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ANALGESIC ACTIVITY OF ETHANOLIC EXTRACT OF *TAMARINDUS INDICA* SEED COAT

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ABSTRACT

The aim of the present investigation is to evaluate the analgesic activity of ethanolic extract of *Tamarindus indica* seed coat onWister albino rat. Analgesic activity of the ethanolic extract of*Tamarindus indica (EETI)* seed coat at a dose of 350mg/kg & 500mg/kg was evaluated against the standard drug Pentazocine at a dose of 10mg/kg. Adult Wister albino rat of either sex was divided in to 4 groups comprising six numbers in each group was undertaken for study and evaluated by tail flick method & hot plate method. The two doses of *T. indica* seed coat ethanolic extract was found to produce significant ($p < 0.05$ and $p<0.01$) analgesic activity. In tail flick method, the crude extract produced elongation of time 30 minutes after oral dose of 350 and 500 mg/kg body weight respectively. Test drug at a dose of 500mg showed better analgesic activity in comparison to 350mg dose by both the methods. So, it can be recommended for further studies.

KEYWORDS: Analgesic, *Tamarindus indica*, Pentazocine, Ethanolic extract.

INTRODUCTION

Pain is the part of a protective reaction against dysfunction of an organ or imbalance in its functions against potentially dangerous stimulus. It is an unpleasant feeling often associated with tissue damage.[1]

Pain is a warning signal, primarily protective in nature, but causes discomfort and suffering; may even be uncontrollable and incapacitating.

The drugs that selectively relieve pain by acting on the CNS are called as analgesics. It also acts on peripheral pain mechanisms, without significantly altering consciousness. Analgesic relieves pain as a symptom not cure the cause of pain. Analgesics are of two type opioid analgesic or non-opioid analgesic.[2]

Opioids are substances that act on opioid receptors to produce morphine-like effects. Medically they are primarily used for pain relief, including anesthesia. The drawback of opioids may include itchiness, sedation, nausea, respiratory depression, constipation, and euphoria.

The Non-steroidal anti-inflammatory drug(NSAIDs) used in the treatment of analgesia, pyretic and inflammatory conditions it does not cure and remove cause of the disease but only change the response to the disease. These drugs are not free from side effects. NSAIDs are not use because of their side effect and opiates produce tolerance and dependence so the analgesic agents have not been successful in all the cases.[3]

In recent times, focus on plant research has increase. Herbal drugs are being proved as effective as synthetic drugs with lesser side effects. Herbal medicines are in line with nature, with less hazardous reaction.[4]

The use of herbal medicines worldwide has provided a great opportunity to India to look for therapeutic conduct compounds from our oldster system of therapy, i.e. Ayurveda, which can be utilized for development of new drug. Epidemiological evidence suggests that dietary factors play an important role in human health and in the treatment of certain chronic diseases including cancer. In recent years the popularity of complementary medicine has increased. Over 50% of all modern drugs are earthy product origin and they play an important role in drug advancement programs of the pharmaceutical industry.[5]

Tamarindus indica Linn belonging to family of Fabaceae family. The tree is a long-lived, large, evergreen or semi-evergreen tree, 20-30 m tall with a thick trunk up to 1.5-2 m across and up to 8 m in circumference.

Along with culinary usage, there is a vast medicinal utility of *T. indica* L. described which are enumerated in different ayurvedic classics.[1]

Traditionally seeds of *Tamarindus indica* are being used in asthma, bronchitis, leprosy, tuberculosis, wounds, ulcers, inflammation**,** stomach algia, diarrhea, dysentery, burning sensation, giddiness, vertigo, and diabetes. It has been reported that seeds of *Tamarindus indica* are having antiulcer, anti-asthmatics, ant diabetic and antioxidant activity. Also seeds of *Tamarindus indica* are rich in phenolic compounds, polymeric tannins, and fatty acids flavonoids, saponins, alkaloids, and glycosides. Sterols and Triterpenes are responsible for analgesic activity.[6]

Analgesia can be induced by various method one of them is Hot plate method is based on the rat paw sensitivity to heat at temperatures not damaging the skin which is observed as jumping, paw licking and paw withdrawal. Another is tail flick method, nociceptive response is noted as flick of tail from hot wire. The time until these responses occur is prolonged after administration of centrally acting analgesics, whereas peripherally acting analgesics do not generally affect these responses.[8]

According to literature review of the analgesic activity present in tamarindus bark, so we choose the seed coat for analgesic activity.

MATERIALS AND METHODS

Collection and authentication of plant

The seed of *Tamarindus indica* (TI) were collected from local market of Indore. The seed of *Tamarindus indica* were identified and authenticated by "Dr. S N Dwivedi, Head and Professor of botany, Janta Botany College, Rewa".

Preparation of extract

The maceration was performed at room temperature and ethanol is used as solvent for extraction. 100 gm of coarse powdered drug was macerated with 300 ml of ethanol for 24 hrs with occasional shaking in a conical flask. After 24 hrs the drugs was filtered and extract so obtained was concentrated by heating the extract on water bath till it becomes semi solid extract. Extract were concentrated in a rotary evaporator at a temperature less than 45° and preserved in desiccators for further use.

Experimental animal

Wister albino rats weighing 150-200g were housed in standard cages at room temperature 22±2°C and 50±5% relative humidity, under a light/dark cycle of 10/12 h, for 1 week before

the experiments. Animals were provided with standard rodent pellet diet (Indore, India), and water *adlibitum*. The animals were deprived of food for 24 hours before experimentation, but had free access to drinking water. All experiments were performed in the morning. Experimental animal protocols were approved by our IAECwhich follows guidelines of CPCSEA (Committee for the Purpose of Control and Supervision of Experiments on Animals).

Evaluation of Analgesic Activity

Hot Plate Method

The analgesic activity of the given drug was determined by the basal reaction time. A total of 24 rat of either sex were divided into four groups. Group I was kept as control, administered with distilled water (10 ml/kg) and Group II was treated with standard drug pentazocin (10 mg/kg). Group III and IV were treated with two different concentrations of EETI (350 mg/kg and 500 mg/kg body weight) orally 30 min prior to the start of the experiment. The heated hot plate, maintained at 55±0.5˚C was used to induce pain. Before the treatment, the reaction time of each animal (paw licking or jumping) was recorded. The reaction time was recorded at 1, 2, 3 and 4 h following the administration of EETI and Pentazocine. In order to minimize damage to the animal paw, the cut off time for latency was taken as 25 sec.[7]

Tail flick Method

Wister rat were screened for sensitivity test by placing the tip of the tail on the radiant heat source. Any animal that failed to withdraw its tail within 5 s was rejected from the study. The selected animals were then divided into four groups of six rats each. Each of the groups received one of the following: extract (350,500 mg/kg) anddistilled water (control) in normal saline orally, Pentazocine (standard, 10 mg/kg) intraperitoneally. Basal reaction time was measured initially (0 min) and at 15, 30, 45 and 60 min. A cut-off period of 10sec was observed to avoid damage to the tail.[8]

RESULT AND DISCUSSION

Analgesic activity

The analgesic activity was performed by Hot plate method and Tail flick method which showsdose dependent pain inhibition with ethanol extract as mentioned in (Table 1 and 2).

$$\textbf{Percentage pain inhibition} = \frac{\text{control reading} - \text{test reading}}{\text{control reading}} \times 100$$

Hot plate method:- Ethanolic extract of *Tamarindus indica* L.() (350-500 mg/kg) dose-dependently significantly ($p < 0.05$) increased the pain threshold (latency) 30 min after administration with a percentage pain inhibition of 54.16 and70.17% respectively. The inhibition produced by the extract was maximum at 60min, with a percentage pain inhibition of 67.83% and 94.79 % respectively, however lower when compared with that of the standard drug, Pentazocine which was185% , but it was significant ($P < 0.05$) (Table 1). It was also observed that the percentage inhibition for both the extract and thedrug decreased with time.

Table 1: Analgesic activity of Ethanolic Extract of T. indica in Eddy's hot plate method.

Group	Treatment	Dose	0 min	30min	60min	120 min	180 min
I	Control	1ml/kg	16 ±0.31	16± 0.31	17±0.34	16± 0.46	16 ±0.59
II	Pentazocine	10mg/kg	18 ±0.40	43± 0.46	48 ±0.57	47 ±0.72	42± 0.52
III	EETI	350mg/kg	20 ± 0.41	25± 0.49	28 ±0.50	31± 0.54	27± 0.51
IV	EETI	500mg/kg	22± 0 .57	28 ±0.53	33± 0.27	39 ±0.71	35± 0.49

Tail flick method:-The results of analgesic activity of ethanolic extract T. indica (EETI) are shown in table 2. Rats treated with control did not show any significant difference in reaction time on tail flick throughout the observation time. Standard drug showed more significant action as compared to extract treated animals. The extract treated group with 350mg dose is significant action as compared to control and not significant as compared to standard drug and 500mg dose. The extract treated group of 500mg show significant action as compared to control and EETI 350mg dose and not significant as compared to standard drug. At all points,the tail flick latency time differed significantly between extracts and standard groups, being greater for the latter group.

Table 2: Analgesic activity of ethanolic extract of T. indica in Tail flick method.

Group	Treatment	Dose (mg/kg)	0 min	15 min	30 min	45 min	60 min
I	Control	1ml/kg	2±0.10	2±0.10	2±0.32	2±0.52	2±0.21
II	Pentazocin	10	2±0.54	8±0.26	11±1.12	14±0.61	17±0.32
III	EETI	350	2±0.87	5±0.76	7±0.92	8±0.41	9±0.21
IV	EETI	500	2±0.23	6±0.14	8±0.85	10±0.12	11±0.75

DISCUSSION

In the present study, theanalgesic ofEthanolic extract of *Tamarindus indica*(EETI) was evaluated using different standard methods. In the present study, eddy's hot plate method and tail flick methods were used to evaluate analgesic activity of EETI. The validity of these tests has been shown even in the substantial impaired motor performances of animals. In eddy's hot plate method, EETI was found to affect jumping, withdrawal or paw licking response in

the present study, which makes it evident that it is centrally acting. This suggests implication of μ receptors in the analgesic effect. The significant analgesic activity exhibited by EETI suggests the use of the extract as an analgesic agent.

The ethanolic extract of *Tamarindus indica* was also evaluated in the tail flick test for its analgesic activity. Tail flick method is type of thermal stimuli and induces centrally mediated pain at the supraspinal level. This method is supraspinally mediated and has selectivity for centrally acting analgesics. In this method increase in the reaction time is considered for evaluating central anti nociceptive activity. This method is used to differentiate between central and peripheral analgesics. The centrally acting analgesics increase the reaction time in the tail flick method. In the present study, ethanolic extract of *Tamarindus indica* exhibited significant increase in reaction time to thermal stimuli indicating analgesic activity.

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