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Research Article

EVALUATION OF HYDROALCOHOLIC EXTRACT OF AERIAL PARTS OF *ABUTILON INDICUM* FOR ITS ANALGESIC AND SEDATIVE PROPERTY

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ABSTRACT

The hydro alcoholic extract of aerial parts of *Abutilon Indicum* was tried for its efficacy as analgesic and sedative property. Several pain models namely Eddy's hot plate, acetic acid induced writhing test, tail clip test and hot water immersion test were tried and for sedative property actophotometer test was performed. As the extract has shown very significant ($P<0.01$) result in Eddy's hot plate, acetic acid induced writhing test and hot water immersion test hence it is believed that the extract has certain central and peripheral analgesic property which may be mediated either by closing Na^+ or/and Ca^{2+} channels or by facilitating chloride Cl^- influx by acting on $GABA_A$ receptor. As the extract has significantly reduced loco motor activity hence the mechanism of action of the extract is believed to be mediated by opening of Cl^- channel, indicating that the extract may have GABA mimetic or facilitating effect. As following the administration of the extract no straub reaction was observed hence may be in future it will gain more popularity to be used as a substitute for narcotics to treat pain and also as a good sedative.

Key words: *Abutilon Indicum*, Eddy's hot plate, writhing test, sedative, GABA.

INTRODUCTION

Perception of pain is something which probably starts with the first cry of a baby, even though pain is considered as a protective mechanism[1] of the body but sometimes the quantum of pain is so high that it causes havoc to life and with this comes the need for analgesics. Nature supplies a wide variety of analgesic plants to mankind, which again come under two major classes namely steroidal and non steroidal. But because of certain adverse affects associated with the steroidal ones, the non steroidal ones are gaining more importance in today's life. In our study we chose to work with *Abutilon Indicum* a small shrub with traditional medicine value, used as a demulcent, aphrodisiac, laxative, diuretic, sedative, astringent, expectorant, tonic, anti-inflammatory, anthelmintic and analgesic and to treat leprosy, ulcers, headaches and gonorrhoea and bladder infection[2]. In our study we tried the efficacy of hydro alcoholic extract of the aerial parts of *Abutilon Indicum* as analgesic, as some experiments were done with petroleum ether, Chloroform and aqueous extract but not with hydro alcoholic extract. The other part of the research deals with the sedative property of the hydro alcoholic extract of the aerial parts of *Abutilon Indicum* as no activity is reported regarding the sedative property of the shrub.

MATERIALS AND METHODS

Powdered sample of the hydro alcoholic extract of the aerial parts of *Abutilon Indicum* bearing batch number AIE/12005 was obtained as a gift sample from Green Chem. Domlur, Bangalore (Karnataka), India. Fentanyl citrate was obtained from Apollo Victor Hospital, Margoa, Goa, India. Diazepam was obtained from Ganesha medicals, Malleshwaram, Bangalore (Karnataka), India.

Animals

Male and female albino mice weighing 18-25g were selected and divided into three groups of six animals each. Control group was given distilled water where as standard group and test group were given fentanyl citrate (62.5µg/Kg)[1] and hydro alcoholic extract of aerial parts of *Abutilon Indicum* (400mg/Kg)[3] respectively. Distil water and the extract of the plant were given orally but standard drug was given by subcutaneous route. The animals were fasted overnight for the experiment but water was provided ad. libitum. The research was done after approval had been granted by the Institutional Animal Ethics Committee (VCP/IAEC/01/2013).

Analgesic Activity

Eddy's Hot Plate

Animals were placed on the hot plate maintained at 55° C and responses such as jumping, withdrawal of paws and licking of paws were observed. The time period when the animals were placed and until responses occurred was recorded for all the groups by a stopwatch. Standard drug was given by subcutaneous route where as test compound was given by oral route and responses were monitored at 15, 30, 60 and 120minutes after the drug administration. The cut-off period was of 15second to avoid any injury to the animals.[4]

Writhing Test

Mice were given intraperitoneal injection of 0.7% v/v aqueous acetic acid at 10ml/kg dose and writhing was observed for a period of 20minutes. Test compound was administered 40minutes prior to administration of acetic acid where as fentanyl citrate was given 15minutes prior. The percentage of inhibition of pain was calculated.[5]

$$\text{Percentage of Inhibition} = \frac{\text{Control Mean - Treated Mean}}{\text{Control Mean}} \times 100$$

Haffner's Tail Clip Method

An artery clip is placed at the root of the tail of the mice to induce pain. A quick response of the animal was seen as biting of the clip. The time between the application of the clip

and response was noted by a stop watch. Then the same procedure is recorded after 15, 30 and 60minutes after administration of the test and standard drug and the results were compared.[6]

Hot Water Immersion Test

Female mice were placed into separate cages and their tail was made to hang out freely. The distal 5cm part of the tail was marked and immersed for a maximum period up to 15second in a cup filled with hot water with temperature 55^0 C. Animals lifting their tail within 1second were selected for the study. The test substance and standard drug were given and response was observed at 0, 30, 60, 120 and 180minutes.[7]

Test for Sedative Property

Actophotometer Test

The instrument was turned on and the mice were kept inside one by one and observed for a period of ten minutes to get the basal values. The control group was given distilled water orally where as the standard and the test group were given diazepam by intraperitoneal route (2mg/kg)[4] and hydro alcoholic extract of aerial parts of *Abutilon Indicum* (400mg/Kg)[3] by oral route. For test group the reading was observed 30minutes after drug administration but for standard group the reading was observed 15minutes after drug administration. Percentage decrease in motor activity was calculated.

Table 1: Eddy's Hot Plate Method

Group	Dose (mg/kg)	Reaction time in second				
		0 min	15 min	30 min	60 min	120 min
Control		2.33 ± 0.21	2.33 ± 0.21	2.16 ± 0.16	2.17 ± 0.17	2.33 ± 0.21
Fentanyl Citrate	0.0625	2.5 ± 0.22	4.33 ± 0.42**	7.67 ± 0.21**	11.81 ± 0.19**	4.68 ± 0.15**
Abutilon Indicum	400	2.28 ± 0.15	4.06 ± 0.10**	7.48 ± 0.16**	11.3 ± 0.30**	4.46 ± 0.18**

Values are expressed as Mean ± S.E.M from six observation **P<0.01

Table 2: Writhing Test

Group	Dose (mg/kg)	No. of writhes per 20 minutes	% Inhibition
Control		86 ± 0.88	
Fentanyl Citrate	0.0625	22.66 ± 0.95**	73.65
Abutilon Indicum	400	44 ± 1.03**	48.83

Values are expressed as Mean ± S.E.M from six observation **P<0.01

Table 3: Haffner's Tail Clip Method

Group	Dose (mg/kg)	Reaction time in second			
		0 min	15 min	30 min	60 min
Control		2.33 ± 0.21	2.33 ± 0.33	2.16 ± 0.30	2.41 ± 0.37
Fentanyl Citrate	0.0625	2.33 ± 0.30	24.33 ± 0.66**	22.66 ± 0.84**	11.5 ± 0.56**
Abutilon Indicum	400	2.20 ± 0.16	2.65 ± 0.11	3.56 ± 0.13	2.73 ± 0.08

Values are expressed as Mean ± S.E.M from six observation **P<0.01

Table 4: Hot Water Immersion Test

Group	Dose (mg/kg)	Reaction time in second				
		0 min	30 min	60 min	120 min	180 min
Control		0.84 ± 0.06	0.85 ± 0.05	0.84±0.05	0.83±0.05	0.85 ± 0.06
Fentanyl Citrate	0.0625	0.85 ± 0.04	3.16± 0.30**	2.39±0.12**	2.44±0.09**	0.91 ± 0.02
Abutilon Indicum	400	0.85 ± 0.04	2.06± 0.03**	2.33±0.08**	2.42±0.07**	0.88 ± 0.02

Values are expressed as Mean ± S.E.M from six observation **P<0.01

Table 5: Actophotometer Test

Group	Dose (mg/kg)	No. of writhes per 20 minutes	% Decrease
Control		216 ± 1.32	
Diazepam	2	93 ± 1.59**	56.94
Abutilon Indicum	400	112 ± 1.01**	48.15

Values are expressed as Mean ± S.E.M from six observation **P<0.01

RESULTS AND DISCUSSION

The hydro alcoholic extract of *Abutilon Indicum* was found to be a very effective as an analgesic. It has shown very significant results in various pain models such as Eddy's hot plate, writhing test, hot water immersion test except Haffner's tail clip test. Models like Eddy's hot plate is used to evaluate opioid analgesic and Haffner's tail clip method is highly sensitive for centrally acting drugs.[6]As we did not observe any straub reaction[8]after administration of the extract but got significant result in hot plate model, writhing test and hot water immersion test, hence this indicates that the extract does not have any narcotic property but it has certain central and peripheral analgesic property which may be mediated either by closing sodium (Na^+) or/and calcium (Ca^{2+}) channels or by facilitating chloride (Cl^-) influx by acting on $GABA_A$ receptor. As the extract also has a significant effect towards the reduction of loco motor activity hence the mechanism of action of the extract is believed to be mediated by opening of Cl^- channel. Thus this research opens the way for new researches to confirm GABA mimetic or GABA facilitating effect of the extract. Another observation related to the research is that this extract was found to be effective especially against thermally and chemically induced pain but not much effective against mechanically induced one.

CONCLUSION

From the observation it has become clear that the hydro alcoholic extract of *Abutilon Indicum* is very effective against

thermally and chemically induced pain. As the drug has shown a significant reduction in the loco motor activity hence it also has a good sedative property. As it is not a narcotic agent hence may be in future it will gain more popularity to be used as a substitute for narcotics to treat pain and also as a good sedative.

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