

PARTHENIUM HYSTEROPHORUS LINN. INDUCED CLINICAL MANIFESTATIONS IN RATTUS RATTUS

S. K. SINGH and B. K. GUPTA

Department of Zoology, M.S.J. Govt. P.G. College, Bharatpur-321001, Rajasthan, India.

Parthenium hysterophorus Linn. popularly known as congress grass is a wasteland weed of family Asteraceae. The *Parthenium* leaf extract was orally administered to *Rattus rattus* at 400 mg/kg. b.wt. for acute and 13.33 mg/kg b.wt. for each subchronic treatments by stomach tube feeding. The *R. rattus* were grouped into five sets for treated and one set for control having six individuals in each set. The clinical manifestations, such as salivation, diarrhoea, itching, alopecia and appearance of dermatitic lesions, were observed throughout the experiment, which may be caused due to *Parthenium* leaf extract.

Keywords : Dermatitis; Diarrhoea; Itching sensation; *Parthenium hysterophorus* Linn.; *Rattus rattus*; Parthenin; Sesquiterpene lactones.

Parthenium hysterophorus Linn. is a herbaceous annual member of family Asteraceae. *Parthenium* is an exotic weed popularly known as congress grass, carrot weed, gajar ghas, ramphool, feverfew etc. It has been introduced in India about five decade back in mid fifties¹ and has spread over an area of about 2,05,000 hectares². Nowadays, it can be easily observed on wastelands, railway lines, highways, marshy lands, pond sites, canal ditches and also infested forest and agricultural lands associated with every crop³. *Parthenium* has already been reported as a medical hazard causing allergic contact dermatitis, asthma, bronchitis and hay fever in man and live stock⁴.

Parthenium leaf contains non-alkaloid, non-glycosidic parthenin which is the sesquiterpene lactone of pseudoguaianolide class⁵. Although *Parthenium* has adverse effect on man, cattle and plants but it has also been regarded as beneficial plant too. It is used in various afflictions like fever, anaemia, hepatic amoebiosis, dysentery and purification of blood⁶. *Parthenium* has potential use in compost and green manure value⁷. It is necessary to evaluate the clinical manifestation after the oral exposure of *Parthenium* leaf extract in *Rattus rattus*. **Plant material :** Plants of *Parthenium* were collected from M.S.J. College campus, vicinity of Keoladeo National Park and residential colonies of Bharatpur, Rajasthan (India) in the month of August and September when there was luxuriant growth of plants after rainy season. The leaves were dried at room temperature for fifteen days. Dried leaves were grind in mixer grinder to make fine powder. The powder was mixed with acetone and extraction was carried out in soxhlet apparatus for forty eight hours. A brownish sticky resinous material was obtained. Extraction was carried out at the Department of Zoology, University of Rajasthan, Jaipur. The sub-lethal dose were prepared

by adding distilled water.

Experimental animal - Colony of healthy *R. rattus* were developed and the animals were maintained in metal cages under controlled temperature of 25^o±5^oC, relative humidity 65±5% and photoperiod 12 hours/day. The rats were fed on Gold Mohar rat feed (23.5% protein, 5% fat and 4.5% fibre) purchased from Hindustan Lever Ltd. Calcutta. The water was provided *ad libitum*.

The doses were selected after determining LD₅₀ by the log probit analysis method⁸. The LD₅₀ was calculated 451.15 mg/kg. b.wt. through oral route of exposure.

The rats of almost same weight 225±5gm were selected randomly irrespective of age and sex. The *R. rattus* were grouped into five sets having six individuals in each set. One set for acute study and four for subchronic studies. The control set of six rats were run simultaneously for acute and subchronic treatment.

Experimental protocol

Group	Treatment	Days	Dose mg/kg b.wt.
G	Control	-	*
G ₁	Acute	1	13.33
G ₂	Subchronic	3	13.33
G ₃	Subchronic	7	13.33
G ₄	Subchronic	15	13.33
G ₅	Subchronic	30	13.33

* Vehicle distilled water were given

The *P. hystrophorus* leaf extract was orally administered to *R. rattus* at 400 mg/kg. b.wt. for acute and at 13.33 mg/kg. b.wt. for each sub chronic treatment by stomach tube feeding.

The animals were observed throughout the

experiment for the clinical manifestations such as salivation, onset of diarrhoea, itching, alopecia and appearance of dermatitic lesions.

The following clinical manifestation in acutely and subchronically *Parthenium* leaf extract treated *R. rattus* were recorded as compared to controls.

Salivation : Salivation was observed within 5 to 7 minutes upto three hours exhibiting hypersalivation in three rats each in groups G₁ and G₂ and one rat of G₃ and two rats of G₄. In G₁ and G₂ the salivation was with mild severity and lasted about one hour. This may be due to bitterness of leaf extract or its irritant nature. The sesquiterpene lactones of Asteraceae are known to be bitter and irritant^{6,9} however the results resembled with the studies⁹.

Diarrhoea : Ejection of food and water (diarrhoea) were evident with in 15-30 minutes and lasted about three hours. Marked loss of appetite and anorexia were observed in all groups. This was more pronounced in G₁, G₂ and G₃ groups. These symptoms can be correlated with bitterness of leaf extract. Once the rats got accustomed symptoms declined. Similar results have also been observed in buffalo calves by^{4,10,11}.

Itching sensation : Itching was observed in three rats of G₁ and 5 rats of G₂ after the fourth day of treatment. It was prominent in neck region of all the animals.

Alopecia and dermatitis : Alopecia developed after seven days of treatment and dermatitic lesions appeared after 15th days onwards on face, muzzle, around the eyes along the length of neck, lower side of thorax abdomen, brisket region, back and sacral region. The findings resemble with¹⁰⁻¹³, who observed in cattle and buffalos, and in goats. The lesions were more marked in G₁ and G₂.

The present finding showed that *Parthenium* leaf extract cause salivation, diarrhoea, itching, alopecia and dermatitis in mammals like *Rattus rattus*. The symptoms have also been reported in animals like buffalo, calves, goats, horses and in rabbits. The dermatitis was also observed in human beings only by contact, it is called as allergic contact dermatitis. The main toxic chemical is parthenin, a sesquiterpene lactone, which may be responsible for dermatitic lesions.

It was further observed in the present

investigation that the lesions disappeared after a months, time when doses were discontinued.

References

1. Rao RS 1956, *Parthenium*, a new record for India. *J. Bomb. Nat. His. Soc.* **54** 218.
2. Gidwani I 1975, *Parthenium* a new weed in India. *Pans.* **22** 280.
3. Krishnamurthy K 1976, *Parthenium* weed the problem of present day. *Pesticides* **10** 33.
4. More PR, Vadlamudi VP and Qureshi MI 1982, Toxicity of *Parthenium hysterophorus* Linn. in bovines : Changes in some biochemical constituents of blood. *Indian Vet. J.* **59** 515.
5. Subbarao PV, Mangla A, Subbarao BS and Prakash KM 1977, Clinical and immunological studies on person exosed to *Parthenium hysterophorus* Linn. *Experimentia.* **33**(10) 1387.
6. Ramaswami PP 1997, Potential usages of *Parthenium*. In : Proc. First International conference on *Parthenium* Management, University of Agricultural Sciences, Dharwad, 6-8 Oct., 1997, **1** 77-90.
7. Mahadevappa M 1999, *Parthenium* and its management. Publication Center, University of Agricultural Science, Dharwad. India. 46.
8. Finney DJ 1971, Probit analysis. Cambridge University Press, pp 303.
9. Dollahite JW, Hardy WT and Henson JB 1964, Toxicity of *Helenium microcephalum* (Small head Sneezey weed). *J. Am. Vet. Med. Ass.* **145** 694.
10. Kadhane DL, Jangde CR, Sadekar RD and Joshirao M K 1992, *Parthenium* toxicity in buffalo calves. *J. Soils and Crops* **2**(1) 69-71.
11. Qureshi MI, Vadlamudi VP and Wagh KR 1980, A study on sabaente toxicity of *Parthenium hysterophorus* Linn. in goats. *Live stock Adv.* **5** 39.
12. Narsimhan TR, Anant M, Narayan Swami, Rajendra Babu M, Mangla A and Subbarao PV 1977, Toxicity of *Parthenium hysterophorus* Linn. *Curr. Sci.* **46** 15.
13. Narsimhan TR, Anant M, Narayan Swami, Rajendra Babu M, Mangla A and Subbarao PV 1977, Toxicity of *Parthenium hysterophorus* Linn. to cattle and buffaloes. *Vet. Bull.* **48** 249.