Toxicological Effects of Aqueous Extract of *Calotropis procera* Leaves in Experimentally Poisoned Rabbits

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ABSTRACT

Calotropis procera is announced to be medicinal and poisonous plant to human and animals. In this study, the toxicological effects of aqueous leaves extract were evaluated experimentally in rabbits. The median lethal dose (LD_{50}) was estimated at 2435.25 mg/kg BW using the Up and Down method. Twenty-five local breed rabbits, 1-2-year-old and 1-1.9 kg BW, were divided randomly into five groups with five rabbits each. Those of groupsI, II, III and IV were exposed to 1/10 of LD_{50} (243.5mg/kg), 1/12.5 of LD_{50} (194.8 mg/kg), 1/15 of LD_{50} (162.4 mg/kg), and 1/20 of LD_{50} (121.8 mg/kg BW of extract respectively for 8 weeks, while those in G.V were left without exposed as a control group. Alkaloids, saponins, tannins, cardiac glycosides, steroidal, glycoside, terpenoids and flavonoids detected in phytochemicals screening. The dependent parameter were clinical signs exhibited by animals during the study in addition to some hematological parameters Red blood cells (RBC) count, hemoglobin (Hb) concentration and packed cell volume (PCV). The main changes observed during monitoring the animals were chewing of mouth, bradycardia, engorged blood vessels, coughing and depression especially in these of G I, II and III; diminution body weight in G I; abortion in G I and II. The hematological and biochemical parameters depended showed a significant increase during the study. From this we can concluded that aqueous extract of leaves of the plant has a harmful effect in rabbits.

Keywords: ***Calotropis procera*, Rabbits, Toxicity, Hematological, Biochemical parameters**

Introduction

Poisonous plants are among the important causes of economic losses to livestock (1). Family of Asclepiadaceae include genus Calotropis which have two species *C. procera* and *C. gigantea*; while *C.procera* it is a soft wooded, perennial, evergreen bush. distributed in all parts of the world at a hot weather, dry and alkaline ground (2-4). *Calotropis procera* famous by different vernacular nouns as Giant milkweed and Swallow wort in English, debaj, usher, oshar in Arabic; Indian milkweed and madar in Hindi ; bomba, algodónextranjero, cazuela in Spanish, frensh cotton in French; Calotropis, rubber bush, rubber plant, King Edward's crown, Prince of Wales' crown, kapok tree, king's crown kapok and others (4-8). Leaves of oshar screened to determine phytochemical compounds by many investigators, results revealed presence of mixtures of cardenolides, glycosides, phenols, tannins, saponins and terpenoids (9-11). Giant milkweed is well known for its medical as well as venomous characteristic (12). All parts of plant used medicinally to medication common diseases as anti-inflammatory, anti-pyretic, anti- parasites and anti-microbial activities, analgesic, cold, indigestion, diarrhea, eczema and rheumatism. It has been applied for treated many other conditions including, epilepsy, cancer, and snake bites, the smoke from the bark has been inhaled to treated of asthma and coughs (8).

Regardless these employ, *C. procera* can cause varying venomous influence in human being and

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Received: 27 November 2019, Accepted: 22 April 2020, Published: 28 June 2020.

DOI: https://doi.org/10.30539/ijvm.v44i1.934

animals via touch, air borne allergies, and consuming livestock to this tree (13). The whole plant (leaves, bark, stem latex and roots) is toxic. Brazilian farmers suggested has been accidental ingestion of fresh leaves of Giant milkweed as a toxic to ruminants by several semiarid regions.
Sheep consumption to swallow wort leaves is responsible of temporary cardiac arrhythmia at auscultation 30 min after dosage. *C. procera* plant is poisonous to heart and liver (11). In addition to hepatic poisoning, other investigators to notarize the renal toxicity of this plant (14,15). To best illustrate of the venomous influence of C. *procera*, a toxicological evaluation of the aqueous extract of leaves of this plant was take on clinical, hematological and biochemical parameter**.**

Materials and Methods

Experimental Design

This study was carried out after approval of the scientific committee of department of Internal and Preventive Medicine, College of Veterinary Medicine, University of Baghdad and accordance the International Standards of animal welfare.

Collection and Preparation of Plant Material

Fresh leaves of *C. procera* were shear in July 2018, from villages of Almuqdadiya city, Diyala province, Iraq. Reference sample was identified by Ministry of Agriculture/ Directorate of Seeds Testing and Certification (D.S.T.C) in Abu Graib /Baghdad, (NO. document:41, at 7/1/2019). The fresh leaves were washed in tap water, dried in shade at room temperature, the dried leaves were grinded by electrical mill and this powder preserved at sealed box till used after that.

Extraction of the Plant Material

The dried ground plant (50 g) was mixed with 2 L of deionized water, left for 72 hours in room temperature according to (16). The aqueous extract was filtrated using by Whatman filter paper, then evaporated on water bath to a dark green gummy residue.

Acute Toxicity of *C. procera*

The estimation of oral LD_{50} in male albino rabbits was done using the Up and Down method according to (17).

Experimental Animals

Twenty five adult male and female rabbits were randomly distributed into five sets (I, II, III, and IV) daily exposed to (243.5, 194.8, 162.4, 121.8) milligram/kilogram of b.w respectively of leaves extractor of *Calotropis procera* for eight weeks and group V serving as the control. The dependent parameter was clinical examinations, including pulse and respiratory rate, body temperature, and body weight, in addition to monitoring for any abnormal changes in behavior, appetite, or other signs.

Blood Sample Collection

Four milliliter of blood samples were obtained via cardiac puncture at a zero, 4 and 8 weeks, to study hematological and biochemical parameters, first part of blood sample was directly put into a tube containing (EDTA) as an anticoagulant. For biochemical analysis the second part of blood was placed in a tube without anticoagulant and centrifuged at 3000 round per minute for 5 minutes. The sera obtained were preserved at -4°C prior to analysis (18).

Hematological Study

Red and white blood cells (RBC, and WBC) count was assess by Coles method (18). Hemoglobin (Hb), as well as, Packed cell volume (PCV) were determined by the Hb Hemoglobin Test Strips method.

Biochemical Analysis

Glutamic-oxaloacetic transaminase (GOT) and glutamate pyruvate transaminase (GPT) were estimated as described by commercial kit SGOT, SGPT from AGAPPE DIAGNOSTICS SWITZERLAND, Alkaline phosphatase (ALP) by BIOBO, France. Level of serum creatinine was evaluated by creatinine kinetic technique kit BIOLABO, France, while serum urea level was estimated by using commercially available kit (UREA Berthelot from LINEAR CHEMICALS S.L).

Preliminary Qualitative Phytochemical Analysis

Calotropis procera extract was submitted to phytochemical checking according to standard

procedure for each test, to determine for the existence of the secondary metabolites; alkaloids according to (19). Glycosides, tannins, and saponin components was carried out according to Harborne (20), steroids and terpenoids components, this detection was conducted according to (21). Cardiac glycosides detected according to (22). Detection of flavonoids components, this process was prepared according to (23).

Statistical Analysis

The datum collected were analyzed employed by analyses of variance (ANOVA, 2 way), according to (24). Quantitative data are offered at a mean with standard error mean (SEM). Statistically significant was deemed to be at $P \leq 0.05$.

Results and Discussion

LD_{50} = xf + kd = 2250 + (0.741) ×250 = 2435.25 mg/kg BW. The plant used in current study is *Calotropis procera* according to Ministry of Agriculture/ Directorate of Seeds Testing and Certification (D.S.T.C) in Abu Graib /Baghdad.

Phytochemical checking of the leaves of *Calotropis procera*, by more than way in some tests determined the existence of flavonoids, alkaloids, terpenoids, steroids, saponins, tannins, glycosides and cardiac glycosides (Table1), which are known to possess medicinal and pesticidal properties (25). This result is in agreement with previous study (26).

Acute Toxicity Study of Plant Extracts

Determination of median lethal dose (LD_{50}) were conducted in male rabbit by up and down method, according to (17), the value of LD_{50} was 2435.25 mg/kg BW (Table 2).

Table 1. Phytochemical analysis of leaves of *Calotropis procera*

Test	*C. pl*eaves powder	Results
Flavonoid	++	Yellow Color
Alkaloid / Mayer's T.	++	White Precipitate
Terpenoid	++	Brown Color
Steroid	+++	Blue-Green Color
Saponnins/ Stirring T.	+++	Big Foam
Saponnins/ Silver Nitrate T.	++	Silver Mirror
Tannins/ Lead Acetate T	++	Gelatin-White Color
Tannins / Ferric chloride T.	++	Blue –Green Color
Glycosides/ Fehling.T.	++	Red Precipate
Glycosides/ Bendect´s T.	–	Red Precipate
Cardiac glycosides	++	brown ring

T=test, += low concentration, ++= medium concentration, +++=high concentration, - =not detectable

Table 2. LD_{50} of aqueous extract of Leaves of *Calotropis procera*

Range of doses	Decresase or increase in doses	Death or survival of animals within 24 hours	Value of K Table	Last used dose (xf)	Value of LD_{50}
1250-2500 mg/kg BW	250 mg/kg BW	OOOOXOXO	0.741	2250 mg/kg BW	2435.25 mg/kg BW

O=Survival, X=death

Sub chronic Toxicity Study

Clinical Signs

The main clinical signs appeared on animals through daily observation were as shown in Table 3. No signs appeared for first week. While in second week, those of group I (G I) were showed signs of convulsion, chewing movement of mouth, aching of ear and extremities, followed by depression, abnormal behavior included bite of legs, back aching chewing foreign materials around them. At 9th day vaginal discharge with abortion of 4 fetuses in 2nd day, and 17th day other rabbit aborted. In 6th week two rabbits died, one of them was suffered from diarrhea, severe depression, anorexia, stand in water, unable to stand for two days, then died.

The signs appeared on those from groups I and II continued with appearance of sneezing, coughing, diarrhea with depression. At 6th week animals in G I and group II (G II) showed engorgement of blood vessels of ears. Two animals in G II were aborted in 20th and 24th day, in 7th week one rabbit was suffered from depression and anorexia for three days, then died. The abnormal heartbeat and bradycardia are a signal to some harm hit on the heart, and this can be referring to cardiac glycosides effect. Appearance the blood vessels of ears engorged, that refers to circulatory disorder. disturbance of heart architecture, with popularize necrosis of the myocardium may be refers to cardiac glycosides which have the capability to curb of the membrane potential via crippling the Na /K ATPase pump (27).

Inhibition of the Na-K-ATPase in cardiac and other tissues by Cardiac glycosides, leading to intracellular detention of Na, pursued by rise intracellular Ca2 concentrations through the influence of the Na -Ca_2 exchange. The increased intracellular Ca_2 concentration boost inotropic and bradycardia, (28-30). Diarrhea and loss of appetite may be as a result of erosion of mucous lining of the gastrointestinal tract, similar result recorded by (31). Existence of the cardiac glycosides, tannins and alkaloids in several plant promote adverse influence regard to livestock (32), and Saponins disrupt cellular membranes (33). Faye, (1985) (34) revealed that the C. *procera* is a highly toxic when consummated with feed, resulting in high abortion rates .Similar result of abortion in current study, revealed by (35) , while (36) observed that *C. procera* has uterine stimulating effect. Body weight of animals in all groups were non significantly increased except in those of GI. These results are in agreement with data observed by (26).

Heart rates of those groups (I, II and III) were decreased significantly with no significant difference in groups IV and V. Respiratory rates increased significantly in those of GI only. No significant changes in body temperature in all groups (Table 4). The results of RBC in current study did not should any significant changes in values of total erythrocyte counts in all groups during 4th weeks, and significantly increased in G I only during 8th weeks (Table 5). Value of hemoglobin concentration was changed in GI during 4th weeks and changed in GII and G IV during 8th weeks (Table 5). Values of PCV were significantly increased in GI during 4th and8th weeks and during 8th in GII (Table 5). Results of MCH, MCV, and MCHC values showed no significant changes in all groups (Table 5).

The result of WBC count showed no significant changes in the level of WBC in all groups (Table 5). Similar result was recorded by (37) who used different dosages of *C. procera* for treatment rabbits coccidiosis, and revealed significant increase ($P \leq 0.05$) at red blood cell count and concentration of hemoglobin attributed to polycythemia, at a high dose of *C.procera*. This result which confirmed by (38), who stated that polycythemia may be due to generalized tissue hypoxia GOT (AST) significantly increased in those of G I and G II during 4th and 8th weeks, while in GIII only during 8th weeks. the highest level was in G I followed by these in G III and G II (Table 6). The serum of GPT (ALT) significantly increased in G II during 4th weeks, while in 8th were significantly elevated in G I and G II, the highest level was in GI (Table 6). ALP level significantly increased in these of group I,II,III and IV during 4th and 8th weeks, with the highest levels were in 8th in group I then group II (Table 6). Increase in the levels of GOT, GPT and ALP is usually a signal of liver damage (39, 40). These elevations perhaps caused by damage or may be dead of hepatocyte under the venomous impact of active secondary metabolite of plant extract, as a result, this enzyme diffused from the intracellular place (41,42).

In current study, raised of biochemical parameters (GOT, GPT and ALT) of liver assured the toxic effects of the *C. procera* aqueous extract .In contradiction of these results in current study, (10)

observed that, administration of high doses of aqueous extract of *Calotropis procera* not cause significant changes in the activity of AST and ALP and were found significant diminution (P≤0.05) in the level of ALT in smaller rabbits. Also, Ali, (43) revealed lowering in GOT and GPT after fifteen days at exposure to extract or of this plant. shown in Table (7), results of serum levels of urea and creatinine changes in rabbits of different groups. A non- significant difference (P≥0.05) was noticed in serum urea levels in all treated groups I, II, III and IV than control group(V) at the 4th weeks. Urea significantly elevated (P≤0.05) in treated groups (I, II, III and IV) during 8th weeks in comparison to control group. Creatinine in current study significantly increased in GI and GII during 8th weeks (Table 7). These results go in harmony with the conclusion of (10) who revealed, remarkable raise in urea and creatinine values after treated with aqueous extract of *Calotropis procera.* The Creatinine are removed from plasma via glomerular filtration, then excrete into the urine. Elevated in creatinine values is a signal of renal dysfunction (44), this injury may be caused by cumulating of effective substance of the aqueous extract of *C. procera* in kidneys (10), tubular epithelial cells may be damaged due to accumulation of toxic substance, or this accumulated substance may cause necrosis in to cells of the renal convoluted tubules (31,45). Impaired the secretary function of the kidney perhaps due to reduced renal blood flow correlating with elevated serum urea level (46). Kidneys damage can be recognized by measure of creatinine level, it is high specific signal to kidney harms (10), other investigators assured the hurtful influence of the *Calotropis procera* extracts on the kidney (13,31, 47). The conclusion, the aqueous extracts of *C. procera* leaves exhibit a toxic effect to rabbits experimentally exposed to it. The effects were a dose dependence in addition to duration of exposure. The dose 162.4 mg/kg b.w. of extract can be considered as sub chronic, as it allows as to fallow the causes especially in heart, liver, and kidney.

Table 3. Clinical signs that appeared in rabbits used in study

	Groups				
Signs	**I**	**II**	**III**	**IV**	**V**
Depression	+++	++	+	-	-
Diarrhea	+	+	±	-	-
Chewing movement of mouth	+++	++	+	±	-
Engorgement blood vessels at the ear	+++	++	+	-	-
Sneezing	+++	++	±	_	_
Bradycardia	++	+	±	-	_
Convulsion	++	+	_	_	_
Aching of ear and leg	+++	++	+	_	_
Loss of appetite	++	+	±	_	_
Abortion	+	+	-	-	-

+ =signs, += low, ++= medium, +++=high, ±sometime, _ = no signs

Table 4. Influence of oral administration of different doses of *Calotropis procera* aqueous extract on the body weight, temperature, heart and respiratory rates of rabbits used in the study

Parameter	Period (weeks)				
B.W	**0**	**2**	**4**	**6**	**8**
I	1.39±0.07	1.36±0.05	1.36±0.01	1.34±0.05	1.32±0.005
II	1.29±0.03	1.33±0.05	1.35±0.06	1.38±0.08	1.37±0.08
III	1.36±0.004	1.38±0.03	1.42±0.05	1.41±0.04	1.42±0.03
IV	1.22±0.07	1.27±0.10	1.29±0.1	1.29±0.08	1.3±0.06
V	1.26±0.12	1.28±0.11	1.29±0.14	1.31±0.13	1.36±0.11
T					
I	38.8±0.34	38.62±0.26	39.16±0.09	38.44±0.10	38.3±0.36
II	38.42±0.16	38.86±0.22	38.7±0.12	38.48±0.1	38.28±0.28
III	38.78±0.21	38.93±0.15	38.98±0.13	38.7±0.12	38.38±0.11
IV	38.73±0.13	38.3±0.3	39.13±0.30	38.58±0.21	38.85±0.28
V	38.5±0.31	38.98±0.26	38.35±0.18	38.58±0.23	38.58±0.21
H.R					
I	188.6 ± 4.56^{Abc}	175 ± 7.58^{Ab}	171 ± 5.46^{Ab}	151.2 ± 7.29^{Ab}	146 ± 6.44^{Aa}
II	191.2 ± 6.3^{Abc}	183.6 ± 8.13^{Ab}	178.8 ± 6.25^{Bb}	174 ± 6.5^{Bb}	165 ± 4.48^{Ba}
III	189.25 ± 6.1^{Ab}	187.5 ± 6.14^{Bb}	188.25 ± 8.23^{BCb}	184.75 ± 5.04^{BCa}	177.25 ± 5.11^{BCa}
IV	191.5 ± 6.86^{Aa}	190.25 ± 5.11^{Ba}	193.5 ± 4.94^{BCa}	191.75 ± 4.55^{BCDa}	189.75 ± 4.52^{BCDa}
V	191 ± 6.75^{Aa}	190.25 ± 5.5^{Ba}	188.25 ± 6.43^{BCa}	191.75 ± 5.44^{BCDa}	192.25 ± 5.79^{BCDa}
R.R					
I	111.6 ± 6.10^{Ab}	104.4 ± 5.57^{Aa}	101.8 ± 3.63^{Aa}	121.2 ± 6.33^{Bbc}	$126.33\pm4.^{98BCbc}$
II	113.4 ± 5.68^{Aa}	111.4 ± 6.32^{Aa}	113 ± 5.43^{Ba}	116.2 ± 7.51^{Aa}	119.8 ± 7.25^{Ba}
III	113.25 ± 6.97^{Aa}	112.5 ± 5.56^{Aa}	107.75 ± 5.65^{Aa}	113.75 ± 6.07^{Aa}	114 ± 6.42^{Aa}
IV	111.75 ± 4.5^{Aa}	108.25 ± 5.12^{Aa}	110.25 ± 5.57^{Ba}	112.25 ± 6.87^{Ba}	110.5 ± 6.5^{Aa}
V	112.25 ± 6.39^{Aa}	108 ± 6.42^{Aa}	112.75 ± 4.97^{Ba}	109 ± 4.81^{Aa}	110.25 ± 4.89^{Aa}

B.W= body weight, T= temperature, H.R= heart rate, R.R= respiratory rates

Results are expressed as mean±SEM. Values with different superscripts along a column are statistically different ($P\leq0.05$). (5 rabbits in each group)

Table 5. Influence of oral administration of different doses of *Calotropis procera* aqueous extract on hematological parameters in rabbits used in the study

Parameter	Period (weeks)		
RBC	**0**	**4W**	**8W**
I	6.36±0.13^{Aa}	6.93±0.49^{Aa}	7.17±0.06^{Bb}
II	6.53±0.62^{Aa}	6.69±0.52^{Aa}	6.83±0.03^{Ba}
III	6.52±0.48^{Aa}	6.52±0.17^{Aa}	6.51±0.35Aa
IV	6.27±0.28^{Aa}	6.47±0.18^{Aa}	6.55±0.21^{Aa}
V	6.15±0.21^{Aa}	6.27±0.21^{Aa}	6.26±0.23^{Aa}
Hb			
I	10.76±0.44^{Aa}	11.88±0.48^{Bb}	11.6±0.35^{Ba}
II	10.62±0.42^{Aa}	10.92±0.41^{Aa}	11.7±0.29^{BCb}
III	10.63±0.85^{Aa}	10.9±0.60^{Aa}	10.6±0.53^{Aa}
IV	11.05±0.48^{Aa}	11.45±0.55^{Aa}	11.18±0.41^{Ab}
V	10.98±0.18^{Aa}	11.05±0.26^{Aa}	11.23±0.15^{Ba}
PCV			
I	32±1.00^{Aa}	34±1.05^{Bb}	34±1.16^{Bb}
II	31.2±1.20^{Aa}	32±1.27^{Aa}	34.5±0.87^{Bb}
III	32.25±0.48^{Aa}	32.33±1.08^{Aa}	32.5±0.96^{Aa}
IV	31.75±0.95^{Aa}	32.5±0.65^{Aa}	32.5±0.65^{Aa}
V	31.5±0.65^{Aa}	32±0.82^{Aa}	32±0.41^{Aa}
MCH			
I	16.95±0.73	17.49±1.41	17.03±2.51
II	17.01±2.11	16.86±1.91	17.13±0.5
III	16.40±1.23	16.68±0.51	15.87±1.17
IV	17.12±0.85	17.7±0.84	17.71±0.999
V	17.91±0.69	17.67±0.42	18.18±0.40
MCV			
I	50.39±1.63	50.25±4.50	49.85±7.15
II	50.01±6.27	50.27±5.59	50.52±1.48
III	50.16±3.01	49.60±1.05	48.80±3.76
IV	49.69±0.58	50.23±0.83	50.75±0.8
V	51.33±1.15	51.15±1.06	51.24±1.33
MCHC			
I	33.58±0.40	34.92±0.71	34.12±0.14
II	34.03±0.13	34.13±0.15	33.91±0.01
III	32.86±2.25	33.68±1.32	32.58±0.98
IV	34.89±1.77	35.26±1.75	34.43±1.47
V	34.86±0.59	34.55±0.65	35.08±0.14
WBC			
I	4.69±0.14	4.81±0.15	4.69±0.57
II	4.39±0.14	4.75±0.32	4.62±0.11
III	4.26±0.28	4.47±0.14	4.27±0.32
IV	4.8±0.17	4.76±0.38	4.38±0.1
V	4.28±.28	4.24±0.21	4.3±0.02

Results are expressed as mean±ESM Values with different superscripts along a column are statistically different (P≤0.05) (5 rabbits in each group)

Table 6. Influence of oral administration of different doses of aqueous extract of *Calotropis procera* leaves on serum GOT (IU/L), GPT (IU/L), and ALP level (IU/L) in rabbits used in the study

Parameter	Period (weeks)		
GOT	**0**	**4 week**	**8 week**
I	40.52 ± 1.11^{Aa}	62.52 ± 1.1^{Bb}	72.08 ± 0.96^{BCbc}
II	42.48 ± 1.77^{Aa}	62.048 ± 1.57^{Bb}	65.98 ± 1.58^{Bbc}
III	41.87 ± 5.02^{Aa}	53.39 ± 9.2^{Aa}	69.84 ± 7.71^{Bb}
IV	40.15 ± 5.43^{Aa}	49.71 ± 6.81^{Aa}	46.76 ± 4.13^{Aa}
V	42.11 ± 4.13^{Aa}	49.12 ± 5.26^{Aa}	44.39 ± 4.22^{Aa}
GPT			
I	32.39 ± 0.43^{Aa}	31.57 ± 0.97^{Aa}	54.17 ± 1.11^{BCb}
II	31.3 ± 2.31^{Aa}	35.16 ± 2.89^{Bb}	41.21 ± 3.07^{Bbc}
III	33.72 ± 1.83^{Aa}	36.59 ± 2.15^{Ba}	32.64 ± 2.96^{Aa}
IV	$32.89\pm3.48^{A}a$	36.72 ± 2.88^{Ba}	33.05 ± 3.8^{Aa}
V	33.77 ± 2.42^{Aa}	34.99 ± 2.47^{Ba}	34.87 ± 3.99^{Aa}
ALP			
I	159.99 ± 7.73^{Aa}	297.85 ± 4.88^{BCb}	313.25 ± 10.08^{BCDbc}
II	156.54 ± 11.88^{Aa}	310.7 ± 6.34^{BCDb}	303.55 ± 11.10^{BCDb}
III	164.26 ± 8.46^{Aa}	190.7 ± 4.45^{Bb}	243.51 ± 8.4^{BCbc}
IV	160.87 ± 6.91^{Aa}	193.75 ± 4.45^{Bb}	187.69 ± 11.41^{Bb}
V	164.49 ± 7.92^{Aa}	172.23 ± 8.16^{Aa}	169.7 ± 5.47^{Aa}

Results are expressed as mean±SEM. Values with different superscripts along a column are statistically different (P≤0.05) (5 rabbits in each group)

Table 7. Influence of oral administration of different dosse of aqueous extract of *Calotropis procera* leaves on serum urea level (mg/dl) and serum creatinine (mg/dl) in rabbits used in the study

Parameter	Period (weeks)		
Urea	**0**	**4week**	**8week**
I	28.88 ± 1.99^{Aa}	26.68 ± 2.47^{Aa}	49.29 ± 2.45^{BCDb}
II	27.46 ± 0.89^{Aa}	28.64 ± 1.47^{Aa}	43.35 ± 1.41^{BCb}
III	28.12 ± 1.5^{Aa}	29.47 ± 1.16^{Ba}	34.02 ± 0.98^{Bb}
IV	27.99 ± 0.72^{Aa}	27.12 ± 1.59^{Aa}	31.77 ± 1.33^{Bb}
V	27.48 ± 1.35^{Aa}	27.29 ± 0.91^{Aa}	27.88 ± 1.23^{Aa}
Creatinine			
I	0.48 ± 0.047^{Aa}	0.52 ± 0.037^{Aa}	0.79 ± 0.036^{BCb}
II	0.52 ± 0.057^{Aa}	$0.54\pm0.068^{A}a$	0.87 ± 0.256^{BCDb}
III	0.50 ± 0.079^{Aa}	0.51 ± 0.043^{Aa}	0.60 ± 0.053^{Ba}
IV	0.48 ± 0.014^{Aa}	0.47 ± 0.065^{Aa}	0.50 ± 0.053^{Aa}
V	0.51 ± 0.069^{Aa}	0.49 ± 0.013^{Aa}	0.52 ± 0.039^{Aa}

Results are expressed as mean±SEM Values with different superscripts along a column are statistically different (P≤0.05). (5 rabbits in each group)

Acknowledgments

The authors are thankful to the dean of College of Veterinary Medicine, University of Baghdad for providing necessary facilities**.**

Conflict of Interest

The authors declare that there is no conflict of interest.

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التأثيرات السمية للمستخلص المائي لأوراق كالوتروبيس بروسيرا في الأرانب المسمومة تجريبيا

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الخلاصة

كالوتروبيس بروسيرا سجلت كنبات طبي سام للإنسان والحيوان. التأثيرات السمية للمستخلص المائي للأوراق قيمت تجريبياً في الأرانب. تم حساب الجرعة النصف قاتلة LD50(2435.25ملغم / كغم) باستخدام طريقة الصعود والهبوط. خمسة وعشرون من الأرانب المحلية ، بعمر 1-2 سنه ،وزن 1-1.9 كغم. قسمت عشوائيا إلى خمس مجموعات , خمسة أرانب لكل منها. عرضت المجموعات الأولى والثانية والثالثة والرابعة إلى 10/1 من الجرعة السامة الوسطية(234.5 ملغم / كغم) ، 1 / 12.5 من الجرعة السامة الوسطية (194.8) ، 1/15 من الجرعة النصف قاتلة (162.4) ، 1/20 من الجرعة نصف القاتلة (121.8ملغم / كغم من وزن الجسم) من المستخلص وعلى التوالي لمدة 8 أسابيع ، في حين المجموعة الخامسة تركت دون التعرض كمجموعة سيطرة . القلويات ، الصابونين ، العفص ، كليكوسيدات القلب ، الستيرويد ، الكليكوسيدات ، التربينويدات والفلافونويد حددت في فحص المواد الكيميائية النباتية .كانت المعايير المعتمدة هي العلامات السريرية التي اظهرتها الحيوانات أثناء الدراسة بالإضافة إلى بعض المعايير الدموية (عدد كرات الدم الحمراء ، تركيز الهيموغلوبين ، حجم الخلية المرصوص). التغييرات الرئيسية التي لوحظت أثناء مراقبة الحيوانات كانت مضغ الفم ، بطء القلب ، احتقان الأوعية الدموية ، السعال والاكتئاب خاصة في المجموعة 2,1 ,3 , انخفاض وزن الجسم في المجموعة الاولى ,الاجهاض في المجموعة الاولى والثانية . أظهرت المعايير الدموية والكيميائية الحيوية المعتمدة زيادة كبيرة اثناء الدراسة ، ومن هنا يمكن أن نستنتج أن المستخلص المائي لأوراق النبات له تأثير ضار في الأرانب التي اجريت عليها التجربة.

الكلمات المفتاحية: كالوتروبيس بروسيرا ، الأرانب ، السمية ، معايير الدم والكيمياء الحيوية