



ANTI-INFLAMMATORY EFFECTS OF VARIOUS EXTRACTS OF ROOT OF *ABUTILON INDICUM* LINN.

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ABSTRACT

The extracts of roots of *Abutilon indicum* Linn. were investigated for anti-inflammatory activity by carrageenan induced paw oedema in rat and increase in paw thickness was measured using digital vernier caliper after 3 hr of injection. All the results compared with control and evaluated statistically by student's t-test were found to be significant.

Key words: Anti- inflammatory, *Abutilon indicum* Linn., Malvaceae.

INTRODUCTION

Abutilon indicum Linn. var. sweet (Malvaceae) commonly called “Country Mallow” is a perennial plant up to 3m in height. It is abundantly found as weed in sub-Himalayan tract, hotter parts of India, adjoining countries, Malaya, Philippine islands and China. The plant is used in traditional medicine in India, Pakistan, China and Philippine for treatment of several diseases like bronchitis, body ache, toothache, jaundice, diabetes, fever, piles, leprosy, ulcers, cystitis, gonorrhoea and diarrhoea¹⁻⁴. *Abutilon indicum* Linn. is reported to have hepatoprotective⁵, hypoglycemic⁶, antimicrobial⁷, male contraceptive⁸ and antidiarrhoeal⁹ activities. A large number of phytoconstituents have been isolated from different parts of *Abutilon indicum* Linn. viz. carbohydrates, essential oil, flavonoids, sesquiterpenes, fatty acids, amino acids and sterols¹⁰⁻¹².

In recent years, there is an increasing interest in the research for potential anti-inflammatory moieties from natural sources. Hence, present study was aimed to authenticate the traditional use of plant in inflammatory disorders.

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EXPERIMENTAL

Preparation of extract

The roots of *Abutilon indicum* Linn. were collected from Chaudhary Charan Singh Haryana Agriculture University Campus, Hisar, Haryana in May, 2004 and identified by Raw Materials, Herbarium and Museum division of NISCAIR, New Delhi. A voucher specimen has been retained in the Department of Pharmaceutical Sciences, GJU, Hisar for further reference. The root (1 kg) was powdered and subjected to successive solvent extraction with solvents in increasing order of polarity (petroleum ether, methanol and ethanol) by Soxhlet apparatus for 72 hrs. Thereafter the marc was extracted with water by cold maceration for 72 hrs. After complete extraction, the solvents were removed by distillation under reduced pressure and concentrated to dryness in vacuum to obtain petroleum ether extract (3.1%), methanol extract (4.3%), ethanol extract (4.9%) and water extract (2.1%)

Animals

Healthy Wistar albino rats, of either sex weighing between 150-200 g (supplied by Germ free Animal House, CCS HAU, Hisar) were used for study. Prior permission from IAEC, GJUST, Hisar was obtained as per prescribed guideline. Animals were fasted overnight during the experiment but had free access to water.

In acute toxicity study, extracts did not show any mortality up to 1200 mg/kg in rats, also there were no change in general behaviour and morphological profile¹³.

Preparation of doses

For the preparation of various doses gum acacia (2%) solution in distilled water was used to suspend the extracts and standard drug.

Anti-inflammatory activity

The anti-inflammatory activity was assessed as suggested by Winter *et al.*¹⁴, by using carrageenan as the edematogenic agent. The selected albino rats were divided into eight groups of six animals each and housed under laboratory conditions. The test samples were suspended in gum acacia solution and administered orally 60 min before injection of carrageenan (0.1 mL of 1% w/v solution) in normal saline into the sub-planter region of left hind paw of each rat^{15,16}. Animals of group I and II received 2% gum acacia aqueous solution as vehicle and diclofenac sodium (10 mg/kg)¹⁷ as standard, respectively through

oral route. Animals of group III to VIII received the test drugs as petroleum ether extract, ethanol extract and water extract, respectively at a dose of 200 mg/kg and 400 mg/kg in a similar manner. Paw thickness was measured in control, standard and extracts treated groups in the time duration 0 hr (immediate after carrageenan injection) and after 3 hr using digital vernier caliper (least count 0.01 mm) ¹⁸.

Statistical analysis

Results were compared with control group using unpaired *t*-test was considered as statistically significant and data are summarized as mean \pm SEM.

RESULTS AND DISCUSSION

Anti-inflammatory studies on experimental animal by carrageenan induced rat paw oedema model showed that *Abutilon indicum* Linn. increases the inhibition of inflammation caused by an edematogenic agent.

The studies shows that petroleum ether extract and water extract show statistically significant increase in inhibition of inflammation (57.8% and 63%, respectively) caused by carrageenan 0.1 mL (1% w/v) as compared to control group at a dose of 400 mg/kg. This inhibition was comparable to standard (diclofenac sodium 10 mg/kg) (69.3%). However petroleum ether extract and water extract did not show any significant effect at a dose of 200 mg/kg. Ethanol extract showed insignificant results at both tested doses (200 mg/kg and 400 mg/kg) (Table 1).

Table 1. Anti-inflammatory activity of various extracts of *Abutilon indicum* Linn. root by using carrageenan induced rat paw oedema model

Groups	Treatment	Dose	Increase in paw thickness after 3hr (in mm)	% Age inhibition
I	Solvent	2 ml/kg	3.81 \pm 0.08	-
II	Diclofenac sodium	10 mg/kg	1.17 \pm 0.05*	69.3 %
III	Petroleum ether extract	200 mg/kg	3.13 \pm 0.08	17.9 %
IV	Petroleum ether extract	400 mg/kg	1.61 \pm 0.05*	57.8 %

Cont...

Groups	Treatment	Dose	Increase in paw thickness after 3hr (in mm)	% Age inhibition
V	Ethanol extract	200 mg/kg	3.00 ± 0.06	21.3 %
VI	Ethanol extract	400 mg/kg	3.35 ± 0.08	12.1 %
VII	Water extract	200 mg/kg	2.67 ± 0.13	30 %
VIII	Water extract	400 mg/kg	1.41 ± 0.11*	63 %

Results expressed as Mean ± SEM from six observations. *P<0.01

The carrageenan induced oedema is attributed to release of various inflammatory mediators. Leukotrienes are the potent inflammatory mediator of various inflammatory conditions where as enzyme lipoxygenase plays important role in generation of leukotrienes. The mechanism by which inflammatory effect occurs is not fully understood. The inhibition of enzyme lipoxygenase may not be the main factor, but may be one of the several possibilities.

In this study, the ability of various extracts to inhibit the inflammation caused by carrageenan 0.1 mL (1% w/v) confirms the inflammation properties, which may count for the use of plant in traditional medicine.

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