



## Research Article

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### ANTI INFLAMMATORY ACTIVITY OF FOLKLORE MEDICINAL PLANT

#### *COMMIPHORA CAUDATA* (WIGHT & ARN.)

S. Balasundar <sup>1\*</sup>, Ravi Rao S <sup>2</sup>, Subramanya P <sup>3</sup>

<sup>1</sup>P.G. Scholar, Department of Dravyaguna Vijnana, Alva's Ayurveda Medical College & Hospital, Moodbidri, Karnataka, India

<sup>2</sup>Professor, Department of Dravyaguna Vijnana, Alva's Ayurveda Medical College & Hospital, Moodbidri, Karnataka, India

<sup>3</sup>Professor & HOD, Department of Dravyaguna Vijnana, Alva's Ayurveda Medical College & Hospital, Moodbidri, Karnataka, India

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#### \*Corresponding author

E-mail: drbala7@gmail.com

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#### ABSTRACT

The drug *Commiphora caudata* is a folklore drug widely seen in South India, found using for its anti-inflammatory action. Though it is found as a folklore claim, the drug has to be evaluated. Hence the study has been undertaken to prove the anti-inflammatory action. The *Commiphora caudate* leaves were screened for their anti-inflammatory activity at different form such as internal water extract (Swarasa) and external paste form (Kalka) in Carrageenan induced inflammatory oedema of hind paw in albino rats. In the study 24 Albino rats were selected and divided into 4 groups. Group 1 taken as Control, Group 2 as Standard, Group 3 treated with the Trial drug A *Commiphora caudata* (Wight & Arn.) leaves water extract (swarasa) as oral and Group 4 treated with Trial drug B *Commiphora caudata* (Wight & Arn.) leaves paste (kalka) externally. The paw volume was measured at 0 min, 15 min, 30 min, 60 min, 120 min and 240 minutes. The statistical data of the results of four groups were analyzed and compared. The study found the drug *Commiphora caudate* (Wight & Arn.) shows highly significant effect with  $P < 0.0001$  and on comparison of Standard and Trial drug A shows similar effect with P value 0.2897. On comparison of Standard drug and Trial drug B, the standard shows better result with P value 0.0073 in treating the inflammation. The drug shows significant action in *Shotha* (Inflammation) when administered orally.

**Key words:** *Commiphora caudata*, Inflammation, Anti-inflammatory activity

#### INTRODUCTION

Ayurvedic medical science plays a vital role in treating the chronic ailments where herbal drugs are the base which is very well explained by the ancient Acharyas (Great Scholars) of Ayurveda. The drug *Commiphora caudata* is a folklore drug widely used in South India, well known for its anti-inflammatory action. Inflammation is said to be the commonly seen symptom irrespective of any pathological condition where NSAIDS are the widely prescribed drug to overcome the pathology. Even though having much awareness about the untoward effect of NSAIDS, people are not much focused on herbal remedies as NSAIDS gives speedy recovery.

The drug *Commiphora caudata* (Wight & Arn.) is a moderate sized handsome tree of the Burseraceae family found in Kerala, Tamil Nadu, Andhra Pradesh, Karnataka, and in Srilanka<sup>1-5</sup>. This plant is found to be non-toxic<sup>12</sup>, known for its Antispasmodic activity<sup>6</sup>, Cytotoxic activity<sup>6</sup>, Hypothermic activity<sup>6</sup>, Analgesic<sup>7</sup> and Anti-inflammatory<sup>8</sup>. The paste of fresh leaves of this plant is used externally as an anti-inflammatory agent at Koothuparampu, Kanoor district in Kerala by some folklore practitioners.

Any inflammation or swelling in any part of the body is generally called as *Shotha* (inflammation) in Ayurveda. The compound or single drugs which are capable of reducing this symptom are called as *Shothahara* (Anti-inflammatory) or *Shothagna* (Anti-inflammatory) in Ayurvedic classic. In classical text, compound drugs such as Dashamoola (Root of ten

drugs) even many single herbal drugs like Sudarsana (*Crinum latifolium*), Eranda (*Ricinus communis*) etc are explained as *Shothahara* (Anti-inflammatory) in different context of Ayurveda. and even single drug modified in to tablet form studies also carried out<sup>9</sup>. Even though there are many available classical herbal drugs for the treatment of *Shotha* (Inflammation), the drug *Commiphora caudata* (Wight & Arn.) is abundant and easily available, which is even economical too. Considering its importance the attempt is made to study the anti inflammatory activity of the drug under the concept of extra pharmacopeia drug (Anukta dravya).

#### MATERIALS AND METHODS

**Collection of Sample:** The Botanically identified samples of *Commiphora caudata* (Wight & Arn.) Leaves from Cannanoor District and a voucher specimen of the plant are kept in our laboratory, Department of Dravyaguna Vijnana, Alva's Ayurveda Medical College & Hospital, Moodbidri, Karnataka. The specimens voucher number: AAMC/PG/DG/HR/2015/201

**Method to evaluate the Anti-inflammatory activity of Drug by Carrageenan induced paw oedema**<sup>10,11</sup>

#### Animals

Albino rats obtained from from the Animal house working in the Alva's Ayurveda Medical College, Moodbidri were used in the present study. Weight of the rats ranged from 150-200gm. All animals were housed individually and were maintained at 22°C (±3°C) with a dark/light cycle of 12:12 hours. Unlimited supply

of water was provided and feeded with conventional rodent laboratory diet and was fasted 16 hours prior to the experiment.

### Selection of Animals

24 number of healthy Albino rats of either sex, weighing between 150-200gms were selected. The animals were acclimatized at laboratory hygienic condition for 15 days before starting the experiment. The animal study was conducted at the animal house of Alva's Ayurveda Medical College, Moodabidri, after the approval from the institutional animal ethics committee. The number is AAMC/CPCSEA/IAEC/2014-15-AL-01

### Drug

- Control-Distilled water
- Standard drug-Combiflam suspension
- Trial drugs – Leaves of *Commiphora caudata* (Wight & Arn.) in two different forms Kalka (Paste) and Swarasa (Water extract) prepared as per classical reference.
- Inflammatory agent-Carrageenan

### Method of preparation of the drugs

1. Combiflam suspension

2. Test drugs

The leaves of *Commiphora caudata* (Wight & Arn.) were collected from Cannanor District, Kerala and officially identified.

**Swarasa** – The fresh leaves of *Commiphora caudata* (Wight & Arn.) was grinded in Kalvayantra (Mortar and pestle) then squeezed through and Swarasa (Water extract) was obtained as per classical reference<sup>12</sup>.

**Kalka** – The fresh leaves of *Commiphora caudata* (Wight & Arn.) was grinded in Kalvayantra (Mortar and pestle) and the Kalka(Paste) was obtained as per classical reference<sup>13</sup>.

### Doses

Animal dose is calculated by converting human dose by referring Paget & Barns Table.

Rat dose = Human dose x 0.018 x 5/ kg body wt.

#### i)For Trial drug A - Oral

As per classical text the single Swarasa (Water extract) dose is ½ Pala (24ml)

I.e. 24ml × 0.018 = 0.43ml / 200g rat

#### ii)For Trial drug B – External application

Sufficient quantity of Kalka (Paste)

#### iii)For Standard drug – Oral

Combiflam suspension 10ml = 10 x 0.018 x 5/ kg body wt. = 0.18 / 200g rat

### Preparation of Carrageenan

Carrageenan is a sulphated polysaccharide obtained from sea weeds (Rhodophyceae) and by causing the release of Histamine-5H T, Bradykinin and Prostaglandins it produces inflammations and oedema. 100 ml Saline is taken, to that 1gram powder of Carrageenan was added and stirred well to get unique mixture of 1% carrageenan solution.

### Method of measuring inflammation using Plethysmometer

Plethysmometer is a device designed by Singh & Ghosh in the year 1968 employed for measurement of paw volume of experimental rats. The apparatus consists of a chamber in one side and a graduating tube (Pipette) on the other side. In the pipette one unit displacement indicates 0.25 ml of displacement of Mercury. The pipette and the chamber are connected by U tube. To maintain the accurate reading a graph paper is attached to the side of the pipette and marked '0' at an initial level and Mercury is filled till that level and maintain that level as the initial point throughout the experiment. Then dipped the inflammation induced left paw in the chamber till the mark at the tibio-tarsal joint. The displacement of mercury from the level '0' is observed and readings are taken.

### Procedure

24 healthy albino rats of either sex were selected and divided into 4 groups, consisting of 6 rats in each group. The grouping was done in such a way that each group contained the rats of different weights ranging between 150-200g. The animals were kept in different cages and marked for their identification. The groups were named as 1, 2, 3 and 4. The drugs were then administered internally and externally by following manner.

**Group 1-** Control group- Natural recovery without giving any medicines was observed in this group.

**Group 2-** Standard group- This was treated with Combiflam suspension internally.

**Group 3-** Trial drug A - This was treated with *Commiphora caudata* (Wight & Arn.) Leaves Swarasa as oral.

**Group 4-** Trial drug –This was treated with *Commiphora caudata* (Wight & Arn.) Leaves paste as external application.

After one hour, 0.1 ml of Carrageenan was injected in the plantar region of left hind paw of each animal to induce the paw oedema. The paw volume was measured using Plethysmometer just after injection, 0min, 15 min, 30 min, 60 min, 120 and 240 minutes after injection.

### Statistical analysis

The data were statistically analyzed with repeated measures of ANOVA test and multiple comparison procedures (Tukey's multiple comparison) test by InStat software. In the present study 4 groups of Albino rats were used. The result was assessed statistically in different aspects for the better understanding such as comparison within group, between groups etc. Each group paw oedema was assessed at 0 minute, 15 minutes, 30 minutes, 60 minutes, 120 minutes and 240 minutes.

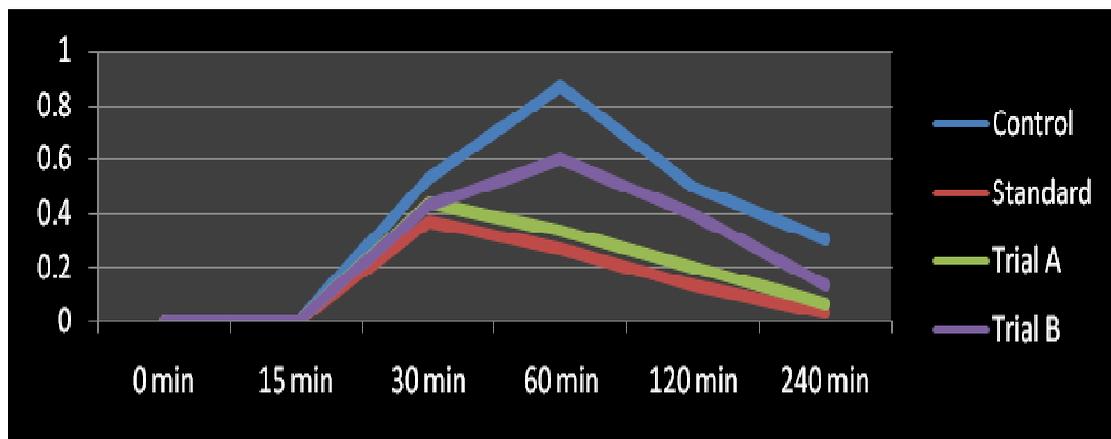
Table 1: Multiple comparisons between the groups

Comparison	30 min	60 min	120 min	240 min
Control- Standard	0.0002***	0.0001***	<0.0001***	0.0004***
Control-Trial A	0.0073***	0.0001***	0.0002***	0.0009***
Control-Trial B	0.0073***	0.0039**	<0.0001***	0.0055***
Trial A-Trial B	>0.9999*	0.0002***	0.0031***	0.0493**
Standard -Trial A	0.0493**	0.0493**	0.1579*	0.2897*
Standard -Trial B	0.0493**	<0.0001***	0.0002***	0.0073***

The t values at 0 min and 15 min cannot be calculated as the values are zero. It implies there is no significant difference between the groups at these intervals. \*Not significant, \*\* Significant, \*\*\*Highly significant [N= 6]

Table 2: Comparison of means of all groups at different intervals of time

Groups	Initial mean paw volume	Mean paw volume at 15 min	Mean paw volume at 30 min	Mean paw volume at 60 min	Mean paw volume at 120 min	Mean paw volume at 240 min
Control	0	0	0.533	0.866	0.5	0.3
Standard	0	0	0.366	0.266	0.133	0.033
Trial A	0	0	0.433	0.333	0.2	0.066
Trial B	0	0	0.433	0.6	0.4	0.133



Graph 1: Comparison of means at different intervals of time



Figure 1: Injection of Carrageenan



Figure 2: Initiation of inflammation



Figure 3: Complete paw oedema



Figure 4: Reduction in inflammation

## RESULT AND DISCUSSION

Statistically multiple comparisons of treatment effects between groups at different time intervals were done (Shown in table no 1, 2). It is found that the test was not significant statistically when assessed just after 0 minutes and 15 minutes in all the groups, because as it takes time for the developing of paw oedema.

In multiple comparison of control to standard group showed highly significant differences in 30 min, 60 min, 120 min, and 240 min was observed. It shows that there is significant effect of treatment in reducing the paw oedema in standard group than the control group.

In multiple comparison of control to trial A group showed highly significant differences at 30 min, 60 min, 120 min, 240

min and. It shows the significant effect of treatment in reduction of paw oedema in Trial A group than the control group.

In multiple comparison of control to trial B group showed statistically significant difference at 60 min and highly significant difference at 30 min, 120 min, and 240 minutes. This shows the significant effect of treatment in reduction of paw oedema in Trial B group than the control group.

In multiple comparison of Trial A to Trial B group showed statistically not having significant difference at 30 min and highly significant difference at 60 min and 120 min and significant difference observed at 240 minutes this shows the significant effect of treatment in reduction of paw oedema in Trial A group than the Trial B group but test was not significant at 30 minutes because as there was steady increase in oedema.

In multiple comparison of Standard to Trial A group shows statistically significant difference at 30 min and 60 min. It shows the significant effect of treatment in reduction of paw oedema in standard group than the Trial A group but test was not significant at 120 min and 240 minutes. It shows that there were no much difference in Standard and Trial A drug in the reduction of paw oedema at 240 min.

In multiple comparison of Standard group to Trial B group shows significant difference was observed at 30 minutes and statistically highly significant difference at 60 min, 120 min and 240 min. and. It shows the significant effect in reduction of paw oedema in Standard group than the Trial B group.

To analyse the comparison of means in all the groups showed that, Standard group is better than all groups in reduction of paw oedema and when comparison is done between the Trial A and Trial B groups, the Trial A group was better than Trial B group in reducing the oedema at different intervals of time.

#### Probable mode of action

The Rasadi (Principle components) properties of the drug *Commiphora caudata* (Wight & Arn.) are not mentioned in any of the classical text books of Ayurveda. By the Rasonipata (Taste threshold) method it was found that the Leaf of the drug has Kashaya (Astringent) as Pradhana rasa (Main taste).

As Kashaya Rasa (Astringent taste) is said to have Drava Soshana (Drying up / sucking of fluid accumulation) property which can reduce the fluid accumulation. As it is found that drug possess Kashaya (Astringent) as main rasa (Taste) the drug is inferred to have Sheetha Veerya (cold in potency) which can pacifies the Ushmata (Increase in temperature), mainly found during acute inflammation. So it can give a soothing effect.

Kashaya rasa (Astringent taste) which mainly pacifies the Kapha as well as Pitta Dosha can ultimately reduces the symptoms like Sirayama (torturing of blood vessels) and Davathu (Burning sensation).

Phytochemical study shows the presence of Flavonoid compound a secondary metabolite in plants which is well known for its anti-inflammatory property<sup>14</sup>.

This shows that the drug can be effective in treating inflammatory conditions and gives a better relief.

#### CONCLUSION

*Commiphora caudata* (Wight & Arn.) is a drug of folklore importance which is widely used by traditional practitioners owing to its medicinal values, so it deserves an important place in bio-diversity. Experimental evaluation on artificially induced inflammation proved that the *Commiphora caudata* (Wight & Arn.) has significant action in Shotha (Inflammation) were oral administration is much better than external application. The outcome of the study suggests that the study drug is effective in reducing the inflammation. So it can be considered as a drug of choice for inflammatory conditions. The overall assessment of study shown in graph 1

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