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EVALUATION OF ANALGESIC ACTIVITY OF GANDHAGA SARKKARAI IN SWISS ALBINO MICE BY EDDY'S HOT PLATE METHOD

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ABSTRACT

To evaluate analgesic activity of herbal formulation *Gandhaga Sarkkarai* and compare it with pentazocine by using Eddy's hot plate in mice. The animals were divided into 4 groups of six animals in each group. Group I served as control and did not receive any drug. Group II animals received 10 mg/kg/i.p of pentazocine. Group III and group IV received *Gandhaga Sarkkarai* 100mg/kgb.wt and 400mg/kg b.wt respectively. In Eddy"s hot plate method, *Gandhaga Sarkkarai* showed analgesic activity 180 minutes after drug administration with mean pain tolerance time of 4.08±0.38 seconds while pentazocine showed analgesic activity at 180 minutes with pain tolerance time 5.5±0.6. *Gandhaga Sarkkarai* at the dose of 26 mg/kg exhibits significant ($p<0.001$) analgesic activity.

KEYWORDS: *Gandhaga Sarkkarai*, Eddy's hot plate, Pentazocine.

INTRODUCTION

Pain is an unpleasant and emotional experience associated with or without actual tissue damage. Pain sensation is described in many ways like sharp, pricking, electrical, dull ache, shooting, cutting, stabbing, etc.[1] It is a warning signal, primarily protective in nature, but causes discomfort and suffering which may be unbearable and incapacitating. It is the most common symptom which brings the patient to the physician. Analgesics relieve pain as a

symptom without affecting its cause. They are used when the noxious stimulus cannot be removed or as adjuvant to most etiological approaches to pain. Analgesics are divided into two groups, Opioid and Non-opioid / Non-Steroidal Anti-inflammatory Drugs (NSAIDS). NSAIDS are the mainstay treatment for acute and chronic pain, which inhibits prostaglandin synthesis by inhibiting enzyme cyclo-oxygenase.[2,3] Researchers have shown that some of the ancient traditional medicines have been proved useful in relieving pain. In this purview, the drug *Gandhaga Sarkkarai* was studied for its analgesic activity. It is a Siddha herbo-mineral preparation mentioned in *Siddha* text *Anuboga vaithiya navaneetham*, Part VI, indicated for *Megam (syphilis), Premegham, Kiranthi, Purai (Whole Abscess), Kai kaal kudaichal (Joint pain).*[4]

MATERIALS AND METHODS

Collection of raw drugs

Gandhagam was purchased from a well reputed country shop in Parrys, Chennai. *Karisalai and Vellai vengayam* were freshly collected from Tambaram sanatorium, Tamilnadu.

Identification and Authentication of the drug

Mineral drug was authenticated by Dr.M.Suresh Gandhi, Department of Geology, University of Madras, Chennai. Herbal drugs were identified and authenticated by Dr. D. Aravind M.D(s), Botanist, National Institute of Siddha, Tambaram Sanatorium, Chennai.

Selection of Experimental animals

The experimental protocol was submitted and approved by institutional Ethical Committee, (IAEC approved no: NIS/IAEC-III/02/29092016). Swiss albino mice (20-25 gm) of approximate same age were employed in this investigation.

The animals were kept in plastic cages and maintained at 24-28°C. All the mice were oused individually with free access to food, water and libitum. They were feed with standard diet and kept in well ventilated animal house they also maintained with alternative dark-light cycle of 12hrs throughout the studies. Mice were allowed an acclimatization period of 14 days before actual experiments. The mice were closely observed for any infection and if they show signs of infection they were excluded from the study. The animal experiment was performed with accordance legislation on welfare.

Evaluation of Analgesic activity

Pain is the part of a defensive reaction against dysfunction of an organ or imbalance in its functions against potentially dangerous stimulus. The ascending pathway of pain includes the contralateral spinothalamic tract, lateral pons, mid brain to thalamus and ultimately through the somatosensory cortex of the brain that determines the locations, intensity and depth of pain.

Animal grouping

Mice 20-25 g were grouped in four groups, six animals in each group. Group I served as control. Group II animals received 10 mg/kg/i.p of pentazocine. Group III and group IV received *Gandhaga Sarkkarai* 100mg/kgb.wt and 400mg/kg b.wt respectively.

Eddy's Hot plate method

Principle: Painful reactions can be produced in experimental animals by applying noxious stimuli such as thermal – using radiant heat as a source of pain, chemical – using irritants such as acetic acid and bradykinin and physical pressure – using tail compression. The hot plate test was a test of the pain response in animals. It was used in basic pain research and in testing the effectiveness of analgesics by observing the reaction to pain caused by heat. They used a behaviour model of nociception where behaviours such as jumping and hind paw-licking are elicited following a noxious thermal stimulus. Licking was a rapid response to painful thermal stimuli that was a direct indicator of nociceptive threshold. Jumping represents a more elaborated response, with a latency and encompasses an emotional component of escaping.

Procedure

Animals were weighed and placed on the hot plate. Temperature of the hot plate was maintained at 55 ± 1^{o}C. Jumping response was seen. The time period (latency period), from when the animals were placed and until the responses occurred, were recorded using a stopwatch. To avoid tissue damage of the animals, 10 seconds was kept as a cut off time. The time obtained was considered the basal / normal reaction time in all the untreated groups of animals. Increase in the basal reaction time was the index of analgesia. All the animals were screened initially at least three times in this way and the animals showing a large range of variation in the basal reaction time were excluded from the study. A final reading of the basal reaction time was recorded for the included animals. After selecting the animals, the drugs

were administered to all the groups at the stipulated doses. The reaction times of the animals were then noted at 0, 30, 60, 120 and 180 minutes interval after drug administration.[5]

RESULTS AND DISCUSSION

Table 1: Analgesic activity of Gandhaga sarkkarai in Swiss albino mice.

Group	Treatment					
		0 min	**30 min**	**60 min**	**120 min**	**180**
I	Control	2.66±0.27	2.97±.16	2.8±0.16	2.95±0.17	3.01±0.37
II	Pentazocine (10mg/kg)	2.83±0.98	5.67±0.60***	5.7±0.66***	5.6±0.62***	5.5±0.6***
III	Low dose GS (100mg/kg)	2.24±0.35*	2.32±0.34*	3.42±0.25*	4.36±0.79*	4.11±0.47**
IV	High dose GS (400mg/kg)	2.34±0.37*	2.53±0.42*	2.81±0.55**	5.18±0.19***	4.81±0.24***

N= 6, Values are expressed as mean ± SD, analysis was done by using ANOVA followed by Dunnett's method. Test for significance is *P < 0.05, **P < 0.01, ***P < 0.001.

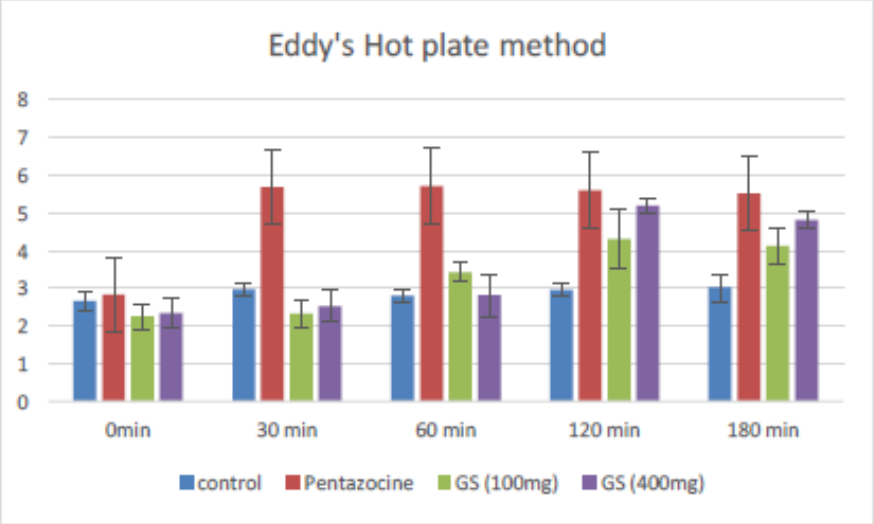

Figure 1: Analgesic activity of Gandhaga sarkkarai in Swiss albino mice.

Analgesic activity was carried out by Eddy's Hot plate method. *Gandhaga sarkkarai* at doses 100 mg/kg showed analgesic activity with the statistical significance of (P<0.050) at 60 min and (P<0.01) at 180 min when compared to control mice. At 26 mg/kg, the drug showed analgesic activity with significance (P<0.01) at 60 min and (P < 0.001) at 90 mins. Among the two doses of *Gandhaga sarkkarai*, 400 mg/kg dose have shown better analgesic activity (P<0.01) and (P < 0.001) when compared with control mice.

CONCLUSION

Thus, it was concluded that administration of *Gandhaga sarkkarai* at the dose of 400 mg/kg exhibited significant ($p<0.001$) analgesic activity in Swiss albino mice when compared with control.

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