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Anti-inflammatory Activity of *Bougainvillea glabra* Linn. Flowers by Carrageenan Induced Model in Rats

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ABSTRACT

The purpose of the present study is to evaluate the anti-inflammatory activity of the fresh extract obtained from the fruits Bougainvillea glabra Linn. in rats. The fresh juice extracted from the flowers of B. glabra Linn. were evaluated for the anti-inflammatory activity by using the carrageenan induced model in rats at a doses of 100 mg/kg and 200 mg/kg respectively. Biochemical parameters like paw oedema were studied. The B. glabra contains the phytochemical constituents like steroids. The fresh extract of B. glabra flowers showed the significant reduction in the paw volume at the doses of 100 mg/kg and 200 mg/kg. The results suggest that the flower extract of the Bougainvillea possess anti-inflammatory effect. The observed effect may be due to the presence of bioactive constituents.

Keywords: Anti-inflammatory activity, Carrageenan induced inflammation, Phytochemical constituents, Paw volume

INTRODUCTION

Numerous plants and herbs are used to treat inflammatory disorders in traditional medicine. Considering the several side effects of modern medicine, indigenous drugs with fewer side effects should be looking for as a better alternative for the treatment of inflammation with *Bougainvillea glabra* Linn. The importance of medicinal plants in traditional health care practices, providing clues to new areas of drug research and biodiversity conservation is now well recognized. Inflammation is a complex biological response of vascular tissues to harmful stimuli such as Pathogens, damaged cells and irritants. It is the protective attempt by the organism to remove the injurious stimuli as well as initiate the healing process for the tissue and considered to be the major cause of rheumatoid arthritis. Drugs currently used for the management of pain and inflammatory conditions present toxic side effects on chronic administration. Therefore, attempts are being taken to study promising plants which may lead to develop newer or safer drugs.

The genus of Opuntia contains more than 400 species, which are native to the America and Canada. The pulp, stem, seeds of the cactus will contain ethanol soluble carbohydrates. It contains the alkaloids like Indica xanthin and neobentanoin and flavonoids like isohamentin, quacertin, kaemferol, dihydro kaemferol, dihydro quercetin. A number of different betacyanins also exists in the plant. It is used as an antioxidant agent, recent studies shows that it shows the antiproliferative effects of the bentanian on k-562 cells. It also shows the effects like anti-inflammatory and hypoglycaemic effects [1-15].

MATERIALS AND METHODS

Plant collection and authentication

The fresh flowers of *B. glabra* Linn were collected from the local market and they are authenticated.

Preparation of fresh extracts

The plant material (flowers) (Figure 1) was dried for seven days and powdered. 200 g of powdered matter is soaked in 1000 ml of water and shaken vigorously for every 1 h to get the contents dissolved well in water. The mixture is subjected to cold maceration technique and the mixture is then subjected to double filtration. Filtrate is then distilled. Extract is stored in a refrigerator at –20°C.

Figure 1: *Bougainvillea glabra* Linn

Animals

Total 20 numbers male Wistar albino rats are weighing 150-200 g were used for the present study. They were maintained under standard environmental conditions and were fed with standard pellet diet and water *ad libitum*. The experiments were performed followed by approval from animal ethical committee of the establishment.

Methodology

Carrageenan induced paw oedema method

Anti-inflammatory activity was evaluated using carrageenan induced hind paw oedema method. Carrageenan (0.1 ml of 1% w/v suspension) was injected into the sub plantar region of the right hind paw of each rat. The extracts (100 and 200 mg/ml) and Indomethacin (20 mg/kg) were administered orally to rats 1 h before carrageenan injection.

Control group received an equal volume of vehicle (0.6% w/v sod. CMC). The volume of the paw was measured with a volume differential meter (Model 7140 UGO Basile) at 0, 1, 2, 3 and 4 h of carrageenan injection. Results were determined as the percentage inhibition of oedema compared to the control.

Phytochemical screening

Phytochemical constituents of aqueous extract of *B. glabra* Linn. were evaluated by elementary phytochemical screening examination; screening was performed utilizing standard systems. The strategies for discovery of phenols, sterols, carbohydrates, alkaloids, quinines, tannins and triterpinoids.

RESULTS AND DISCUSSION

Phytochemical analysis of the *B. glabra* Linn. flowers was shown the existence of phenol, sterols, carbohydrates, alkaloids, quinines, tannins and triterpinoids (Table 1).

Table 1: Phytochemical constituents of *Bougainvillea glabra* Linn

Phytochemicals	Aqueous extract of *B. glabra* Linn. Flowers
Phenol	+++
Sterols	+++
Carbohydrates	+++
Alkaloids	+++
Quinines	+++
Tannins	+++
Triterpinoids	+++

In the present study it indicates that the presence of the steroids will reduces the inflammation induced by the carrageenan. Prostaglandins and bradykinin were suggested to play important role in carrageenan induced oedema. Both steroidal and non-steroidal anti-inflammatory drugs can be tested by the carrageenan induced paw inflammation test. The oedema induced in the rat paw by the injection of 1% carrageenan is brought about by autacoids, histamine and 5-hydroxytryptamine during the first 1 h, after which kinins act, to increase the vascular permeability up to 2 ½ h. The maximum inflammation is seen approximately 3 h post the carrageenan injection, after which it begins to decline. Following that the prostaglandins act from 2 ½ h to 6 h, which results in the migration of leucocytes into the inflamed site. The carrageenan induced paw oedema model in rats is known to be sensitive to cyclooxygenase inhibitors and has been used to evaluate the effect of non-steroidal anti-inflammatory agents.

In the present the evaluation of anti-inflammatory activity is by the carrageenan induced paw oedema method (Figure 2). Both the aqueous extracts of *B. glabra* Linn. have shown the significant reduction in the inflammation this is due to the presence of the steroids as the chemical constituents (Tables 2 and 3).

Table 2: Anti-inflammatory activity of *Bougainvillea glabra* flower extract

S. No.	Group No.	Animal No.	Weight of the animal (g)	Dose (mg/kg)	Paw volume(ml)									
					0 h		1 h		2 h		3 h		4 h	
					R	L	R	L	R	L	R	L	R	L
1	1	1	120	Control+ carrageenan	0.1	0.1	0.1	0.14	0.1	0.17	0.1	0.2	0.1	0.23
		2	130		0.1	0.1	0.1	0.15	0.1	0.18	0.1	0.21	0.1	0.24
		3	125		0.1	0.1	0.1	0.16	0.1	0.19	0.1	0.22	0.1	0.24
		4	120		0.1	0.1	0.1	0.15	0.1	0.16	0.1	0.23	0.1	0.25
		5	120		0.1	0.1	0.1	0.13	0.1	0.17	0.1	0.21	0.1	0.24
2	2	1	120	*B. glabra* flower extract (100 mg/kg) +carrageenan	0.1	0.1	0.1	0.14	0.1	0.12	0.1	0.09	0.1	0.08
		2	125		0.1	0.1	0.1	0.15	0.1	0.12	0.1	0.08	0.1	0.04
		3	130		0.1	0.1	0.1	0.13	0.1	0.11	0.1	0.07	0.1	0.06
		4	120		0.1	0.1	0.1	0.11	0.1	0.09	0.1	0.09	0.1	0.03
		5	120		0.1	0.1	0.1	0.12	0.1	0.08	0.1	0.08	0.1	0.07
3	3	1	120	*B. glabra* flower extract (200 mg/kg) +carrageenan	0.1	0.1	0.1	0.12	0.1	0.15	0.1	0.12	0.1	0.07
		2	120		0.1	0.1	0.1	0.18	0.1	0.16	0.1	0.11	0.1	0.09
		3	130		0.1	0.1	0.1	0.19	0.1	0.15	0.1	0.11	0.1	0.08
		4	120		0.1	0.1	0.1	0.2	0.1	0.14	0.1	0.12	0.1	0.07
		5	130		0.1	0.1	0.1	0.17	0.1	0.13	0.1	0.09	0.1	0.06
4	4	1	120	Standard drug Indomethacin (20 mg/kg) +carrageenan	0.1	0.1	0.1	0.13	0.1	0.12	0.1	0.09	0.1	0.09
		2	125		0.1	0.1	0.1	0.12	0.1	0.11	0.1	0.08	0.1	0.06
		3	120		0.1	0.1	0.1	0.14	0.1	0.12	0.1	0.09	0.1	0.05
		4	120		0.1	0.1	0.1	0.14	0.1	0.12	0.1	0.07	0.1	0.04
		5	120		0.1	0.1	0.1	0.15	0.1	0.12	0.1	0.08	0.1	0.08

Table 3: Mean and S.D of anti-inflammatory activity of *Bougainvillea glabra* flower extract

S. No.	Group No.	Treatment	Mean and S.D. of paw volume (ml)									
			0 h		1 h		2 h		3 h		4 h	
			R	L	R	L	R	L	R	L	R	L
1	1	Control + carrageenan	0.1 ± 0.0	0.1 ± 0.0	0.1 ± 0.0	0.146 ± 0.0114	0.1 ± 0.0	0.174 ± 0.0114	0.1 ± 0.0	0.214 ± 0.0114	0.1 ± 0.0	0.24 ± 0.0071
2	2	*B. glabra* flower extract (100 mg/kg) + carrageenan	0.1 ± 0.0	0.1 ± 0.0	0.1 ± 0.0	0.13 ± 0.0158	0.1 ± 0.0	0.104 ± 0.0182	0.1 ± 0.0	0.082 ± 0.0084	0.1 ± 0.0	0.056 ± 0.0207
3	3	*B. glabra* flower extract (200 mg/kg) + carrageenan	0.1 ± 0.0	0.1 ± 0.0	0.1 ± 0.0	0.17 ± 0.0311	0.1 ± 0.0	0.145 ± 0.0114	0.1 ± 0.0	0.11 ± 0.0122	0.1 ± 0.0	0.074 ± 0.0114
4	4	Standard drug indomethacin (20 mg/kg) + Carrageenan	0.1 ± 0.0	0.1 ± 0.0	0.1 ± 0.0	0.13 ± 0.0114	0.1 ± 0.0	0.118 ± 0.0044	0.1 ± 0.0	0.082 ± 0.0084	0.1 ± 0.0	0.064 ± 0.0207

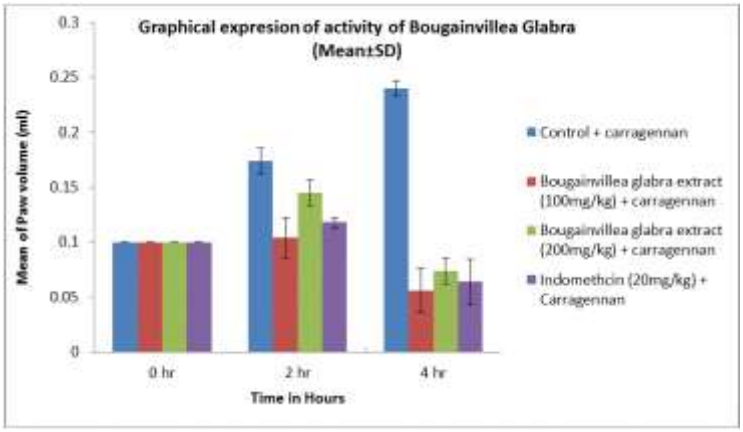

Figure 2: Effect of *Bougainvillea glabra* Linn. extract on carrageenan induced paw edema along the time (Mean ± SD)

SUMMARY AND CONCLUSION

From the phytochemical screening we can conclude that the *Bougainvillea* extract has shown the constituents like phenols, sterols, carbohydrates, alkaloids, quinines, tannins and tri-terpenoids. Anti-inflammatory activity will be performed by using the carrageenan induced paw oedema method. It shows that there is a significant reduction in the in the inflammation was observed when compared with the standard drug indomethacin.

REFERENCES

[1] S. Heuer, S. Richter, J.W. Metzger, V. Wray, M. Nimtz, D. Strack, *Phytochem*., **1994**, 37, 761-767.
[2] D.D. Joshi, A.M. Mujumdar, C.R. Narayanan, *Indian J. Pharm. Sci*., **1984**, 46, 187-188.
[3] E. Sheeja, E. Edwin, A. Amal Raj, V.B. Gupta, A.C. Rana, *Planta Indica*., **2005**, 1, 33-36.
[4] S.N. Giri, A.K. Biswas, B.P. Saha, S.P. Pal, *Ind. J. Pharm. Sci*., **1998**, 50, 42-44.
[5] C.K. Kokate, A.P. Purohit, S.B. Gokhale, Text Book of Pharmacognosy, 33 Edi., Nirali Prakashan, **2001**, 593-597.
[6] G.K. Chatterjee, S.P. Pal, *Indian Drugs*., **1984**, 21, 413.
[7] K.D Rainsford, M. W. Whitehouse, *Agents' Action*., **1980**, 10, 451-455.
[8] K.C. Huang, The pharmacology of Chinese herbs. London: CRC Press, **1999**, 199.
[9] A.S Chawla, Plant Anti-inflammatory agents, *J. Sci. Ind. Res*., **1987**, 46, 214-223.
[10] Z. Abraham, D.S. Bhakuni, H.S. Garg, A.K. Goel, B.N. Mehrotra, G.K. Patnaik, *Indian J. Experimen. Biol.*, **1986**, 24(1), 48-68.
[11] T.S. Rao, N. Basu, H.H. Siddiqui, *Indian J. Med. Res*., **1982**, 75, 574-578.
[12] D. Guillermo, *J. Nat. Prod*., **2001**, 64(7), 861-864.
[13] M.V. Venkataranganna, *Indian Drugs*., **2000**, 37, 543-546.
[14] D. Ghosh, A. Anand Kumar, *Indian J. Pharmacol*., 1983, 15(4), 391-402.
[15] A.C. Basile, J.A.A. Sertie, P.C.D. Freitas, A.C. Zanini, *J Ethnopharmacol*., **1988**, 22, 101-109.