Anti-inflammatory activity of the hydroalcoholic extract of leaves of *Sida rhombifolia* L. (Malvaceae)

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SUMMARY. The hydroalcoholic extract of leaves of *Sida rhombifolia* L. (Malvaceae) were tested to evaluate its anti-inflammatory activity. Oedema induced by injecting carrageenan was decreased by oral administration of extract (400 mg/kg) presented inhibitory effects, compared to the control group (p<0.05). This result seems to support the use of *S. rhombifolia* leaves ethanolic extract in relieving inflammation.

INTRODUCTION

Species belonging to the genus *Sida* has been used in traditional medicine and several therapeutic activities were reported, among them *S. humilis* possesses antiarthritic action 1; *S. rhombifolia*, *S. acuta* and *S. veronicaefolia* antibacterial activity 2; *S. rhombifolia* exhibited cytotoxic activity 3 and from *S. acuta* 4 antimalarial activity.

In *S. rhombifolia* has been reported the presence of fatty acids, amino acids 5; alkaloids 6 and ecdysteroids 7; *S. rhombifolia*, *S. acuta* and *S. veronicaefolia* contain alkenes, steroids and hydrocarbons 2; there are cyclopropenoid fatty acids in seed oils of *S. acuta* and *S. rhombifolia* 8; *S. acuta* also contains heraclenol, beta-sitosterol, acanthoside B and daucoglycoside 9.

The aim of the present paper was to study the anti-inflammatory activity of the hydroalcoholic extract of leaves of *S. rhombifolia*, in experimental model of oedema.

MATERIALS AND METHODS

Collection of the material

The leaves of *S. rhombifolia* were collected during the first quarter of 1996 in the roundness of the Campus of the Universidade Federal de Santa Maria. The botanical identification was accomplished in the Botanical Department.

ANTI-INFLAMMATORY ACTIVITY

The anti-inflammatory activity was evaluated by measuring the carrageenan-induced paw oedema according to Winter et al. 10. Inflammation was induced by injecting carrageenan (0.1 ml of carrageenan 0.5%) subcutaneously into the sub-plantar region of the right hind paw and 0.1 ml of sterile saline (0.9%) in the left paw. The test group received orally the hydroalcoholic extract (HAE, 400 mg/kg) 1h before carrageenan injection. The control group received saline. Indomethacin (Ind; 10 mg/kg) was used...
as a standard. Paw volume was measured before and 0, 1, 2, 3 and 4 h after the carrageenan injection using the modified plethysmometric method. The oedema was reported as the difference between the final and the initial volumes of the paw.

Statistical Analysis
Data were expressed as mean ± S.E.M. and the different treatments were compared by analysis of variance and the post-hoc Duncan’s multiple range test, with the aid of the statistical software SPSS (version 1986). The minimum significance level was set at P < 0.05. Differences between two means were detected using the Student’s t test.

RESULTS AND DISCUSSION
It was observed in this experiment a significant difference among the groups Ind and HAE in relation to the Control; 1, 2, 3 and 4 h after the oedema (Fig. 1; p <0.05). The HAE reduced the oedema significantly in 67% (1st hour 17.27±2.07) when compared with control (51.75±7.25); in 56% (2nd hour 41.68±3.76) when compared with control (95.3±1.55); in 37% (3rd hour 55.27±2.52) when compared with control (85.39±4.06) and it remaining constant in 37% (4th hour 52.37±3.57) when compared with control (52.37±3.57).

The anti-inflammatory process represents the answer of the organism to harmful incentives. In that process a variety of substances, denominated as mediators of the inflammation, are formed and liberated at the place of the lesion. Carrageenin-induced oedema is commonly used as an experimental model for evaluation the anti-inflammatory potential of natural products. In agreement with literature’s data, the paw oedema induced by the carrageenan injection is associated with three different phases from alterations of the vascular permeability induced by mediators. During the first 60 min, possibly histamine and serotonin release occurs. A second phase is characterized by bradykinin and prostaglandins (mainly PGE2) release.

β-sitosterol, a sterol isolated of different species of Sida, which is reported to have anti-inflammatory properties, similar to hydrocortisone and oxyphenbutazone, might be responsible for the activity showed for HAE. The anti-inflammatory activity accomplished in mice by the oral administration of HAE of S. rhombifolia and Ind, as standard, showed considerable effectiveness, inhibiting the oedema of the injection subcutaneously into the sub-plantar region of 0.1 ml of carrageenan 0.5%, probably acting on the agents mediators of the inflammation.

REFERENCES