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Evaluation of Central Analgesic Activity of *Tecoma stans* Flower Extracts

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ABSTRACT

The study of was undertaken to evaluate the analgesic activity of *Tecoma stans* flower extracts using Eddy's hot plate method in mice. The study comprised of six treatment groups namely: control, standard and test (*Tecoma stans* aqueous and ethanol flower extracts 200 and 400 mg) all with five animals in each group. Analgesic activity was evaluated by paw licking and jumping response. At the end of study the aqueous and ethanol flower extracts of *Tecoma stans* 400 mg showed significant central analgesic effect ($p<0.005$) as evidenced by significant increase in reaction time when compared to the control and standard (Pentazocin).

INTRODUCTION

Pain is a symptom of many diseases requiring treatment with analgesics. Severe pain due to cancer metastasis needs the use of strong analgesics that means opioid drugs. The addiction liability of opioids led to intensive research for compounds without this side effect. Many approaches have been used to differentiate the various actions of strong analgesics by developing animal models not only for analgesic activity but also for addiction liability. Several types of opioid receptors have been identified in the brain allowing *in vitro* binding tests. However, the *in vitro* tests can only partially substitute for animal experiments involving pain. Pain is a common phenomenon in all animals, at least in vertebral animals, similar to that felt by man. Analgesic effects in animals are comparable with the therapeutic effects in man. Needless to say, that in every instance painful stimuli to animals must be restricted as much as possible. Painful stimuli can consist of direct stimulation of the efferent sensory nerves or stimulation of pain receptors by various means such as heat or pressure. The role of endogenous peptides such as enkephalins and endorphins gives more insight into rain processes and the action of central analgesics [1-5].

MATERIALS AND METHODS

Screening for Analgesic Activity

Although the *in vivo* methods have been used more extensively in the past, they are still necessary in present research that analgesic tests should be performed in animals before a compound administering to human. Mostly, rodents, such as mice or rats, are used for analgesic tests, but in some instances experiments in higher animals such as monkeys are necessary.

Several methods are available for testing central analgesic activity, such as

a) HAFFNER's tail clip method in mice,
b) Tail flick or other radiant heat methods,
c) Tail immersion tests,
d) Hot plate methods in mice or rats,
e) Electrical stimulation (grid shock, stimulation of tooth pulp or tail),
f) Monkey shock titration,
g) Formalin test in rats.

The temperature of hot plate was maintained at 55±0.5°C. The animals were placed individually on hot plate and time between placement and licking of paws, shaking or jumping off the surface was recorded by using Eddy's hot plate apparatus. As a response latency rate with baseline latencies of less than 5 sec or more than 15 sec were eliminated from the study and cut off latency time was set at 15 sec to avoid tissue damage. After determination of base line response latencies, hot plate latencies were re-determined at 0, 30, 60, 120 and 180 min after drug administration [6-7].

Experimental Animals

Swiss albino mice of either sex (25-30gms) were maintained for 7 days in the animal house of Chalapathi Institute of Pharmaceutical Sciences, Guntur under standard conditions temperature (24±1^{0}C), relative humidity (45-55%) and 12:12 light:dark cycle. The animals were fed with standard rat pellet and water *ad libitum*. The animals were allowed to acclimatize to laboratory conditions 48 h before starting the experiment 5 mice/group was used. The experiment conducted after obtaining permission from the Institutional Animal Ethics Committee (IAEC) of Chalapathi Institute of Pharmaceutical Sciences, Guntur.

Selection of Dose and Treatment

The test animals were randomly chosen and divided into six groups having five mice in each as follows:

Group-1: Control group treated with 0.9% normal saline, i.p.

Group-2: Standard (Pentazocin, 10 mg/kg, i.p.)

Group-3: EETS I (*Tecoma stans* ethanol flower extract 200 mg/kg, i.p)

Group-4: EETS II (*Tecoma stans* ethanol flower extract 400 mg/kg, i.p)

Group-5: AETS I (*Tecoma stans* aqueous flower extract 200 mg/kg, i.p)

Group-6: AETS II (*Tecoma stans* aqueous flower extract 400 mg/kg, i.p)

Statistical Analysis

The values are expressed as mean ± SEM. The results were analysed for statistical significance using two way ANOVA followed by Dunnett's multiple comparison test.

RESULTS AND DISCUSSION

Analgesic effect of EETS and AETS at doses (400 mg i.p, $p<0.001$) has shown marked central analgesic effect as evidenced significant increase in reaction time when compared to the control and standard (Figure 1).

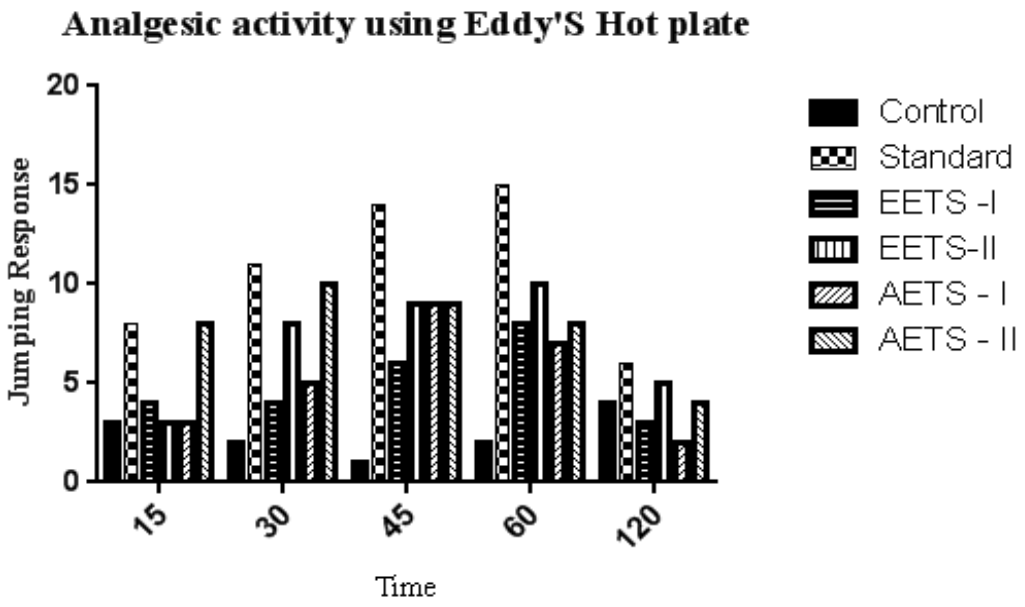

Figure 1: Analgesic activity of aqueous and ethanol flower extracts of *Tecoma stans* compared to the control group

CONCLUSION

The aqueous and ethanol flower extracts of *Tecoma stans* showed significant analgesic activity when compared with the other treatment groups and therefore it has the potential of being used in the treatment of pain.

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