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ORIGINAL ARTICLE

Efficacy of Aqueous Extract of *Solanum xanthocarpum* on Hematological and Biochemical Parameters of wistar albino rat

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ABSTRACT
This work has been performed to study the efficacy of hot whole plant aqueous extract of Solanum xanthocarpum Schrad and Wendl on hematological and Biochemical parameters of wistar albino rats.Doses hot aqueous extract of different concentration like 125 mg/kg, 250 mg/kg, 500 mg/kg and 1000 mg/kg body weight was given orally to different group of rats. As the result of dose administration level of hemoglobin , Packed cell volume (PCV), RBCs decreased and WBCs significantaly (p<.05) increased .On the other hand efficacy of dose on Biochmemical parameter show the mixed effect , the level of urea, creatinin ,albumin, and bilirubin as comparison with control wistar albino rat were not significantly differ while level of Glucose, total cholesterol, Alanin amono transferas (ALT) and Aspartate amino transferase (AST) significantly (p<.05 and .01) decreased .
Key words: Hematological, Biochemical, Solanum xanthocarpum (SX)

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INTRODUCTION

Solanum xanthocarpum Schrad and Wendl family solanaceae commonly known as the Indian night shade or yellow berried night shade(English) and Kantkari (Sanskrit). It is spiney diffuse green perennial herb. *Solanum xanthocarpum* used in this study has profound use in Ayurveda as folkore medicine[1],Solasonine is present in its different parts due to this SX show the pharmacological and medicinal value[2]extract prepared from different parts of SX contain vit C, anthocyanin and solasonin[3]. SX extract show the antibacterial[4], antifungal[5],Hypoglycemic[6], antifilariasis[7] and antioxidant[8] activity.Hematological parameters such as total WBC, RBC,hemoglobin and neutrophil are important constitute of immune system. An alteration in the concentration of these cells profoundly affects the health and immune system as they are known to recognize the foreign antigen and mount immune response [9].Present work was done to estabilish the correlation between the hematological and biochemical parameter with different pharmacological activity[10].

MATERIAL AND METHODS

SX plant was collected from the month of Jan to feb from Mathura(India) and adjoining areas and was identified and authenticated by Dr. A. K. agrawal Head dept. of microbiology BSA college Mathura. The plants was dried in shade and coarsely powdered. Powdered SX 200 gram used for hot aqueous extraction by soxlet apparatus at 100^0C for 8-10 hrs. The extracted solution was dried in rotator evaporator that result in dark tan coloured crystals, percentage yields was 24% w/v.

Wistar albino rats male and female weighing 60-100 gm were collected from central animal house, GLA University, Mathura with GLAIPR/CPCSEA/IAEC/2014/Biotech02. Five groups of rat were made with six rats in each group. Safe dose were determined according to Organization for Economic Co-operation and Development guidelines No. 423[11] Group I i.e. control was fed with rat pellets and water ad libitum.

Group II, III,IV and V were fed with 125 , 250 , 500 , and 1000 mg/kg body weight doses of aqueous extract of whole plant respectively for 21 days with rat pellets and water *ad libitum*. At 22nd day blood from all rats were collected from retro orbital plexux . Quantitative analysis of hematological parameters susch hemoglobin Packed cell volume(PCV), WBC, RBC was done by automated hemato analyzer , Nihon . Albumin, creatinine, urea, glucose, total cholesterol, alanine aminotransferase (ALT), aspartate amino transferase (AST) and bilirubin were estimated using span diagnostic kit. Reading was taken with UV-visible double beam spectrophotometer.

Statistical Analysis

Different data was analyzed statistically by the one way analysis of variance (ANOVA) using SPSS version 20.0 software and DMRT at p<.05 and .01 to determine significant differences among treatment means. Values are expressed as mean ± SEM.

RESULT AND DISCUSSION

The result of efficacy of hot aqueous extract of *SX* whole plant is given in Table 1. Various doses of extract caused significant (p<.05) decrease in RBC and PCV as compared with control. More significant (p<.01) increase in Hb, was found at 100mg/kg body weight (bwt) doses with respect to control. Literatures revealed out the facts that oral intake of medicinal compounds or drugs can change the normal range of haematological parameters. These changes could either be beneficial or harmful [12, 13]. The AEWP of SX fed rat exhibited decrease in PCV and Hb values. A decreased value was noticed in total leucocytes count in the AEWP fed rat with respect to unfed rat. This study revealed that extract might have adverse effect on RBCs indicated by decreasing value of hemoglobin and PCV content (Table-1). Biochemical tests carried out which showed that the AEWP of SX fed rat exhibited marked decrease in blood glucose level, Cholestrol, ALT and AST level. This study shows that extract has high antidiabetic value (Table-2). Our finding supported by literature [14,15,16] worked on group of rats (100mg/kg body wt.) noticed that reduction of blood glucose level was also achieved dose dependently and significantly compared to the vehicle control group ,they concluded that fruits of *S. xanthocarpum* can be used for the treatment of diabetes.

TLC was found to be significantly decreased (p<.05) at 500mg/Kg bwt , which gives us the impression that AEWP of *SX* show the immune suppressive activity , which needs to be further studied.

No significant differences in albumin, creatinine, bilirubin and urea levels of albino rats fed with different doses of aqueous extract of whole plant was observed when compared to control. Study suggested probable non toxic effect of aqueous extract of AEWP of *SX* over kidney of wistar albino rats since it does not cause any significant changes in creatinine level. Significant (p<.05, and .01) decrease in total cholesterol was found in 125mg/kg, 250mg/kg , 500mg/kg and 1000mg/kg fed albino rats as compared with control. Dose dependent effect was found (Fig-6). Present study gives an impression about cardioprotective efficacy of this plant [17]. Hence there is a need to work over lipid lowering activity of aqueous extract of this plant.

The activity of AST in treated groups were found to be significantly (p <.05 and .01) less as compared to control [18]. The effect was dose dependent (Fig -7). Whereas significant (p< .05) decrease was found in ALT activity at 125mg/Kg, 250mg/Kg and 500 mg/Kg fed albino rats with respect to control (Fig-8).Whenever the lever cells are damaged, the AST and ALT activity in plasma is increased [17].Phytochemical analysis and identification of components responsible for lowering AST and ALT activity needs to be further investigated.

Table -1: Effect of *Solanum xanthocarpum* whole plant aqueous extract at various dose on hematological parameters of wistar albino rats

hematological parameters	Group-I (Control)	Group-II 125mg/kg body wt	Group-III 250mg/kg body wt	Group-IV 500mg/kg body wt	Group-V 1000mg/kg body wt
Hb (gm/dl)	$13.92^{a} \pm 0.12$	$13.55^{a} \pm 0.10$	$12.84^{a} \pm 0.13$	$12.54^{b} \pm 0.11$	$12.13^{b} \pm 0.15$
PCV (%)	$36.97^{a} \pm 0.32$	$36.54^{a} \pm 0.12$	$36.25^{a} \pm 0.17$	$29.45^{b} \pm 0.12$	$26.32^{a} \pm 0.43$
RBC(x 10^{6} /mm)	$5.96^{a} \pm 0.07$	$6.27^{b} \pm 0.12$	$6.48^{b} \pm 0.13$	$6.86^{b} \pm 0.32$	$7.12^{b} \pm 0.22$
TLC(x 10^{3} /mm)	$6.29^{a} \pm 0.06$	$6.71^{a} \pm 0.12$	$6.18^{a} \pm 0.18$	$4.34^{b} \pm 0.23$	$4.13^{b} \pm 0.21$

SEM ± value shown in the table was six rat. Results are significant at <.05 as per ANOVA and DMRT.

Table -2: Effect of *Solanum xanthocarpum* whole plant aqueous extract at various dose on biochemical parameters of wistar albino rats

Biochemical parameters	Group-I (Control)	Group-II 125mg/kg body wt	Group-III 250mg/kg body wt	Group-IV 500mg/kg body wt	Group-V 1000mg/kg body wt
Glucose (mg/dl)	$104.25^{d} \pm 0.478$	$98^{c} \pm 1.290$	$95.5^{c} \pm 0.866$	$87.25^{b} \pm 1.25$	$78.75^{a} \pm 2.86$
Urea (mg/dl)	36.03 ± 1.84	39.33 ± 4.00	37.03 ± 3.12	32.03 ± 4.03	29.3 ± 2.45
Creatinine (mg/dl)	0.79 ± 0.05	0.72 ± 0.03	0.76 ± 0.08	0.73± 0.27	0.76 ± 2.45
Cholestrol (mg/dl)	$113.5^{c} \pm 1.19$	$109.25^{c} \pm 1.31$	$107.75^{c} \pm 1.10$	$96.25^{b} \pm 2.4$	$87.25^{a} \pm 4.3$
Albumin (mg/dl)	3.5 ± 0.12	3.22 ± 0.45	3.05 ± 0.11	2.67 ± 1.4	2.98 ± 1.3
Billirubin (mg/dl)	0.71 ± 0.30	0.80 ± 0.02	0.78 ±0.06	0.76 ± 1.7	0.73 ± 0.5
AST(IU/L)	$62.35^{b} \pm 2.70$	$48.93^{a} \pm 1.68$	$44.84^{a} \pm 3.76$	$44.39^{a} \pm 1.64$	$41.64^{a} \pm 3.4$
ALT (IU/L)	$27.47^{c} \pm 2.23$	$24.12^{bc} \pm 1.68$	$24.25^{bc} \pm 1.05$	$22.2^{a} \pm 0.61$	$19.45^{a} \pm 0.82$

The values represent the mean ± SEM of six rats. Results are significant at p<.05 and .01 as per one way ANOVA followed by DMRT. Same superscript within different groups at each parameter Indicates no significant difference between values whereas b p<.05 and c p<.01 indicates Statistically significant difference in comparison with control group.

Fig 1: Effect of aqueous extract of SX plant on Hb

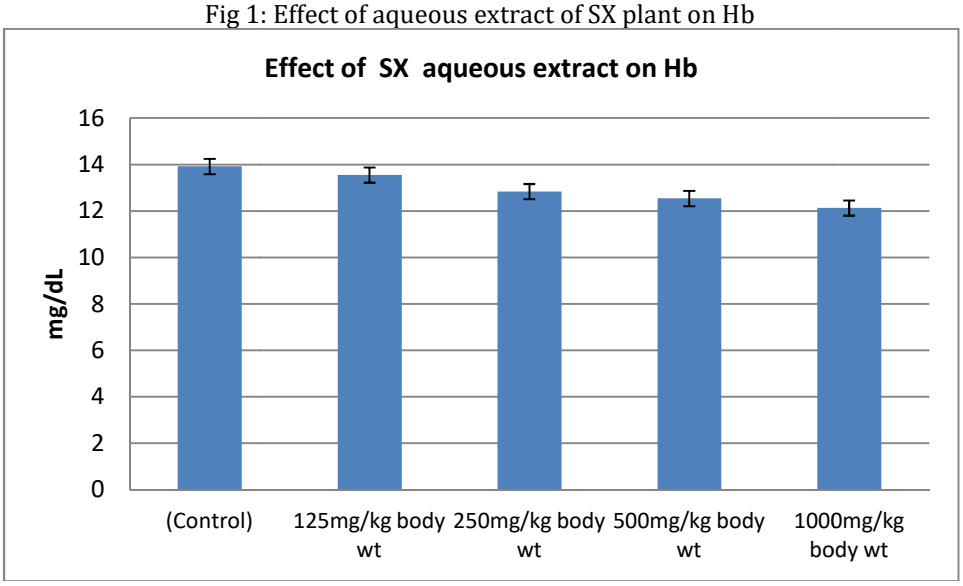

Fig 2: Effect of aqueous extract of SX plant on RBCs

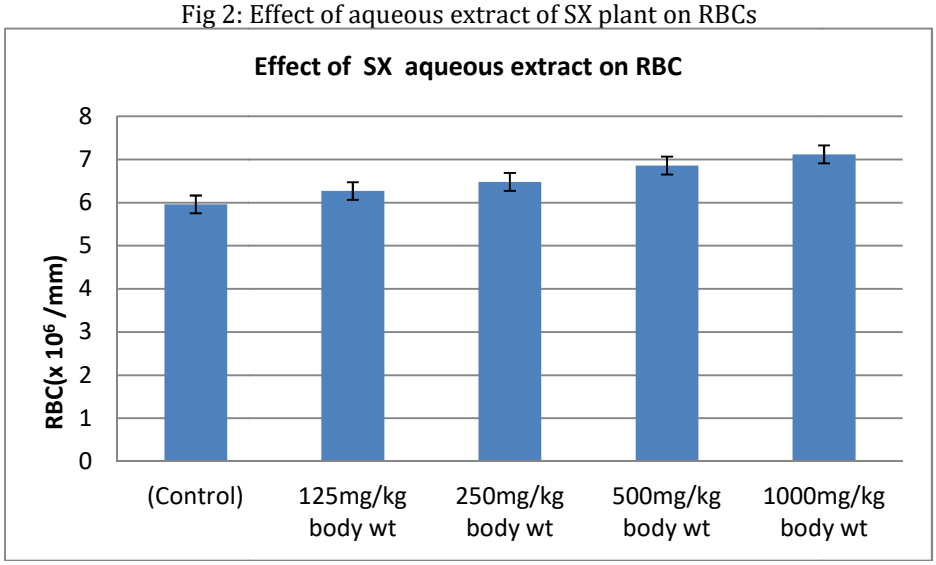

Fig-3 : Effect of aqueous extract of SX plant on TLC

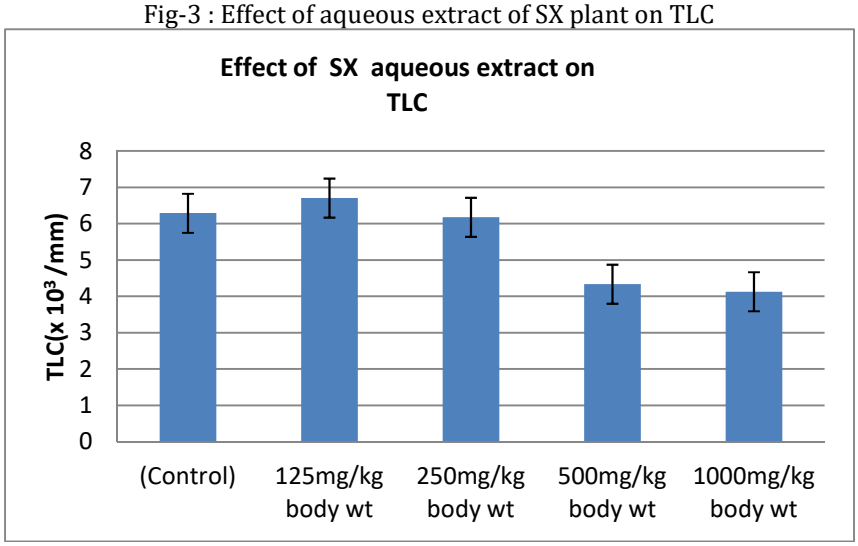

Fig-4: Effect of aqueous extract of SX plant on Blood Glucose

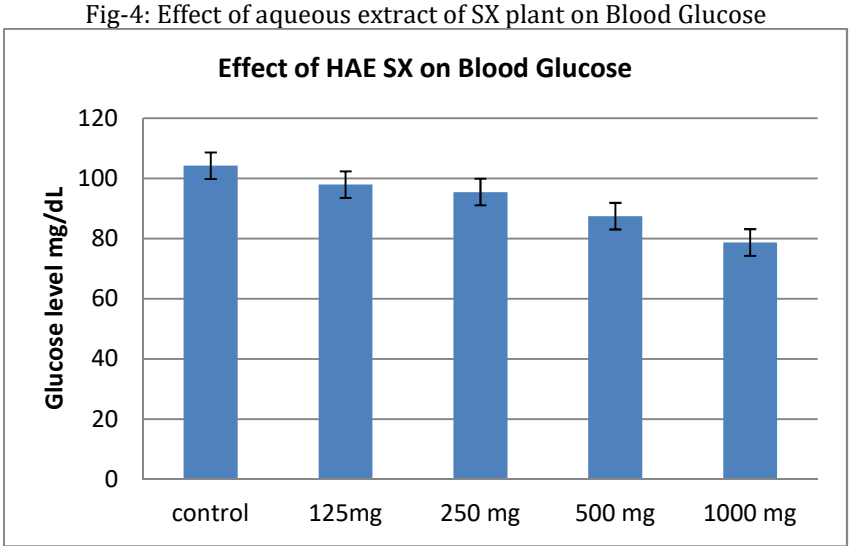

Fig:5: Effect of aqueous extract of SX plant on Urea

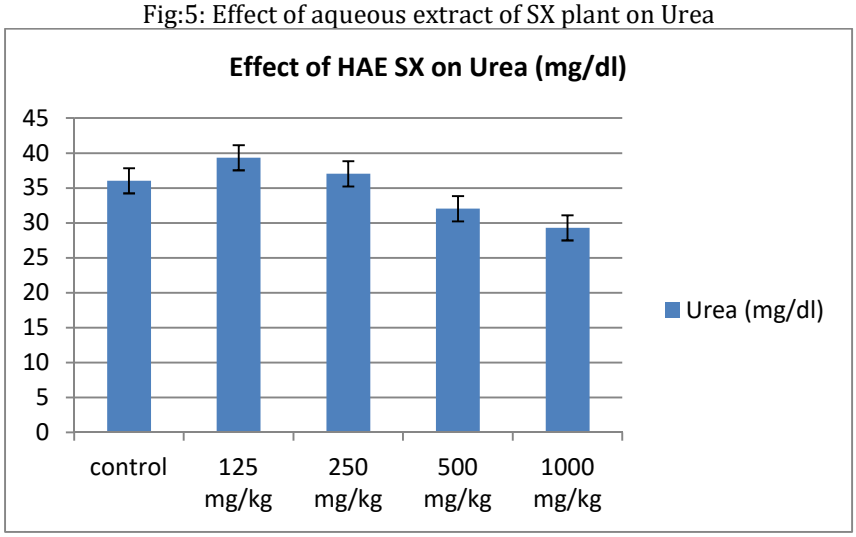

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Fig:6: Effect of aqueous extract of SX plant on Creatinine

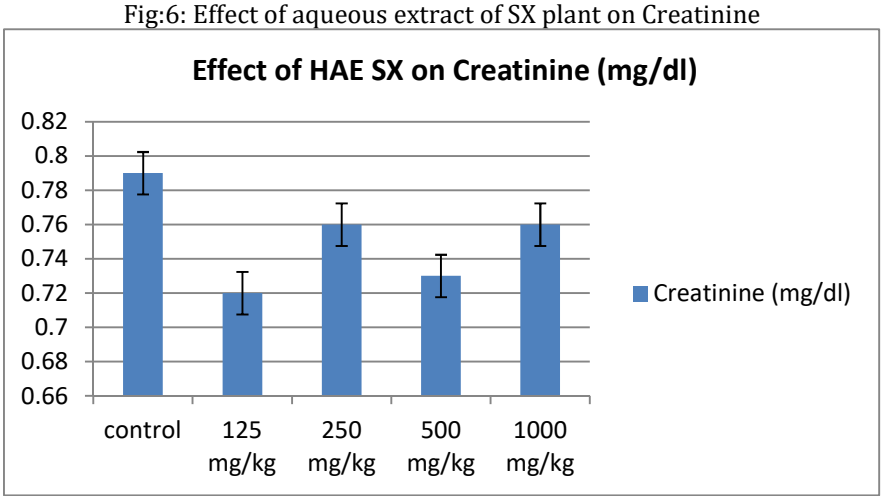

Fig:7: Effect of aqueous extract of SX plant on Cholesterol

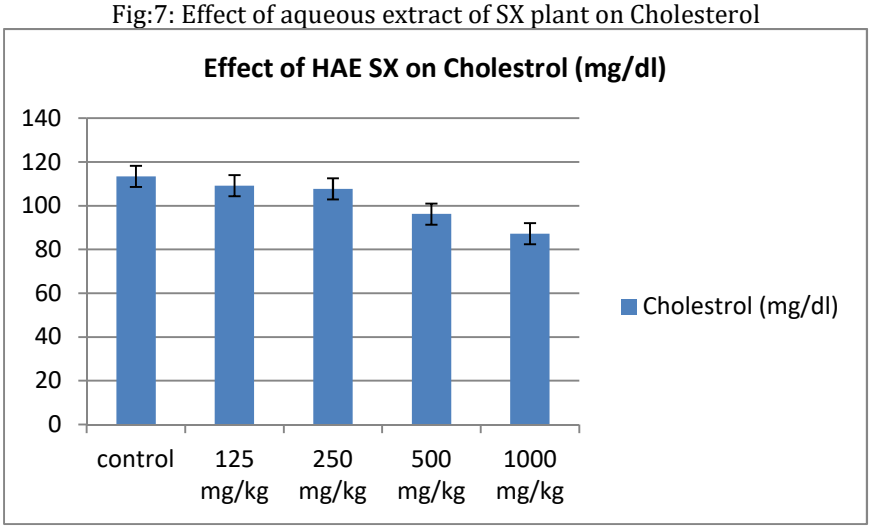

Fig:8: Effect of aqueous extract of SX plant on Albumin

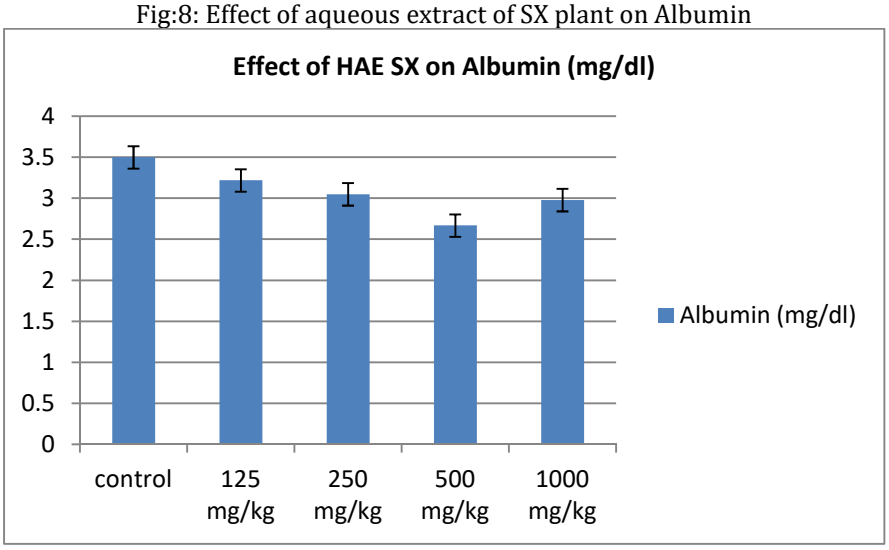

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Fig:9: Effect of aqueous extract of SX plant on Billirubin

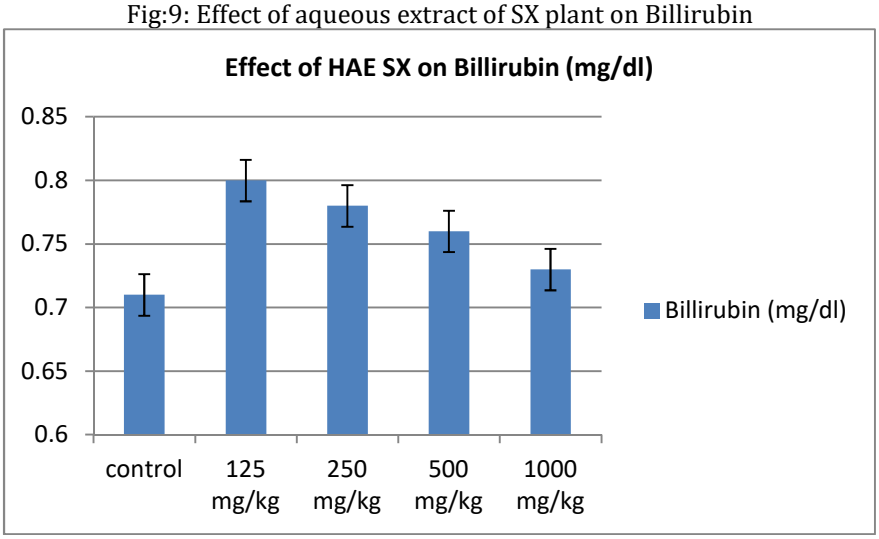


Fig:10: Effect of aqueous extract of SX plant on AST

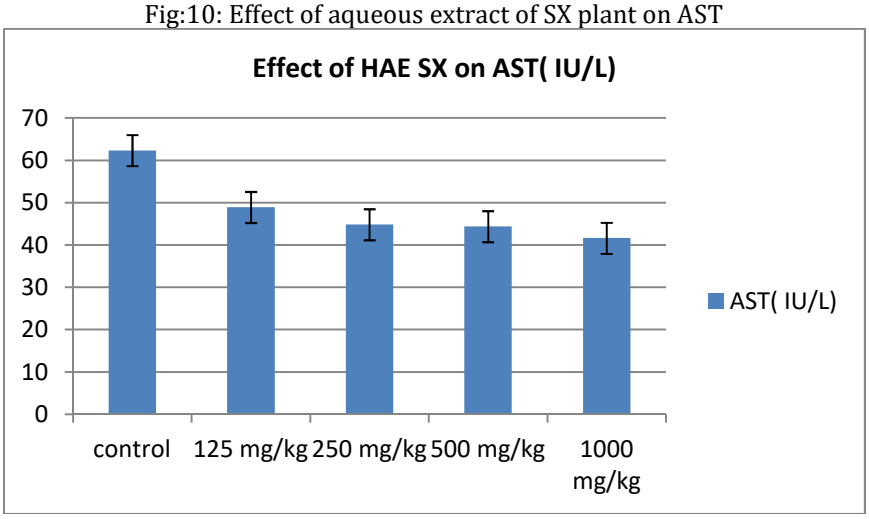
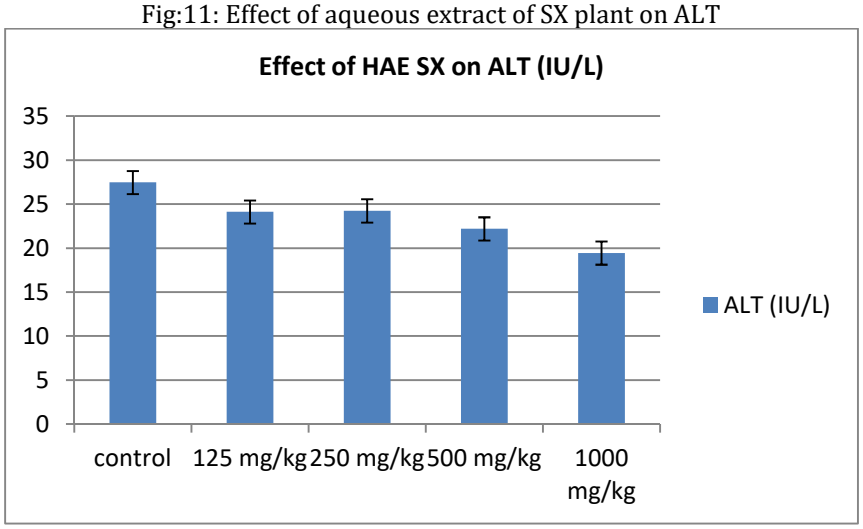


Fig:11: Effect of aqueous extract of SX plant on ALT



CONCLUSION

Present study concludes about hypoglycemic, hypolipidomic, hepatoprotective and probable immunosupressive activity of whole plant aqueous extract of *Solanum xanthocarpum*.

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