Original Research Article

Phytochemical screening and acute oral toxicity study of root extracts of *Combretum hereroense* Schinz and *Balanites aegyptiaca* Del. traditionally used to treat female infertility in Baringo County, Kenya

Abstract

Aims: To carry out phytochemical screening and acute toxicity test to validate their safety and efficacy

Study design: Standard phytochemical screening tests were used to highlight phytochemical compounds of roots of the plants. The evaluation of acute toxicity of the root extracts of followed the model of Acute Toxicity Class based on OECD 423 Guideline, 2001.

Place and duration of the study: Department of Chemistry & Biochemistry for the extraction for sample extraction and phytochemical screening. Department of Biological Sciences for acute toxicity study, University of Eldoret, Between June and September 2022.

Methodology: Phytochemical screening for presence of Tannins, saponins, flavonoids, glycosides,alkaloids, anthocyanins, terpenoids, steroids, coumarins, lipids, proteins and carbohydrates was undertaken. Acute oral toxicity was done using the fixed dose method at 2000mg/kg body weights. Three groups were used control and test groups for the respective plant root extracts; signs of toxicity and/or mortality were monitored daily for 14 days. Weekly fasting body weights were recorded.

Results: The phytochemical screening showed the presence of Tannins, saponins, flavonoids, glycosides, alkaloids, anthocyanins, terpenoids, steroids, lipids, proteins and carbohydrates present in the root extract of *Combretum hereroense*. Tannins, saponins, flavonoids, glycosides, terpenoids, steroids, and carbohydrates were present in root extract of *Balanites aegyptiaca*. After the acute oral toxicity study, no abnormalities of the physiological parameters observed in rats were observed. In addition, no deaths have been recorded. The LD_{50} was therefore greater than 2000 mg/kg. The fasting weights of extract treated rats increased stably compared to the control [$p = .05$].

Conclusion: The current results show *C. hereroense* and *B. aegyptiaca* root methanolic extracts would be considered as safe in acute exposure. However, long-term toxicity studies are needed for further toxicological profile elicitation of the plant, and a possible reinforcement of clinical relevance of the results of laboratory studies.

Key words:
C. hereroense, B. aegyptiaca, phytochemical screening, acute toxicity test, roots.

1.0 INTRODUCTION

A wide range of plant species have been used by man since the dawn of medicine for his health care. Traditional medicines, of proven quality, safety, and efficacy, contribute to the goal of ensuring that all people have access to care. For many millions of people, herbal medicines, traditional treatments, and traditional practitioners are the main source of health care, and sometimes the only source of care [1]. This assertion is consistent with WHO estimate which indicate that approximately 80% of the populations of developing countries still rely on a traditional system of medicine based on herbal drugs for primary healthcare [2]. In addition to their established pharmacological properties, one of the reasons of the resurgence of interest in plant-based treatments is that herbal medicines, being natural, are considered as harmless [5]. Despite this positive perception of herbal treatments, their safety has most often not been

evaluated, and cases of contamination, adulteration, toxicity, or poisoning are regularly detected. Until now, only a few quality toxicological studies have been carried out on the most widely used herbs; the situation appears even worse for herbs used in developing countries, notably in African traditional medicine [6.16].

Combretum hereroense also known as the mouse eared Combretum or Russet bush willow, belongs to the family Combretaceae which consists of 18 genera with the largest genus, Combretum composed of about 370 species [9]. *Combretum hereroense* is a deciduous shrub, often with arching stems; or, more commonly, a small tree with a dense crown growing between 9 and12 metres tall. It produces 4-winged samara fruits that are rich in reddish-brown, and approximately 20 millimeters in diameter [25]. *C. hereroense* tree is most often seen around pans, in rocky areas and sometimes on-stream banks in Southern and eastern Africa - Ethiopia, Somalia, Kenya, Uganda Tanzania, Angola, Zambia, Malawi, Mozambique, Namibia, Botswana, Zimbabwe, S. Africa. Many studies have revealed that plants possess antioxidant compounds which have anti-inflammatory, antimutagenic, antiatherosclerotic, antitumor, anticarcinogenic, antibacterial, and antiviral activities [Schueler and Hemp]. See Figure 1 below.

Figure 1: *Combretum hereroense* plant and harvested roots

Balanites aegyptiaca also known as 'desert date,' is a spiny shrub or tree widely distributed in dry land areas of Africa and South Asia. It is multibranched, spiny shrub or tree up to l0 meters tall [17]. Crown spherical, in one or several distinct masses. Trunk short and often branching from near the base [Figure 2]. Bark dark brown to grey, deeply fissured. Branches armed with stout yellow or green thorns up to 8 cm long. Leaves with two separate leaflets; leaflets obovate, asymmetric, 2.5 to 6 cm long, bright green, leathery, with fine hairs when young. Flowers in fascicles in the leaf axils, and are fragrant, yellowish-green. Fruit is a rather long, narrow drupe, 2.5 to 7 centimeters long, 1.5 to 4 centimeter diameter. Seed is the pyrene [stone], 1.5 to 3 centimeters long, light brown, fibrous, and extremely hard [23].

[Chothani and Vaghasiya]Natural distribution is obscured by cultivation and naturalization. It is believed indigenous to all dry lands south of the Sahara, extending southward to Malawi in the Rift Valley, and to the Arabian Peninsula, introduced into cultivation in Latin America and India. It has wide ecological distribution, but is mainly found on level alluvial sites with deep sandy loam and free access to water. After the seedling stage, it is intolerant to shade and prefers open woodland or savannah for natural regeneration. It is a lowland species, growing up to 1000 m

altitude in areas with mean annual temperature of 20 to 30°C and mean annual rainfall of 250 to 400 mm [4].

Figure 2: *Balanites aegyptiaca* plant and harvested roots

It is traditionally used in treatment of various ailments i.e. jaundice, intestinal worm infection, wounds, malaria, syphilis, epilepsy, dysentery, constipation, diarrhea, hemorrhoid, stomach aches, asthma, and fever.

C. hereroense and *B. aegyptiaca* roots are traditionally used in combination for the treatment of female infertility. According to traditional healers in Baringo, the roots are boiled and administered with positive results of implantation. Infertility refers to inability to achieve pregnancy after twelve months of regular and unprotected intercourse [10].

Phytochemical and toxicological data on root extracts of both plants are scarce. Therefore, the objectives of the present study were to establish the phytochemical profile of *C. hereroense* and *B. aegyptiaca* roots, and also to evaluate the acute oral toxicity of their methanolic extracts in vivo in experimental animals, with a view to establishing a database for further researches.

2 MATERIALS AND METHODS

2.1 **Plant collection and identification**

The medicinal plants were first identified *in situ* by a local herbalist. The healthy roots of *Combretum hereroense* and *Balanites aegyptiaca* were dug out from the ground using a Jembe, and freshly collected from around Rondinin village in Baringo County [0°44'26"N 35°52'27"E], Kenya in June 2022. The roots and plant parts were separately placed in polyethene bags and transported. The plant material was identified and authenticated by Dr. Benard Wanjohi, a University taxonomist at University of Eldoret. Voucher numbers M.U.H/COMBHE/0021/1995 and M.U.H/0192/1987 were assigned to the plants respectively. The plant specimens were kept in the herbarium of Department of Biological Sciences at the University of Eldoret. The roots were sorted to remove dirt, washed using distilled water, then chopped into small sizes, dried in the shade for weeks before grinding using an electric mill [Disk Mill FFc-23, China] to produce fine powder.

2.2 Root Extraction

One hundred grams of powdered roots of *C. Hereroense* and *B. aegyptiaca* were each extracted by maceration method [24; 7]. using methanol by soaking 100 grams of respective roots in 500

ml of methanol in 1 litre conical flask for 72 hours. Filtration was done and solvent was evaporated by using a rotary evaporator [EL 30, model AG CH-9230, Germany] at 40^{o}C. The resulting solution was further dried in an oven set at 40^{0}C temperature for 24 hours to completely remove the solvent. The concentrates were then put in an airtight glass containers and stored at 4 °C until use.

2.3 Experimental animals

Male and female Wistar rats [*Rattus norvergicus*] weighing about 80–160 g were obtained from the Department of Biological Science animal house in University of Eldoret. The animals were acclimatized for 2 weeks before the commencement of the study. Standard commercial chow and water were provided *ad libitium* for the animals. Housing conditions were maintained at 25 ± 2 °C at 12 h day/night cycles. The care and handling of the animals were carried according to the established public health guidelines in Guide for Care and Use of Laboratory Animals [Albus, 2012].

2.4 Preparation of Administration Doses

In this study, the Organization for Economic Cooperation and Development standards were followed in the preparation of the doses for administration. Briefly, to make a stock solution with a dosage level of 2000 mg/kg b.wt for administration to a rat weighing 100 g, the following formula described by Erhirhie et al. [2014] was followed:

Animal dose [mg/kg b.wt] = bodyweight of the animal[g]/1000[g] × selected dose

In accordance with the Organization for Economic Cooperation and Development guidelines, 50 mg should be reconstituted in 0.2 ml of the physiological saline [vehicle]. In this study, an 8 ml stock solution containing the crude methanol root extracts of *C. hereroense and B. aegyptiaca* were separately prepared and serially diluted using physiological saline to generate the 2000 mg/kg b.wt doses based on individual fasting weights of the rats.

2.5 Phytochemical screening

Phytochemical analysis of the extracts was performed according to standard methods [7, 14].

1. Tannins

About 0.5 g of each of the plant extract was diluted with 5 ml of distilled water. To 1 ml aliquot of each of the extracts 4 drops of neutral 5% ferric chloride solution was added. Formation of dark green colour indicated the presence of tannins.

2. Saponins

Extracts [1 g] were diluted with distilled water to 20 ml and this was shaken in a graduated cylinder for 15 minutes. Formation of 1 cm layer of foam indicated the presence of saponins.

3. Flavonoids

0.5 g of each of the plant extracts dilute with 1 ml of distilled water. The extracts were mixed with 0.1 g of metallic zinc and 8ml of concentrated sulphuric acid. The mixtures were observed for red colouation which is indicative of presence of flavonoids.

4. Glycosides

Extracts were hydrolyzed with dilute hydrochloric acid, and then subjected to test for glycosides. Two millilitres [2 ml] acetic acid and two millilitres [2 ml] chloroform with whole plant crude extract were added to each extract. The mixture was then cooled and drops of concentrated sulphuric acid were added. The mixture was observed for green colour indicative of presence of glycosides.

5. Alkaloids

Five [5] grams of each of the extracts was stirred with 5 ml of 1% aqueous hydrochloric acid on water bath and then filtered. Of the filtrates, 1 ml of each extract filtrates were taken into test tubes to be tested for the presence of alkaloids. To 1 ml of each of the extracts, 2 ml of Wagner‘s reagent [iodine in potassium iodide] was added. A reddish brown coloured precipitate indicated the presence of alkaloids.

6. Anthocyanins

Two millilitres [2 mL] of distilled water diluted root extracts were each added with two millilitres [2 ml] of 2M hydrochloric acid. Appearance of a pink-red colour that turns blue after addition of ammonia indicated presence of anthocyanins.

7. Terpenoids

Five millilitres [5 ml] of diluted of each plant crude root extract was mixed with two millilitres [2 mL] of chloroform, and three millilitres [3 ml] of concentrated sulphuric acid was carefully along the test tube sides to form a layer. A reddish-brown coloration of the interface indicated presence of terpenoids.

8. Test for steroids

One gram [1g] of each root extract was shaken with 2 ml of chloroform and 1ml of concentrated sulphuric acid was added along the walls of the test tube; appearance of a red colour was indicative of the presence of steroids.

9. Coumarins

In a test tube, 1 g of each of the extracts was placed and covered with filter paper moistened with dilute sodium hydroxide [NaOH], then heated in a water bath for a few minutes. The filter paper was examined under UV light, yellow fluorescence indicated the presence of coumarins.

10. Lipids

One gram [1g] of each plant crude root extract was mixed with two millilitres [2 ml] of ethanol. An equal volume of distilled water was added. A milky white emulsion formed would indicate presence of lipids.

11. Proteins

The plant crude root extract was each placed in a test tube. Two millilitres [2 ml] of 5% sodium hydroxide solution was added. Then five [5] drops of copper sulphate solution was added. A bluish violet colour indicated presence of proteins.

12. Carbohydrates

Two millilitres [2 ml] of each of water diluted plant crude root extract was mixed with three [3] drops of Molisch reagent. Then gradually concentrated sulphuric acid was added along the inner

walls of the glass test tube. Formation of violet ring at the junction of the liquid layers confirmed presence of carbohydrates.

2.6 Acute Oral Toxicity Study

Nine healthy, adult, female albino Wistar rats aged between 6-8 weeks and weighing between [90-155 g] were randomly selected for this experiment. According to Organization for Economic Cooperation and Development [OECD] guideline 423 [2002]. Specifically, after the rats were fasted, they were all weighed to obtain the baseline body weights before treatment started. The rats were randomly grouped into three groups of 3 female rats each as follows; Group I, Group II and Group III.

The first group served as a normal control and the rats received vehicle [water] at 1 ml/kg b.wt, the second group received *C. hereroense* root extract orally at dose of 2000 mg/kg b.wt and the third group received *B. aegyptiaca* root extract orally at dose of 2000 mg/kg b.wt. Food and water were provided *ad libitum* after root extract administration. The animals were observed individually at least once during the first 30 minutes after dosing, periodically during the first 24 h [with special attention during the first 4 h], and daily thereafter for a period of 14 days. Once daily, cage-side visual observations for any changes in skin and fur, eyes and mucous membrane [nasal] and also autonomic [salivation, lacrimation and defecation] and central nervous system [drowsiness and tremors] were made. The animals were fasted overnight before the fasting body weights were determined on day 1, 7 and 14 and recorded. Signs or symptoms of root extracts related toxicity and rat mortalities were also monitored for up to the 14^{th} day [24].

3 STATISTICAL DATA ANALYSIS

The data obtained from analgesic and anti-inflammatory activities were tabulated on Microsoft Excel spreadsheet [24], expressed as Mean ± Standard Error of the Mean [SEM], and analyzed using analysis of variance [ANOVA]. Values were considered statistically significant [$p < 0.05$]. Acute oral toxicity data were quantitatively and qualitatively analyzed according to OECD [2002] guidelines [Guideline No. 423].

4 RESULTS

Phytochemical screening

Table 1 shows the phytochemical constituents of the root extracts of *B. aegyptiaca* and *C. hereroense*. Tannins, saponins, flavonoids, glycosides, alkaloids, anthocyanins, terpenoids, steroids, lipids, proteins and carbohydrates were present in the root extracts of both plants, while alkaloids, anthocyanins, lipids and proteins were absent in *B. aegyptiaca*.

Table 1: Phytochemical constituents of root extracts of *B. aegyptiaca* and *C. hereroense*

S.No	Phytochemical Constituent	Chemical test	*C. hereroense* root extract	*B. aegyptiaca* root extract
1	Tannins	Ferric chloride test	+ve	+ve
2	Saponins	Froth test	+ve	+ve
3	Flavonoids	Pew's test	+ve	+ve

4	Glycosides	Liebermann's test	+ve	+ve
5	alkaloids	Wagner's test	+ve	-ve
6	Anthocyanins	General test	+ve	-ve
7	Terpenoids	Salkowski test	+ve	+ve
8	steroids	Salkowski test	+ve	+ve
9	Coumarins	Fluorescence test	+ve	+ve
10	Lipids	Emulsion test	+ve	-ve
11	Proteins	Biuret test	+ve	-ve
12	Carbohydrates	Molisch test	+ve	+ve

Presence [+ve], Absence [-ve]

Acute oral toxicity of *C. hereroense* and *B. aegyptiaca* plant root extracts

Effects on toxicity signs

Rat mortality recorded after 2000 mg/kg b.wt. single dose administration of *C. hereroense* and *B. aegyptiaca* root extracts was investigated and showed no animal death in the study. Furthermore, upon the 14-day observation period, no signs of toxicity were noted in the wellness parameters of the animals [Table 2].

Table 2: signs recorded during acute toxicity studies after administration of *C. hereroense* and *B. aegyptiaca*

Wellness parameters	***C. hereroense* root extract**	***B. aegyptiaca* root extract**
Mucus membrane	N	N
Salivation	N	N
Lacrimation	N	N
Diarrhea	N	N
Drowsiness	N	N
Tremors	N	N
Death	N	N

Absence [N], Presence [+]

Effects of root extracts on fasting body weights

The body weights of all the female rats increased with respect to their initial weight values from the 1st day of treatment to the 14th day. The fasting body weight changes during the 14 days treatment of the animals dosed at 2000 mg/kg b.wt of root extracts increased steadily [Figure 3]. All extract treated animals showed a stable increase in fasting body weights during the 14 days. The control group rats had the following individual fasting body weights, [129.2g, 162.2g and 173.79g] respectively; *C. hereroense* group [111.44g, 135.46g and 157.14g], while *B. aegyptiaca* group [127.07g, 150.18g and 166.14g] for day 1, 7, and 14 respectively. Therefore, the extracts may be considered safe at dose of 2000 mg/kg b.wt in rats.

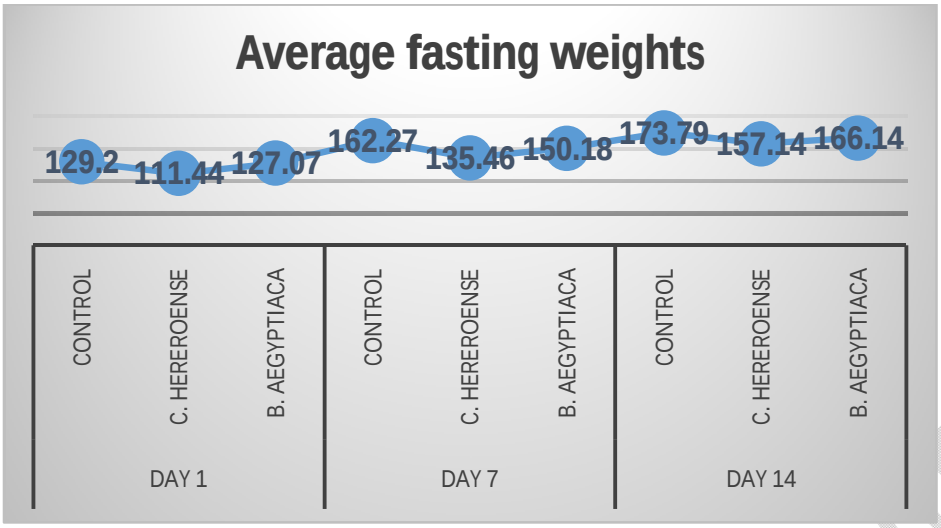

Figure 3: Trend in average weight gains for control, *C. hereroense* and *B. aegyptiaca* root extracts from day zero [day 1] - day 14.

Comparison of weights obtained from different extracts treatments from day zero [day 1] - day 14

For day zero, *B. aegyptiaca* root extract had the highest average fasting weight of 127.07±31.53 sd with a coefficient variation of 24.81% while *C. hereroense* root extract had the lowest average [111.43±18.17sd] with a coefficient variation of 16.30% with no significant difference [$F_{0.05\ [2,\ 6]}$ =0.48, p=0.6419]. For day 7, control [162.29±7.86 sd] had the highest insignificant average [$F_{0.05\ [2,\ 6]}$ =3.06, p=0.1211] while *B. aegyptiaca* root extract had the lowest [150.18±18.59sd]. In day 14, control still held the highest average of 173.79±14.15sd with no significant difference [$F_{0.05\ [2,\ 6]}$ =0.76, p=0.5080] as illustrated in Table 3 below. When the comparisons were made from day 1 to 14 for control, day 14 recorded the highest average173.79±14.15 while day zero recorded the lowest with a significant difference [$F_{0.05\ [2,\ 6]}$ =6.78, p=0.0289], similar result were recorded for *C. hereroense* root extract [$F_{0.05\ [2,\ 6]}$ =7.03, p=0.0268]. *B. aegyptiaca root* extract averages from day 1 to 14 did not change significantly [$F_{0.05\ [2,\ 6]}$ =6.78, p=0.2173].

Table 3: Fasting weights comparison of *C. hereroense* and *B. aegyptiaca* root extracts from day zero [day 1] – day 14

Days	Experiments	Count	Average±sd
Day 1	Control	3	129.20 ± 21.19^{a}
	C. hereroense	3	111.44 ± 18.17^{a}
	B. aegyptiaca	3	127.07 ± 31.53^{a}
Day 7	Control	3	162.29 ± 7.87^{b}
	C. hereroense	3	135.46 ± 11.07^{ab}
	B. aegyptiaca	3	150.18 ± 18.59^{ab}
Day 14	Control	3	173.79 ± 14.16^{c}
	C. hereroense	3	157.14 ± 14.72^{bc}

B. aegyptiaca	3	166.14±20.14[a]

Means with different letters along the columns are significantly different at P<0.05

Trend in average weight gain for control, *C. hereroense* and *B. aegyptiaca* root extracts from day zero [day 1] -day 14

Rats that received distilled water [control] showed insignificant weight gain from 129.20±21.19 sd to 173.79±14.16 sd. Control average weight gain trend from day 1 to day 14 indicated highest weight gain occurred from day 1 to day 7[33.08g increase] [25.61%] and low from day 7 to day 14 [6.62%]. The trend in weight gain increased insignificantly with days [β=22.2933, R^2=0.927, $F_{0.05\,[1,\,1]}$=12.81, p=0.1735] with a model equation of:

*Control = 110.507 + 22.2933*day.*

Rats treated with *C. hereroense* root extract showed a significant weight gain from 111.44±18.17sd to 157.14±14.72sd for group II. *C. hereroense* root extract average weight gain trend from day 1 to day 14 indicated highest weight gain occurred from day 1 to day 7[24.02g increase] and low from day 7 to day 14. The trend in weight gain increased significantly with days [β=22.8517, R^2=0.99.82, $F_{0.05\,[1,\,1]}$=1134.70, p=0.0189] with a model equation of:

*C. hereroense root extract = 88.9767 + 22.8517*day.*

Rats treated with *B. aegyptiaca* root extracts showed insignificant weight gain from 127.07±31.53sd to 166.14±20.13sd for *B. aegyptiaca* root extract. The trend in weight gain increased insignificantly with days [β= 19.5300, R^2=0.9889, $F_{0.05\,[1,\,1]}$=89.7400, p=0.0.0670] with a model equation of:

*B. aegyptiaca root extract = 88.9767 + 22.8517*day as portrayed in* figure 2.

5 DISCUSSION

Many studies have shown that plants are used in the prevention of several diseases. The significance of plants in medicine remains even of greater importance with the current globalization to obtain drugs from plant sources due to high safety, efficacy and economy. Most of the phytochemicals have valuable therapeutic activities, such as insecticidal, antibacterial, antifungal, anticonstipative, spasmolytic, antiplasmodial and antioxidant activities. The plants thus get their medicinal worth due to individual phytochemical constituents they contain. Toxicity is the science of poison. Organization for Economic and Development [OECD] defined toxicity as the adverse effects taking place shortly [usually within 24 h] after oral administration of a single dose or multiple doses of a substance. Plant botanical interaction may lead to poisoning resulting in injury or even death. Chemical constituents determine the biological activities of the plant, whether the activity is a toxicity or a pharmacological property. Many plants produce toxic secondary metabolites as natural defense from adverse conditions. In some toxicologically and medicinally relevant plant species, these toxic substances are not distinguished from therapeutically active ingredients [1].

Therefore, in this study, it was necessary to establish the phytochemical and toxicological profiles of *C. hereroense* and *B. aegyptiaca* roots to confirm their safety and efficacy. In the present study, the phytochemical screening and qualitative estimation of two medicinal plants studied showed that the roots were rich in phytochemicals. Root extracts of *C. hereroense* revealed the presence of tannins, saponins, flavonoids, glycosides, alkaloids, anthocyanins, terpenoids, steroids, lipids, proteins and carbohydrates. *B. aegyptiaca* root extract revealed presence of tannins, saponins, flavonoids, glycosides, terpenoids, steroids, and carbohydrates [table 1]. These are similar to other results obtained in previous studies that have examined the analgesic activities of other medicinal plants [18].

Anthocyanins help the human immune system to work more efficiently to protect against viral infections. The mechanism is a bit more complex, specific types of anthocyanins may have a direct effect in decreasing influenza viruses' infectivity by decreasing the ability of the virus itself to get into the human cell or to be related from infected cells or by having a virucide effect [11]. Various studies have demonstrated that coumarins and flavonoids are potential antioxidants and their antioxidant activities are due to their abilities to scavenge free radicals and to chelate metal ions [3]. Several pharmaceutical studies have demonstrated that fatty acids have many biological effects, such as anticancer, antimicrobial and anti-inflammatory effects [15]. Terpenoids and tannins are attributed to analgesic and anti-inflammatory activities. Apart from this, tannins contribute the property of astringency i.e. speed up the healing of wounds and inflamed mucous membrane [12]. Traditionally saponins have been extensively used as detergents, as pesticides and molluscicides, in addition to their industrial applications as foaming and surface-active agents and also have beneficial health effects [21]. Steroidal compounds are of importance and of interest in pharmacy due to their relationship with sex hormones [22]. The presence of bioactive compounds indicates the medicinal value of the *C. combretum* and *B. aegyptiaca*. Preliminary qualitative tests are useful in the detection of bioactive principles and subsequently may lead to drug discovery and development.

In view of the strong traditional use of the root, this study investigates the safety of this part of the plants by determination of eventual detrimental effects. For the toxicological investigation, the oral administration of a single dose of aqueous extract in female rats at 2000 mg/kg b.w. was performed. There were no effects on the mortality, examined clinical signs and fasting body weights were observed [figure 3 and table 3]. Absence of mortality permits to estimate the median lethal dose at 2000 mg/kg b.wt. in accordance with the Guideline 423 of OECD [2002]. With such median lethal dose, methanol extract of *C. hereroense* and *B. aegyptiaca* may be classified to belong to substance unlikely to present acute hazards according to the Globally Harmonized System of Classification and Labeling of Chemicals of the United Nations [13]. These results are in agreement with those of previous studies which has noted the absence of mortality by intraperitoneal single dose of 2000 mg/kg b.wt. [27]. This concurs with the previous studies conducted by [19] and [8]. These authors showed that single oral doses of methanol root extract of *Eichhornia Crassipes* [2000 mg/kg b.wt.] administered to the rats, did not induce significant variation of weight in these animals after two weeks of monitoring.

6 CONCLUSIONS

In the present study, phytochemical profile and toxicological effect of root wood from *C. hereroense* and *B. aegyptiaca* were investigated. Phytochemical screening revealed rich phytochemical groups in the roots of *C. hereroense* and *B. aegyptiaca*. The acute oral toxicity results showed that the root extracts did not induce mortality in the rats up to the dose of 2000 mg/kg b.wt. There were stable weight increases in both treated groups of rats. In view of the current results, subject to results of hematological and pathological analysis, the root extracts of *C. hereroense* and *B. aegyptiaca* are safe during oral acute toxicity exposure. For further clinical relevance of the results, toxicity studies must be extended to long term toxicity tests as sub chronic [90 days repeated administration] and chronic [at least 6 months repeated administration in rodent] toxicity study. Exploitation of these pharmacological properties should involve further investigation of these active ingredients by implementation of other techniques of extraction, purification, separation, crystallization and identification.

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