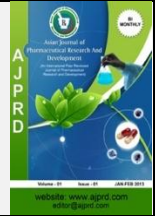


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Research Article

### Antiinflammatory Activity of Pagoda Flower (*Clerodendrum Paniculatum* L.) Ethanol Extract Using Paw Edema Method

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#### ABSTRACT

**Objectives:** The purpose of this study was to determine antiinflammatory activity of pagoda flower (*Clerodendrum paniculatum* L.) ethanolic extract

**Design:** This study uses an experimental laboratory design. This research uses paw edema method by inducing carrageenin in the legs of male white rats as an induction of inflammation.

**Interventions:** The sample used was pagoda flower ethanol extract in various dosages of 25, 50 and 100 mg / kg. As a comparison, acetosal dose 33 mg / kg was used. Na CMC suspension was used as a negative control.

**Main outcome measure:** The results in this study are the difference in the volume of edema volume from rat feet per unit time. The measurement of the rat's leg volume was measured at 30, 60, 120, 180, 240 and 300 minutes.

**Conclusion:** Pagoda flower ethanol extract does not have good anti-inflammatory activity. there were no significant differences between groups except at dose 100 and positive control at minute 300 of negative control.

**Keywords:** antiinflammatory activity, *Clerodendrum paniculatum* L., paw edema

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#### INTRODUCTION

The antiinflammatory activity of the pagoda plant was tested in 2016. The ethanol extracts of the pagoda leaves were active at a dose of 50 mg/kg. In addition to having anti-inflammatory activity, ethanol extract of pagoda leaves also has a very strong antioxidant activity of 27.73376  $\mu\text{g}/\text{ml}^1$ . Similar plants in the genus *Clerodendrum* which have antiinflammatory activity include *C. Phlomidis*, *C. Serratum*, *C. Trichotomum*, *C. Chinense*, *C. Petasites*, *C. inermis*, and *C. viscosum*<sup>2-6</sup>.

Besides having antiinflammatory and antioxidant activity, *C. paniculatum* has been measured its pharmacological potential using the Brine shrimp Lethality Toxicity (BSLT) toxicity test, the result is that the ethanol extract of the pagoda flower

has a strong activity potential as evidenced by  $\text{LC}_{50}$  value of 45,487 ppm<sup>7</sup>.

In 2019 an anti-inflammatory activity test was carried out on the ethanol extract of pagoda flowers as a follow-up study from previous studies.

#### MATERIALS AND METHODS

##### Plant and Chemical Materials

The pagoda used in this study was obtained from the Pancur Batu area in Deli Serdang Regency, North Sumatra, Indonesia. The part of the plant used is flowers. Pagoda

flowers have been determined by the Herbarium Bogoriense Indonesian Institute of Science and it is known that the species is *Clerodendrum paniculatum* L. with Familia Lamiaceae.

The tools used in this study were glassware (pyrex), 1 ml syringes, oral sonde, analytical scales, rotary evaporator and plethysmometer.

The chemicals used in this study were ethanol, carragenin kappa, CMC sodium, and acetosal (Aspilets®) from Darya-Varia.

### Plant Extraction

Pagoda flower extraction uses maceration method which is a number of pagoda flower simplicia soaked in 96% ethanol solvent for 3 days while stirring occasionally. Maserate and residue are separated and filtered, then the pulp is washed using the same solvent until a total of 10 times the weight of the simplicia is obtained. Maserates are collected and allowed to stand for 24 hours without stirring, then separate the clear solution with the precipitate. Clear solution was thickened using a rotary evaporator until a thick extract was obtained<sup>8,9</sup>.

### Measurement of Antiinflammatory Activity

Test animals used were male white rat species of *Rattus novergicus wistar* strain with 2-3 months of age and body

weight 150-200 g. These test animals are commonly used in testing pharmacological activities. This study has fulfilled the requirements of the ethics committee regarding the use of test animals in research<sup>10,11</sup>.

This study used 25 test animals which were divided into 5 groups. The first group was given sodium CMC suspension as a negative control, the second group was given acetosal 33 mg/kg as a positive control, and the other group was given ethanol extract of pagoda flowers in doses of 25, 50 and 100 mg/kg.

Antiinflammatory activity was tested using the paw edema method in which the rat's feet were swollen with carragenan kappa which was injected into the sole of the rats feet. Test samples in the form of extracts and comparison compounds were given to each test animal 30 minutes before inducing carragenane. Then the volume of the feet of rats was measured in minutes 0, 30, 60, 120, 180, 240, and 300. Based on the measurement results the difference in foot volume was calculated from 30 to 300 minutes to the initial volume (minute 0). The results of the study were analyzed using the ANOVA method to see differences between groups.

## RESULT AND DISCUSSION

Antiinflammatory research result from the ethanol extract of the pagoda flower can be seen in table 1.

**Table 1:** Antiinflammatory activity of *C. paniculatum* ethanol extract

No	Groups	Difference of Edema Volume (ml) per Time (Minutes) ± Error Standard					
		30	60	120	180	240	300
1	Negative control	0.00±0.00	0.00±0.00	0.03±0.03	0.14±0.04	0.23±0.03	0.27±0.03
2	Positive control	0.00±0.00	0.10±0.06	0.10±0.06	0.07±0.03	0.03±0.03	0.03±0.03*
3	Extract 25 mg/kg	0.00±0.00	0.07±0.07	0.07±0.07	0.13±0.07	0.20±0.06	0.20±0.06
4	Extract 50 mg/kg	0.07±0.03	0.17±0.03	0.17±0.03	0.17±0.03	0.10±0.06	0.10±0.06
5	Extract 100 mg/kg	0.07±0.07	0.13±0.07	0.13±0.07	0.07±0.07	0.07±0.03	0.13±0.03*

\*significantly different with negative control (p value ≤ 0.05)

Based on the results of the study it was found that the anti-inflammatory activity possessed by the active pagoda flower ethanol extract at the 300th minute and started at a dose of 100 mg / kg. At 30 to 240 minutes there were no differences between groups. Antiinflammatory activity of the pagoda flower ethanol extract is smaller than the activity of the pagoda leaf ethanol extract. The Pagoda leaves reduce inflammation or active as an antiinflammatory at a dose of 50 mg / kg at the 30th minute<sup>1</sup>. The root extract of *C. paniculatum* possessed the anti-inflammatory potential by reducing the release of inflammatory mediators (NO, PGE<sub>2</sub>) and pro-inflammatory cytokine (TNF-α)<sup>12</sup>.

Peak edema develops within the first 3 to 4 hours, and is inhibited by pretreatment of the animals by single oral doses of antiinflammatory agents, steroid or non-steroid. Log dose responses to drugs are linear and parallel, and yield potency ratios with relatively narrow confidence limits. The potency ratios obtained for aspirin, phenylbutazone and hydrocortisone are fairly close to the ratios of their

respective daily doses in the treatment of rheumatic disease. A potent antihistaminic-antiserotonin compound, cyproheptadine, is without effect on carrageenin-induced edema<sup>13</sup>.

## CONCLUSION

Pagoda flower ethanol extract does not have good anti-inflammatory activity. there were no significant differences between groups except at dose 100 and positive control at minute 300 of negative control.

## CONFLICT OF INTEREST

All author have no to declare.

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