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**EFFECT OF THE ETHANOLIC EXTRACT OF LEAVES OF *ANNONA SQUAMOSA*
ON HAEMATOLOGICAL PARAMETERS IN RAT**

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ABSTRACT

The present study was designed to elucidate the effect of ethanolic extract of leaves of *Annona squamosa* L. (Annonaceae) on the haematological parameters in rat. Haematological parameters are considered as bioindicators of toxicosis in animals exposed to xenobiotics. The rats exposed to ethanolic extract of the leaves of *Annona squamosa* at the dose level of 200 and 300 mg/rat/day for 28 days showed significant alterations in hematological indices like hemoglobin, blood cell counts (RBC, WBC) and serum parameter like serum cholesterol, serum GPT and GOT.

Keywords: *Annona squamosa*, rat, haematological parameters, blood cell count, serum cholesterol, serum GPT and Serum GOT

INTRODUCTION

Annona squamosa Linn. belonging to family Annonaceae is commonly known as "Custard apple" a native of West Indies and South America and is cultivated throughout India, mainly for its edible fruits (Morton, 1987). The leaves of this plant have been used as insecticide, styptic, suppurant and dried fruit work as antidysentric and vermifuge. Seeds are used to kill head-lice and fleas. This plant also reported to possesses anti-fertility, anti-tumour and anti-diabetic activities in mice and rats. (Gupta *et. al.*; 2005; Jain and Dixit (1982)).

Hence, the present study was undertaken to evaluate the effect of ethanolic extract of the leaves of *Annona squamosa* at on the haematological parameters in rat at two different doses.

MATERIALS AND METHODS

Plant material and extract preparation:
The fresh fruits of *Annona squamosa* were collected from Gorakhpur district of U.P. (India) and were identified in the department of Botany, University of Gorakhpur. The leaves were removed from stem and were shade dried. The leaves were then powdered and mixed with

100% ethanol. The extract was then filtered and oven-dried.

Animal model and experimental procedure: Healthy colony bred albino rats weighting 120-150 grams were used for the experiments. The animals were housed in polypropylene cages and maintained under standard conditions (12h light / 12h dark cycles). Rats were fed with standard diet and water was provided *ad libitum*.

The animals were divided into three groups of one control and two treated each with 16 animals. In treated groups one group received the extract at the dose level of 200mg/rat/day and another group received the extract at the dose level of 300mg/rat/day. The plant extract was dissolved in ethanol and administered orally to animals every morning for 7, 14, 21 and 28 days respectively. After every 7th, 14th, 21st and 28th days blood was collected from both control and treated groups were autopsied under light chloroform anesthesia. Four animals of each three groups were autopsied for every 7th, 14th, 21st and 28th day. Blood was collected through cardiac puncture. The blood of the experimental rats was analyzed for R.B.C and W.B.C count, hemoglobin, serum cholesterol, serum GPT, serum GOT. The protocol for the experiment was approved by the Ethical Committee of the D.D.U. Gorakhpur University, Gorakhpur, U.P., India. The results are expressed as mean±SE followed by student's t-test.

RESULTS

A significant decrease was observed in blood variables i.e. RBC, WBC, hemoglobin ($p < 0.05$) (Table 1) while serum analysis variables i.e. Serum cholesterol, serum GOT and serum GPT showed significant increase ($p < 0.05$) (Table 2) after treatment of animals with ethanolic extract of leaves of plant *Annona squamosa* in comparison to control

DISCUSSION

Haematological indices like haemoglobin content, blood cell counts (RBC and WBC) revealed significant changes due to the treatment. This reveals the toxic nature of the extract. A significant decrease in erythrocyte (RBC) count and haemoglobin percent was observed and this can be attributed to defective haemopoiesis (Choudhary and Deshmukh, 2007). The decrease in haemoglobin content and RBC count can be correlated with paling of the animals, weakness and morbidity. (Cella, *et al.*, 2000; Kumar, *et al.*, 1999; Choudhari and Deshmukh, 2007)

Significant increase in WBC count of treated rats was observed in the present study can be attributed to the stimulation of immune system (Oluwole, 2001). An increase in the WBC count has been reported after chemical stress by various workers (Pandey, *et al.*, 1976; Goel and Garg, 1980; Sastry and Sharma, 1980). A significant increase in the activity of SGPT and SGOT of treated rats was observed in the present study. Excess of SGOT is common in

myocardial infraction (Varley, 1976). The altered levels of these enzymes are found to be affected by the physiological status of the important organs as evidenced by the alteration in transaminase activity levels that leads to an increase in transamination process required during depletion of body proteins. Arora and Saxena (1999), Oser (1965), Ayub Shah and Gupta (2001) have reported that an increase in

SGOT and SGPT in albino rats, after administration of synthetic pyrethroid for 21 days, causes change in membrane permeability and hepatocyte dysfunction. An increase in blood cholesterol level of rats on exposure to EEPH in the present study may be due to the accumulation of cholesterol as it is associated with retarded oxidative breakdown of sugar under stressed condition (Kabeer, *et al.*, 1978).

Table1. Effect of different doses of ethanolic extract of leaves of plant *Annona squamosa* on blood variables in rat.

Parameters	Days	Control Rats Mean±SE	Treated rats		Change in %	
			200mg/kg Body Weight Mean±SE	300mg/kg Body Weight Mean±SE	200mg/kg Body Weight Mean	300mg/kg Body Weight Mean
Hemoglobin (gm%)	7	14.46 ±0.17	11.97* ±0.12	11.78* ±0.014	17.21↓	18.53↓
	14	14.75 ±0.08	11.70* ±0.13	11.63* ±0.18	20.68↓	21.15↓
	21	14.83 ±0.06	11.54* ±0.08	10.86* ±0.20	22.18↓	26.77↓
	28	14.88 ±0.04	11.37** ±0.08	10.34* ±0.18	23.59↓	31.66↓
RBC count (million/cumm)	7	8.68 ±0.09	8.52* ±0.12	8.35* ±0.09	1.84↓	3.80↓
	14	8.83 ±0.06	8.47* ±0.12	8.27* ±0.07	4.08↓	6.34↓
	21	9.20 ±0.19	8.31* ±0.11	7.68* ±0.08	9.67↓	16.52↓
	28	9.60 ±0.19	8.14* ±0.09	7.46* ±0.2	15.20↓	22.29↓
WBC count (thousand/cumm)	7	8.61 ±0.04	8.8* ±0.06	10.68* ±0.14	2.2↑	24.04↑
	14	8.52 ±0.07	9.5* ±0.10	11.38* ±0.34	11.50↑	33.57↑
	21	8.87 ±0.01	10.01* ±0.20	11.97* ±0.17	12.85↑	34.94↑
	28	8.59 ±0.04	10.49* ±0.30	12.81* ±0.08	22.11↑	49.12↑

*Indicates significant (p<0.05) and ** indicates significant (p<0.01).

Table 2. Effect of different doses of ethanolic extract of leaves of plant *Annona squamosa* on serum variables in rat.

Parameters	Days	Control Rats Mean±SE	Treated rats		Change in %	
			200mg/kg Body Weight Mean±SE	300mg/kg Body Weight Mean±SE	200mg/kg Body Weight Mean	300mg/kg Body Weight Mean
Serum cholesterol	7	58.47 ±0.16	62.89* ±0.38	65.35* ±0.16	7.56↑	11.76↑
	14	59.37 ±0.07	63.92* ±0.14	67.10* ±0.26	7.66↑	13.02↑
	21	60.16 ±0.31	64.63* ±0.29	69.51 ±0.14*	7.43↑	15.54↑
	28	61.60 ±0.36	65.99* ±0.32	72.55** ±0.12	7.12↑	17.77↑
Serum GOT	7	84.03 ±0.19	90.25** ±0.07	104.12* ±0.29	7.4↑	23.90↑
	14	85.04 ±0.08	94.54* ±1.13	110.47* ±0.08	11.17↑	29.90↑
	21	85.75 ±0.06	95.34* ±0.12	115.30* ±0.05	11.18↑	34.46↑
	28	87.52 ±0.13	98.48* ±0.12	121.48* ±0.14	12.78↑	38.80↑
Serum GPT	7	54.74 ±0.55	67.67* ±6.23	75.25* ±0.03	23.62↑	37.47↑
	14	56.67 ±0.48	73.32* ±0.10	78.67* ±0.34	29.38↑	38.82↑
	21	59.85 ±0.34	83.77** ±1.06	88.59* ±0.87	39.97↑	48.02↑
	28	62.98 ±0.25	90.36* ±0.14	102.6* ±1.5	43.47↑	62.91↑

*Indicates significant (p<0.05) and ** indicates significant (p<0.01).

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