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Anti-inflammatory activity of *Adhatoda vasica* and *Berberis aristata* on carrageenin induced paw oedema in rats

N. Rajput[1], J. M. Nigam[2], D. N. Srivastava[3], Y. P. Sahni[4]*

1. Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur.
2. College of Veterinary Science and Animal Husbandry, Palampur (H. P.)
3. Department of Pharmacology and Toxicology, College of Veterinary Science and Animal Husbandry, Jabalpur-482001, M. P.
4. Department of Pharmacology and Toxicology, College of Veterinary Science and Animal Husbandry, Jabalpur-482001, M. P.

Abstract

Objective : Though a number of medicinal plants are being used to bring about traditional cure of inflammatory conditions, they are yet to be properly investigated and scientifically validated. Hence the present study was aimed to evaluate the anti-inflammatory activity of *Adhatoda vasica* and *Berberis aristata* in rats using carrageenin induced paw oedema method. Materials and methods : Rat paw oedema was produced by injecting carrageenin in the plantar aponeurosis of hind paw of each rat. The paw volume was measured before and at one hour interval for six hours post carrageenin injection. The extracts or drugs, were administered 30 min prior to injection of carrageenin. Results and conclusions: Aqueous and alcoholic extracts of *A. vasica* and *B. aristata* produced significant anti-inflammatory activity on acute inflammatory process, which is quite comparable to Diclofenac sodium in terms of their activity in respective therapeutic doses.

Key words : Anti-inflammatory activity, *Adhatoda vasica, Berberis aristata*.

1. Introduction

Inflammation is a defensive and reparative response to any stimuli. It also alters physiological function of any part of the body and as such anti-inflammatory drugs are prescribed to control the pathological changes or pain in man and animals. These drugs are usually of synthetic in origin and exerts an analgesic and anti-inflammatory effect in rheumatic disorders.

Many herbal agents and medicinal plants such as *Glycerrhiza glabra, Lawsonia inermis* Linn, *Withania somnifera, Eclipta alba* etc. have been reported to possess anti-inflammatory activity. These agents are usually preferred due to their

* Corresponding author

therapeutic properties, availability and free from any side effects.

The leaves of *Adhatoda vasica* are commonly used in the treatment of rheumatism, chronic bronchitis, cough and asthma [1]. The root bark of *Berberis aristata* is effective in the treatment of ulcer, fever, chorea and acute diarrhoea. It has also been reported to possess anti-inflammatory activity [2].

The present study was carried out to assess anti-inflammatory activity of *A. vasica* and *B. aristata,* if any, on carrageenin induced rat paw oedema, a model for acute inflammatory process, in albino rats.

2. Materials and methods

The present study was conducted on 60 healthy Norwegian strain of inbred albino rats of either sex, weighing between 100-150 gm. The rats were randomly divides in 10 groups having 6 rats in each group. Rats in group I were given normal saline and were treated as control.

Rats in group II were administered diclofenac sodium at the dose of 10 mg/kg, ip and were kept as standard. Rats in group III and IV were given aq. ext. of *A. vasica* at the doses of 500 and 1000 mg/kg, ip, respectively.

Rats in group V and VI received 500 and 1000 mg/kg ip, alc. ext. of *A. vasica,* respectively. Rats in group VII and VIII were administered aq. ext. of *B. aristata* in doses of 500 and 1000 mg/kg, ip, respectively. Rats in group IX and X were administered with alc. ext. of *B. aristata* in the doses of 25 and 50 mg/kg, respectively.

The rats were maintained under identical managemental conditions. The animal were fasted overnight before the experimentation but water was given *ad libitum.* The leaves of *A. vasica* and root bark of *B. aristata* were used to prepare aq. and alc. extracts.

Rat paw oedema was produced as per the method of Winter et al. [3]. Freshly prepared 0.1 ml suspension of carrageenin (0.1 per cent in 0.9 per cent saline) was injected in the plantar aponeurosis of the hind paw of each rat. The paw volume was measured before and at one hour interval for six hours post carrageenin injection. [4]. The extracts/drug was administered 30 min. prior to injection of carrageenin.

3. Results and Discussion

The anti-inflammatory activity of different extracts of *A. vasica* and *B. aristata* have been shown in the Table - 1. The aq. ext. of *A. vasica* at the dose of 500 mg/kg, b.wt. caused significant anti-inflammatory activity of second hour of its administration which was maintained upto 6th hour. The peak activity was observed at third hour of administration.

At the dose of 1000 mg/kg, the aq. ext. of *A. vasica* produced significant effect at first, second, third, fifth and sixth hours of drug administration, however the peak activity was observed on third hour of treatment. The alc. Ext. of *A. vasica* in the doses of 500 mg/kg and 1000 mg/kg showed anti-inflammatory activity at first, second, third, fifth and sixth hours of treatment, which was found to be statistically significant ($P<0.01$).

It is evident that the anti-inflammatory activity is not dose dependent and by increasing doses of aq. and alc. extracts from 500 mg/kg to 1000 mg/kg the effect did not increase significantly ($P<0.01$). The results on anti-inflammatory activity of *A. vasica* are comparable to the reports on *Lawsonia inermis [5], Vitex negundo [6],* and *Withania Somnifera* [8].

The aq. ext. of *B. aristata* at the dose of 500 mg/kg and 1000 mg/kg, ip, produced statistically significant ($P<0.01$) anti-inflammatory effect at first, second, third, forth, fifth and sixth hour

Table 1
Anti-inflammatory activity of aqueous and alcoholic extracts of *Adhatoda vasica* on carrageenin induced paw oedema in rats.

Treatment (mg/kg, ip)	**Dose**	**Oedema volume (ml) Mean ± SE**						**Per cent anti-inflammatory activity**					
		I h	**II h**	**III h**	**IV h**	**V h**	**VI h**	**I h**	**II h**	**III h**	**IV h**	**V h**	**VI h**
Control	-	0.384b	0.563 e	0.670 e	0.647 d	0.537 g	0.503 e	-	-	-	-	-	-
(saline)		±0.020	±0.019	±0.042	±0.037	±0.015	±0.020						
Diclofenac	10	0.260a	0.363 c	0.337 b	0.373 b	0.323 cde	0.317 abc						
Sodium		±0.019	±0.017	±0.015	±0.014	±0.010	±0.008	32.29	35.52	49.70	42.35	39.85	36.98
A. vasica	500	0.360b	0.380 cd	0.270 a	0.287 a	0.257 a	0.297 ab						
(aq. ext.)		±0.014	±0.014	±0.009	±0.010	±0.010	±0.010	6.25	32.50	59.70	55.64	52.14	40.95
A. vasica	1000	0.250a	0.360 c	0.247 a	0.280 a	0.293 abc	0.333 bc						
(aq. ext.)		±0.007	±0.014	±0.004	±0.007	±0.007	±0.012	34.90	36.06	63.13	56.72	45.44	33.80
A. vasica	500	0.277a	0.377 cd	0.267 a	0.297 a	0.287 abc	0.280 a						
(alc. ext.)		±0.010	±0.006	±0.007	±0.008	±0.010	±0.009	33.04	27.86	60.15	54.10	46.55	44.33
A. vasica	1000	0.243a	0.350 c	0.240 a	0.263 a	0.300bcd	0.340 c						
(alc. ext.)		±0.006	±0.009	±0.005	±0.017	±0.012	±0.015	36.72	37.83	64.18	59.35	44.13	32.41

Number of rats in each group : 6
Similar superscripts indicate non - significant; different superscript indicate significant differences ($P < 0.01$).

Table 2
Anti-inflammatoryaActivity of aqueous and alcoholic extracts of *Berberis aristata* on carrageenin induced paw oedema in rats.

Treatment	**Dose (mg/kg, ip)**	**Oedema volume (ml) Mean ± SE**						**Per cent anti-inflammatory activity**					
		I h	**II h**	**III h**	**IV h**	**V h**	**VI h**	**I h**	**II h**	**III h**	**IV h**	**V h**	**VI h**
Control (saline)	-	0.384b ±0.020	0.563 e ±0.019	0.670 e ±0.042	0.647 d ±0.037	0.537 g ±0.015	0.503 e ±0.020	-	-	-	-	-	-
Diclofenac Sodium	10	0.260a ±0.019	0.363c ±0.017	0.337b ±0.015	0.373b ±0.014	0.323cde ±0.010	0.317 abc ±0.008	32.29	35.52	49.70	42.35	39.85	36.98
B. aristata (aq. ext.)	500	0.280a ±0.009	0.357c ±0.017	0.263a ±0.011	0.283a ±0.008	0.270ab ±0.009	0.283a ±0.008	27.08	36.59	60.75	56.26	49.72	43.74
B. aristata (aq. ext.)	1000	0.253a ±0.007	0.200 a ±0.005	0.400 cd ±0.014	0.390 bc ±0.012	0.337 def ±0.013	0.400 d ±0.012	34.11	64.48	40.30	39.72	37.24	20.48
B. aristata (alc. ext.)	25	0.370b ±0.007	0.413d ±0.007	0.373bc ±0.018	0.413c ±0.007	0.350ef ±0.020	0.383d ±0.011	3.65	26.64	44.33	36.17	34.82	23.86
B. aristata (alc. ext.)	50	0.370b ±0.015	0.257b ±0.006	0.420d ±0.005	0.417c ±0.006	0.363f ±0.006	0.380 d ±0.015	3.65	54.35	37.31	35.55	32.40	24.45

Number of rats in each group : 6
Similar superscripts indicate non - significant; different superscript indicate significant differences ($P < 0.01$)

of observations with peak effect by 500 mg/kg dose, at 3rd hour of drug administration.

However at the dose of 1000 mg/kg, ip, it produced peak anti-inflammatory effect at second hour of drug administration. The aq. ext. of *B. aristata* has failed to show any dose dependent activity. The alc. ext. of *B. aristata* at the dose of 25 mg/kg, caused significant anti-inflammatory activity from second hour of administration and was maintained upto sixth hour. The peak anti-inflammatory effect was produced at third hour of drug administration.

Similar observations were also recorded with alc. ext. of *B. aristata* at the dose of 50 mg/kg, but the peak effect was observed at second hour of treatment.

The anti-inflammatory activity of *B. aristata* in the present study are in close conformity with the result [9], who reported that the ethnolic extract of *B. vulgaris* was highly effective against carrageenin induced paw oedema in mice. Anti-inflammatory activity of "Berberine", an alkaloid from *B. aristata*, on acute and subacute inflammatory process further confirms the findings of the present study [10].

Diclofenac sodium at the dose of 10 mg/kg, ip, produced significant ($P<0.01$) anti-inflammatory activity at first, second, third, forth, fifth and sixth hours.

The peak effect was seen on third hour of drug administration. Similar observations were also made [11], who reported the anti-inflammatory activity of diclofenac sodium on acute inflammatory process. The observations [5, 6] indicating 50.39 and 58.76 per cent anti-inflammatory activity of diclofenac sodium in the dose of 15 mg/kg ip, further confirm the findings of the present study.

Aq. and alc. extracts of *A. vasica* and *B. aristata* produced significant anti-inflammatory activity on acute-inflammatory process, which is quite comparable to diclofenac sodium in terms of their activity in respective therapeutic doses. Similar observations have also been reporting comparable effect *Lawsonia inermis* and *Vitex negundo* with diclofenac sodium [5, 6].

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References

1. Chopra RN, Nayar SL, Chopra IC. (1956) *Glossary of Indian Medicinal Plants*, C. S. I. R. New Delhi, p. 7.

2. Akhter MH, Sabir M, Bhide NK. (1977) *Ind. J. Med. Res.* 65 (1) : 133 - 141.

3. Winter CA, Risley EA, Nuss GW. (1962) *Biol. Proc. Soc. Exp. Biol.* 111 : 544.

4. Bhatt KR, Mehta RK, Srivastava PN. (1977) *Indian J. Physiol. Pharmacol.* 21 (4) : 349 - 353.

5. Gordiya N. (2000) Anti-inflammatory and analgesic activity of Lawsonia inermis in albino rats. M.V.Sc. & A.H. Thesis, J.N.K.V.V., Jabalpur.