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# A preliminary study on anti-inflammatory activity of *Cayratia pedata* leaves on wister albino rats

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## ABSTRACT

*The aim of the present study was to evaluate the Anti-inflammatory principle of the Chloform, Alcoholic and Aqueous extract of the leaves of Cayratia pedata Lam. (Vitaceae). The extracts are evaluated for Anti-inflammatory potential using Carrageenan induced paw oedema in albino rats. Diclofenac sodium (20mg/kg) was used as standard positive control. Chloform, Alcoholic and Aqueous extracts are administered at the doses of 200mg/kg and 400mg/kg/body weight. Chloroform and Aqueous extract in 200mg/kg and 400mg/kg doses exhibited significant (P<0.001) and (P<0.01) Anti-inflammatory activity respectively; Whereas Alcoholic extract showed significant activity at 200mg/kg (P<0.001). The present study indicates that Chloroform, Alcoholic and Aqueous extract of the leaves of Cayratia pedata exhibited significant anti-inflammatory potential/ properties.*

**Keywords:** *Cayratia pedata*, Phytochemical screening, Carrageenan induced paw oedema, Diclofenac sodium, Anti-inflammatory.

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## INTRODUCTION

Inflammation is complex biological response of vascular tissues to harmful stimuli, such as pathogens, damaged cells, or irritants. It is a defensive mechanism of the organism to remove the injurious stimuli as well as to initiate the healing process for the tissue. In absence of inflammation, wounds and infections would never heal and progressive destruction of the tissue would compromise the survival of the organism [1]**.** Inflammation is a normal protective response to tissue injury caused by physical trauma, noxious chemicals or microbiological agents. Inflammation is body's response to inactivate or destroy the invading organisms, remove

irritants and set stage for tissue repair [2]**.** Cayratia pedata Lam. [3] is a climber belonging to the Family Vitaceae and it grows in shrubberies of India, Andaman Islands, Ceylon and Malaya [4,5]. Traditionally whole plant is used in the treatment of Anti-diarrhoeal and refrigerant, useful in burn and hysteria [6]. Leaves of this plant were used in the treatment of ulcers and diarrohea [4,7]. A decoction of this leaves were given to check uterine and other fluxes [5,6] . The Thailam of this plant leaves (Naralai Thailam) were used in the treatment of Chickunguniya by Folklore medicine but this was not scientifically explored. To the best of our knowledge the Anti-inflammatory property of this plant is not yet reported. Hence it was thought worth to carry out the Anti-inflammatory potential of this plant which is scientifically unexplored.

## MATERIALS AND METHODS

***Plant Material:*** The taxonomically identified Cayratia pedata leaves were collected in the month of August and September in the rural parts of Thiruvarur, Tamil Nadu, India and certified by Botanical Survey of India (BSI), Coimbatore, India (Certificate No. BSI/SC/5/23/08-09/Tech.952). Voucher specimen of the plant was deposited in the Department of Pharmacognosy, MTPG&RIHS for future reference.

***Extraction of Dried Plant:*** The collected fresh leaves were cleaned and washed in running water and dried at room temperature ($22^oC$) for two weeks and then Coarsely powdered it with the help of Hand mill. The powdered leaves were successively extracted with n-Hexane, Chloroform, Ethyl acetate and Methanol using Soxhlet apparatus till exhaustion and finally aqueous extract was prepared by using Chloroform: Water (1:99) by simple Maceration at RT. All the extracts were carefully evaporated in a rotary evaporator under Controlled Temperature and Reduced Pressure to get the extract [8,9].

***Phytochemical Screening:*** The extracts of Cayratia pedata were analyzed for the presence of Carbohydrates, Proteins, Gums, Mucilage, Glycosides, Flavonoids, Alkaloids, Terpenoids, Saponins, Steroids, Tannins, according to the standard methods [9-11].

***Animals:*** Albino rats of wistar strain (120-150g) of either sex from the breeding lot of this institute's animal house, were housed in spacious poly propylene cages at temperature of $25\pm2^oc$; relative humidity (60-70%) and maintained with a controlled 12/12 h light / dark cycle. Uniform diet was provided during the entire period of the study. Water was provided *ad libitum*.

***Effect of Cayratia pedata leaves extracts on carrageenan induced Paw oedema in rats:*** Screening for Anti-inflammatory potential of Cayratia pedata extract was done in carrageenan induced paw oedema in rats [12-14]**.** The animals were selected randomly and divided into eight groups as shown in Table-1.

One Hour after the oral administration of standard and extracts, Oedema was induced by sub-plantar injection of 0.1ml of freshly prepared 1% suspension of Carrageenan (prepared with 0.5% CMC in distilled water) into the right hind paw of the rats. The volume of pedal oedema was measured at 0 and at 30, 60, 90 and 120 min after injection of Carrageenan using Plethysmograph.

The % of oedema inhibition of extracts and standard drug was calculated for each animal group using the formula;

$$\% \text{ of oedema inhibition} = (1-T/C)*100$$

Where
*T –Mean change in paw oedema in groups treated with test compounds.*
*C – Mean change in paw oedema in control.*

**Statistical Analysis:**
The results were expressed as mean ± SEM. Statistical significance between the treated and control groups were tested by Student's t-test. The differences were considered significant at P<0.001 and P<0.01[15].

## RESULTS

The results of anti-inflammatory activity of Cayratia pedata leaves extracts was evaluated in carrageenan induced paw oedema methods were showed in Table-1 & Figure 1. Chloroform extract at the dose of 200kg and 400mg/kg exhidited significant anti-inflammatory activity after 120 min i.e 90% (P<0.01) and 80% (P<0.01) respectively. Alcoholic extract at the dose of 200mg/kg exhibited significant anti-inflammatory activity i.e 90% (P<0.001). Aqueous extract at the dose of 200kg and 400mg/kg exhidited significant anti-inflammatory activity after 120 min i.e 60% (P<0.01) and 70% (P<0.01) respectively.

**Table 1: Effect of Cayratia pedata leaves extracts on carrageenan induced Paw oedema in rats**

| TREATMENT Dose, mg/kg, i.p. | Increase in paw volume (ml) | | | | | % Inhibition at 120 min |
|---|---|---|---|---|---|---|
| | 0 min | 30 min | 60 min | 90 min | 120 min | |
| Control | 0.13±0.012 | 0.204±0.003 | 0.22±0.012 | 0.23±0.012 | 0.23±0.012 | - |
| Diclofenac sodium 20mg/kg | 0.11±0.01 | 0.16±0.01** | 0.13±0.012** | 0.12±1.02 | 0.12±0.012* | **90%** |
| Chloroform extract 200mg/kg | 0.13±0.012 | 0.2±0.016 | 0.18±0.012 | 0.17±0.037 | 0.14±0.017** | **90%** |
| Chloroform extract 400mg/kg | 0.11±0.010 | 0.18±0.016 | 0.17±0.009 | 0.14±0.010* | 0.13±0.012** | **80%** |
| Methanol extract 200mg/kg | 0.11±0.0098 | 0.20±0.016 | 0.15±0.071 | 0.15±0.007* | 0.12±0.001* | **90%** |
| Methanol extract 400mg/kg | 0.11±0.014 | 0.22±0.011 | 0.22±0.012 | 0.23±0.012 | 0.23±0.012 | **20%** |
| Aqueous extract 200mg/kg | 0.12±0.012 | 0.20±0.016 | 0.18±0.009 | 0.172±0.010** | 0.16±0.013** | **60%** |
| Aqueous extract 400mg/kg | 0.13±0.012 | 0.20±0.02 | 0.18±0.021 | 0.17±0.017 | 0.16±0.013** | **70%** |

*All values are expressed as mean ±SEM; n=5; *P<0.001 ,**P<0.01 as compared to control*

## DISCUSSION

The results from the present study suggest that the various extract of *Cayratia pedata Lam* exhibited significant Anti-inflammatory effect. Inflammation has different phases the first phase is caused by an increase in vascular permeability the second one by infiltrate of leucocytes and third one by granuloma formation, by activating the cyclo-oxygenase, the levels of prostaglandin, especially $PGE_2$, increase markedly and its production provokes inflammation and

pain [16]**.** Therefore, we assume that some active metabolites of the extract in this study could inhibit cyclo-oxygenase activity.

The most widely used primary test to screen anti-inflammatory agent is to measure the ability of a compound to reduce local oedema induced in rat paw following the injection of irritants such as carrageenan [13]**.**

The carrageenan - induced paw oedema model in rats is known to be sensitive to cyclo-oxygenase (cox) inhibitors and has been used to evaluate the effects of non-steroidal anti-inflammatory agents [17]**.**

It is also suitable for assessing the anti-oedematous effects of natural products and is believed to be biphasic [18]**.** The first phase of 1 hour involves the release of Serotonin and Histamine while the second phase of the next 1 hour is mediated by Prostaglandin especially $PGE_2$ [19]**.** The significant reduction as well as inhibitory effect of the extract on the carrageenan – induced oedema paw volume is an indication of the anti-inflammatory potentials of the plant. Therefore, the result of this study supports the use of the plant in folklore medicine for the management of acute inflammation, a symptom of chickungunya. The suppression of paw oedema in the last phase could probably be due to inhibition in the release of early mediators such as Histamine, Serotonins & Kinins [20] as well as Cyclo-oxygenase [21]**.** The phytochemical screening of the extracts of cayratia pedata revealed the presence of Carbohydrates, Flavonoids, Glycosides, Terpenoids, Saponins and Tannins. Hossinzadeh H reported that a number of flavonoids possesss anti-inflammatory potential [22]. Flavonoids are capable oto inhibit the Prostoglandin synthetase, more specifically the endoperoxidase and reported to produce anti-inflammatoery effect [23]. The presence of Flavonoids and other Phytochemicals may be contributing to the anti-inflammatoery potential.

The results provide a scientific basis for the utilization of this herb in traditional medicine for the treatment of inflammatory diseases & chickungunya. Further tests are needed to explore the exact active principle responsible for the anti- inflammatory activity.

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