ADVANCES IN BIORESEARCH, Vol. 2 [1] June 2011: 79 - 81

http://www.soeagra.com/abr.htm
ISSN 0976-4585

RESEARCH ARTICLE

Influence of *Lantana aculeata* Stem extract on Haematological Parameters in Rats

K. Vinoth Kumar[1], S. Dawood Sharief[2], R. Rajkumar[2], B. Ilango[3] and E. Sukumar [4]
[1]Department of Biosciences, Community College, Pondicherry University, Puducherry – 605 008, India
[2]School of Environmental Sciences, Post Graduate and Research Department of Zoology, The New College, Chennai – 600 014, India
[3]Division of Medical Oncology, School of Medicine, University of Colorado Denver, Aurora 80045, Colorado, USA
[4]Department of Applied Sciences, Higher College of Technology, Muscat, Sultanate of Oman.
E-mail: krishnamurthyvinothkumar@yahoo.co.in

ABSTRACT
Lantana aculeata is a weed that grows up in pastures along fences and in cultivated fields. Different parts of the plant are used in Indian system of Medicine especially in Ayurveda to treat various diseases. The objective of the present study is to investigate the ethanolic extract of Lantana aculeata stem on haematological parameters in normal rats. Test animals were administered with the extract orally according to their body weight in doses of 50 and 100 mg/kg body weight for 30 days. Blood samples were evaluated for haematological parameters like erythrocyte count, leukocyte count, haemoglobin count and haematocrit value. A dose-dependant increase in haematological parameters suggests that the plant extract might possess haematopoietic activity.
KEYWORDS: *Lantana aculeata stem, haematopoietic activity, rats*

INTRODUCTION

Assessment of haematological profile becomes a pre-requisite to understand the normal functioning of the system and to further confirm the toxic nature of the administered plant extract or any drug. Alterations in blood parameters may be due to changes in cellular integrity, membrane permeability of cells or even due to exposure to toxic chemicals [1]. The weed *Lantana aculeata* has the reputation of being used in traditional medicine [2].The leaves are used as a bechic, antitumoral, antibacterial and antihypertensive agent [3], while roots possess antioxidant [4] and antidiabetic activity [5]. However, reports regarding haematological studies of *Lantana aculeata* stem are scanty, the present study was undertaken.

MATERIAL AND METHODS

Plant Material

Mature stems of *Lantana aculeata* (Verbenaceae) were collected during the month of October – November from Puducherry (India). The plant material was identified and authenticated by Dr. P. Jayaraman, Director, Plant Anatomy Research Centre, Medicinal Plant Research Unit, Chennai (India). A voucher specimen has been deposited for future reference (No. PARC/2006/8).

Preparation of Extract

Plant material (about 1 kg) was cut into small pieces, shade dried, coarsely powdered and exhaustively extracted with ethanol by cold percolation method. After 72 hours, the solvent was decanted and distilled-off over the boiling water-bath. Further concentrations were done under reduced pressure using rotary flash evaporator and finally dried in a dessiccator. The yield of the extract was noted to be 0.25% (w/w).

Animals

Adult male albino rats of Wistar strain weighing 150 - 200 g used for the study were obtained from Tamil Nadu University of Veterinary and Animal Sciences, Chennai (India) and maintained according to the guidelines of Committee for the Purpose of Control and Supervision of Experiments on Animals, Chennai (India) (Reg. No. 324). The permission of the Departmental Ethical Committee was obtained for the study and the experiment was conducted as per the principles prescribed for laboratory animal use. Animals were fed with commercial pelleted chow obtained from Poultry Research Station, Chennai (India) and water was provided *ad libitum.*

Experimental design

The LD_{50} study was performed and the test animals were divided into three groups of six rats in each group. Group I was kept as the control group (administered vehicle only). Group II and III were given ethanolic extract of *Lantana aculeata* stem suspended in 1 ml of saline at doses of 50 and 100 mg/kg, body weight for 30 days. On the 31st day, blood samples were collected from the jugular vein of the rats in vials containing EDTA as the anticoagulant. These samples were evaluated for haematological parameters [6,7] like erythrocyte count, leukocyte count, haemoglobin count and haematocrit value using haematology cell counter (Beckmann Coulter Analyzer (Ac.T 5 Diff), United Kingdom) repeatedly (five times) to check the reproducibility of results.

Statistics

Data obtained were subjected to T–test analysis and expressed as mean ± standard deviation. Values with $^{**}P < 0.01$, $^{***}P < 0.001$, $^{*}P < 0.05$ were considered significant.

RESULTS AND DISCUSSION

The LD_{50} studies revealed that animals tolerated a considerable high dose of 1600 mg/kg of body weight with out any manifestation. The extract tested with 50 and 100 mg/ kg of body weight resulted in dose-dependent increase in haematological parameters on the 31st day (Table 1). Depletion in erythrocytes number and haemoglobin content is an Indication of defective haematopoiesis [8]. No possible evidence for anemia (common nutritional disorder, mainly caused by iron deficiency) was inferred in the present study from the levels of haemoglobin, which is a protein utilized by red blood cells for the distribution of oxygen to other tissues and cells in the body [9]. Leukocyte formed in the bone marrow enters the blood for defense mechanism, dose-dependant increase in its level with extract treated indicates no alteration of the same. A decrease in haematocrit value may show the extent of the shrinking cell size due to chemical intoxication [10], its significant increase in the study indicates the normal functioning of bone marrow. In the present work, the toxic effects caused by the extract are not studied. Further experimental studies to elucidate the haematopoiteic activity and its mechanism of action involved are in progress. The results lead to the conclusion that *Lantana aculeata* stem might possess haematopoietic activity. The study is first of its kind on an Indian weed and affords optimistic support for further investigation on many more weeds so that new agents for utilization in the field of food and nutrition can be discovered.

Table 1: Effect of *Lantana aculeata* stem extract *(LAS)* on the haematological parameters of rats treated for 30 days

Treatment (mg/kg)	**Erythrocyte** (10^6/µl)	**Leukocyte** (10^3/µl)	**Haemoglobin** (g/dl)	**Haematocrit** (%)
Group I Control	7.89 ± 0.07	7.20 ± 0.40	13.33 ± 0.36	40.58 ± 0.39
Group II *LAS* [50 mg/kg]	8.26 ± 0.42^{NS}	8.30 ± 0.49**	13.55 ±0.38^{NS}	48.58 ± 2.46***
Group III *LAS* [100 mg/kg]	8.37 ± 0.38*	8.62 ± 0.40***	14.37 ± 0.58**	50.40 ± 1.69***

Values represent mean ± standard deviation of six animals

$^{*}P< 0.05$, $^{**}P<0.01$, $^{***}P<0.001$; ^{NS} -Non-significant when compared to control animals

ACKNOWLEDGEMENT

The authors acknowledge the Management, Post Graduate and Research Department of Zoology of the New College, Chennai (India).

REFERENCES

[1] Hoffbrand, A.V. & Pettit, J.E. (1997). Essential of Haematology. Black well Science, USA pp.518

[2] Duke, J.A. (1985). Handbook of Medicinal Herbs, CRC Press, Boca Raton, Florida pp. 226.

[3] Taoubi, K., Fauvel, M.T., Gleye, J. & Moulis, C. (1997). Phenylpropanoid glycosides from *Lantana camara* and *Lippia multiflora.* *Plan. Med.* 63:192-193.

[4] Vinoth Kumar, K., Dawood Sharief, S., Rajkumar, R., Ilango, B., Nausheen Dawood, S., Chamundeeswari, D. & Sukumar, E. (2009). Free radical scavenging activity of *Lantana aculeata* root extract in hyperlipidemic rats. *J. Cell. Tiss Res*., 9 (**2**):1869 -1873.

[5] Vinoth Kumar, K., Dawood Sharief, S., Rajkumar, R., Ilango, B. & Sukumar, E. (2010). Antidiabetic activity of *Lantana aculeata* root extract in alloxan-induced diabetic rats. *Int. J. Phytomed*., 2: 299 - 303.

[6] Mazumdar, U.K., Gupta, M. and Maiti, S. (1996). Effect of petroleum ether extract from *Hygrophila spinosa* on haematological parameters and epatorenal functions in mice. *Indian J Exp Biol.,* 34:1201-1203.

[7] Pedrazzi, A.H.P., Rodrigues, E.R., Zanardo-Filho, A. and Franco, J.J. (1997).Haematological evaluation of "Carqueja" (*Baccharis trimera*) infusion. *Fitoterapia.*, 38: 26-28.

[8] Cella, J.H. & Watson, J. (2000). Manual of Laboratory Test, A.I.T.B.S. Publishers & Distributors, New Delhi pp.152

[9] Choudhari & Deshmukh. (2007). Acute and subchronic toxicity study of *Semecarpus anacardium* on haemoglobin percent and RBC count of male albino rat. *J. Herb Med. Tox.*, 1(**1**): 43 – 45.

[10] Atamanalp, M. & Yanik, T. (2003). Alterations in Hematological Parameters of Rainbow Trout (*Oncorhynchus mykiss*) Exposed to Mancozeb. *Turk J. Vet Anim Sci*., 27: 1213-1217.