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# EFFECT OF JATHIPALATHI CHOORANAM ON CARRAGEENAN INDUCED LOCALISED INFLAMMATORY PAIN IN RATS

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## ABSTRACT

**Aim:** To study the Anti-inflammatory effect of Jathipalathi Chooranam (JPC) in the Male Wister rats of Carrageenan- induced localized inflammation. **Method:** The paw edema volumes of the test compounds, standard and control groups were measured at 0, 1, 2, 3, 4, 5, 6$^{th}$ hr after Carrageenan treatment with the help of Digital Plethysmometer. Mean increase in paw edema volume after carrageenan injection was measured and the percentage of inhibition was calculated. Drug and solutions: 1. Carrageenan (0.1ml of 1%) 2. Diclofenac sodium (10mg/kg IP) 3. Jathipalathi Chooranam 1gm per day. **Results:** The results showed significant ($p<0.05$) anti inflammatory activity when compared to control group. **Conclusion:** The test drug JPC shows have an anti-inflammatory activity at the concentration of 3.024mg/kg compared to standard drug, Diclofenac Sodium.

**KEYWORDS:** Siddha medicine, Jathipalathi Chooranam, Anti-inflammatory activity, Carrageenan induced localized inflammatory pain, Male Wister rats, Pre-clinical study.

## INTRODUCTION

An anti-inflammatory refers to the property of a substance or treatment that reduces inflammation or swelling. Anti-inflammatory drugs make up about half of analgesics, remedying pain by reducing inflammation as opposed to opioids, which affect the central nervous system to block pain signaling to the brain. Prostaglandins are hormone-like

substances that affect the body in variety of ways, also regulating inflammatory mediation. An anti-inflammatory diet includes fewer foods that create inflammation-causing prostaglandins (PGE-2) in the body, and more foods that create anti-inflammatory prostaglandins (PGE-1 and PGE-3).[1] The rats were acclimatized for 3 days to the laboratory conditions and were identified by a unique tail marking using permanent red marker pen. During the acclimatization, individual animal was subjected to daily general observation and prior to final assignment to the study the animals were subjected to a detailed clinical examination to ensure the selected rats were in a good state of health. Intraplantar injection of carrageenan into the hind paw produces localized inflammation in rats. An intraplantar injection of carrageenan is widely used to produce a model of localized inflammatory pain. In this study the anti-inflammatory effect of Subcutaneous in the rat model of carrageenan-induced localized inflammation.

**Ingredients of Jathipalathi chooranam.[2]**

| | | |
|---|---|---|
| 1. | Jaathikai (*Myristica fragrans*) | 8.75 gram |
| 2. | Kirambu *(Syzygium aromaticum)* | 8.75 gram |
| 3. | Lavangapattai *(Cinnamomum verum)* | 8.75 gram |
| 4. | Kiranthi thakaram *(Tabernaemontana divaricata)* | 8.75 gram |
| 5. | Nelliparuppu *(Phyllanthus emblica)* | 8.75 gram |
| 6. | Thalisa pathiri *(Abies spectabilis)* | 8.75 gram |
| 7. | Chukku *(Zingiber officinale)* | 8.75 gram |
| 8. | Milagu *(Piper nigrum* | 8.75 gram |
| 9. | Thippili *(Piper longum)* | 8.75 gram |
| 10. | Kadukkaai *(Terminalia chebula)* | 8.75 gram |
| 11. | Sirunagapoo *(Mesua nagassarium)* | 8.75 gram |
| 12. | Karpooram (*Purified Camphor*) | 8.75 gram |
| 13. | Santhanam (*Santalum album*) | 8.75 gram |
| 14. | Ellu (*Sesamum indicum*) | 8.75 gram |
| 15. | Moongiluppu (*Bambusa arundinacea*) | 8.75 gram |
| 16. | Sombu (*Pimpinella anisum*) | 8.75 gram |
| 17. | Chithiramoola ver (*Plumbago zeylanica*) | 8.75 gram |
| 18. | Vaividangam (*Embelia ribes*) | 8.75 gram |
| 19. | Lavanga pathiri (*Cinnamomum tamala*) | 8.75 gram |
| 20. | Elakkai arisi (*Elettaria cardamomum*) | 8.75 gram |

**Source of raw drugs**

The required raw drugs are purchased from authorized centers and standardized before preparing medicines. The raw drugs will be authenticated and then they are purified and the medicines are prepared in Gunapadam laboratory of Government Siddha Medical College, Palayamkottai.

**Purifications of Drugs**

- ❖ Raw drugs will be heated to a golden brown color and cooled it.
- ❖ Plumbago zeylanica root will be backed in steam of milk.
- ❖ Kadukkai seed is removed.
- ❖ Camphor: Soke in the flower juice of Cyanthillium cinereum for 24 min, and then dried in sun light.[3]

**Preparation:** Purified ingredients should be ground and powdered them finely.

**Drug storage:** The trial drug Jathipalathi Chooranam is stored in a clean and dry air tight container.

**Study Guidelines:** The study plan was developed based on the guidelines of Vogel[4] and also it has reference to Chao Ma and Jun-Ming Zhang[5] and Walker et al.[6] Winter CA, Risley EA, Nuss GW. Carrageenan induced edema in hind paw of the rat as an assay for anti-inflammatory drugs. Proc Soc Exp Biol Med. 1962; 111:544–7.

**Requirements of animals**

- ✓ Species: Rats
- ✓ Strain: Wister
- ✓ Age: 6-8 Weeks at the time of dosing
- ✓ Total no. of Rats: 30
- ✓ Sex: Male
- ✓ Drugs and chemicals: 0.1ml of 1% Carrageenan, Diclofenac sodium (Standard),
- ✓ Apparatus: Digital plethysmometer.
- ✓ Test compound: Jathipalathi Chooranam (JPC).

## MATERIALS AND METHODS

In this study, male Wister rats are selected totally 30 in numbers and the age is 6-8 weeks at the time of dosing. Male Wister rats were housed in polypropylene cages with stainless steel top grills having facilities for holding pellet food and drinking water in bottle with stainless steel sipper tube. Each cage contained 6 rats. All rats had free access to potable water and standard pelleted laboratory animal diet ad libitum. Paddy husk was used as bedding material. *Approval No: KMCRET/ MD(S)/ 03/ 2016-17 by the Institutional Animal Ethical Committee (IAEC) of KMCH College of Pharmacy, Coimbatore (685/PO/Re/S/2002/CPSCEA) Dated*

*21st August 2002* constituted in accordance with the guidelines of the CPCSEA, Government of India.

**Drugs and chemicals**

The animals were housed in polypropylene cages with stainless steel top grills having facilities for holding pellet food and drinking water in bottle with stainless steel sipper tube. Each cage contained 6 rats. All rats had free access to potable water and standard pelleted laboratory animal diet ad libitum. Paddy husk was used as bedding material. The animals were divided into 5 groups (6 rats/ group). Localized inflammatory pain was induced in all groups of animals by intra plantar injection of Carrageenan (0.1ml of 1%). Group 1 received vehicle orally, Group 2 received a standard Diclofenac sodium (10 mg/kg IP), whereas groups 3, 4 and 5 received Jathipalathi chooranam 3.024mg, 15.12mg and 75.6mg b.w. The doses of JPC were prepared in Honey, where as Diclofenac sodium was dissolved in normal saline. One day before the experiment, three basal readings of hind paw in each rat were recorded. Group I received (0.1ml of 1% Carrageenan), Group II animals received Diclofenac sodium (10 mg/kg IP). Group III, IV and V animals received the JPC 3.024mg, 15.12mg and 75.6mg b.w. After 30 min, the rats were challenged with subcutaneous injection of 0.1 ml of 1% w/v solution of carrageenan into the sub plantar region of left paw. The paw was marked with ink at the level of lateral malleolus and immersed in mercury up to the mark. The paw volume was measured at 0, 1, 2, 3, 4, 5 and 6$^{th}$ hr after Carrageenan injection using Digital Plethysmometer. The difference between initial and subsequent reading gave the actual edema volume.

**Dosage schedule**

The required dose for mice/rat will be calculated by using the standard dose calculation procedure from recommended clinical dose.

**Conversion formula**

Human dose is 1g/ day

Total clinical dose (a) x conversion factor (b) 0.018 = (c) per 30 gm of mice

1000 mg x 2(a) x 0.018 (b) = 18 (c) /140gms of mice

108/1000x140 = 15.12 mg

Experimental Doses Calculated as per the standard procedures are,

| S. No | Groups | Dose /kg, weight | Dose /30 gms. weight | Volume of administration |
|---|---|---|---|---|
| 1 | Vehicle Control | -- | -- | 1 ml |
| 2 | Therapeutic Dose | 15.12 mg | 3.024mg | 1 ml |
| 3 | Middle Dose | 75.6mg | 15.12mg | 1 ml |
| 4 | High Dose | 378mg | 75.6mg | 1 ml |

**Experimental design**

Treatment received by each Group,

Group-I: Served as a negative control (0.1ml of 1% Carrageenan)

Group-II: Served as standard received Diclofenac sodium (10mg/kg, IP) + (0.1ml of 1% Carrageenan)

Group-III: Received Jathipalathi Chooranam (3.024mg/kg po) + (0.1ml of 1% Carrageenan)

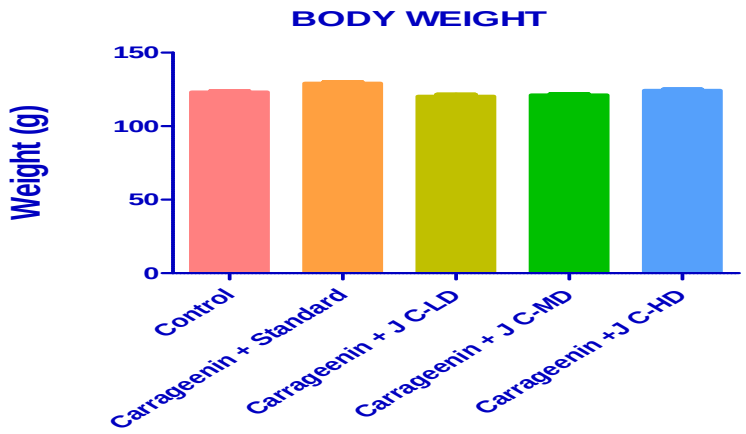
Group IV: Received Jathipalathi Chooranam (15.12mg/kg po) + (0.1ml of 1% Carrageenan)

Group V: Received Jathipalathi Chooranam (75.6mg/kg po) + (0.1ml of 1% Carrageenan)

**Effect of Jathipalathi Chooranam on Carrageenan-Induced Paw Edema In Rats (Body Weight)**

| Group | Only Carrageenan | Carrageenan+ Standard | Carrageenan+ JPC-LD | Carrageenan + JPC-MD | Carrageenan + JPC-HD |
|---|---|---|---|---|---|
| Initial body weight | 123.167± 0.909823 | 129.167± 1.04616 | 120.333± 1.40634 | 121.167± 0.749074 | 124.333± 0.802773 |

Values are expressed as the mean ± S.D. Statistical significance (p) calculated by one way ANOVA followed by dunnett's. ns- Not significant $^{**}P<$ 0.05 calculated by comparing treated group with control group.




***JC=JPC (Jathipalathi Chooranam)***

## RESULTS

**Effect of Jathipalathi Chooranam on Carrageenan-Induced Paw Edema in Rats (Body Weight).**

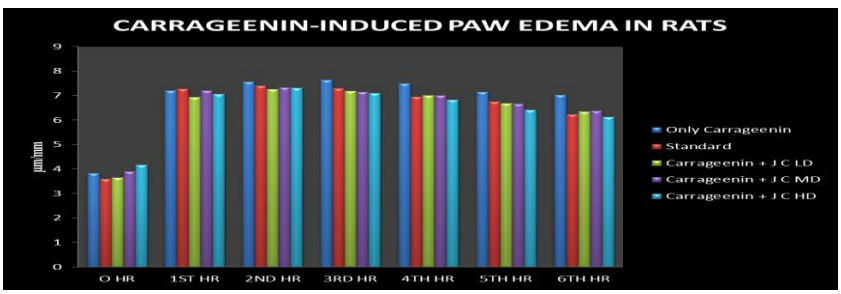
| Group | Mean paw volume before carrageenan injection | Paw Volume after induction with carrageenan. Increase in paw volume (mm) after carrageenan injection (mean ± SEM)/Percent Inhibition of edema. | | | | | |
|---|---|---|---|---|---|---|---|
| | 0 min | 1h | 2h | 3h | 4h | 5h | 6h |
| **Only Carrageenan** | 3.83± 0.189367 | 7.215± 0.1735 | 7.57± 0.2068 | 7.638± 0.08548 | 7.493± 0.08731 | 7.16± 0.07746 | 7.02± 0.04397 |
| **Carrageenan + Standard** | 3.60833± 0.125391 | 7.275± 0.2198 | 7.405± 0.1907 | 7.308± 0.04385$^{ns}$ | 6.958± 0.16* | 6.753± 0.1416$^{ns}$ | 6.24± 0.03367*** |
| **Carrageenan + JPC LD** | 3.64± 0.116304 | 6.935± 0.3413 | 7.268± 0.2234 | 7.195± 0.1422* | 7.005± 0.09296* | 6.68± 0.1878$^{ns}$ | 6.345± 0.1305** |
| **Carrageenan + JPC MD** | 3.89667± 0.169188 | 7.21± 0.2011 | 7.33± 0.1542 | 7.165± 0.1284* | 7.005± 0.09296* | 6.678± 0.1358$^{ns}$ | 6.385± 0.09708** |
| **Carrageenan + JPC HD** | 4.17333± 0.166907 | 7.07± 0.1909 | 7.313± 0.1614 | 7.103± 0.1143* | 6.825± 0.1615** | 6.423± 0.1405** | 6.133± 0.1759*** |

Values are expressed as the mean ± S.D. Statistical significance (p) calculated by one way ANOVA followed by dunnett's. ns- Not significant $^{**}P< 0.05$ calculated by comparing treated group with control group.

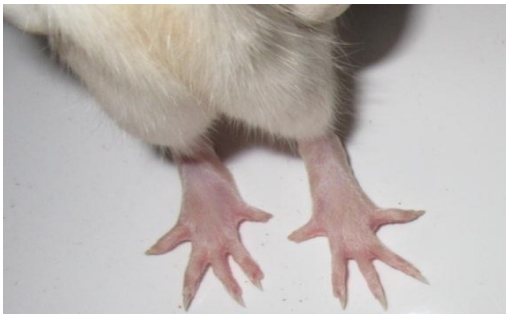
**Effect of Jathipalathi Chooranam on Carrageenan-Induced Paw Edema in Rats (Body Weight).**

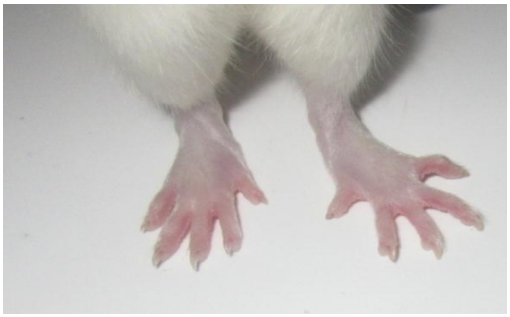
| Group | Paw Volume after induction with carrageenan. Increase in paw volume (Mm) after carrageenan injection (mean ± SEM)/Percent. Inhibition of edema. | | | |
|---|---|---|---|---|
| | Initial Paw volume(mm) | Final Paw volume(mm) | Difference | Percentage protection (%) |
| Control | 3.83±0.189367 | 3.83±0.189367 | --- | --- |
| Only Carrageenan | 3.83±0.189367 | 7.02±0.04397 | 3.19 | 83.28 % |
| Carrageenan + Standard | 3.60833±0.125391 | 6.24±0.03367*** | 2.64 | 73.33 % |
| Carrageenan + JPC LD | 3.64±0.116304 | 6.345±0.1305** | 2.7 | 74.17 % |
| Carrageenan + JPC MD | 3.89667±0.169188 | 6.385±0.09708** | 2.49 | 64.01 % |
| Carrageenan + JPC HD | 4.17333±0.166907 | 6.133±0.1759*** | 1.96 | 47.00 % |

**Effect of Jathipalathi Chooranam on Carrageenin-Induced Paw Edema In Rats (Body Weight).**

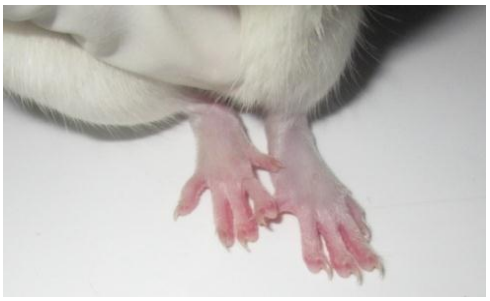


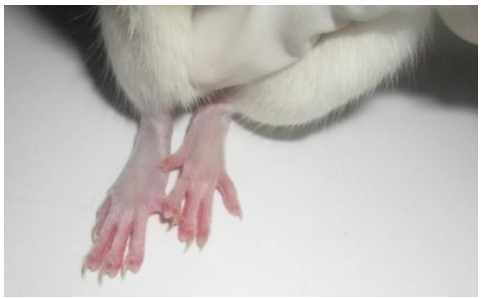
**Effect of Jathipalathi Chooranam on Carrageenin-Induced Paw Edema in Rats (Body Weight)**



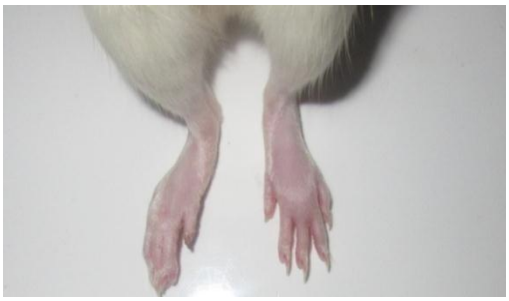


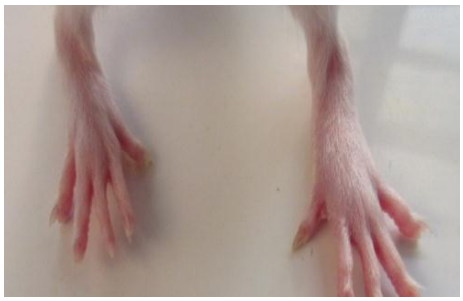
**Group: I Control.** **Group: II Only Carrageenan.**





**Group: III Carrageenan+ STD. Group: IV Carrageenan+ LD.**





**Group: V Carrageenan+ MD. Group: VI Carrageenan+ HD.**

## CONCLUSION

Inhibition percentage of Jathipalathi Chooranam is 74.17% as compared with standard drug Diclofenac (73.33%). To conclude, the Jathipalathi Chooranam was evidenced as a siddha drug for the treatment of pain and inflammation and it is found that it useful for inflammatory disorders.

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