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RESEARCH ARTICLE

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ANTI-INFLAMMATORY ACTIVITY OF LEAVES EXTRACTS OF *MURRAYA KOENIGII* L.

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ABSTRACT

This work has been done for the investigation of the anti-inflammatory activity of solvent extracts of dried leaves of *Murraya koenigii* Linn. by oral administration at dose of 100, 200 and 400 mg/kg body weight in healthy albino rats. Extracts were studied for its anti-inflammatory activity by using carrageenan- induced hind paw edema in albino rats and the mean increase in paw volume and % inhibition in paw volume were measured plethysmometrically at different time intervals after carrageenan (1% w/v) injection. The methanol extract showed significant ($P < 0.001$) reduction in the carrageenan-induced paw edema in comparison to aqueous extracts. Petroleum ether and hexane extracts showed no reduction in paw edema. The methanol extract showed anti-inflammatory effect in dose dependent manner when compared with the control and standard drug, Aspirin (10mg/kg, p.o). These inhibitions were statistically significant ($p < 0.05$). Thus our investigation suggests a potential benefit of methanol and aqueous extracts of leaves of *Murraya koenigii* in treating conditions associated with inflammation. This study illustrates about the presence of some active polar compounds in the leaves extracts which might be responsible for anti-inflammatory activity.

KEYWORDS

Murraya koenigii, Anti-inflammatory activity, Methanol extract, Aqueous extract, Paw volume, Aspirin.

INTRODUCTION

Murraya koenigii is known as '*curry patta*' in Hindi and widely used as spice and condiment in India and other tropical countries. It belongs to the family Rutaceae[1]. Traditionally, the plant is used as a stimulant, stomachic, febrifuge, analgesic and for the treatment of diarrhea, dysentery; insect bites and also used to allay heat of body[2]. Previous Phytochemical investigations on this plant revealed the occurrence of carbazole alkaloids[3-6]. Antioxidant, anti-tumour, antimicrobial, anti-inflammatory, anti-trypanocidal and mosquitocidal activities have been indicated for some of these alkaloids [7-13]. This study, therefore, intends to investigate the analgesic and anti-inflammatory activities of the leaves of *Murraya koenigii* by studying the effects of methanol extracts of the plant on carrageenan induced inflammation in experimental animal models, in order to confirm the medicinal properties of the plant.

MATERIALS AND METHODS

Plant material

The leaves of *Murraya koenigii* were collected from the local gardens of Dehradun (U.K), India and were authenticated by the Taxonomist at Botanical Survey of India (BSI), Dehradun (U.K), India.

Preparation of leaves extract

Extracts were prepared in order to study their anti-inflammatory activity. The leaves were dried under shade and were ground to form the smooth powder. Aqueous, methanolic, petroleum ether and hexane extracts of the powdered material were prepared by soaking 20g of the material in various solvents for 72 h and after every 24 h, the mixtures were stirred with a sterile glass rod. After the completion of 72 h time period the extracts were filtered with Whatmann filter paper no. 1 in order to obtain the filtrate. The filtrates were kept in water bath to obtain the crude extract[14].

Animals

Male albino rats (180–200 g) were used taking into account international principles and local regulations concerning the care and use of laboratory animals[15]. The animals had free access to a standard commercial diet and water *ad libitum* and were kept in rooms maintained at 22 ± 1ºC with a 12-h light/dark cycle. The institutional animal ethical committee has approved the protocol of the study.

Carrageenan-induced edema in rats

6 Groups of five animals each were used. Paw swelling was induced by sub-plantar injection of 0.1 ml 1% sterile carrageenan in saline into the right hind paw. The solvent extracts of *M. koenigii* at dose of 100, 200 and 400 mg/kg were administered orally 60 min before carrageenan injection. Aspirin (10 mg/kg) was used as reference drug. Control group received the vehicle only (10 ml/kg). The inflammation was quantified by measuring the volume displaced by the paw, using a plethysmometer at time 0, 1, 2, 3, and 4 h after carrageenan injection. The difference between the left and the right paw volumes (indicating the degree of inflammation) was determined and the percent inhibition of edema was calculated in comparison to the control animals.

Statistical analysis

The results were expressed as mean ± S.D. Statistical significance was determined by

analysis of variance and subsequently followed by Turkey's tests. P values less than 0.05 were considered as indicative of significance. The analysis was performed using INSTAT statistical software.

RESULTS

Carrageenan-induced edema in rats

The anti-inflammatory effects of the solvent extracts of *M. koenigii* on carrageenan-induced oedema in rat's hind paws are presented in **Table 1**. There was a gradual increase in oedema paw volume of rats in the control group. However, in the test groups, methanol and aqueous extracts (400 mg/kg) showed a significant reduction in the oedema paw volume. There was no reduction in inflammation found in case of rats treated with petroleum ether and hexane extracts. Methanol extracts were found to possess maximum anti-inflammatory activity in comparison to aqueous extracts in dose dependent manner. The inhibitory effect was thus highest with 400 mg/kg. Significant effects were demonstrated by the extract. Aspirin as reference drug (10 mg/kg orally) produced a significant inhibitory effect comparable to methanol and aqueous extracts. Methanol extract, Aqueous extract and Aspirin respectively exhibited 40.8 ± 5.6, 38.17 ± 8.8 and 45.56 ± 4.5 % inhibition of oedema formation, respectively at 4 h after carrageenan administration. The present study provides evidence that the methanol and aqueous extracts of *Murraya koenigii* acts as an anti-inflammatory agent in rats in acute inflammation model.

Table 1

Anti-inflammatory activity of different solvent extracts of leaves of Murraya koenigii (at 400 mg/ kg of plant extract) Paw volume (ml) ± SD

Experiment	Control	Aspirin (10mg/kg orally)	Methanol extract	Aqueous extract	Petroleum ether extract	Hexane extract
1h after treatment	2.75±0.19	2.70±0.15	2.73± 0.18(in single line)	2.58±0.25	2.65±0.09	2.68±0.0 9…(in single line)
2h after treatment	3.77±0.12	2.56±0.25	2.58± 0.16(in single line)	2.63±0.15	2.67±0.12	2.72±0.12…..(in single line)
3h after treatment	3.65±0.15	2.35±0.13	2.45± 0.15(in single line)	2.52±0.17	2.57±0.15	2.65±0.15…..(in single line)
4h after treatment	3.45±0.19	2.50±0.20 **45.56±4.5 % inhibition of paw edema**	2.65±0.20(in single line) **40.8±5.6% inhibition of paw edema**	2.72±0.18 **38.17±8.8% inhibition of paw edema**	2.78±0.19	2.85±0.19…..(in single line)

SD, Standard deviation

DISCUSSION AND CONCLUSION

Carrageenan induced inflammation is most commonly used as an experimental model for evaluating the anti-inflammatory potency of compounds or natural products[16]. Our results are in accordance with the study[17] which described methanol extracts of leaves (400 mg/kg) of *Murraya koenigii* as potent anti-inflammatory agent in carrageenan induced inflammation in albino rats. Further studies are

needed to isolate and identify some active compounds which might be responsible for anti-inflammatory activity.

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