



## RESEARCH ARTICLE

**ANTI INFLAMMATORY ACTIVITY OF *ZIZIPUS MAURITIANA* LAM. IN CARRAGEENAN INDUCED PAW EDEMA IN RATS AND ITS COMPARISON WITH SOME STANDARD FLAVONOIDS.**

Bhargava Amit\*, Rana A.C.

Research Scholar, B. N. College of Pharmacy, Udaipur, Rajasthan, India

Received 17 June 2014; Accepted 25 June 2014

**ABSTRACT**

The aim of present investigation is to evaluate Anti-inflammatory activity of hydroalcohol extract of whole plant of *Zizipus mauritiana* Linn. In carrageenan induced paw edema in rats. Treatment with *Zizipus mauritiana* hydro alcohol extract at two different dose 200 mg/kg and 400 mg/kg and its comparison with standard drug diclofenac sodium at dose of 12.5 mg/kg and some flavonoids i.e. quercetin, kaempferol and epicatechin each at dose of 100mg/kg after induction of inflammation by carrageenan 1% solution at dose of 10 mg/kg, caused significant produce inflammation in rats hind paw. It is furthermore *Zizipus mauritiana* at dose of 200mg/kg and 400mg/kg shows more significant result than some of standard flavonoids. Thus, whole plant of *Zizipus mauritiana* Lam. may have potential anti inflammatory activity.

**Key words:** *Zizipus mauritiana*, Carrageenan, Flavonoids, Anti-inflammatory.

**INTRODUCTION:**

Inflammation is complex reaction to injurious agents such as microbes and damaged usually necrotic cells that consist of vascular responses, migration and activation of leukocytes and systemic reactions<sup>1</sup>. Acute Inflammation is a short term process, usually appearing within a few minutes or hours and ceasing upon the removal of the injurious stimulus<sup>1</sup>. It is characterized by five cardinal signs<sup>1</sup>. Rubor (redness), calor (increased heat), tumor (swelling), dolor (pain) and function laesa (loss of function).

Due to variety of pharmacological activities in the mammalian body, flavonoids are referred as nutraceuticals<sup>2</sup>. Flavonoids are defined as a food or part of food that provide medical or health benefits, including the prevention and treatment of diseases<sup>2</sup>. Over 8,000 flavonoids have been identified many of which occurs in fruits, vegetables and beverages. Flavonoids perform many functions for the plant, such as providing taste, smell, colors and protection against microbes and insects<sup>2</sup>. They have been reported to have antiviral, antiallergic, antidiabetic, antiplatelets, anti-inflammatory, antitumor, hepatoprotective, antiulcer and antioxidant activities<sup>3</sup>. Due to obscure etiology, short term efficacy and limiting contraindications and side effects of available drugs, the treatment is not satisfactory and thus there is a demand for search of new and safer ones<sup>4</sup>. Raw

material cultivation and processing is environmental friendly.

A large section of world's population relies on traditional remedies to treat a plethora. Medicinal herbs are an indispensable part of traditional medicine practiced all over the world due to low costs, easy access and ancestral experience<sup>5</sup>.

*Zizipus mauritiana* Lam. belonging to family Gramineae/Poaceae commonly known as doob, durwa or bermuda grass. Leaf, roots and the rhizomes of the plant have been used in folk medicine of different countries as anti-inflammatory, anticystitis, antihypertensive, antihysteria, antigonorrhoeal infection, antiviral as well as hypolipidemic, hypoglycaemic agent<sup>6,7,8</sup>.

Doob grass is valuable herbal medicine and used as first aid for minor injuries<sup>10</sup>. Farmers traditionally apply crushed leaves to minor wounds as a styptic to stop bleeding<sup>11</sup>.

**MATERIAL AND METHOD:**

Male or female Wistar albino rats with a body weight between 175 to 225 g are used. The animals are starved overnight. To insure uniform hydration, the rats receive 5 ml of water by stomach tube (controls) or the test drug dissolved or suspended in the same volume. Thirty minutes later, the rats are challenged by a subcutaneous injection of 0.1 ml of 1% solution of carrageenan into the plantar side of the right hind paw<sup>12</sup>. The paw is marked

with ink at the level of the lateral malleolus and immersed in mercury up to this mark. The paw volume is measured by using plethysmograph immediately after injection, and procedure was repeated at 1, 2, 3, 4, hours after carrageenan injection. Rats were divided into eight groups containing six rats each.

**Group I**

Rats were given only vehicle (only water)

**Group II**

Rats were given carrageenan (0.1 ml of 1% mg /kg, bw, p.o.)

**Group III**

Animal were given carrageenan (0.1 ml of 1% mg /kg, bw, p.o.) single dose plus drug diclofenac (12.5 mg/kg bw, p.o.)

**Group IV**

Rats were given carrageenan (0.1 ml of 1% mg /kg, bw, p.o.) Plus drug Quercetin (100 mg/ kg/ day, bw, p.o.)

**Group V**

Rats were given carrageenan (0.1 ml of 1% mg /kg, bw, p.o.) Plus drug kampferol (100 mg/ kg/ day, bw, p.o.)

**Group VI**

Animal were given carrageenan (0.1 ml of 1% mg /kg, bw, p.o.) Plus drug

Epicatchin (100 mg/ kg/ day, bw, p.o.)

**Group VII**

Rats were given carrageenan (0.1 ml of 1% mg /kg, bw, p.o.) Plus drug Zizipus mauritiana Lam. (200 mg/ kg/ day, bw, p.o.)

**Group VIII**

Rats were given carrageenan (0.1 ml of 1% mg /kg, bw, p.o.) Plus drug Zizipus mauritiana Lam. (400 mg/ kg/ day, bw, p.o.)

**RESULT AND DISCUSSION:**

The tested extract of Zizipus mauritiana and flavonoids significantly reduce the increase in hind paw edema induced by carrageenan, with effects starting from 1 h except Zizipus mauritiana-200 start from 2 h and lasting for 4 h. at the end of 4 h Zizipus mauritiana at dose of 200 mg/kg shows 51.72% inhibition and at dose of 400 mg/kg its showed inhibition 57.61% which is higher than standard diclofenac (54.83%) and other tested flavonoids Quercetin showed inhibiton at dose of 100mg/kg was 57.14% which is less than Zizipus mauritiana 4000mg/kg dose effect .

**Table 1: Effect of flavonoids, extracts on Carrageenan induced paw edema (% of edema inhibition) of rats**

| Group | Treatment                      | Dose (mg/kg) | Normal      | 0 Hr.                     | 1 Hr.                     | 2 Hrs.                     | 3 Hrs.                     | 4 Hrs.                             |
|-------|--------------------------------|--------------|-------------|---------------------------|---------------------------|----------------------------|----------------------------|------------------------------------|
| I     | Normal                         | Vehicle      | 3.45 ± 0.07 | 3.46 ± 0.07               | 3.45 ± 0.07               | 3.45 ± 0.06                | 3.45 ± 0.05                | 3.40 ± 0.05                        |
| II    | Only carrageen                 | 10           | 3.43 ± 0.05 | 3.95 ± 0.06 <sup>++</sup> | 4.56 ± 0.08 <sup>++</sup> | 5.25 ± 0.07 <sup>+++</sup> | 5.46 ± 0.06 <sup>+++</sup> | 5.28 ± 0.06 <sup>+++</sup>         |
| III   | Carrageen + Diclofenac         | 12.5         | 3.48 ± 0.04 | 3.83 ± 0.04               | 4.13 ± 0.06 <sup>**</sup> | 3.61 ± 0.07 <sup>**</sup>  | 3.45 ± 0.04 <sup>**</sup>  | 3.41 ± 0.06 <sup>**</sup> (54.83%) |
| IV    | Carrageen + Quercetin          | 100          | 3.35 ± 0.06 | 3.83 ± 0.06               | 4.15 ± 0.06 <sup>*</sup>  | 3.71 ± 0.07 <sup>**</sup>  | 3.53 ± 0.06 <sup>**</sup>  | 3.36 ± 0.04 <sup>**</sup> (57.14%) |
| V     | Carrageen + Kaempferol         | 100          | 3.30 ± 0.05 | 3.83 ± 0.08               | 4.18 ± 0.06 <sup>*</sup>  | 3.78 ± 0.09 <sup>**</sup>  | 3.60 ± 0.05 <sup>**</sup>  | 3.36 ± 0.05 <sup>**</sup> (57.14%) |
| VI    | Carrageen + Epicatechin        | 100          | 3.38 ± 0.06 | 3.76 ± 0.08               | 4.21 ± 0.13 <sup>*</sup>  | 3.96 ± 0.08 <sup>**</sup>  | 3.68 ± 0.06 <sup>**</sup>  | 3.43 ± 0.06 <sup>**</sup> (53.93%) |
| VII   | Carrageen + Zizipus mauritiana | 200          | 3.35 ± 0.08 | 3.81 ± 0.07               | 4.25 ± 0.07 <sup>NS</sup> | 4.00 ± 0.06 <sup>**</sup>  | 3.81 ± 0.07 <sup>**</sup>  | 3.48 ± 0.07 <sup>**</sup> (51.72%) |
| VIII  | Carrageen + Zizipus mauritiana | 400          | 3.36 ± 0.07 | 3.86 ± 0.07               | 4.18 ± 0.07 <sup>*</sup>  | 3.86 ± 0.06 <sup>**</sup>  | 3.58 ± 0.07 <sup>**</sup>  | 3.38 ± 0.06 <sup>**</sup> (57.61%) |

All values are represented as Mean + SEM (n=6); values in parentheses are represents percentage of inhibition  
 P Value: +++ <0.001; ++ <0.01; + <0.05 When compared with control untreated animals.  
 \*\*\* <0.001; \*\* <0.01; \* <0.05 When compared with glucose treated model.

**REFERENCES:**

1. Harsh Mohan In Text Book of Pathology, 6th Edition; JAYPEE Brothers: Medical publishers Pvt. Ltd. New Delhi (India), 2010; 133-179.
2. Tapas AR, Sakarkar DM and Kakde RB. Flavonoids as nutraceuticals: A Review. Tropical J. Phar. Research., 2008; 7(3): 1089-1099.
3. Kokate CK, Purohit AP and Gokhale SP. In Text book of Pharmacognosy, 32nd Edition; Nirali Prakashan Ahmedabad (India), 2006: 72-80.
4. Rao VE. Modern approach to herbal medicine. East. Pharmacist, 2000; 7(3): 35-37.
5. Diniz DRS. and Viwanath GD. Gastric cytoprotection. Indian J. Physiol. Pharmacol., 1991; 35(2): 88-98.
6. Biswas TK and Mukherjee B. Plant medicine of Indian origin for wound healing activity. Int. J. Low, Extream. Wounds., 2003; 2: 25-39.
7. Uncini MRE, Tomei PE. Ethanopharmacobotanical studies of the Tuscan Archipelag. J. Ethnopharmacol., 1999; 65: 181-202.
8. Yesilada E, Sezik E, Honda G, Takaishi Y, Takeda Y, Tanaka T. Traditional medicine in Turkey IX: Folk medicine in north-west Anatolia. J. Ethnopharmacol., 1999; 64: 195-210.
9. Leporatti ML, Corradi L. Ethnopharmacobotanical remarks on the province of chieti town ( Abbruzzo, central Italy). J Ethnopharmacol., 2001,74:17-40.
10. Oudhia, P. Medicinal weeds in groundnut field of chattisgarh (India) Int. Arachis. News. Let., 1999; 19: 62-64.
11. Oudhia, P., Paul, A.R. Rainy season medicinal weeds flora in waste lands of Chamra Nallah watershed area at Bagbahara. J. Med. Arom. Plant Sci., 2000; 22/4A and 23/4A : 444-49.
12. Aditya GN, Chattopadhyay RN, Mandal S, Roy RK, Lahiri HL, Maitra SK. Preliminary study on anti-inflammatory effect of calcium channel blockers in albino rats, Indian J. Pharmacol., 1997; 29: 132-134