardiac glycoside	Tannin	Alkaloid	Saponin	Flavonoid	Polyphenol	Phlobatannin	Anthranoid	Anthraquinone	Reducing Sugar
Raw latex sample	-	-	++	++	-	+	-	-	-	-
Leaf water extract	-	-	-	-	+	-	-	-	-	+
Leaf petroleum-ether extract	+	-	-	-	-	-	-	-	-	-

Table 3: Results of qualitative analysis of phytochemical properties of *Eleaphorbia drupifera* leaf and latex: + = present, ++ = abundantly present – = not detected

Parameters	Cardiac glycoside	Tannin	Alkaloid	Saponin	Flavonoid	Polyphenol	Phlobatannin	Anthranoid	Anthraquinone	Reducing Sugar
Raw latex sample	-	-	0.15±0.02	0.30±0.10	-	0.08±0.12	-	-	-	-
Leaf water extract	-	-	-	-	0.21±0.10	-	-	-	-	0.03±0.00
Leaf petroleum-ether extract	0.055±0.00	-	-	-	-	-	-	-	-	-

Table 4: Results of quantitative analysis of phytochemical properties of *Eleaphorbia drupifera* leaf and latex: Values are expressed as Mean± Standard Error Mean (SEM)

Parameters	Hydrogen cyanide	Oxalate	Phytate
Leaf water extract (Mg/100g)	0.46±0.00	0.81±0.01	0.0062±0.00
Latex (Mg/100g)	0.42±0.00	0.73±0.02	0.0058±0.00

TABLE 5: Results of anti-nutrient composition of *Eleaphorbia drupifera* leaf and latex: Values are expressed as Mean± Standard Error Mean (SEM)

Discussion

The current study was embarked upon to examine the phytochemical, proximate and anti-nutrients of the leaf extract and latex of *Eleaphorbiam (euphorbia*-synonym*) drupifera*. The nutritional content of a food material is often evaluated by the analysis of its proximate composition.

Proximate analysis in table 2 shows the presence of moisture, crude protein, ash, fats, crude fibre, and carbohydrates in the leaf extract. In the latex, analysis shows moisture, crude protein, fats, crude fibre, ash and carbohydrates. The high water contents of the leaf and latex of *E.drupifera* was an index of short shelf life characteristic of the plant as high moisture content encourages microbial spoilage and deterioration (Bartholomew and Norman 1947). The high ash contents were an indicator of rich mineral composition of the leaf and latex of the plant which was confirmed by the mineral content analyses. The fat and high carbohydrate content of the leaf and latex indicated that the plant could be a source of dietary energy. The crude protein was low when compared to the average protein intake of 23-50g for humans. In addition, the low fibre contents of both leaf and latex of *E.drupifera* was also noted. Dietary fibre helps in ensuring the normal motility of the GIT and prevents constipation. Besides, dietary fibre is also known to lower the incidence of colon cancers as well as reduce the absorption of dietary cholesterol. This implied that *Eleophorbia drupifera* leaf can help in management of intestinal problems and lipid associated disorders. The fibre content of the plant has a positive benefit on human health if utilized for nutritional purpose because it has been observed that high dietary fibre promotes rapid digestion, absorption of proteins as well as intestinal absorption of certain mineral like calcium, phosphorus and magnesium. The proximate composition of *E.drupifera* is higher as observed in this study, than that of *Euphorbia hyssopifolia*-specie of the same genus as reported by Igwenyi *et al* (2014). According to the authors, *Euphorbia hyssopifolia* contained 83.00 percent moisture, 3.2 percent crude fat, 3.80 percent ash, 2.15 percent crude fibre, 0.88 percent protein, and 6.98 percent carbohydrate. The differences observed in the proximate, mineral and anti-nutrients content of the different species of *Euphorbia* as compared to *E. drupifera* under study may be due to differences in specie, environmental conditions such as location, soil types and post-harvest processing conditions as suggested by Soetan *et al* (2010).

Minerals are inorganic chemical substances, found in body fluids and tissues. The presence is vital for the maintenance of some physio-chemical processes necessary to life. Despite the fact that they are of no caloric value, they have essential roles in body activities. The macro minerals which include sodium, phosphorus, calcium and chloride are needed in amounts higher than 100 mg/dl and the microminerals (copper, iron, potassium, cobalt, magnesium, zinc, iodine, molybdenum, manganese, fluoride, sulphur, selenium and chromium are needed in amounts less than 100mg/dl (Murray *et al*., 2000).

Minerals play vital parts in disease and health states of humans and animals. For instance, iron deficiency anaemia is said to be a problem of public health importance in certain localities. The trace elements iron, cobalt, magnesium, zinc, and manganese are essential components of enzyme systems where they serve as co-factors and are therefore indispensable in numerous biochemical pathways. Sodium is the major cation in extracellular fluids. It regulates acid-base balance and plasma volume, partake in homeostasis of the osmotic pressure of body fluids, activates function of nerve and muscle, preserves permeability of a cell and normal irritability of muscles and maintenance of membrane potentials, functions in Na^+/K^+ATPase, as well as nerve impulses transmission (Murray *et al*., 2000). Iron is an essential part of cytochromes which are involved in cellular respiration (Malhotra, 1998). It is also a component of haemoglobin which is involved in oxygen transport. Iron is cofactor for succinate dehydrogenase (Chandra, 1990). It serves the role of a cofactor for several enzymes involved in neuro-transmitter synthesis and several other functions (Larkin and Rao, 1990). Calcium functions as a constituent of teeth and bones, and regulates the activities of nerve and muscle. It also plays a role in conversion of prothrombin to thrombin during blood coagulation. It activates many enzymes such as succinic dehydrogenase, adenosine triphosphatase and lipase. Calcium is also necessary for membrane permeability, participates in normal nerve impulse transmission, muscle contraction and in neuromuscular excitability among several other function (Malhotra, 1998; Murray *et al*., 2000). Zinc is a cofactor of several enzymes like alcohol dehydrogenase, glutamate dehydrogenase, lactate dehydrogenase, carbonic anhydrase, alkaline phosphatase, retinene reductase, superoxide dismutase, carboxypeptidase, RNA and DNA polymerase. Zinc-dependent enzymes take part in cell replication and macro-nutrient metabolism. The most important roles of the mineral seem to be in gene expression and cell replication, and in amino acid and nucleic acid metabolism. The metabolism and bioavailability of vitamins A and E are dependent on zinc status. It is necessary for vitamin A uptake from liver and the stabilization of plasma membranes, for fertility of humans, for normal testicular development, for tissue repair and wound healing and for optimum insulin action (Soetan *et al* 2010). However, zinc which is sometimes administered to boost the immune system has been documented to lower calcium levels and weaken immunity (Soetan *et al* 2010). Magnesium is an active part of a number enzyme systems with thymine pyrophosphate as a cofactor. The absence of magnesium greatly reduces oxidative phosphorylation. Magnesium is also an important activator for enzymes involved phosphate-transferring such as creatine kinase, diphosphopyridine nucleotide kinase, and myokinase. It also activates pyruvic acid oxidase, pyruvic acid carboxylase, and the condensing enzyme of the tricarboxylic acid cycle reactions. Magnesium is also a constituent of teeth, bones and enzyme cofactor (Murray *et al*.,2000). Cobalt is a constituent of vitamin B_{12}. It also a co-factor of enzymes involved in the DNA biosynthesis process and in the metabolic pathways for amino acid (Arinola *et al*., 2008). Vitamin B_{12} is also involved in methylating thamine and choline (required for the synthesis of DNA). Deficiency symptoms or disease is manifested in vitamin B_{12} deficiency. Toxicity symptoms or disease symptoms in humans include hypothyroidism, goitre and heart failure (Murray *et al*., 2000). Manganese is a co-factor of decarboxylase, transferase, and hydrolase enzymes. It takes part in the synthesis of proteoglycan and glycoprotein and is a constituent of superoxide dismutase present in mitochondria. It is a co-factor in phosphotransferases and phosphohydrolases involved in the synthesis of proteoglycans in cartilage etc. (Murray *et al*., 2000). There is no concrete scientific evidence for requirements and essentiality of cadmium and lead. Accumulation of heavy metals like lead and cadmium in plants poses a serious health risk on humans who utilize plants for therapeutic or nutritional purposes due to their ability to accumulate in living systems and cause toxicity. Reports propose a close relationship between cases of declining reproductive health and environmental pollutants such as lead (Bonde *et al*., 2002). There are findings that some metals such as lead, mercury, arsenic and cadmium affect reproductive functions of males including sperm counts (Johnson and Okon, 2023; Chia *et al*., 1992), spermatogenesis, morphology (Telisman *et al*., 2007) and motility. Heavy metal accumulation in plants comes from agricultural and industrial activities (Johnson *et al.,* 2022). Most heavy metal are present as component of fertilizers, insecticides, fungicides while some originate from soil contaminated with industrial waste such as oil spills (Johnson *et al.,* 2022).

Excessive consumption of some minerals can alter homeostatic equilibrium and leads to harmful side effects. Excess iron can cause liver damage and excess intake of sodium is linked with high blood pressure. In this study, mineral analysis showed that both leaf and latex of *Eleophorbia drupifera* contained essential elements like; magnesium, sodium, calcium, zinc, manganese, and iron (Table 2). Among these elements, only iron was found to be higher in the latex than the leaf. Cobalt was found to be present in detectable levels only in the latex. Lead was found to be higher in the latex (25.18mg/L) than the leaf (0.003mg/L) and above WHO permissible standard of 1-3mg/L. Trace or insignificant amount of mercury was found in both leaf extract and latex of *Eleophorbia drupifera* while cadmium was not detected. Both leaf extract and latex of *Eleophorbia drupifera* generally contained essential elements (magnesium, sodium, zinc, manganese, and iron) in amounts higher than the WHO standards. Based on this study, utilization of this plant for nutritional purpose may result in toxicity diseases associated with these elements if used for long periods of time.

While the rich content of some minerals found in this plant might suggest its possible therapeutic application in remedying certain ailments (for instance the role of zinc in insulin secretion in diabetes management), the heavy metal, alkaloid and toxicant components of the plant on the contrary, limits its nutritional use despite it appreciable proximate composition. The high mineral content of this plant in quantities higher than WHO acceptable limits may be due to the location of the plant and also suggest the capacity of the plant to bio-accumulate these metals. Hence, further research on the possible utilization of the study plant for phytoremediation studies is recommended, rather than for nutritional purpose because of the toxicity associated with the plant. Literature on the mineral content of *Euphorbia* species is not found hence the findings of this research could not be compared appropriately with previous investigations.

Quantitative determinations showed that the leaf contained anti-nutrients: oxalate (0.81 mg/100g), hydrocyanate (0.46 mg/100g) and phytate (0.0062mg/100g) while the latex contains oxalate (0.73 mg/100g), hydrocyanate (0.42 mg/100g) and phytate (0.0058 mg/100g) (table 6).

Plant antinutrients can affect the absorption and availability of certain minerals to humans and other animals. These factors decrease the nutrient utilization of plant foods (Soetan *et al.,* 2010). The amounts of this substance in plants differ with the plant species, cultivar and post-harvest treatment. Phytate and oxalate and are known to bind some bivalent metals such as magnesium and calcium thereby interfering with their absorption and making them nutritionally unavailable. Zinc may be complexed with calcium-phytate and cause inefficient dietary zinc utilization (Soetan *et al.,* 2010). Toxic effects contributed by these toxicants especially hydrocyanic acid might probably account for non- utilization of *Eleophorbia drupifera* for nutritional purpose.

Qualitative phytochemical analysis of the leaf showed the presence of flavonoids and reducing compounds only in the water extract and absence of cardiac glycosides, tannins, alkaloids, saponins, polyphenols, phlobatannins, anthranoids, anthraquinones whereas only cardiac glycosides were found in the petroleum ether extract (table 3a). In the latex, results showed the presence of alkaloid, saponin and polyphenols only. Other phytochemicals were not detected. Based on this investigation, the latex of *E. drupifera* appears to have a richer phytochemical component than the aqueous and petroleum ether leaf extracts. Kumara *et al.,* (2011) noted similar findings in the water extract of *euphorbia neriifolia*, where only phlobatannins and flavonoids were found. Saponins, phenols, tannins, terpenoids, steroids and anthraquinones were not detected and this was associated with less anti-microbial activity. From their studies, it was apparent that the various phytochemicals identified in *Euphorbia neriifolia* were solvent dependent. Ethylacetate elaborated the highest amount of phytochemicals followed by chloroform and ethanol. It could be inferred in this study that the choice of solvent might have limited the amount of phytochemicals identified in *Euphorbia drupifera*. Water and petroleum ether might therefore be poor solvents for the extraction of these phytochemicals from this plant. The reduced solubility of the phytochemicals in water and petroleum ether may be responsible for the amount of active principles identified in this plant and may not necessarily imply complete absence of the active principles. According to Eno, *et al.,* (1999), earlier investigations have revealed a low toxicity of *Eleophorbia drupifera* leaves extract with high LD_{50} value (135.6 mg/kg) indicating its low acute toxicity. This may, in a way, be related to low concentration of active principles in the leaf as observed in this study.

The presence of alkaloids, tannins, glycosides, steroids, saponins and flavonoids have been documented in the chloroform extract of some members *of Euphorbiaceae* viz. *Phyllanthus reticulates, Euphorbia tirucalli* and *Chrozophorarottleri* (Madane *et al.,* 2013). It was concluded from their studies that *Euphorbiaceae* members show highest phytochemicals soluble in organic solvent; acetone and chloroform being the best solvents for phytochemical evaluation. The presence of some detectable active medicinal principles in the leaf of this plant justifies its use by traditional healers for therapeutic purposes such as management of diabetes, hypertension and many other ailments as documented by Eno *et al.,* (1999). Among several other pharmacological activities, flavonoid consumption has been noted to prevent many cardiovascular diseases including hypertension and atherosclerosis by offering protection against oxidative modification of LDL and oxidative stress (Bimlesh *et al.,* 2011). Furthermore, the latex of *Eleophorbia drupifera* has been shown in this study to contain alkaloids, saponins and polyphenols. The results of this investigation is in consonance with those of Falodun *et. al.,* (2006) who reported saponins, alkaloids, tannins, flavonoids and terpenes to be present in extracts of leaves and flowers of *E. Heterophylla*L.

Conclusion

The phytochemical, mineral, proximate and toxic compositions of the leaf and latex of *Eleaphorbia drupifera* were carried out in this study. Phytochemical screening of the leaves revealed the presence of flavonoids and reducing compounds only in the water extract and absence of cardiac glycosides, tannins, alkaloids, saponins, polyphenols, phlobatannins, anthranoids, anthraqquinones whereas only cardiac glycosides was found in the petroleum ether extract. In the latex, results showed the presence of alkaloids, saponins and polyphenols only. Other phytochemicals were not detected. Based on this investigation, the latex of *E. drupifera* appeared to have a richer phytochemical composition than the aqueous and petroleum ether leaf extracts. Mineral analysis showed that both leaf and latex of *Eleophorbia drupifera* contained essential elements such as magnesium, sodium, calcium, zinc, manganese, and iron. Among these elements, only iron was found to be higher in the latex than the leaf. Cobalt was found to be present in detectable levels only in the latex. Lead was found to be higher in the latex than the leaf and above WHO permissible standard. Trace amount of mercury was found in both leaf and latex of *Eleophorbia drupifera* while cadmium was not detected. Both leaf and latex of *Eleophorbia drupifera* contained essential elements (magnesium, sodium, zinc, manganese, and iron) in amounts higher than the WHO standards. Based on this study, utilization of this plant for nutritional purpose may result in toxicity diseases of these elements if used for prolong duration. The high concentration of the minerals in *Euphorbia drupifera*, especially lead, may probably contribute to the observed hepatototoxicity of the plant's latex on liver function carried out by the same author.

In conclusion, *Euphorbia drupifera* latex contains substances that causes injury to the liver. The low polyphenol content of the latex could not offer protection from deleterious effect of these substances which according to phytochemical screening might be an alkaloid or saponin compounds. While the plant may contain active medicinal principles and rich mineral content, caution should be exercised when utilizing the plant for therapeutic purpose.

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