



## Research Article

# Anti-Inflammatory Effect of an Ethanolic Extract of *Ficus Dalhousiae* Miq Whole Plant (EEFD) In Wistar Albino Rats

V. Venkata Rajesham\*<sup>1</sup>, Harish Yeleti<sup>1</sup>, K. Manjeera<sup>1</sup>, Ashok Morsu<sup>2</sup>, Siddartha Goutham Reddy Banda<sup>2</sup>, Prasanna Kumar Lankalapalli<sup>3</sup>

<sup>1</sup>Department of Pharmacology, CMR College of Pharmacy, Kandlakoya (V), Medchal (M & D), Hyderabad– 501401, Telangana, India.

<sup>2</sup>PPD Part of Thermo Fisher Scientific, 3900 Paramount Parkway, Morrisville, North Carolina, United states<sup>2</sup>

<sup>3</sup>Visual Technologies LLC, 1333 Corporate Drive, Suite 264 Irving, TX 75038, USA

**Background:** *Ficus dalhousiae* is traditionally used in the treatment of liver, skin, and as antidiarrheal, antispasmodic, and to cure high cholesterol levels and malignancy. **Objective:** To evaluate the *in vitro* antioxidant and anti-inflammatory activity, *in vivo* anti-inflammatory activity of *Ficus dalhousiae* by carrageenan-induced hind paw edema in rat. **Methods** Anti-inflammatory activity was assessed by inducing edema in rat paw by injecting carrageenan (0.05 ml 1% w/v) on the last day of treatment. Before that Ethanolic extract of *Ficus dalhousiae* (EEFD) (200, 400 and 800 mg/kg) was administered for 30 days p.o once daily. The *in vitro* antioxidant and anti-inflammatory studies are also performed by methods like FRAP and hydrogen peroxide scavenging activity for antioxidant & inhibition of protein denaturation and proteinase inhibitory activity are for anti-inflammatory studies. The biochemical parameters are also performed such as CBP & CRP to determine WBC count and inflammation respectively. **Results:** Treatment with the Ethanolic Extract of *Ficus dalhousiae* (EEFD) has shown a significant dose-dependent improvement at the dose of 400 and 800mg/kg b. wt of anti-inflammatory activity. It is shown that EEFD has antioxidant activity, FRAP has shown IC<sub>50</sub> 170 ± 5.77 µg/ml in EEFD and L-ascorbic acid shown 8.71 ± 1.06 µg/ml of IC<sub>50</sub>. Hydrogen peroxide scavenging activity, EEFD has shown higher IC<sub>50</sub> value than gallic acid. The *in vitro* anti-inflammatory shown that, EEFD doesn't have the capacity to stop the heat-induced protein denaturation. But in proteinase inhibitory activity, it has shown that EEFD has higher IC<sub>50</sub> value than diclofenac sodium 91.9 ± 4.12µg/ml and 88.74 ± 1.42µg/ml respectively. **Conclusion:** The results of this study indicate that Ethanolic extract of *Ficus dalhousiae* has potential antioxidant and anti-inflammatory activities. Many polyphenolic compounds, such as alkaloids, flavonoids, and tannins, can be responsible for the reported effects. The substances isolated from the sample may behave as main oxidants due to their ability to block or scavenge free radicals. These components also inhibit proteinase activity and protect albumin from heat-induced denaturation. Based on these findings, a chemical isolated from the *Ficus dalhousiae* plant may prove to be a useful starting point for creating an effective anti-inflammatory drug.

**Keywords:** *Ficus dalhousiae*, Anti-inflammatory activity, Diclofenac sodium, Carrageenan.

## INTRODUCTION

Natural goods include bioactive chemicals which have ability to become innovative medicinal treatments. During the past ten years, there was an increase in enthusiasm for plant-based medications, which have become a significant group for disease

prevention. In accordance with the World Health Organization, over eighty per cent of individuals in poor countries rely on conventional medicines for basic health care, and a recent study found that over sixty per cent of patients utilize medicinal plants as part of their treatment <sup>[1]</sup>. Since tens of thousands of years ago, numerous individuals have used plants to

heal a variety of illnesses. Various countries employ plants as medicine, and they are the foundation of a wide range of potentially strong medications. Conventional medical care has established a foothold in everyday life and is still the major source for medical care in the countryside of numerous countries that are developing. Compared to synthetic or contemporary drugs, these medications are generally inexpensive and safer. Because they are present in combination or in a pooled form of several molecules in the protoplasm of the plant cell, herbal compounds are less dangerous and can defeat the resistance established by infections [2]. The researchers discovered an intriguing species of *Ficus* of the family Moraceae thriving in rock fissures while doing botanical research in Kuntho Betta near Pandavapura in Mandya District (Karnataka State). Through careful inspection and a thorough search, this was identified as *Ficus dalhousiae* Miq. It's notable that this extremely uncommon species is restricted to peninsular India. According to Wight's collection from India, Miquel initially identified this species as *Urostigma dalhousiae* in 1847. However, in 1867, it changed its name to *Ficus dalhousiae*. Later, the species was discovered the Nilgiri Mountains in the altitudinal range ranging from 605-1,370 m by king (1888), Hooker (1890), Brandis (1906), and Gamble (1928). There have been sightings of this particular species in many places. The fact that there has only ever been one *F. dalhousiae* tree in the area confirms its rarity. This species can be found thriving on the tops of rocky hills in Savanadurga (Ramanagaram District of Karnataka) and Siddara Batta (Tumakur District of Karnataka). No matter where it grows, its range is relatively constrained within the extremely rare group of endangered plants [3]. *Ficus dalhousiae* Miq is a Moraceae plant. They're exceptionally rare species seen in the Nilgiri highlands at elevations ranging from 605 to 1370 m. It is a 10 m tall tree with brown bark & simple oval leaves. The plant grows in damp deciduous woods and is found only in the Southern Western Ghats. It has a very limited number of inhabitants everywhere it expands which is presumably why it is listed as a vulnerable plant. Fruit is utilized as a cardio tonic, whereas leaves and bark are mostly employed in conditions of the liver and skin. The juice from leaves is anti dysentric in nature. Antispasmodic roots are used. According to tradition, bark can be used to cure high cholesterol levels and

malignancy [4]. Our study was focused on novel anti-inflammatory medicines from natural botanical sources that may have low side effects was motivated by the serious adverse effects of steroidal and non-steroidal anti-inflammatory therapies [5].

## MATERIALS AND METHODS

### MATERIALS

The reagents used in qualitative analysis are Millon's reagent, Ninhydrin reagent, Dragendroff's reagent, Wagner's reagent, benedict' reagent, Fehling's A and B solution, and the chemical used Ethanol (95%), Carboxymethyl cellulose (CMC), L-ascorbic acid, Disodium hydrogen phosphate, Potassium dihydrogen phosphate, Trichloroacetic acid (TCA), Ferric chloride, Hydrogen peroxide, Disodium phosphate, Monosodium phosphate, Tris HCl, Trypsin and chymotrypsin, Casein, Petchloric acid, and Diclofenac sodium.

### Collection and authentication the plant

*Ficus dalhousiae* Miq was collected in its whole at Tirupati, Andhra Pradesh. The *Ficus dalhousiae* Miq. plant has been verified by Dr. K. Madhava Chetty, who has a number of advanced degrees and is an assistant professor in the field of botany. Sri Venkateswara College in Andhra Pradesh's holy city of Tirupati.

### Preparation of ethanolic plant extract

The *Ficus dalhousiae* whole plant was washed with fresh water and dried in the dark at ambient temperature and in the shade to ensure cleanliness and hygiene. At room temperature, the brittle whole plant was grounded into powder using an electric grinder. The plant drug, whole coarsely powdered, is maintained in contact with the 95% ethanol in a sealed vessel for 6-7 days while being agitated frequently to disperse the soluble materials. The dried ethanolic extract of *Ficus dalhousiae* (EEFD) was stored in a day area in an airtight bottle for further studies [6].

### Experimental animals

Ethical approval for the study (ID: CPCSEA/1657/IAEC/CMRCP/COL-22/106) was

granted by the Institutional Animal Ethical Committee (IAEC) on November 9, 2022. The research included the use of 200-250 g adult male cross-bred albino rats. The animals had free access to pelleted food and running water in their plastic cages in a controlled environment (temperature: 28-31°C; photoperiod: roughly 12h sunlight per day; relatively humidity: 50-55%). Animals were dealt with only during cage cleaning and not at any other time except during experimental procedures. Animals were only employed as a last resort, and every attempt was made to lessen their suffering.

### Treatment Groups

**Group I-Normal Control:** Normal saline (10ml/kg), p.o, OD for 28 days.

**Group II-Toxic Control:** Carrageenan (1%w/v), intraplantar injection to paw.

**Group III-Standard Control:** Diclofenac sodium (10mg/kg), i.p,

**Group IV-Test Control (200mg/kg):** EEFD (200mg/kg), p.o,

**Group V-Test Control (400mg/kg):** EEFD (400mg/kg),

**Group VI- Test Control (800mg/kg):** EEFD (800mg/kg).

### Qualitative phytochemical analysis

The qualitative phytochemical analysis was performed to determine the presence of bioactive compounds like proteins, amino acids, alkaloids, flavonoids, tannins, phenolic compounds, carbohydrates, saponins, and coumarins [7, 8, 9, 10].

### *In vitro* Antioxidant Studies

#### Ferric Reducing Antioxidant Power Assay

Five different doses of EEFD (100, 200, 400, 800, & 1000 mg/ml) were mixed and L-ascorbic acid at the same concentrations, together with 2 ml of phosphate buffer (0.2 M, pH 6.6) and 2 ml of 1% potassium ferricyanide. The mixture was kept at 50°C for 20 minutes. After adding 2 ml of 10% trichloroacetic

acid (TCA), the mix was centrifuged at 1000 rpm for 10 minutes. The resultant 2 ml solution should be discarded and mixed with 2 ml of purified water and 1 ml of 0.1% ferric chloride (FeCl<sub>3</sub>). Each experiment was repeated three times. Absorbance values were then measured using a UV-visible spectrophotometer at 700nm and recorded.

### Hydrogen peroxide scavenging activity

Hydrogen peroxide was diluted to 20mM in a phosphate buffer of 50mM, pH 7.4. Each sample was diluted to a level of 0.1 ml in 50mM phosphate buffer pH 7.4 and put to the test tube. H<sub>2</sub>O<sub>2</sub> absorbance at 230 nm was measured against a blank after 0.6 ml of H<sub>2</sub>O<sub>2</sub> solution has been added and the tubes were shaken for 10 minutes [11].

### *In vitro* Anti-inflammatory Methods

#### Inhibition of Protein Denaturation

5 ml of the resulting solution encompassed 0.2 ml of fresh egg albumin, 2.8 ml of phosphate buffer saline (PBS, pH 6.4), and 2 ml of EEFD at doses of 10, 20, 40, 60, 80, and 100 mg/ml. Double-distilled water of the same volume was used as a control. After being heated to 70°C for 5 minutes, the samples were left to incubate at 37°C for 15 minutes. Once chilling was complete, the vehicle was used to measure their absorbance at 600 nm. The absorbance of diclofenac sodium was measured at concentrations of 10, 20, 40, 60, 80, and 100 mg/ml [12].

### Proteinase inhibitory activity

Enzyme at a concentration of 0.5 ml, 25mM Tris HCl buffer at 1 ml, and test solutions at 10–100 g/ml, each in 1 ml. Incubation at 37°C for 5 minutes was applied to the aforementioned mixture. Add 2 ml of 70% perchloric acid and boil at 70°C for 15 minutes with 1 ml of 0.8% w/v casein. The supernatant layer was separated from the rest of the mixture after centrifugation, and the absorbance at 276 nm was compared to that of a blank. Consequently, diclofenac sodium was selected as the gold standard [13].

### *In vivo* Anti-inflammatory studies

#### Carrageenan-induced hind paw edema

Six groups of six male rats overall were randomly assigned. The rat's weights ranged from 100 to 200g. An intradermal injection of carrageenan (0.05 ml, 1% w/v, normal saline solution) was injected into the plantar side of the left hind paw 1 hour after the administration of the vehicle, diclofenac (10 mg/kg), or EEFD (200, 400, 800 mg/kg). One, three, and six

hours after receiving a carrageenan injection, the paw volume was measured utilising a plethysmometer.

## RESULTS AND DISCUSSION

### RESULTS

**Table 1: Results of Qualitative phytochemical analysis**

| S.NO | Name of the Phytochemical | EEFD |
|------|---------------------------|------|
| 1.   | Carbohydrates             | -    |
| 2.   | Amino acids               | +    |
| 3.   | Proteins                  | +    |
| 4.   | Alkaloids                 | +    |
| 5.   | Saponins                  | +    |
| 6.   | Flavonoids                | +    |
| 7.   | Phenolic compounds        | +    |
| 8.   | Tannins                   | +    |
| 9.   | Triterpenoids             | +    |
| 10.  | Coumarins                 | -    |

Here, + indicates positivity and - negativity.

### *In vitro* Antioxidant Studies

An abundance of components, including amino acids, proteins, alkaloids, saponins, flavonoids, phenolic compounds, tannins, and triterpenoids, were found by qualitative phytochemical study of EEFD.

### Ferric Reducing Antioxidant Power Assay

**Table 4: Ferric Reducing Antioxidant Power Assay Results**

| Treatment                                 | Concentrations (µg/ml) | Absorbance (nm) | % Inhibition | IC50 (µg/ml) |
|-------------------------------------------|------------------------|-----------------|--------------|--------------|
| Plant Extract ( <i>Ficus dalhousiae</i> ) | 100                    | 0.159 ± 0.005   | 15.5 ± 0.7   | 170.9 ± 5.77 |
|                                           | 200                    | 0.12 ± 0.006    | 22.4 ± 2.16  |              |
|                                           | 400                    | 0.09 ± 0.003    | 48.2 ± 3.7   |              |
|                                           | 600                    | 0.077 ± 0.004   | 61.5 ± 4.34  |              |
|                                           | 800                    | 0.033 ± 0.004   | 73.5 ± 5.04  |              |
|                                           | 1000                   | 0.019 ± 0.006   | 87.5 ± 6.00  |              |
| Standard Drug (L-ascorbic acid)           | 100                    | 0.123 ± 0.006   | 8.2 ± 0.89   | 8.71 ± 1.06  |
|                                           | 200                    | 0.11 ± 0.004    | 17.9 ± 1.26  |              |
|                                           | 400                    | 0.076 ± 0.007   | 43.2 ± 2.83  |              |
|                                           | 600                    | 0.065 ± 0.010   | 51.4 ± 2.80  |              |
|                                           | 800                    | 0.032 ± 0.006   | 76.1 ± 4.44  |              |
|                                           | 1000                   | 0.027 ± 0.003   | 79.8 ± 3.17  |              |

The values are shown as a Mean ± SEM.

EEFD's IC50 value was 170 ± 5.77 µg/ml, whereas L-ascorbic acid's was 8.71 ± 1.06 µg/ml.

The present study shows a link between dose and activity within the designated 100-1000 ng/ml range of the plant *F. dalhousiae*. According to **Table 4**,

### Hydrogen peroxide scavenging activity

**Table 5: Hydrogen peroxide Scavenging Activity Results**

| Treatment                        | Concentrations (µg/ml) | Absorbance (nm) | % Inhibition | IC50 (µg/ml) |
|----------------------------------|------------------------|-----------------|--------------|--------------|
| Plant Extract (Ficus dalhousiae) | 100                    | 0.616 ± 0.14    | 21.40 ± 1.5  | 302.2 ± 22.1 |
|                                  | 200                    | 0.56 ± 0.08     | 38.40 ± 1.2  |              |
|                                  | 400                    | 0.425 ± 0.07    | 57.20 ±      |              |
|                                  | 600                    | 0.369 ± 0.06    | 65.70 ± 4.25 |              |
|                                  | 800                    | 0.267 ± 0.03    | 89.80 ± 3.49 |              |
|                                  | 1000                   | 0.162 ± 0.03    | 93.20 ± 1.3  |              |
| Standard Drug (Galic acid)       | 100                    | 0.63 ± 0.07     | 27.40 ± 2.02 | 246.0 ± 19.4 |
|                                  | 200                    | 0.515 ± 0.05    | 35.50 ± 2.1  |              |
|                                  | 400                    | 0.405 ± 0.06    | 45.60 ± 1.9  |              |
|                                  | 600                    | 0.327 ± 0.06    | 69.90 ± 1.8  |              |
|                                  | 800                    | 0.216 ± 0.04    | 87.40 ± 2.04 |              |
|                                  | 1000                   | 0.146 ± 0.02    | 95.50 ± 2.08 |              |

Values are represented as Mean ± SEM

Within a concentration range of 100-1000 µg/ml, several parts of *F. dalhousiae* were shown to have scavenging action against hydrogen peroxide. With an IC50 of 302.2 ± 22.1µg/ml, the EEFD demonstrated potent H<sub>2</sub>O<sub>2</sub> scavenging activity. The scavenging activity of standard L-ascorbic acid against H<sub>2</sub>O<sub>2</sub> was

246.0±19.4µg/ml, in contrast. According to **Table 5**, the H<sub>2</sub>O<sub>2</sub> inhibition rates of *F. dalhousiae* plant extract and L-ascorbic acid (1000 g/ml) were 93.20 ± 1.3 % and 95.50 ± 2.08 %, respectively.

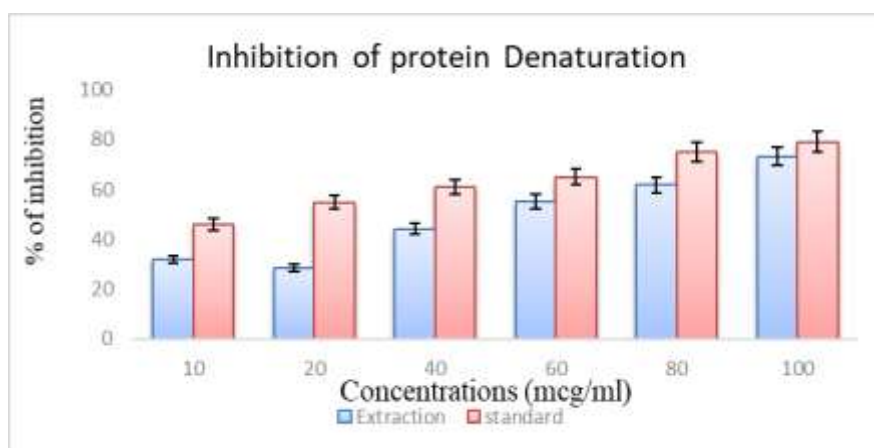
#### ***In vitro* Anti-inflammatory Studies**

##### **Inhibition of Protein Denaturation**

**Table 6: Inhibition of protein denaturation Results**

| Treatment                                 | Concentrations (µg/ml) | Absorbance (nm) | % Inhibition | IC50 (µg/ml) |
|-------------------------------------------|------------------------|-----------------|--------------|--------------|
| Plant Extract ( <i>Ficus dalhousiae</i> ) | 10                     | 0.237± 0.03     | 31.8±21.2    | 98.05±3.76   |
|                                           | 20                     | 0.128± 0.03     | 28.7±17.4    |              |
|                                           | 40                     | 0.1± 0.02       | 44±12.05     |              |
|                                           | 60                     | 0.08066± 0.01   | 55.1±7.5     |              |
|                                           | 80                     | 0.0686± 0.0083  | 61.8±5.33    |              |
|                                           | 100                    | 0.0483± 0.0075  | 73.1±4.37    |              |
| Standard Drug (Diclofenac sodium)         | 10                     | 0.097± 0.002    | 45.9±1.12    | 179.6±7.32   |
|                                           | 20                     | 0.081± 0.0003   | 54.8±0.18    |              |
|                                           | 40                     | 0.07± 0.0008    | 60.9±0.48    |              |
|                                           | 60                     | 0.063± 0.001    | 65±0.96      |              |
|                                           | 80                     | 0.045± 0.002    | 75±1.12      |              |
|                                           | 100                    | 0.037± 0.001    | 79.0±0.84    |              |

Values are represented as Mean ± SEM



**Figure 1: Inhibition of protein denaturation graph**

Further investigation into the anti-inflammatory mechanism was performed by testing the EEFD's inhibitory impact on protein denaturation. It worked well to avert the heat-induced denaturation of albumin. At a dose 100 µg/ml, suppression was measured to be  $73.1 \pm 4.37\%$ . At a concentration 100 µg/ml, the common anti-inflammatory medication

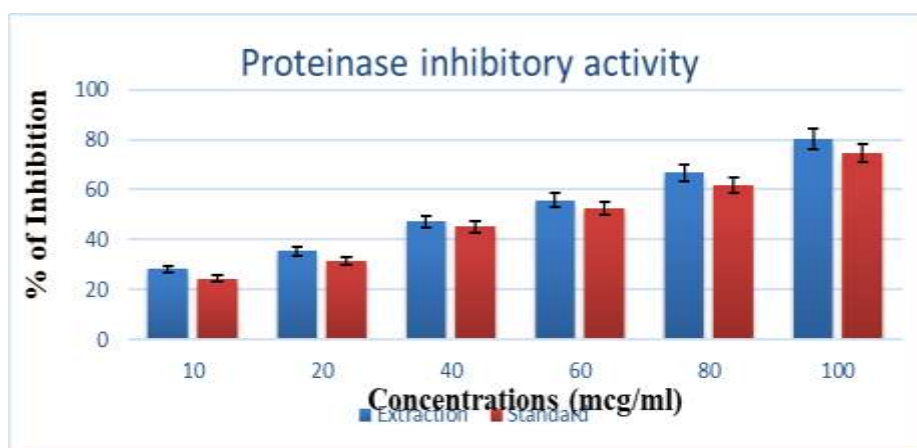
diclofenac sodium inhibits at a maximum rate of  $79.0 \pm 0.84\%$ . When compared to diclofenac sodium, for which the  $IC_{50}$  is  $179.6 \pm 7.32\mu\text{g/ml}$ , EEFD's result is lower, and at  $98.05 \pm 3.76\mu\text{g/ml}$ . **Table 6** clearly illustrates this.

#### Proteinase inhibitory activity

**Table 7: Proteinase inhibitory activity Results**

| Treatment                                 | Concentration (µg/ml) | Absorbance (nm) | % Inhibition | IC <sub>50</sub> (µg/ml) |
|-------------------------------------------|-----------------------|-----------------|--------------|--------------------------|
| Plant Extract ( <i>Ficus dalhousiae</i> ) | 10                    | 0.055±0.013     | 28.1 ± 6.03  | 91.9 ± 4.12              |
|                                           | 20                    | 0.04 ±0.005     | 35.4 ± 2.20  |                          |
|                                           | 40                    | 0.035 ± 0.006   | 47.2 ± 3.12  |                          |
|                                           | 60                    | 0.028 ± 0.004   | 55.8 ± 3.57  |                          |
|                                           | 80                    | 0.022 v 0.003   | 66.9 ± 1.46  |                          |
|                                           | 100                   | 0.016 ± 0.006   | 80.3 ± 1.89  |                          |
| Standard Drug (Diclofenac sodium)         | 10                    | 0.042 ± 0.003   | 76.6 ± 1.34  | 88.74 ± 1.42             |
|                                           | 20                    | 0.038 ± 0.006   | 78.8 ± 0.46  |                          |
|                                           | 40                    | 0.025 ± 0.006   | 86.1 ± 2.51  |                          |
|                                           | 60                    | 0.022 ± 0.001   | 87.7 ± 1.53  |                          |
|                                           | 80                    | 0.018 ± 0.005   | 90 ± 2.72    |                          |
|                                           | 100                   | 0.015 ± 0.006   | 91.6 ± 0.95  |                          |

Values represented as Mean ± SEM



**Figure 2: Proteinase inhibitory activity graph**

Table 14 shows that at several concentrations, EEFD has significant anti-proteinase action. At 100 $\mu$ g/ml, there was a maximum inhibition of EEFD of  $80.3 \pm 1.89$  %. Diclofenac sodium showed  $91.6 \pm 0.95$  %

inhibition at a concentration of 100 $\mu$ g/ml. EEFD had an  $IC_{50}$  of  $91.9 \pm 4.12$  $\mu$ g/ml, whereas diclofenac sodium had an  $IC_{50}$  of  $88.74 \pm 1.42$  $\mu$ g/ml.

#### ***In vivo* Anti-inflammatory Studies:**

**Table: Carrageenan-induced Paw edema in albino rats**

| Treatment                   | Initial Vol of Leg (ml) |                   | After 30 min       |                   | 1 hr               |                   | 3 hr               |                   | 5 hr               |                   | 6 hr               |                    |
|-----------------------------|-------------------------|-------------------|--------------------|-------------------|--------------------|-------------------|--------------------|-------------------|--------------------|-------------------|--------------------|--------------------|
| Rat legs                    | Right Leg Vol (ml)      | Left Leg Vol (ml) | Right Leg Vol (ml) | Left Leg Vol (ml) | Right Leg Vol (ml) | Left Leg Vol (ml) | Right Leg Vol (ml) | Left Leg Vol (ml) | Right Leg Vol (ml) | Left Leg Vol (ml) | Right Leg Vol (ml) | Left Leg Vol (ml)s |
| Control Group               | 0.28 $\pm$ 0.03         | 0.28 $\pm$ 0.03   | 0.28 $\pm$ 0.03    | 0.28 $\pm$ 0.03   | 0.28 $\pm$ 0.03    | 0.28 $\pm$ 0.03   | 0.28 $\pm$ 0.03    | 0.28 $\pm$ 0.03   | 0.28 $\pm$ 0.03    | 0.28 $\pm$ 0.03   | 0.28 $\pm$ 0.03    | 0.28 $\pm$ 0.03    |
| Toxic Group                 | 0.3 $\pm$ 0.03          | 0.3 $\pm$ 0.03    | 0.3 $\pm$ 0.03     | 1.4 $\pm$ 0.03    | 0.3 $\pm$ 0.03     | 1.4 $\pm$ 0.03    | 0.3 $\pm$ 0.03     | 1.2 $\pm$ 0.04    | 0.3 $\pm$ 0.03     | 1.8 $\pm$ 0.04    | 0.3 $\pm$ 0.03     | 2 $\pm$ 0.05       |
| Standard Group              | 0.3 $\pm$ 0.03          | 0.3 $\pm$ 0.03    | 0.3 $\pm$ 0.03     | 1.4 $\pm$ 0.03    | 0.3 $\pm$ 0.03     | 1.3 $\pm$ 0.02    | 0.3 $\pm$ 0.03     | 1.5 $\pm$ 0.02    | 0.3 $\pm$ 0.03     | 0.7 $\pm$ 0.12    | 0.3 $\pm$ 0.03     | 0.4 $\pm$ 0.02     |
| Low Dose (200 mg/kg)        | 0.3 $\pm$ 0.03          | 0.3 $\pm$ 0.03    | 0.3 $\pm$ 0.03     | 1.3 $\pm$ 0.04    | 0.3 $\pm$ 0.03     | 1.3 $\pm$ 0.04    | 0.3 $\pm$ 0.03     | 1.2 $\pm$ 0.03    | 0.3 $\pm$ 0.03     | 1 $\pm$ 0.03      | 0.3 $\pm$ 0.03     | 1 $\pm$ 0.02       |
| Intermediate Dose(400mg/kg) | 0.2 $\pm$ 0.03          | 0.2 $\pm$ 0.03    | 0.2 $\pm$ 0.03     | 1.3 $\pm$ 0.04    | 0.2 $\pm$ 0.03     | 1.3 $\pm$ 0.04    | 0.2 $\pm$ 0.03     | 1.2 $\pm$ 0.03    | 0.2 $\pm$ 0.03     | 1 $\pm$ 0.03      | 0.2 $\pm$ 0.03     | 0.7 $\pm$ 0.14     |
| High Dose (800 mg/kg)       | 0.3 $\pm$ 0.03          | 0.3 $\pm$ 0.03    | 0.3 $\pm$ 0.03     | 1.4 $\pm$ 0.03    | 0.3 $\pm$ 0.03     | 1.4 $\pm$ 0.03    | 0.3 $\pm$ 0.03     | 1.1 $\pm$ 0.05    | 0.3 $\pm$ 0.03     | 0.7 $\pm$ 0.13    | 0.3 $\pm$ 0.03     | 0.3 $\pm$ 0.03     |

Taking *F. daldousiae* orally showed promising anti-inflammatory effects. The 800 mg/kg dose of *F. daldousiae* reduced edema volume significantly. An hour afterward ( $1.4 \pm 0.03$  ml). A significant edema decrease was seen after 3 hours ( $1.1 \pm 0.05$  ml). Edema volume decreased similarly with 400 mg/kg

( $1.3 \pm 0.04$  to  $0.7 \pm 0.14$  ml) dose. Comparing the results to common anti-inflammatory drugs such as Diclofenac sodium (10mg/kg), considerable inhibition was shown after 5 hours ( $1.4 \pm 0.03$  to  $0.4 \pm 0.02$  ml).

#### **Biochemical parameters**

**Table 2: Complete Blood Picture Results**

| Groups                      | Control | Toxic | Standard | EEFD Low Dose | EEFD Intermediate Dose | EEFD High Dose |
|-----------------------------|---------|-------|----------|---------------|------------------------|----------------|
| WBC (x10 <sup>3</sup> /μl)  | 4.7     | 6.7   | 5.1      | 6.1           | 5.4                    | 5.2            |
| Lym%                        | 20      | 28    | 21       | 26            | 24                     | 22             |
| Gran%                       | 19      | 27    | 20       | 22            | 20                     | 20             |
| Mid%                        | 20      | 30    | 22       | 24            | 22                     | 19             |
| Lym (x10 <sup>3</sup> /μl)  | 1.03    | 3.2   | 1.3      | 2.9           | 2.7                    | 2.5            |
| Gran (x10 <sup>3</sup> /μl) | 0.03    | 2.4   | 1.2      | 1.8           | 1.7                    | 1.1            |
| Mid (x10 <sup>3</sup> /μl)  | 1.2     | 2.5   | 1.5      | 2.6           | 1.8                    | 2.4            |
| RBC (x10 <sup>3</sup> /μl)  | 5.4     | 6.1   | 5.6      | 5.8           | 5.4                    | 5.8            |
| HGB (g/dl)                  | 13.4    | 12.5  | 14.3     | 14.3          | 14.4                   | 12.6           |
| HCT %                       | 45      | 42    | 44       | 45            | 46                     | 47             |
| MCV (fl)                    | 51.3    | 59.2  | 53.4     | 57.5          | 53.8                   | 53.2           |
| MCH (pg)                    | 17.5    | 24.2  | 21.3     | 22.9          | 20.4                   | 17.9           |
| MCHC(g/dl)                  | 33.6    | 50.2  | 37.6     | 45.4          | 21.3                   | 34.9           |
| PLT (x10 <sup>3</sup> /μl)  | 9       | 20    | 10.2     | 14            | 12                     | 10             |

The CBP test shows an increase in the toxic and low dosage groups in the absolute number of WBC, Lym, Gran, Mid, and PLT as well as the percentage of Lym, Gran, Mid. HGB, HCT, MCV, MC, and MCHC levels are all within normal ranges, while there is a little rise

in the RBC count as well. When comparing the high dosage to the standard, you'll notice a little increase in WBC.

#### C-reactive Protein Test

**Table 3: C-reactive Protein Test Results**

| Groups     | Control | Toxic | Standard | EEFD Low Dose | EEFD Intermediate Dose | EEFD High Dose |
|------------|---------|-------|----------|---------------|------------------------|----------------|
| CRP (mg/L) | 0.5     | 7     | 0.8      | 6             | 3                      | 1              |

Test for C-reactive protein; a result of 5 or below indicates good health. Control, toxic, standard, low dosage, intermediate dose, and high dose all have CRP levels, control of 0.5; toxic has 7, standard has 0.8, low has 6, intermediate 3, and high has 1. Taking the C-reactive protein data into account, we can state that *Ficus dalhousiae* Miq Possesses potent anti-inflammatory properties. 400 and 800 mg/kg of body weight of a plant extract were shown to have anti-inflammatory properties.

#### DISCUSSION

This study evaluated the anti-inflammatory properties of *Ficus dalhousiae* Miq extract at 200, 400, and 800 mg/kg body weight, focusing on its phytochemical and pharmacological evaluation. Phytochemical analysis of EEFD shows that it contains a variety of useful chemicals such alkaloids, proteins, tannins,

flavonoids, amino acids, phenolic compounds, and saponins. Increased production of reactive oxygen species and decreased effectiveness of antioxidant systems inside the body lead to oxidative stress. Reactive oxygen species (ROS) generation is a natural cellular activity that cannot be stopped in aerobic organisms. Oxidative stress causes an increase in reactive oxygen species (ROS) production, which in turn alters the lipid, protein, and nucleic acid composition of membranes. Antioxidants derived from plants are quickly becoming a popular alternative to synthetic antioxidants. The widespread belief that antioxidants derived from plants are safer, more easily accessible, and more reasonably priced is a major factor in this change. Research on antioxidants show a correlation between EEFD content and efficiency from 100 to 1000 μg/ml. Compared to the reference medication L-ascorbic acid (8.71 ± 1.06 μg/ml), EEFD has a greater IC50

value ( $170.9 \pm 5.77 \mu\text{g/ml}$ ), as shown by the data. EEFD's IC<sub>50</sub> value for hydrogen peroxide scavenging action ( $302.2 \pm 22.1 \mu\text{g/ml}$ ) is greater than that of the gold standard medication, gallic acid ( $246.0 \pm 19.4 \mu\text{g/ml}$ ). Pain is often associated with inflammation, a complex biological phenomenon. It includes numerous processes, such as increased protein denaturation, changes to cellular membranes, and increased vascular permeability. Internal damage to cells from microorganisms, physical trauma, or chemical toxins ultimately emerges as stress within the human body. A physiological response to stress is tissue inflammation. When proteins are exposed to extreme conditions, such as high temperatures, powerful acids or bases, highly concentrated inorganic salts, or other forms of stress, they can become denatured, losing their tertiary and secondary structures. When denaturation occurs, most biological proteins lose their original biological activity. *F. dalhousiae* has been shown to be effective in halting heat-induced albumin denaturation. At a concentration of  $100 \mu\text{g/ml}$ , its inhibitory efficacy was at its highest ( $73.1 \pm 4.37\%$ ). It inhibited activity less well than diclofenac sodium. Neutrophils are distinguished by their high serine proteinase output and lysosomal location. Leukocyte proteinases have been found to have an important part in the development of tissue damage during inflammatory reactions. In addition, it has been shown that proteinase inhibitors provide a high level of protection towards this kind of harm. Results from testing EEFD at a range of doses showed that it had potent anti-proteinase action. The greatest observed level of inhibition was achieved at a concentration of  $100 \mu\text{g/ml}$ , when  $80.3 \pm 1.89\%$  was recorded. EEFD's anti-inflammatory effects were especially encouraging when taken orally. An important finding indicated that EEFD, when administered to rats at  $800 \text{ mg/kg b. wt}$ , significantly reduced edema volume. Thus, in the setting of carrageenan-induced hind paw edema, *Ficus dalhousiae* Miq was demonstrated to have anti-inflammatory activities.

## CONCLUSION

The results of this study indicate that *Ficus dalhousiae* ethanolic extract has powerful antioxidant and anti-inflammatory properties. Many polyphenolic compounds, such as alkaloids, flavonoids, and

tannins, can be responsible for the reported effects. The substances isolated from the sample may behave as main oxidants due to their ability to block or scavenge free radicals. These components also inhibit proteinase activity and protect albumin from heat-induced denaturation. Based on these findings, a chemical isolated from the *Ficus dalhousiae* plant may prove to be a useful starting point for creating an effective anti-inflammatory drug. Cancer, neurological disease, senescence, gastroprotection, hepatoprotection, and inflammation are only a few of the possible applications for this sort of medication.

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