

**A TOXICITY STUDY ON LINGA CHENDURAM****Aruljothi R.*¹ and Thiruthani M.²**

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ABSTRACT

The aim and objective of the study was to prepare and evaluate the safety of Linga Chenduram in animal model. Linga chenduram was prepared by standard operative procedure mentioned in siddha text. To evaluate its safety acute and 28days repeated oral toxicity studies were performed following OECD guidelines 423 & 407 respectively. In acute toxicity study, the animals were treated with Linga chenduram 2000 mg/kg were showed tolerance with negligible toxic signs. From Acute Toxicity Study, 1/10 & 2/10 of maximum tolerated dose ie 200mg&400mg/kg, were selected for further 28days repeated oral toxicity study.

KEYWORDS: Metals, Linga Chenduram, Acute and Sub-Acute Toxicity.

INTRODUCTION

Siddha is an ancient system of medicine and healing that origination in South India. The term Siddha comes from Tamil Language which means Perfection (or) Achievement. According to the Siddha Medicine, the treatment is aimed at restoring balance to the Mind-Body-Spirit system. In Siddha, an individual is a microcosm of the universe, who body consists of 5 Primordial elements Earth, Fire, Water, Air and Space. Also, the siddha system of medicine places more importance on preventing diseases than curing them known as Pini Anuaa Vidhi.

MATERIALS AND METHODS

Linga Chenduram is a Metallic preparation, has been selected to evaluate its Acute and Sub-Acute toxicity effects through animal study mentioned in “Anupoga Vaithya Navaneetham

vol IV'-Hakim Pa.Mu.Abdullah Saibu. The ingredients of linga chenduram are four in number. They are purified of lingam, Thirugukallipal, Utthamanipoo and Vellaierukampoo.

RESULTS



Acute Toxicity Study

Table 1: Physical and Behavioral Examinations.

Group No	Doses/mg/kg	Observation sign	No of animal affected
Control	Distilled Water	Normal	0 of 3
Group I	5 mg / kg	Normal	0 of 3
Group II	50 mg / kg	Normal	0 of 3
Group III	300 mg / kg	Normal	0 of 3
Group IV	2000 mg/ kg	Normal	0 of 3

Table 2: Showed the effect of Linga Chenduram (5mg/50mg/300mg/kg) on general behavior after single oral administration in mice.

S.No	General Behaviour	Time of Observation after Linga Chenduram (5mg/50mg/300mg/kg) administration		
		1 st hr	3 rd hr	4 th hr
1	Sedation	-	-	-
2	Hypnosis	-	-	-
3	Convulsion	-	-	-
4	Ptosis	-	-	-
5	Analgesia	-	-	-
6	Stupar Reaction	-	-	-
7	Motor activity	-	-	-
8	Muscle Relaxant	-	-	-
9	CNS Stimulant	-	-	-
10	CNS Depressant	-	-	-
11	Pilo Erection	-	-	-
12	Skin Colour	-	-	-
13	Lacrimation	-	-	-
14	Stool Consistency	-	-	-

“+” Present, “-” Absent.

Table 3: Showed the effect of Linga Chenduram (2000mg/kg) on general behavior after single oral administration in mice.

S.No	General Behaviour	Time of Observation after Linga Chenduram (2000mg/kg) administration		
		1 st hr	3 rd hr	4 th hr
1	Sedation	-	-	+
2	Hypnosis	-	-	-
3	Convulsion	-	-	-
4	Ptosis	-	-	-
5	Analgesia	-	-	+
6	Stupar Reaction	-	-	-
7	Motor activity	-	-	-
8	Muscle Relaxant	-	-	-
9	CNS Stimulant	-	-	-
10	CNS Depressant	-	-	-
11	Pilo Erection	-	-	-
12	Skin Colour	-	-	-
13	Lacrimation	-	-	-
14	Stool Consistency	-	-	-

“+” Present, “-” Absent.

Sub-Acute Toxicity Study

Table 4: Effect of Linga Chenduram on body weight during 28 days treatment in rats.

Groups	Drug Treatment	Body Weight (gms)				
		1 st Day	7 th Day	14 th Day	21 st Day	28 th Day
I	Control Distilled Water (1ml/kg, p.o)	155.36± 2.87	158.58± 2.46	162.65± 1.98	169.71± 1.90	180.54± 2.35
II	Linga Chenduram (200mg/kg, p.o)	165.86± 2.12	174.21± 3.65	179.90± 4.90	185.06± 3.42	194.32± 2.66
III	Linga Chenduram (400mg/kg, p.o)	159.24± 2.80	166.41± 2.65	178.32± 2.55	190.51± 3.43	199.43± 4.23

Values are in mean ± SEM (n=6)

*P<0.05, **P<0.01, ***P<0.001 Vs Control.

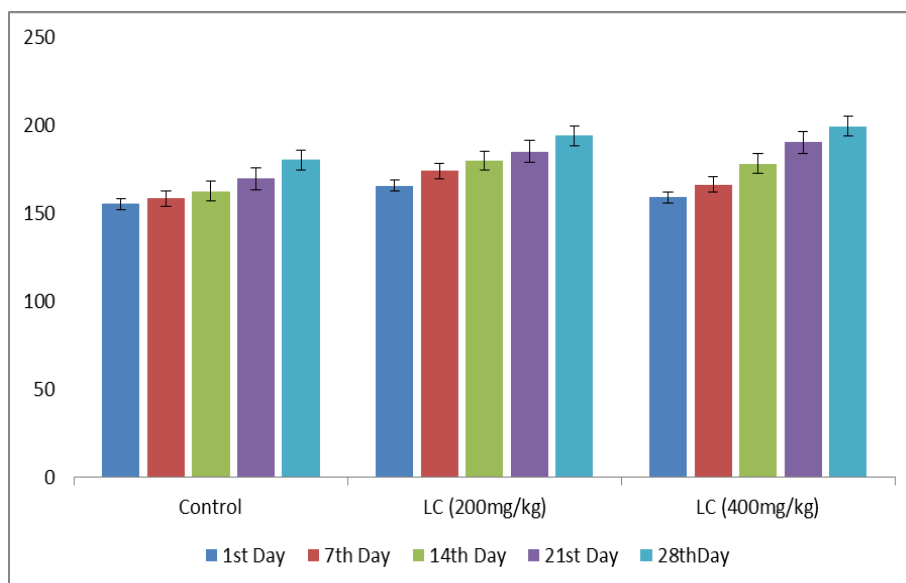


Figure 1: Effect of Linga Chendhuram on body weight during 28 days treatment in rats.

Table 5: Effect of Linga Chendhuram on food intake during 28 days treatment in rats

Groups	Drug Treatment	Food Intake (gms)				
		1 st Day	7 th Day	14 th Day	21 st Day	28 th Day
I	Control Distilled Water (1ml/kg, p.o)	24.36± 1.23	23.66± 2.07	23.23± 2.23	24.32± 2.31	25.59± 2.06
II	Linga Chendhuram (200mg/kg, p.o)	26.65± 1.23	29.32± 1.76	30.22± 2.23	32.54± 2.67	33.95± 1.80
III	Linga Chendhuram (400mg/kg, p.o)	25.23± 2.07	27.87± 1.09	29.66± 2.43	33.65± 1.05	33.89± 2.12

Values are in mean ± SEM (n=6)

*P<0.05, **P<0.01, ***P<0.001 Vs Control

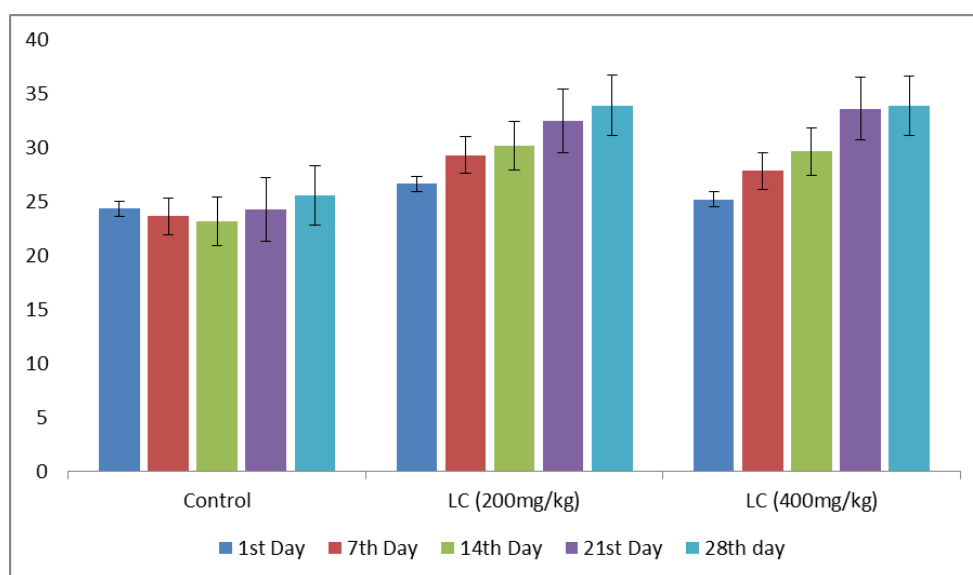


Figure 2: Effect of Linga Chendhuram on food intake during 28 days treatment in rats.

Table 6: Effect of Linga Chendhuram on water intake during 28 days treatment in rats

Groups	Drug Treatment	Water Intake (ml)				
		1 st Day	7 th Day	14 th Day	21 st Day	28 th Day
I	Control Distilled Water (1ml/kg, p.o)	66.37± 2.45	69.41± 3.09	72.55± 4.33	70.23± 3.39	75.58± 4.98
II	Linga Chendhuram (200mg/kg, p.o)	69.33± 2.94	69.65± 3.24	76.53± 4.90	79.54± 4.08	76.55± 2.74
III	Linga Chendhuram (400mg/kg, p.o)	67.64± 4.32	74.98± 5.21	78.05± 4.99	82.54± 4.23	75.54± 5.31

Values are in mean ± SEM (n=6)

*P<0.05, **P<0.01, ***P<0.001 Vs Control

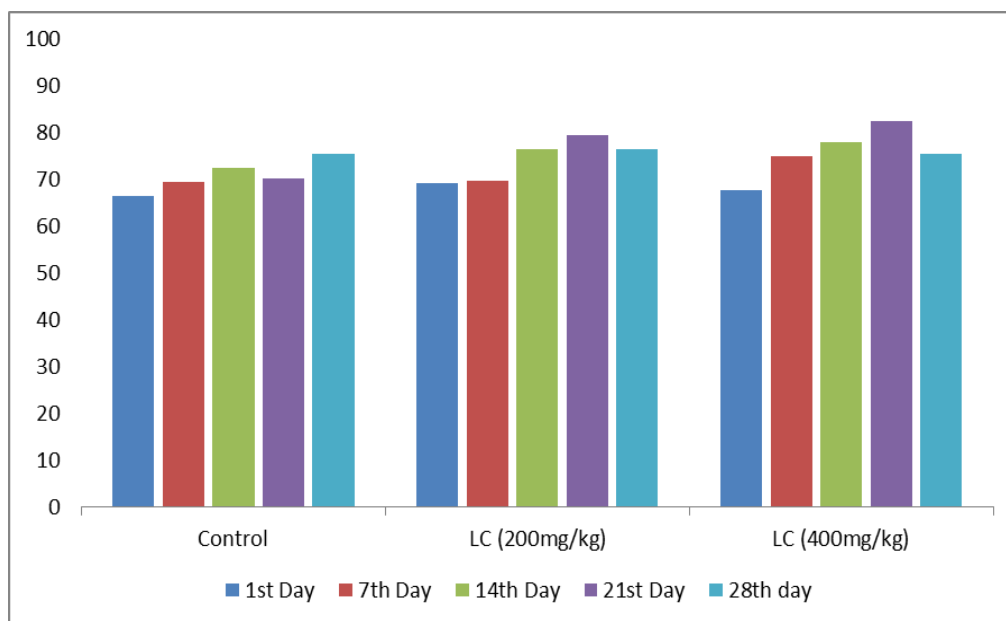


Figure 3: Effect of Linga Chendhuram on water intake during 28 days treatment in rats.

Table 7: Shows the effect of Linga Chendhuram on RBC, WBC and Hb in rats after 28 days treatment.

Groups	Drug Treatment	RBC million cells/cmm	WBC cells/cmm	Haemoglobin gm %
I	ControlDistilled Water (1ml/kg, p.o)	4.21 ± 0.40	8696.81 ± 67.32	14.40± 0.59
II	Linga Chendhuram (200mg/kg, p.o)	4.52 ± 0.21	8568.70 ± 92.12	14.72 ± 0.70
III	Linga Chendhuram (400mg/kg, p.o)	4.44 ± 0.23	8431.62 ± 82.61	14.53 ± 0.95

Values are in mean ± SEM (n=6)

*P<0.05, **P<0.01, ***P<0.001 Vs Control

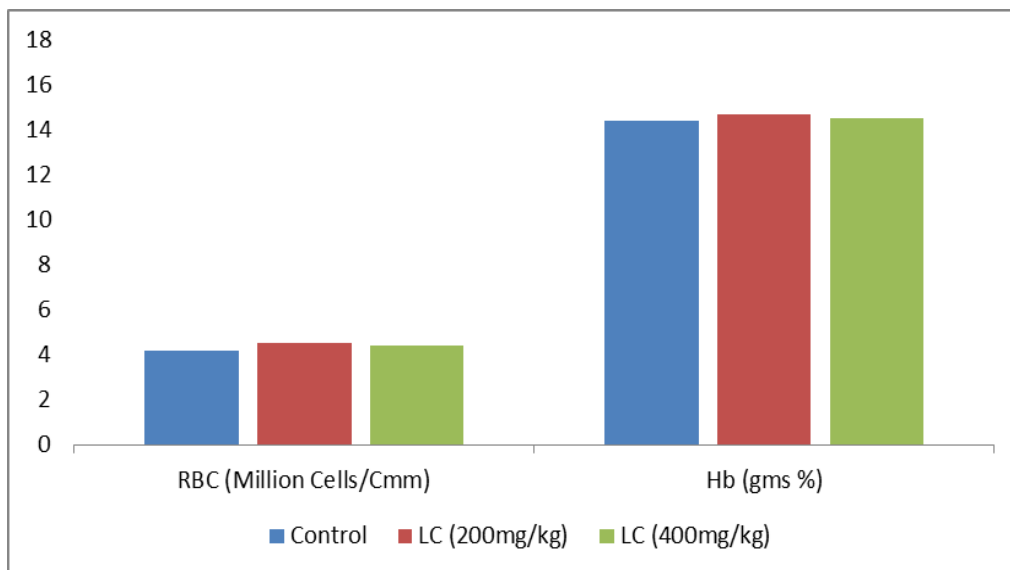


Figure 4: Shows the effect of Linga Chendhuram on RBC and Hb in rats after 28 days treatment.

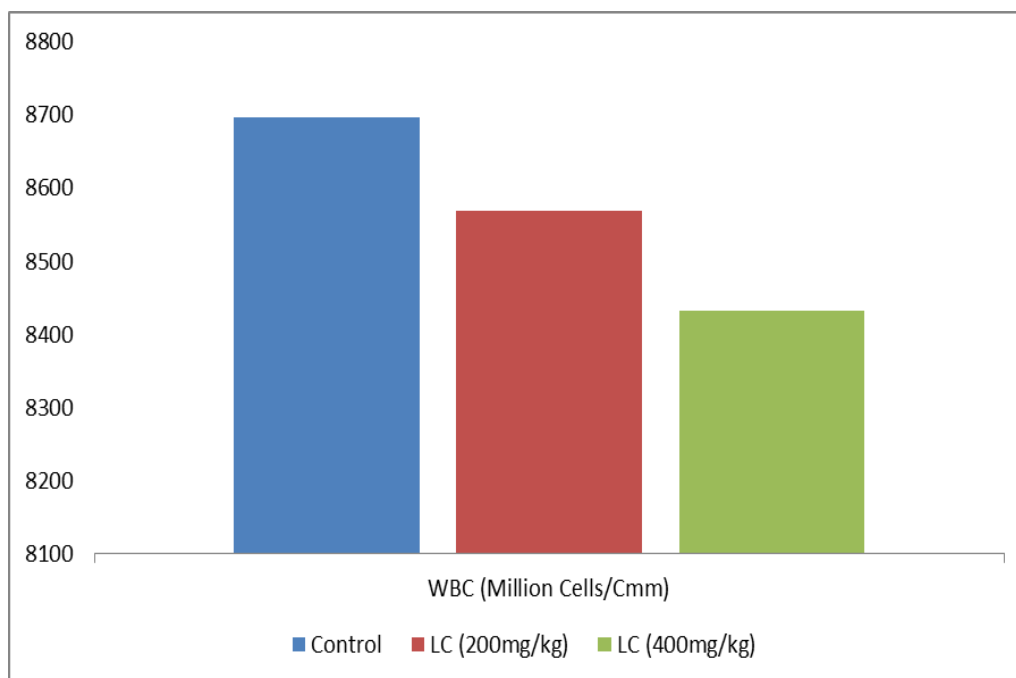


Figure 5: Shows the effect of Linga Chendhuram on WBC in rats after 28 days treatment.

Table 8: Shows the effect of Linga Chendhuram on Differential Count in rats after 28 days treatment.

Groups	Drug Treatment	Differential Count %			
		<i>Neutrophils</i>	<i>Eosinophils</i>	<i>Monocyte</i>	<i>Lymphocyte</i>
I	Control Distilled Water (1ml/kg, p.o)	31.72±1.60	1.93±0.15	3.89±0.19	63.17±3.76
II	Linga Chendhuram (200mg/kg, p.o)	33.10±1.31	2.02±0.11	4.02±0.31	59.43±2.98
III	Linga Chendhuram (400mg/kg, p.o)	32.98±2.42	2.06±0.09	4.77±0.21	58.43±2.24

Values are in mean ± SEM (n=6)

*P<0.05, **P<0.01, ***P<0.001 Vs Control

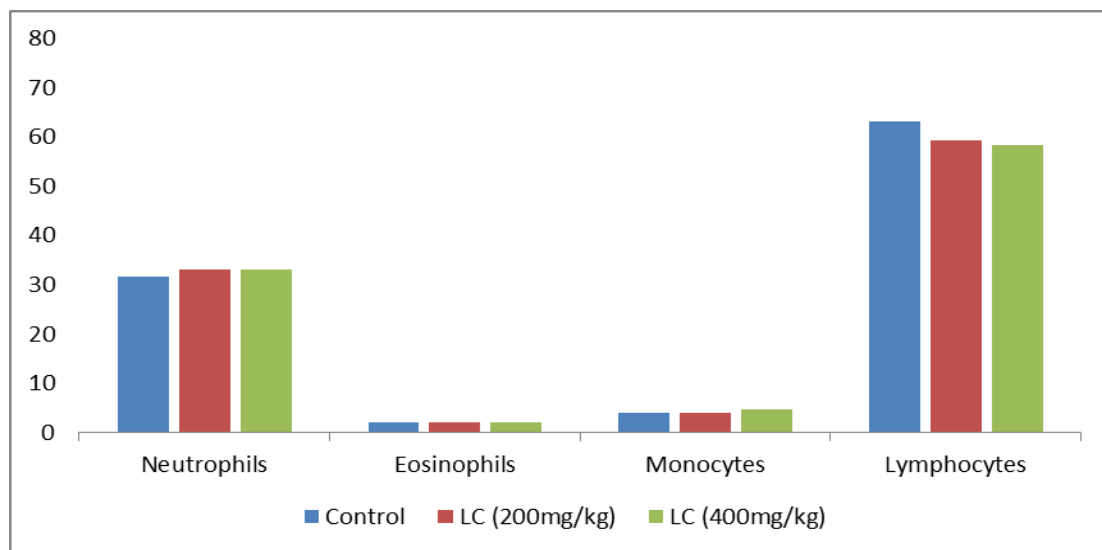


Figure 6: Shows the effect of Linga Chendhuram on Differential Counts in rats after 28 days treatment.

Table 9: Shows the effect of Linga Chendhuram on Hepatic Functions (SGPT, SGOT and ALP) in rats after 28 days treatment.

Groups	Drug Treatment	SGPT (IU/L)	SGOT (IU/L)	ALP (IU/L)
I	Control Distilled Water (1ml/kg, p.o)	82.14±3.06	148.28±4.71	287.52±11.76
II	Linga Chendhuram (200mg/kg, p.o)	78.25±2.97	152.27±3.95	279.36±13.91
III	Linga Chendhuram (400mg/kg, p.o)	76.61±3.98	155.58±2.32	281.90±8.26

Values are in mean ± SEM (n=6)

*P<0.05, **P<0.01, ***P<0.001 Vs Control

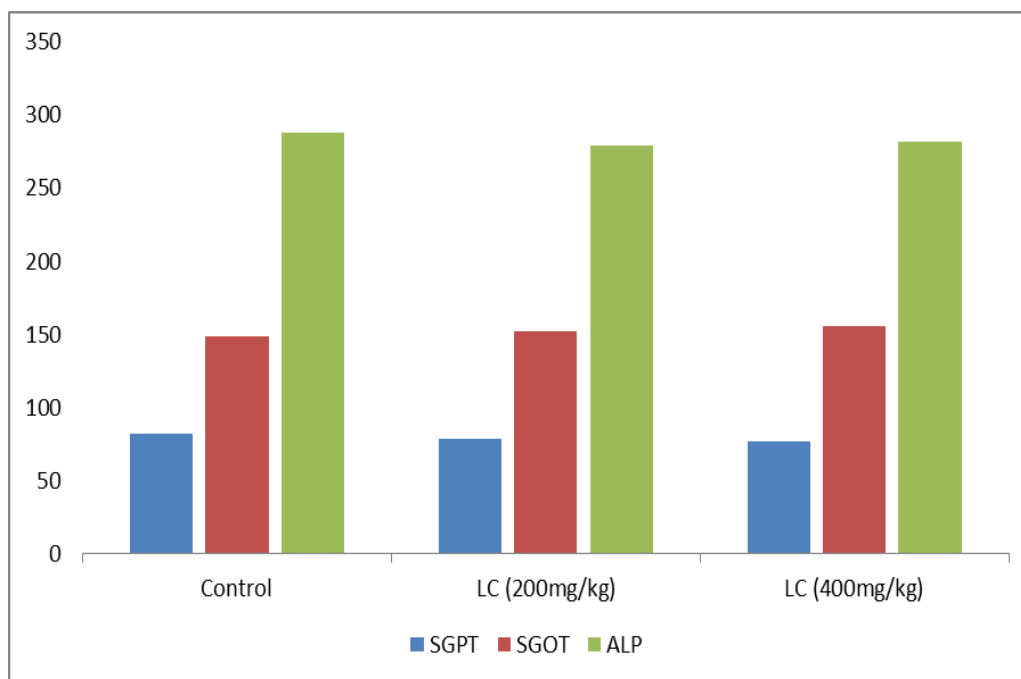


Figure 7: Shows the effect of Linga Chenduram on Hepatic Functions in rats after 28 days treatment.

Table 10: Shows the effect of Linga Chenduram on Kidney Functions in rats after 28 days treatment.

Groups	Drug Treatment	Urea (mg/dl)	Creatinine (mg/dl)
I	Control Distilled Water (1ml/kg, p.o)	39.79±3.0	0.94±0.03
II	Linga Chenduram (200mg/kg, p.o)	39.48±1.82	0.81±0.03
III	Linga Chenduram (400mg/kg, p.o)	38.42±2.15	0.84±0.06

Values are in mean ± SEM (n=6)

*P<0.05, **P<0.01, ***P<0.001 Vs Control

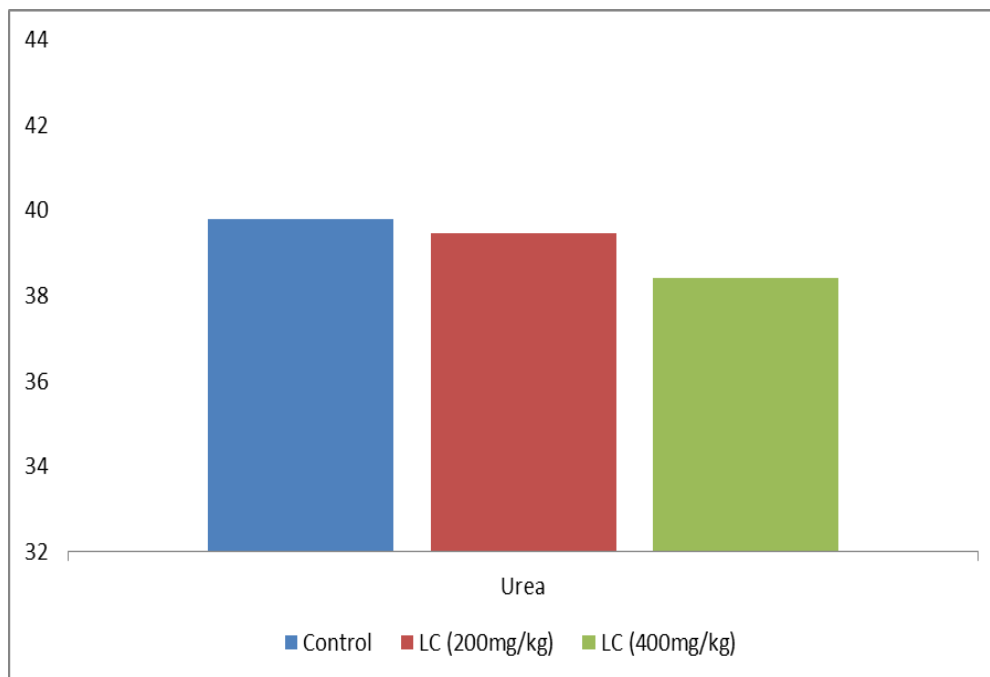


Figure 8: Shows the effect of Linga Chendhuram on Kidney Functions (Urea) in rats after 28 days treatment.

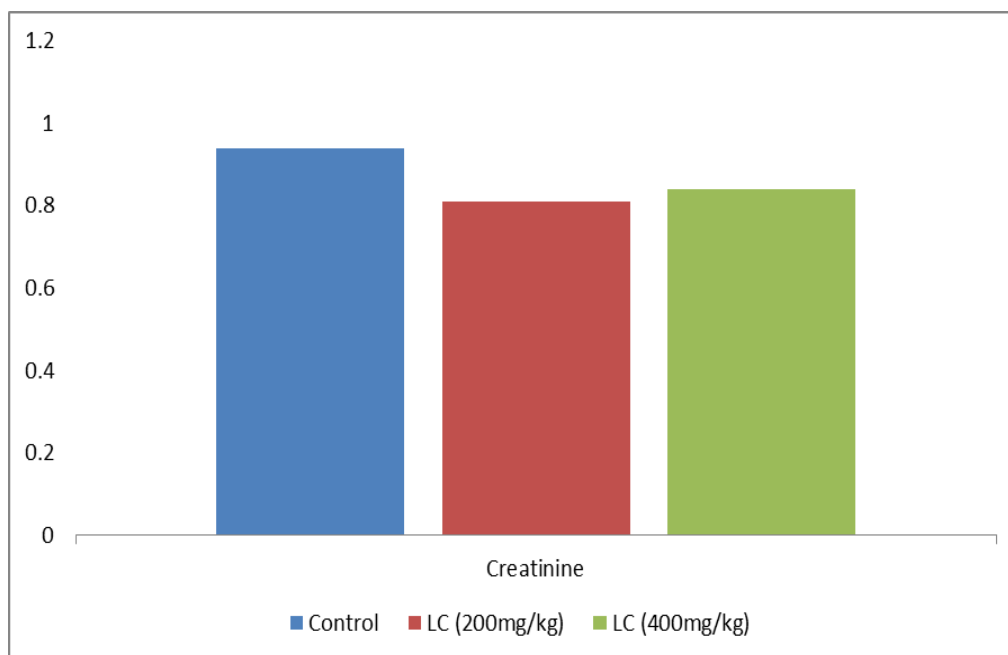


Figure 9: Shows the effect of Linga Chendhuram on Kidney Functions (Creatinine) in rats after 28 days treatment.

DISCUSSION

The results of acute toxicity study of Linga Chenduram were shown on table 1-3 There was no mortality with the Linga Chenduram after 72 hrs even at higher dose of 2000mg/kg. There was no significant change in general behavior after 1st and 24 hrs. After 72hrs of Linga Chenduram administration (2000mg/kg), the animals showed mild sedation and analgesic effect. From the results of acute toxicity study, Linga Chenduram was found to be safe in mice.

From acute toxicity study, 1/10 and 2/10 of maximum tolerated dose ie, 200 & 400mg/kg, were selected for further sub-acute toxicity study.

In sub-acute toxicity study, body weight, food intake and water intake were observed on 1st, 7th, 14th 21st and 28th day of Linga Chenduram administration.

The effect of Linga Chenduram on body weight during 28 days treatment in rats was given in table 4 and figure 1. There was no significant change in the body weight compared to control with both the doses of Linga Chenduram during 28 days treatment.

The effect of Linga Chenduram on food intake during 28 days treatment in rats was given in table 5 and figure 2. Linga Chenduram did not alter the food intake at both the dose levels as compared to control during the 28 days treatment. It indicates that it does not influence food intake.

The effect of Linga Chenduram on water intake during 28 days treatment in rats was given in table 6 and figure 3. Linga Chenduram did not alter the water intake at both the dose levels as compared to control during the 28 days treatment. There was no significant change in water intake as compared to control.

Table 7, figure 4 and 5, shows the effect of Linga Chenduram on haematological parameters like RBC, WBC and Hb in rats after 28 days treatment. Both the doses of Linga Chenduram did not produce any significant change in RBC, WBC and Hb compared to control.

The effect of Linga Chenduram on Differential Count in rats after 28 days treatment was shown on table 8 and figure 6. Both the doses of Linga Chenduram did not show any significant change in differential counts like Neutrophils, Eosinophils, Monocyte and

Lymphocytes. From the effect of Linga Chenduram on hematological parameters it was found that it does not produce any toxicity in haemopoietic system.

The effect of Linga Chenduram on hepatic functions in rats after 28 days treatment was shown on table 9 and figure 7. The hepatic enzymes (SGPT, SGOT and ALP) were remain normal with both the doses of Linga Chenduram and the values were similar as that of control group which received distilled water. From the result of hepatic enzymes it was found the Linga Chenduram did not produce any toxic effects on liver in rats.

The effect of Linga Chenduram on renal functions in rats after 28 days treatment was shown on table 10 and figure 8 & 9. Both the doses of Linga Chenduram does not showed any significant change in urea and creatinine after 28 days treatment compared to control which indicates, Linga Chenduram was free form renal toxicity.

CONCLUSION

Linga Chenduram was studied for its acute and sub-acute toxicity studies using laboratory animals. In acute toxicity study, Linga Chenduram did not produce any specific toxicity and mortality even at the dose of 2000mg/kg in mice.

In sub-acute toxicity study, 200 and 400mg/kg of Linga Chenduram was used and it was administered once daily for 28 days through oral route Linga Chenduram did not alter the body weight, food intake and water intake during the study period.

After 28 days the blood was subjected to liver and kidney function test. Both the doses of Linga Chenduram, did not showed any significant change the functional parameters of liver and kidney. From the study it was concluded that, Linga Chenduram was found to be safe in laboratory animals.

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