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ANTI-INFLAMMATORY ACTIVITY OF PAEDERIA FOETIDA LINN IN CARRAGEENAN INDUCED RAT PAW EDEMA

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ABSTRACT:

Ancient time herbal medicine are used for diagnosis of many disease use of natural restoration for prevention and removal of disease symptoms . Although both ethanolic extract and butanolic fraction are effective against carrageenan induced paw edema but butanolic fraction was more effective then its ethanolic extract.Finaly accomplished butanolic fraction of ethanolic extract 100 mg produce a significant anti-inflammatory effects than phenylbutazone 50 mg and ethanolic extract 200 mg. occurs 4 to 5 hrs. after carrageenan injection their acceptability in modern system of medicine . One of the major problems faced by the herbal industry is the unavailability of rigid quality control profiles for herbal materials and their formulations. QC of herbal drugs should meet the standards related to safety, potency and efficacy.

There are some specific system present in human body that is responsible for controlling brain heamostatis as well as heamolytic factors. these factor are extradude there effect in the form of adverse reaction role The inflammatory activity against carrageenam induced paw edema in rat using pet ether extract and ethanolic are effective but aqueous extract was more effective as compare to Pet.ether and ethanolic extract. All three extract having analgesic activity but aqueous fraction has more analgesic activity in camparision of Pet ether and ethanol extract . In conclusion every that the plant extracts possess anti- inflammatory and analgesic properties and lead to the isolation of novel compounds.

KEYWORDS: Quality control, Herbal drugs, Anti- inflammatory,Edema

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INTRODUCTION

Inflammation or cell decay is caused by the tissue injury caused by various environmental factors related to nature. When ever certain harmful stimuli occur cause demage to tissues underlying cell.The inflammatory factors cause demage i8n form of redness,tumor,swelling of veins and change skin colour. There are many causes for the inflammations, but the mechanisms are common to all. The inflamatory agent acts in the cell membranes inducing the activation of phospholipase A2 and consequently, liberates arachidonic acid and metabolites. The process of irritationor inflammation occur in three different steps ,each steps having seperate mode for inflammation.

(1) Cell permeability and vasodilation increased during the first step .

(2) Subacute phase characterized by infiltration of leukocytes and phagocytic cells.

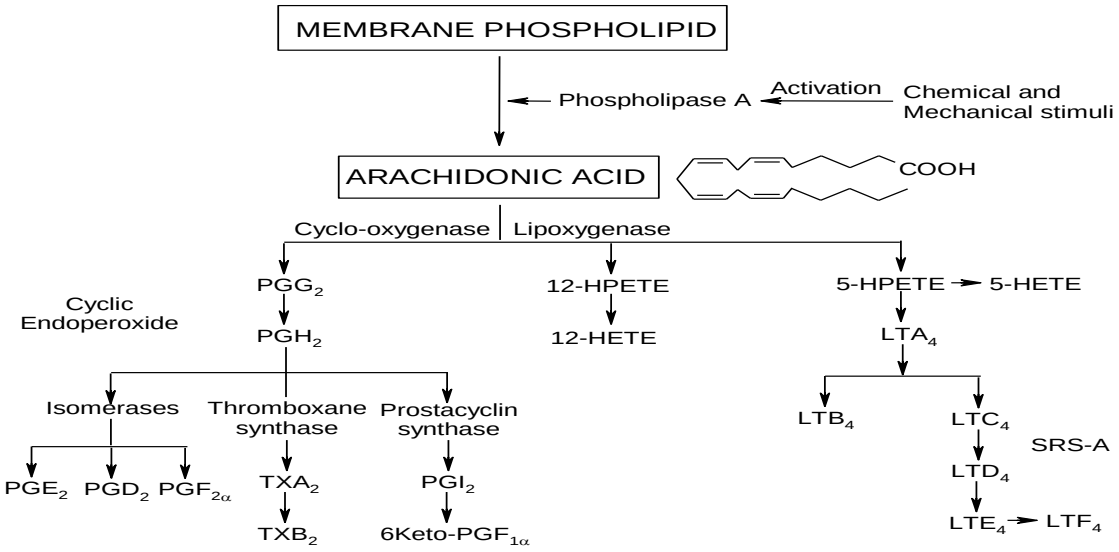
(3) At last cell division lead to chronic ,as a result activity of cell destroy and and cause bleeding.

Mediators of Inflammation:

Tissues demages occur by the action of mediator that is responsible for the generation of certain chemical stumuli and various types of enzymes system. . These chemicals are histamine,plasmakinnin,prostaglandian some kinnin factors related to kidney like rennin trivalent monosacrides etc. mediatorsa means specific messangers that is responsible for generation of information.

Inflammatory mediators are divided into two categories:

1) Platelets and mast cell produce inisitals mediators.some of the chemotaxix cytokinin, interleukin IIX,1X2 IX4 ,TNF-produce inflammation.
2) Late phase mediators are responsible for the regulation of vascular events occurring later about 6-12 hours after initiation of inflammation.
3) Arachidonic acid control or causes last inflammatory response.



Scheme 4.1: Biosynthesis of Prostaglandins and Leukotrienes (Tripathi., 2004)

4.2 SCREENING METHODS FOR ANTI-INFLAMATTORY DRUGS

The network process of inflammation and the chemical nature of drugs that have been found effective in modifying this process have resulted in development of numerous methods of assay for the detecting the anti inflammatory substances. Various *in-vivo* and *in-vitro* models have been proposed as being able to detect anti-inflammatory effect.Some of these methods are used for there evaluation or lecoform of active drug for there potential data used in rheumatoid arthritis. Since the of pathophysiology**,** of arthritis ,in development immunologyuniue test are used for thyere diagnosis.

According to three phases (acute, subacute, and chronic), pharmacological methods have been developed. Methods for testing acute and subacute inflammation are (Vogel, 2003):

- UV-erythema in guinea pigs
- Vascular permeability
- Oxazolone-induced edema
- Croton-oil ear edema in rats and mice
- Carrageenan induced paw edema in rats
- Pleurisy tests
- Granuloma pouch technique

The proliferate phase in measured by methods for testing granuloma formation, such as:

- Cotton wool granuloma
- Glass rod granuloma
- PVC sponge granuloma.

Furthermore, methods for testing immunological factors have been developed, such as:

- Adjuvant arthritis in rats
- Experimental allergic encephalomyelitis
- Schultz-Dale-reaction
- Passive cuetaneous anaphylaxis
- Arthus type immediate hypersensitivity
- Delayed type hypersensitivity
- Carrageenan induced paw edema model

Materials and Methods

Albino rats (Wistar strain 110-160 gm) of either sex were used for this experiment. The animals were housed in the polypropylene cages in animal house, Department of Pharmaceutical Sciences, Dr. H. S. Gour University, Sagar (M.P.) and provided with food and water *ad libitum*. The research was conducted in accordance with the ethical rules on animal experimentation approved by ethical committee.

Preparation of test and standard drug solution: -

1. **Carrageenan solution:** Suspension of drug was prepared by suspending the Carrageenan in 2% tween 80 suspension solution.
2. **Standard drug solution:** Phenylbutazone suspended in 2% tween 80 was prepared giving a suspension of 50 mg/kg b.w.
3. **Ethanolic extract:** Ethanolic extract suspended in 2% tween 80 was prepared giving a suspension of 100, 200 mg/kg b.w.
4. **Butanolic fraction of ethanolic extracts:** Butanolic fraction suspended in 2% tween 80 was prepared giving a suspension of 25, 50, 100 mg/kg b.w.

Administration of dose to test animals

Seven groups of 6 rats each were allotted to different treatment groups.

Group one is served as control, was given distilled water as a vehicle orally (10 ml/kg, b.w.).

Animals of groups 2 and 3 received ethanolic extract orally at the doses of 100 and 200 mg/kg b.w., respectively.

Similarly Groups 4-6 received butanolic fraction of ethanolic extract orally at the doses of 25, 50 and 100 mg/kg b.w. respectively.

Group 7 was treated orally with 50 mg/kg, b.w., of phenylbutazone used as standard drug.

After 30 minutes, edema was induced by injection of carrrageenan (0.1 ml, 1% w/v in normal saline) into the sub plantar tissue of the right hind paw of rats. Volumes of right hind paw of control and treated animals were measured with a Plethysmometer. Reading of paw volumes was taken immediately before designated as (Vo) and after 1, 2, 3, 4 and 5 hrs following carrageenan injection, designated as (Vt). The inhibitory activity was calculated according to the following formula.

$$\% \text{ Inhibition} = \frac{[V_t - V_0] \text{ Control} - [V_t - V_0] \text{ Treated}}{[V_t - V_0] \text{ Control}} \times 100$$

Statistical analysis

The percentage of deviation is calculated by the utilization of standared deviation method. The difference between initial anf final deviation by calculation of variance analysis.

Table: Effect of Extracts of the Leaves of *Paederia foetida* and Phenylbutazone on carrageenan induced rat paw edema

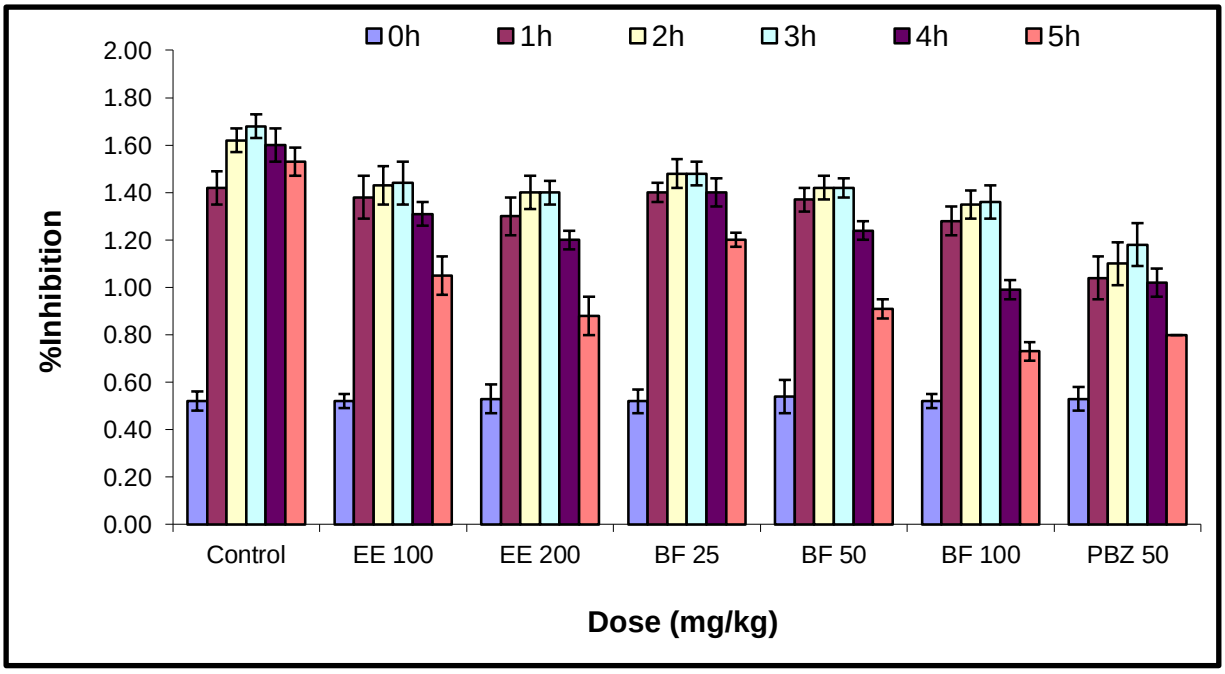
S. No.	Treatment	.Dose (mg/kg)	Right hind paw volume (mean±SD) (ml)					
			0h	1h	2h	3h	4h	5h
1.	Control	–	0.52 ±0.04	1.42 ±0.07	1.62 ±0.05	1.68 ±0.05	1.60 ±0.07	1.53 ±0.06
2.	Ethanolic Extracts	100	0.52 ±0.03	1.38 ±0.09 (4.4%)	1.43 ±0.08** (17.2%)	1.44 ±0.09** (20.6%)	1.31 ±0.05** (26.8%)	1.05 ±0.08** (47.5%)

3	Ethanolic Extracts	200	0.53 ±0.06	1.30 ±0.08* (14.4%)	1.40 ±0.07** (20.9%)	1.40 ±0.05** (25.0%)	1.20 ±0.04** (37.9%)	0.88 ±0.08** (65.3%)
4.	Butanolic Fraction	25	0.52 ±0.05	1.40 ±0.04 (2.2%)	1.48 ±0.06** (12.7%)	1.48 ±0.05** (12.7%)	1.40 ±0.06** (18.5%)	1.20 ±0.03** (32.6%)
5.	Butanolic Fraction	50	0.54 ±0.07	1.37 ±0.05 (7.7%)	1.42 ±0.05** (20.0%)	1.42 ±0.4** (24.1%)	1.24 ±0.04** (35.1%)	0.91 ±0.04** (63.3%)
6.	Butanolic Fraction	100	0.52 ±0.03	1.28 ±0.06** (15.5%)	1.35 ±0.06** (24.5%)	1.36 ±0.07** (27.5%)	0.99 ±0.04** (56.4%)	0.73 ±0.04** (79.2%)
7.	Phenylbutazone	50	0.53 ±0.05	1.04 ±0.09** (43%)	1.10 ±0.09** (48%)	1.18 ±0.09** (43.9%)	1.02 ±0.06** (54.6%)	0.80 ±0.06** (73.2%)

Values are expressed as mean ± SD, n = 6 in each group

Values in parentheses indicate percent inhibition and calculated as

$$\frac{[V_t - V_0] \text{ Control} - [V_t - V_0] \text{ Treated}}{[V_t - V_0] \text{ Control}} \times 100$$



Effect of Extracts of the Leaves of *Paederia foetida* and Phenylbutazone on carrageenan induced rat paw edema

4.4 RESULTS AND DISCUSSION

In the present study ethanolic extract and butanolic fraction of *Paederia foetida* were investigated for their anti-inflammatory activity using carrageenan induced paw edema model. The oral administration of ethanol extract at dose of 100 and 200 mg/kg b.w. produced dose related inhibition of carrageenan induced paw edema in rat. The percent inhibition by extracts is reported in table.

All seven groups of the rats were injected with the carrageenan and caused localized edema. The swelling increased progressively after 3 hrs to a maximum volume of 1.68 ± 0.07 in case of control group.

Rats pretreated with ethanolic extracts and butanolic extract of *Paederia foetida* significantly decreased the carrageenan induced edema in a dose related manner.

At a dose of 200 mg/kg b.w. ethanolic extract showed percent inhibition 14.4%, 20.9%, 25.0%, 37.9% and 65.5% after 1, 2, 3, 4 and 5 hrs.

At 100 mg/kg b.w. the ethanolic extract attain its reduce 4.4%, 17.2%, 20.6%, 26.8%, and 47.5% same duration of time

Mild effect observe in 200 mg/kg b.w. of ethanolic extract of *Paederia foetida* achieved maximum action attain 37.9% and 65.3% after four hrs and six hrs respectively.

At a dose of 100 mg/kg b.w. butanolic fraction showed percent inhibition 15.5%, 24.5%, 27.5%, 56.4% and 79.2% after 1, 2, 3, 4 & 5 hrs respectively.

At dose of 50 mg/kg b.w. butanolic fraction showed percentage inhibition 7.7%, 20.0%, 24.1%, 35.1% and 63.3% after 1, 2, 3, 4 during 5 hrs .

At dose of 25 mg/kg b.w. butanolic fraction down activity 2.2%, 12.7%, 15.5%, 18.5% and 32.6% after 1, 2, 3, 4at the 5 hrs duration.

Better inhibitory effect seen in 100 mg/kg b.w. of butanolic fraction its achieved maximum inhibitory effect 56.4% and 79.2% after 4 & 5 hrs respectively. At dose of 50 mg/kg b.w. phenylbutazone showed percent inhibition 43%, 48.0%, 43.9%, 54.6% and 73.2% after 1, 2, 3, 4 & 5 hrs respectively.

The ethanolic extract exhibited the anti inflammatory activity which might be due to ethanol soluble active principles such as phytosterol, flavanoids, phenolic compounds, saponin, titerpenoid which are to possess anti-inflammatory activity.

The anti-inflammatory activity of butanolic fraction might be due to phytosterol, saponin and triterpenoids. Phytochemical study confirmed the presence of these phytoconstituents.

Although both ectracted should be done for its test and by decrease of inflammation butanolic extract ar high-powerde then other.

Finaly accomplished butanolic and ethanolic extract 100 mg produce a significant anti-inflammatory effects than phenylbutazone 50 mg and ethanolic extract 200 mg. occurs 4 to 5 hrs. after carrageenan injection.

These results suggest that these crude drugs have anti-inflammatory effects on inflammation. At the initial stage occurs after 1 h of carrageenan injection. It derdurong that time

the release of numerious enzymes and inflammatory cell from and enhance the normal cell activity. The second phase occurs 3–5 h after carrageenan injection. In this phase, the macrophages in carrageenan-insulted dermal tissue release much interleukin-1 (IL-1) to induce accumulation of polymorphic nuclear cell (PMNs) into the inflammatory area.

The results of the present study further confirm the use of *Paederia foetida* in ethnomedicine for the treatment of inflammatory disorders, specialy in case of arthritis.

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