



## **Anti-inflammatory Potentials of *Fibraurea tinctoria* Leaves Extract in Experimental Rats or Animals**

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### **Author's contribution**

The sole author designed, analysed, interpreted and prepared the manuscript.

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### **ABSTRACT**

The activity of the hydroalcoholic extract of *Fibraurea tinctoria* leaves and anti-inflammatory was investigated. We utilized rats for which oedema was induced by carrageenan. The extract of *Fibraurea tinctoria* leaves was administered orally at doses of 100, 200 and 400 mg/kg. Paw oedema was significantly minimized using all prepared doses of the extract administered. The 400 mg/kg dose producing the highest oedema reduction. The Percent Inhibition with hydroalcoholic extract of *Fibraurea tinctoria* and Indomethacin were 67.6% and 68.49% respectively. We concluded that this study has established the anti-inflammatory activity of hydroalcoholic extract of *Fibraurea tinctoria* leaves. I believe the results justify the traditional uses of the plant in the treatment of wounds and inflammation.

**Keywords:** Anti-inflammatory; *Fibraurea tinctoria*; carrageenan; hydroalcohol.

### **1. INTRODUCTION**

A naturally occurring pathophysiological response of all living tissue to various types of injuries is inflammation process. It usually results

in local accumulation of plasmatic fluids and blood cells. Many diseases will be induced, maintained, or aggravated by the complex events and mediators that compose the inflammatory process [1]. There are many substances that are

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used for the treatment or management of inflammation due to various causes [1]. Because such substances carries the risk of side effects during clinical use, the researchers are continuing to evaluate them [2]. There for, it is necessary to continue the investigation and development of newer, safer, and powerful anti-inflammatory agents. Several medical conditions manifestation include pain and inflammatory process.

The inflammation is one of the main defence layer of the body to combat and overcome foreign pathogens entering the circulation. Among a major selection of drugs that used for pain and inflammation control are the Non-steroidal anti-inflammatory drugs (NSAIDs) [3]. But the use of such important class of drugs is associated with side effects which limit its use. It is important to note that users of NSAIDs will encounter a bothersome gastrointestinal damage (34-46% of users) and that because of its mechanism of action in the suppression of the favoured protective effect of cyclooxygenase enzyme in gastric mucosa [4].

During inflammation, the body releases inflammatory mediators that include histamine, 5-HT, bradykinin and eicosanoids [5]. Recent clinical trials on anti-inflammatory drugs reflect improved efficacy and tolerability and reduction in major adverse effects including gastrointestinal discomfort, dizziness, blurring of vision, rashes, itching etc.

Inflammation is central to bodily defence as well as many pathological conditions. The inflammatory process is the response to a harmful stimulus [6,7]. This process is triggered by a wide spectrum of toxic factors (e.g., infections, antibodies, or physical injuries). Body being able to initiate an inflammatory response is crucial for existence in the face of environmental pathogens and injury; in some situations and diseases sustained without apparent benefit which severs adverse consequences [8,9].

*Fibraurea tinctoria* is a plant that is characterized by large woody, entirely glabrous climber up to 40 m long and with a stem diameter up to 5 cm. It's roots are flexible and spongy to pressure, the bark greyish and the leaves entire, elliptic to ovate, 10-28 cm long. The natural habitat of this plant is in lowland forest and will be not exceed elevations of up to 1200 m from sea level.

## 2. MATERIALS AND METHODS

*Fibraurea tinctoria* leaves were collected from our selected plants then prepared for extraction with ethanol in order to prevent any possible microbial growth. All collected and prepared leaves then dried naturally avoiding direct sun exposure. Fifty grams of *Fibraurea tinctoria* grounded leaves were extracted using 250 ml of hydro alcohol (Ethanol + water, 3:1 ratio) in a soxhlet apparatus for 72 hrs. The end mixture then was concentrated and used as hydroalcoholic extract of *Fibraurea tinctoria* leaves.

Albino rats (100-150 mg. each, male/female) were kept under according to standard procedures/environmental conditions (25±2°C under 12 h light and 12 h dark cycle) in standard (polypropylene) cages. Throughout the experiment, standard palliated feed and water were provided. All experimented rats were adapted to laboratory environments 7 days prior to the commencement of experimental work [10, 11].

Anti-inflammatory activity was evaluated after one night fasting of all animals. Rats were divided into five groups of six animals each.

**Group I** served as Inducer control and given normal saline only.

**Group II** given 100mg/kg hydroalcoholic extract of *Fibraurea tinctoria*

**Group III** given 200mg/kg hydroalcoholic extract of *Fibraurea tinctoria*

**Group IV** given 400mg/kg hydroalcoholic extract of *Fibraurea tinctoria*

**Group V** given Indomethacin (10mg/kg b. w.) orally.

Induction of acute inflammation was by injecting 0.1 ml of 1%w/v carrageenan in to the sub-plantar region of the right hind paw of rats. The paw volume is measured by using digital Plethysmometer at the time interval of 15, 30, 60, 120, 180 min respectively. Percentage of edema reduction was calculated by utilizing the following equation:

$$\% \text{ inhibition} = \frac{V_c - V_t}{V_c} \times 100$$

Where

Vt = increase in paw volume in rats treated with compound and

Vc= increase in paw volume in control group of rats.

Graph pad prism 5.0 software was utilized for statistical analysis of the results. The mean  $\pm$  SD was used to express results. Mean values were compared for various treatments one way analysis of variance test (ANOVA test) followed by Dunnett Multiple Comparisons Test and the p values less than 0.5 were considered significant [12].

### 3. RESULTS AND DISCUSSION

All chemical tests performed in this experiment for the hydroalcoholic extract of *Fibraurea tinctoria* leaves expressed favoured results for Saponins, Tannins, Amino acids, Proteins, Cardiac glycosides, Alkaloids, Carbohydrates and Flavonoids except glycosides.

The hydroalcoholic extract of *Fibraurea tinctoria* (400 mg/kg) and indomethacin (10 mg/kg)

inhibited the rat paw edema that was induced by carrageenan ( $P < 0.5$ ). At the completion of 180 minutes, we observed a maximum inhibition of the paw edema as the positive effect of hydroalcoholic extract of *Fibraurea tinctoria* and indomethacin at the given doses. Percent inhibition was used to compare the result with the control group. Table 1 and Fig. 1, demonstrate the percent inhibition of all groups which came to be 67.6% for hydroalcoholic extract of *Fibraurea tinctoria* and 68.49% for Indomethacin.

In a normally functioning body, inflammation process is a naturally occurring defence mechanism. In an acute state, the inflammation is usually occurs with vasodilatation, exudation of plasma, various inflammatory mediators release. That include cytokines, growth factors and emigration of leukocytes [13]. On the other hand, chronic inflammation includes infiltration of mononuclear cells, proliferation of fibroblasts, blood vessels and increased connective tissue formation. Chemical product (natural or manufactured) that have the anti-inflammatory effects will inhibit different stages of inflammation [14].

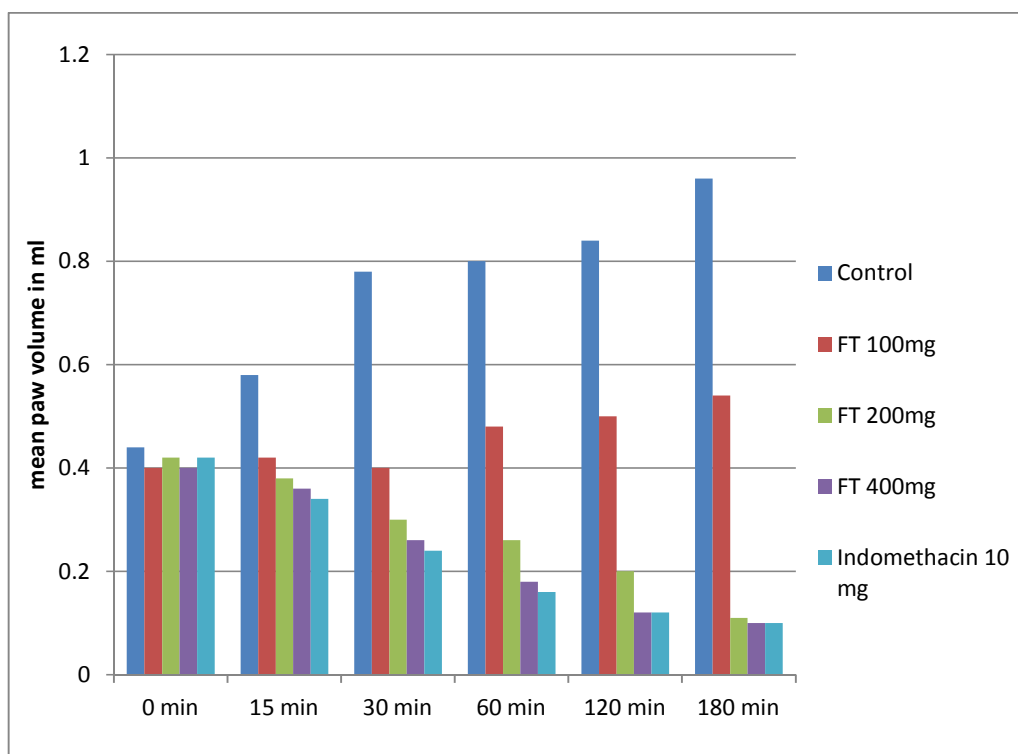


Fig. 1. Effect of *Fibraurea tinctoria* leaves extract on carrageenan induced paw edema in rats

**Table 1. Effect of *Fibraurea Tinctoria* leaves extract on carrageenan induced paw edema in rats**

S. No	Groups	Mean paw volume in ml						Percentage inhibition
		0 min	15 min	30 min	60 min	120 min	180 min	
1	Control	0.44±0.2	0.58±0.1	0.78±0.4	0.80±0.1	0.84±0.2	0.96±0.6	Vc = 0.73
2	FT 100 mg	0.40±0.1*	0.42±0.6	0.40±0.8	0.48±0.4*	0.50±0.4*	0.54±0.8	37.44
3	FT 200 mg	0.42±0.1*	0.38±0.4*	0.30±0.6	0.26±0.4*	0.20±0.1*	0.11±0.2*	61.87
4	FT 400 mg	0.40±0.1*	0.36±0.2	0.26±0.4*	0.18±0.7	0.12±0.1	0.10±0.2*	67.60
5	Indomethacin 10 mg	0.42±0.1*	0.34±0.1*	0.24±0.2*	0.16±0.6	0.12±0.1*	0.10±0.2*	68.49

*Significantly reduced the inflammation on rats (p<0.5)*

#### 4. CONCLUSION

The results here are promising in acute cases but the hydroalcoholic extract of *Fibraurea tinctoria* effect in the chronic cases is of lesser extent in comparison with standard anti-inflammatory product like indomethacin. Our study here is very important to give an alternative giving the fact that NSAIDs as well as steroids are of high side effect index. The outcome of our findings should be carried out in human subjects after establishing the safety and efficacy profile after long term administration.

#### CONSENT

It is not applicable.

#### ETHICAL APPROVAL

Ethical approval was taken from the Animal ethics committee for carry out this work.

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#### COMPETING INTERESTS

Author has declared that no competing interests exist.

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