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Antipyretic activity of *Abutilon indicum* (L.) sweet leaf extract

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Abstract

Oral administration of *Abutilon indicum* leaf different extract at a dose of 400mg/kg body weight shows significant reduction of elevated body temperature alcoholic and aqueous extract and also chloroform extract shows moderate and pet ether did not shown any activity as compared with standard drug.

Keywords: *Abutilon indicum* antipyretic activity extracts

Introduction

The *Abutilon indicum* (L.) sweet belong to the family Malvaceae is a group of 120 species of aromatic herbs. Among 120 species known, only five species recoded in India, they are *Abutilon indicum*, *Abutilon hirtum*, *Abutilon theophrasti*, *Abutilon glaucoma*, and *Abutilon asiaticum*. Apart from this *Abutilon indicum* used to treat different types of ailments traditionally, according to Chinese in Hong Kong seeds are employed as an emollient and demulcent, the root is used as diuretic and pulmonary sedative and flowers and leaves are used in ulcers. Entire plant of *Abutilon indicum* is used as demulcent, diuretic, laxative urinary disorder, chronic, dysentery and fever. *Abutilon indicum* is used for treatment of fever traditionally, but no scientific reports are available. So keeping this in view the present study was designed to evaluate various extracts of *Abutilon indicum* leaf for its antipyretic activity [1, 2].

Experimental**Plant materials**

Leaves of *Abutilon indicum* were collected from in and around the Shivamogga district of Karnataka. The plant was authenticated by Shri. S. B. Kamlakar, Professor and HOD of Botany, Sayadry College Shivamogga.

Preparation of extract

Fresh plant leaves of *Abutilon indicum* were collected washed with tap water. Then these were shade dried, powdered mechanically and applied for successive extraction using Soxhlet apparatus with solvents petroleum ether, chloroform, alcoholic extract and aqueous with cold maceration process respectively, and all extracts applied for phytochemical screening [3-5].

Animals

Swiss albino mice and *Wister albino* rats of either sex were used for the study. The animals experiment was initiated only after approval of animal ethical clearance. The animals were procured from central animal house, National College of Pharmacy, Shivamogga.

Housing of animals

Animals were kept for one week to acclimatize to laboratory condition at room temperature (25±2 °C) before starting the experiment, they were given free access to water and standard rat feed.

Acute toxicity studies

Swiss albino mice of either sex weighing between 20 to 30gms were used during investigation. The animal was fasted over night prior to the experimental procedure. The up and Down or staircase method was adopted and accordingly doses of petroleum ether, chloroform, alcoholic and aqueous were calculated.

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Method

Ten mice were treated with a dose of 2000mg/kg and observed for a period of 2hrs, 4hrs and up to 24 hrs, for any mortality. The subsequent doses were taken increased by a factor of 1.5, if the dose was tolerated or decreased by a factor of 0.7 if it was lethal.

The maximum non lethal and minimum lethal doses were determined using 10 mice, once the approximate LD₅₀ or the range between the maximum non lethal and minimum lethal doses were found, a final or more reliable LD₅₀ assay planned using at least 3 or 4 dose within the range with large number of animals in each group. LD₅₀ was expressed in terms of mg/kg. In addition, source of the animal, sex, age, body weight, injection time, route, solvent and the presence and absence of any immediate reaction were also recorded for further references. The maximum non lethal dose was found to be 4000mg/kg body weight, hence 1/10th of the dose was taken as therapeutic dose (400mg/kg body weight) for the above all extracts [6, 7].

Antipyretic activity

Yeast induced pyrexia in rat's model

The antipyretic effect of *Abutilon indicum* leaf extracts was studied as per the method of shay *et al.*, (1945). All the extracts were suspended in distilled water using one percentage Tween 80, used for pharmacological screening.

Method

Wister albino rats of either sex, weighing between 150 to 200gms were divided in to six groups of six animals each, and were treated as follows, group one control, group two standard drug Paracetamol (150 mg/kg body weight, *p.o.*) groups 3, 4, 5 and 6 received *Abutilon indicum* leaf extract orally at the dose of 400 mg/kg body weight, respectively.

The normal body temperature of each rat was measured rectally before pyrexia by 10 channel digital thermometer probe coated with lubricant using glycerine was inserted which 3-4cm deep into the rectum. After measuring basal rectal temperature animals were given a subcutaneous injection of 10-ml/kg-body weight of 20% (w/v) yeast suspended in distilled water. Rats were then restrained to the individual cage.

After 19 hours of yeast injection animals that showed an increase of 0.3 to 0.5 °C in rectal temperature were selected. Test drugs were then orally administered and rectal temperature of all groups animals were recorded 0, 1, 2, 3, and 4 hours respectively [8-10].

Statistical analysis

Statistical analysis was performed using ANOVA, the significance of difference was accepted at $P < 0.001$ data's are presented as mean \pm S. E. M.

Result and discussion

After successive extraction by hot and cold extraction process percentage yield of different extracts of *Abutilon indicum* were petroleum ether 4.48, chloroform 2.25, alcoholic 14.29 and aqueous extract 7.63.

Preliminary Phytochemical Investigation.

Preliminary phytochemical study showed positive test for steroids and triterpenoids in petroleum ether extract, steroids and tannins in chloroform extract, triterpenoids, tannins and flavonoids in alcoholic and flavonoids in aqueous extract.

Acute toxicity studies

All the extracts of *Abutilon indicum* were found to be non toxic when administered orally to mice in the dose 4000mg/kg b. w and its LD₅₀ value was found to be safe in the same dose. Therefore 1/10th of the LD₅₀ was considered as therapeutic dose and was administered for the study of activity.

Antipyretic property

Fever may be due to infection or the sequel of tissue damage, inflammation graft rejection or their disease states. Yeast induced fever is called pathogenic fever its etiology includes production of prostaglandins which set the thermoregulatory centre at a lower temperature.

The antipyretic effect of *Abutilon indicum* leaf extracts in yeast induced pyrexia, it was found that subcutaneous injection of 20% w/v of yeast suspension markedly elevated the rectal temperature after 19 hrs of administration and treatment with *Abutilon indicum* leaf extract of alcoholic and aqueous extracts decreases elevated rectal temperature of the treated rats.

The Methanolic and aqueous extract of *Abutilon indicum* in the dose of 400mg/kg body weight has been shown significant ($P < 0.001$) antipyretic activity (Table No.1 and Histogram No.1). Both the extracts have been shown significantly produced fall in elevated body temperature up to four hours.

The antipyretic activity was observed at early hour and the same effect was maintained for four hours. The results obtained were compared with the standard antipyretic drug Paracetamol (150mg/kg *P.O.*), extracts, and control. In the study however petroleum ether extract did not showed significant activity where as chloroform extract showed moderate antipyretic activity [9, 10].

Table 1: Antipyretic activity of *Abutilon indicum* leaf

Treatment	Rectal Temperature (°C)					
	Before Treatment		After treatment			
	Before Yeast	After Yeast	1 hr	2 hr	3 hr	4 hr
Control	37.82±0.03	38.46±0.03	38.44±0.05	38.46±0.05	38.42±0.04	38.38±0.04
Standard	37.82±0.03	38.32±0.06	37.74±0.05	37.44±0.05	37.22±0.04	37.28±0.04
Pet-ether	37.78±0.05	38.46±0.05	38.42±0.04	38.38±0.04	37.94±0.05	37.96±0.05
Chloroform	37.83±0.04	38.48±0.04	38.26±0.05	37.9±0.07	37.72±0.08	37.78±0.04
Alcohol	37.83±0.03	38.64±0.07	38.52±0.04	37.88±0.04	37.7±0.07	37.48±0.08
Aqueous	37.79±0.05	38.60±0.06	38.53±0.05	37.89±0.04	37.74±0.06	37.50±0.07

Values are mean \pm S.E.M; n=6 in each group $P < 0.001$ compare to control group.

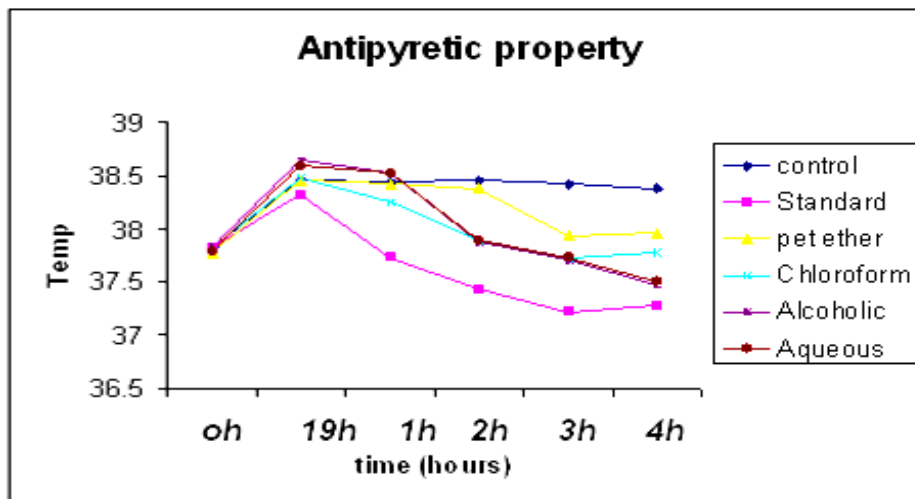


Fig 1: Histogram showing antipyretic activity

Summary and conclusion

The present study showed alcoholic and aqueous extracts exhibited significant ($P < 0.001$) antipyretic activity. This activity may be due to presence of, triterpenoids, tannins and flavonoids, which are secondary metabolites present in *Abutilon indicum* plant leaves. The study showed that, triterpenoids, tannins and flavonoids have antipyretic activity. On the bases of this, it may be concluded that the leaf extracts posse's significant activity due to presence of, triterpenoids, tannins and flavonoids.

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