



Research Paper

Evaluation of the antiinflammatory activity of ethanolic extract of *Paspalum scrobiculatum* using wistar rats

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ABSTRACT

The purpose of this study was to look into and assess the anti-inflammatory activity of an ethanolic extract of *Paspalum scrobiculatum* seed extract in rats with carrageenan-induced inflammation. Wistar rats were given normal saline (0.1%) as a control and *Paspalum scrobiculatum* extract (200 and 400 mg/kg) orally 60 minutes before receiving 0.1 ml 1% carrageenan injection. Paw volumes were measured before and after carrageenan injections at 1, 2, and 3 hours. The results are expressed as mean SEM, and the statistical significance of differences between groups was determined using one-way ANOVA followed by Dunnett's test. In rats, a subplantar injection of carrageenan on the hind paw caused time-dependent paw edema. Oral administration of *Paspalum scrobiculatum* extract (200 and 400 mg/kg) suppressed or reduced paw swelling 1, 2, and 3 hours after carrageenan injection, respectively. From the results of this study, it can be concluded that *Paspalum scrobiculatum* extract exerts a good anti-inflammatory effect in rats.

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I. INTRODUCTION

Medicinal plants are a source of raw materials for both traditional and modern medicine (e.g., Ayurvedic, Chinese, Unani, Homeopathy, and Siddha). Plant materials are now used as home remedies, over-the-counter drugs, and pharmaceutical ingredients in both the developed and developing worlds. As a result, they account for a sizable portion of the global drug market. The majority of rural populations, particularly in developing countries, rely on medicinal herbs as their primary source of primary health care. Although most medicinal herbs are not fit for administration in their natural state, preparations suitable for administration are made in accordance with pharmacopeia guidelines. The therapeutic potential of herbal drugs is determined by their form: whether they are plant parts, simple extracts, or isolated active constituents. Herbal remedies are made up of plant parts or unpurified plant extracts that contain several constituents that often work synergistically.

Inflammation is defined as the local response of living mammalian tissues to injury caused by any agent. It is a body defense response designed to eliminate or limit the spread of harmful agents, followed by the removal of necrosed cells and tissues.

Agents causing inflammation may be as under:

1. Infective agents like viruses, bacteria, and their toxins, fungi, parasites.
2. Immunological agents like cell mediated antibody and antigen antibody reactions.
3. Physical agents like cold, heat or temperature, radiation, mechanical trauma.
4. Chemical agents like inorganic and organic chemicals poisons.
5. Inert materials such as foreign matters.

The acute phase of inflammation is marked by increased blood flow and vascular permeability, as well as the buildup of fluid, leukocytes, and inflammatory mediators like cytokines. The development of particular humoral and cellular immune responses to pathogens present at the site of tissue injury characterises the sub acute/chronic phase.

The annual grain *Paspalum scrobiculatum*, also known as Kodo millet or Koda millet, is largely grown in Nepal (not to be confused with KODO (Finger millet)), although it is also grown in the Philippines, India, Indonesia, Vietnam, Thailand, and West Africa, where it originated. With the exception of the Deccan plateau in India, where it is grown extensively as a food source, it is only sometimes grown in most of these places. Alkaloids, tannins, saponins, steroids, terpenoids, and phenolic chemicals are all present in it chemically.



7 Botanical classifications of *Paspalum scrobiculatum* is given in table 1.

Kingdom	plantae
Sub kingdom	viridiplantae
Division	tracheophyta
Family	poaceae
class	magnoliopsida
order	poales
genus	paspalum
Species	scrobiculatum
Botanical name	Paspalum scrobiculatum

II. Material And Methods

Plant material and Authentication

Plants were collected from various locations in our region. Plant seeds were cut and washed thoroughly under running tap water before harvesting. The seeds were allowed to dry naturally in the shade for the next week. Next, the seeds were ground and pulverized, and the powder was passed through a No. 40 sieve. The powder samples were then subjected to various experimental tasks.

A herbarium of this plant was prepared and submitted for authentication. Then it was authenticated by Dr A vijaya Bhasker Reddy Assistant professor, Department of Botany at Osmania University with voucher no.OUAS-79 Dated 31/10/2022. One voucher specimen has been also preserved in the laboratory of the Institute for further references

Preparation of Herbal Extract

The powdered drug was continuously extracted in a Soxhlet apparatus using ethanol solvents for 48 hours. The extract was collected and concentrated by evaporation and dried in vacuum and used for anti-inflammatory activity.



Chemicals

All the chemicals were of analytical grade and were either Sigma or Merk chemicals.

Experimental Animals

Swiss albino mice (25-30g) of either sex have been used in the entire study. They were housed in standard polypropylene cages and kept under controlled room temperature (24 ± 2 °C; relative humidity 60 -70 %) in a 12 h light -dark cycle. The animals were feeded with standard laboratory diet and water ad libitum. Food was not given 12h before and during the experimental hours. The experimental protocol had been approved by Institutional Animal Ethics Committee.

Screening of Anti-inflammatory Activity

The effect of 200 and 400 mg/kg paspalum scrobiculatam extract, 40 mg/kg diclofenac , or vehicle (saline, 10 ml/kg) on hind paw edema in mice induced by subplantar injection. 0.1 ml of 1% w/v carrageenan was injected into the plantar tissue of each rat's left hind paw. The swelling of carrageenan-injected paws was measured with a plethysmometer at 0, 1, 2, and 3 hours . One hour before carrageenan injection, the animals were given test extracts. Measurements were taken before and three hours after the carrageenan injection. The percentage inhibition of the test drug was calculated in comparison to the vehicle control (100%).



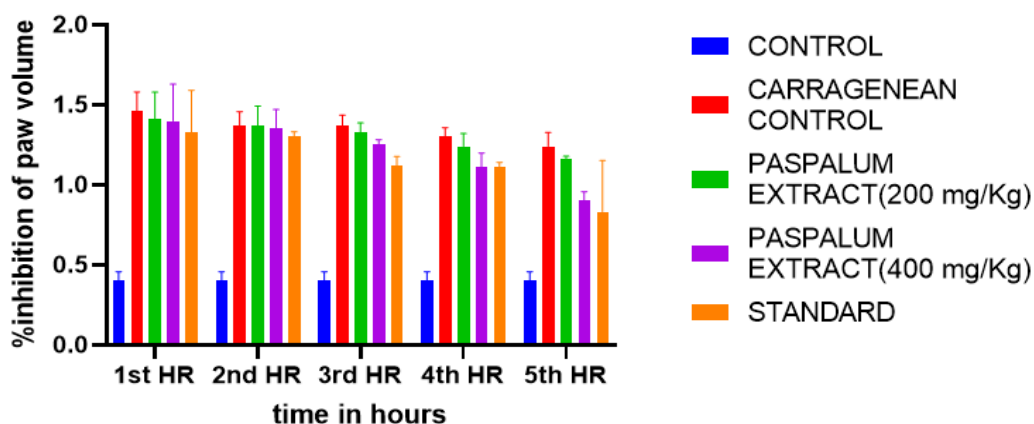
Statistical analysis

Results were analysed using one-way analysis of variance (ANOVA) and presented as Mean SEM. Dunnett's test was used to further analyse the data, and differences between means were deemed significant at P

Results

The results of the anti-inflammatory activity of the extract of Paspalum scrobiculatum seeds against acute pedal oedema are shown in Table 1 and shown strong anti-inflammatory activity. The highest anti-inflammatory effect against carrageenan-induced hind paw edoema was found in the ethanolic extract of Ficus virens (400 mg/kg, p.o.). Paspalum scrobiculatum produced a 51.42% inhibition (Table 1

Groups	Paw volume					% Inhibition at 5th hour
	1 st hour	2 nd hour	3 rd hour	4 th hour	5 th hour	
Control	0.4±0.057	0.4±0.057	0.4±0.057	0.4±0.057	0.4±0.057	-
Carragee man control	1.46±0.120 **	1.37±0.088 ***	1.37±0.066 ***	1.30±0.057	1.24±0.088 ***	-
Plant extract (200mg/kg)	1.41±0.17 **	1.37±0.133 ***	1.33±0.057 ***	1.24±0.088 ns	1.16±0.02 **	30.45%
Plant extract (400mg/kg)	1.40±0.230 *	1.35±0.120 ***	1.25±0.032 **	1.110±0.089 ns	0.9±0.057 ***	51.42%
Standard	1.33±0.2260 *	1.30±0.03 ***	1.12±0.057 **	1.11±0.03 ns	0.833±0.033 **	56.82%



III. Discussion

To provide a scientific explanation for the folk use of *Paspalum scrobiculatum*, we evaluated the biological effects of its extracts, focusing on those related to the inflammatory process. The current findings clearly demonstrated that extracts of dried seeds *Paspalum scrobiculatum* have anti-inflammatory activity, as evidenced by the highly significant responses of some extracts to inhibiting edema formation after carrageenan subplantar injection. The extracts with the highest anti-inflammatory activity also had highly significant statistical values (*P* for carrageenan-induced edema inhibition after phlogistic agent treatment). The current study establishes the anti-inflammatory activity of *Paspalum scrobiculatum* extracts Carrageenan is a sulphated polysaccharide derived from seaweed (Rhodophyceae) that is frequently used to induce acute inflammation and is thought to be biphasic. The first phase is caused by histamine and serotonin release. The release of bradykinin, protease, prostaglandin, and lysosomes starts the second phase. Based on this, it could be argued that suppression of the Ist phase is due to inhibition of the release of early mediators such as histamine and serotonin, while suppression of the II nd phase is explained by inhibition of cyclo-oxygenase. These mediators participate in the inflammatory response and can stimulate nociceptive neurons, reducing pain. It has been reported that the second stage of oedema is sensitive to the majority of clinically effective anti-inflammatory drugs, which have frequently been used to access the anti-oedematous effect of natural products. Based on these findings, it is possible that the inhibitory effect of *Paspalum scrobiculatum* extract on carrageenan-induced inflammation in mice is due to inhibition of the inflammatory mediators.

IV. Conclusion

From the above study it can be suggested that the seeds extract of *Paspalum scrobiculatum* promising anti-inflammatory activity. This effect may be beneficial for the management of pain.

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