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PHARMACOLOGICAL SCREENING OF PLANTS RECOMMENDED BY FOLK MEDICINE AS ANTI-SNAKE VENOM – I. ANALGESIC AND ANTI-INFLAMMATORY ACTIVITIES

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We have observed that several plants used popularly as anti-snake venom show anti-inflammatory activity. From the list prepared by Rizzini, Mors and Pereira some species have been selected and tested for analgesic activity (number of contortions) and anti-inflammatory activity (Evans blue dye diffusion – 1% solution) according to Whittle's technique (intraperitoneal administration of 0.1 N-acetic acid 0.1 ml/10 g) in mice. Previous oral administration of a 10% infusion (dry plant) or 20% (fresh plant) corresponding to 1 or 2 g/kg of Apuleia leiocarpa, Casearia sylvestris, Brunfelsia uniflora, Chiococca brachiata, Cynara scolymus, Dorstenia brasiliensis, Elephantopus scaber, *Marsypianthes* chamaedrys, Mikania glomerata *and* Trianosperma tayuya *demonstrated analgesic and/or anti-inflammatory activities of varied intensity.*

Key words: anti-snake plants – analgesic and anti-inflammatory activity – folkloric uses

Pterocarpanes cabanegrine A I and A II isolated from *Específico Pessoa* demonstrated flavonoides responsible for the anti-snake venom activity of this preparation, popularly used against snake bites (Nakagawa & Nakanishe, 1982). Wagner & Fessler (1986) have shown that Wedelolactone isolated from *Eclipta alba* (equal to *Eclipta prostata*), used in China and Brazil as anti snake venom, possesses anti-inflammatory activity. This Wedelolactone was also shown to inhibit the hemorrhage and the liberation of creatinine kinase induced by jararaca venom, as shown by Melo et al. (1988). Extracts of *E. prostata* and Wedelolactone were reported to protect mice injected with lethal doses of jararaca and cascavel venoms (Mors et al., 1988, 1989), and *Mandevilla velutina* according to Calixto et al. (1985), blocks bradykinin. Anti-inflammatory activity is common in plants known by their anti-snake indication, as shown by Ribeiro et al. (1988) and Aucelio & Ribeiro (1988) for *Chiococca alba;* for *Piper* sp. by Amarante Silva et al. (1988); for *Heterothalamus psidioides* and *H. brunioides* by Silva et al. (1988) and Silva & Frizzo (1988); and for *Peltodon radicans* by Moreira et al. (1988).

Some preparations obtained from plants have shown inhibitory activity on phospholipase A2 isolated from snake venom (Vishwanath et al., 1987).

The Chinese literature refers to about 67 species of plants popularly used as anti snake venom (A Berefoot Doctor's Manual, 1977) and a recent list from Rizzini et al. (1988) assembled some 84 species used in Brazil as anti-snake venom. From this list some species were selected to study its analgesic and anti-inflammatory activities.

MATERIALS AND METHODS

The plants used in the assays (Table I) were bought or harvested in Rio de Janeiro, with the help of Botanists from Museu Nacional and Jardim Botânico.

The aqueous extracts were prepared as "tea" in the concentration of 20% for fresh plants and 10% for dry plants. When the tea was cool, it was filtrated and administered orally, with the help of a gastric catheter, as a dose of 1.0 g/kg (dry plant) of 2.0 g/kg (fresh plant, that is, 0.1 ml of the extract for each 10 g of the animal).

Groups of 10 albino mice of both sexes, the weights ranging from 15 to 20 g, were used in the assays.

The analgesic activity (number of contortions) and the anti-inflammatory activity (Evans blue dye diffusion to the peritoneal

TABLE I

Studied plants

Scientific name	Botanic family	Popular name	Part used
Chiococca brachiata Ruiz & Pav.	Rubiaceae	Caianca, cipó-cruz	Root
Cynara scolymus Lin.	Asteraceae (Compositae)	Alcachofra	Leaves
Elephantopus scaber Lin.	Asteraceae	Erva grossa, Língua-de-vaca	Leaves
Mikania glomerata Sprengel	Asteraceae	Guáco, erva-de-cobra	Leaves
Trianosperma tayuya Mart.	Curcurbitaceae	Taiuiá, cabeça-de-negro	Root
Casearia sylvestris Swartz	Flacurteaceae	Erva-de-bugre, guassatonga	Leaves and bark
Marsypianthes chamaedrys Kuntz	Lamiaceae (Labiatae)	Paracari, Bóia-caá	Leaves
Apuleia leiocarpa (Vog.) Macbr.	Leg-caes	Jutaí, Garapa	Bark and duramen
Dorstenia brasiliensis Lam.	Moraceae	Contra-erva, caapiá	Root
Brunfelsia uniflora Benth.	Solanaceae	Manacá	Leaves

TABLE II

The analgesic (contortions) and anti-inflammatory (diffused Evans blue) activities – Results

Substance administered	Part used	Oral dose g/kg	Contortions		Diffused Evans Blue	
			No. in 30 min	% inhibition	μg/10 ml	% inhibition
(Control)	Physiologic solution	10 ml	84.0 ± 16.4[a]	–	167.8 ± 46.4	–
Alcachofra	Leaf	2.0	7.8 ± 2.1	90.72	66.24 ± 8.2	87.78
Cainca	Root	1.0	13.4 ± 6.6	84.05	68.8 ± 7.4	58.80
Contra-erva	Root	1.0	10.0 ± 4.8	90.48	100.4 ± 29.2	39.88
Erva-de-bugre	Leaf	1.0	8.2 ± 1.2	90.24	76.01 ± 8.5	54.01
Erva-de-bugre	Bark	1.0	32.5 ± 10	61.30	119.56 ± 37.8	28.70
Erva-grossa	Leaf	1.0	23.8 ± 6.2	71.70	93.44 ± 21.1	44.10
Guáco	Leaf	1.0	31.0 ± 8.5	63.10	85.3 ± 14.5	48.92
Jutaí	Bark	1.0	14.1 ± 1.1	83.18	36.84 ± 2.8	78.05
Jutaí	Duramen	1.0	10.8 ± 1.3	87.15	38.88 ± 7.2	76.88
Manacá	Leaf	2.0	20.7 ± 2.3	75.36	190.0 ± 65.3	0
Paracarí	Leaf	2.0	26.4 ± 11.7	68.6	75.12 ± 34.3	55.2
Taiuiá	Root	1.0	14.0 ± 3.1	83.33	136.0 ± 26.7	18.56

a: each value represents mean ± SE of a group of 10 mice.

cavity) were performed according to Whittle's technique (1964), modified by Fernandes (1986) in the study of copaiba Balsamo.

The "teas" of each plant were essayed using as control the animals to which was administered filtrated water in a dose of 0.1 ml/10 g of animal, orally, instead of the tea.

The tea or the filtrated water were given orally 2 h before the administration of dye and acetic acid.

Two hours later it was administered to each animal, intravenously, through the tail veins, 0.2 ml of an aqueous solution of Evans blue at 1% and, after 10 min, it was given intra-perito-

neously, as irritant, 0.1 ml/10 g of corporeal weight of an aqueous solution of acetic acid 0.1 N. It was then registered the number of contortions presented by the animal during 30 min. At the end of this period the animal was sacrificed in a chamber saturated with ether, its peritoneal cavity was open and the extravasated dye was removed with 6 to 8 ml of distillate water. To the peritoneal washed it was added 0.1 ml of NaOH 0.1 N and the final volume was adjusted to 10 ml. The concentration of the extravasated dye was determined by spectrophotometry at 590 nm, with the aid of a standard curve of Ax concentration of the Evans blue, previously constructed.

RESULTS AND DISCUSSION

The results are presented in Table II and show that all the assayed plants presented analgesic activity (reduction in number of contortions), with greater or smaller intensity. The anti-inflammatory activity, measured by the inhibition of Evans blue diffusion to peritoneal cavity, was not always parallel to the analgesia, as it was strongly reduced with the bark of *erva-de-bugre*, and with *taiuiá*, and absent with *manacá*. Only *alcachofra* and the bark and the duramen of *jutaí* presented greater anti-inflammatory activity. Other experimental models are programmed to have a better evaluation of the anti snake venom activity of the assayed material.

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