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ANALGESIC EFFECT OF NEEM (AZADIRACHTA INDICA) SEED OIL ON ALBINO RATS

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ABSTRACT

Neem (*Azadirachta indica*), an indigenous plant is reported to have antidiabetic, anti-inflammatory, antifungal and several other medicinal properties. The present work is undertaken to study the analgesic activity of neem seed oil on albino rats. Neem seed oil was obtained in pure form from Indian Herbs Research Supply Company Limited, Saharanpur, UP. The analgesic activity was tested by the tail flick method using the analgesiometer (Techno.). Neem seed oil in the doses of 0.25, 0.5, 1 and 2 ml/kg body weight was given intraperitoneally to different group of rats. Tail flick latency was measured in seconds before and after the drug injection. Results were compared with morphine and statistically analysed. Neem seed oil showed significant analgesic effect in the dose of 1 and 2 ml/kg. Neem seed oil has dose-dependent analgesic activity.

KEYWORDS

Analgesic, Neem Seed Oil, Tail flick latency, Morphine

INTRODUCTION

Neem *(Azadirachta indica)* is an evergreen tree widely distributed in tropical and subtropical areas all over the world[1]. It is aptly described as a village dispensary. Various parts of the tree and their preparations are used in traditional medicine for the treatment of inflammatory based disorders[2, 3].

In the year of 1981, Pillai *et al.* had reported that nimbidin, a derivative of neem seed oil has antiarthritic and anti-inflammatory properties[4]. Later Khanna *et al.* (1995) had investigated the analgesic action of neem leaf extract[5].

As we know that most of the anti-inflammatory drugs also have analgesic action hence this work was undertaken to study the analgesic action of Neem seed oil (NSO) on Albino rats.

MATERIALS AND METHODS

Albino rats weighing 150-200 g of either sex were randomly divided into groups of ten (n = 10). Tail flick response [6] was observed with the help of analgesiometer (Techno) which was adjusted to 6 amp current (Davies *et al.*, 1946)[7].

Pain sensitivity was tested in response to radiant heat by placing the distal part of tail (except 1 cm from tip) over the red hot nichrome wire. The animals having basal tail flick latency (TFL) within 3-5 seconds were selected for this study.

The doses of neem seed oil were selected based on various pilot studies and toxicity studies done in our own laboratory.

A cut off time of 10 seconds was used to prevent thermal injury. The results were compared with that of morphine. Tail flick latency (in seconds) was recorded just before and 5, 15, 30, 45, 60, 90, 120, 150 and 180 minutes after drug administration. The results were statistically analyzed using paired 't' test. NSO was procured from Indian Herbs Research Company Supply Company Limited, Saharanpur (UP).

Table 1.
Drugs were given to various groups intraperitoneally (IP)

Group	Drug	Dose	Nature
I	Normal saline	0.5 ml/rat IP	Vehicle
II	Morphine sulphate	1 mg/kg IP	Standard
III	NSO	0.25 ml/kg IP	Test
IV	NSO	0.5 ml/kg IP	Test
V	NSO	1.0 ml/kg IP	Test
VI	NSO	2.0 ml/kg IP	Test

OBSERVATIONS AND RESULTS

The observations have been tabulated in Table 2. Normal saline did not produce any change in the Tail flick latency. Morphine showed significant increase in TFL from 5 minutes to 2 ½ hours of injection. NSO in the dose of 0.25 ml/kg did not show any significant rise in TFL whereas at 0.5 ml/kg body weight there was significant rise in TFL from 30 minutes to 90 minutes of injection.

Table 2 .
Effect of morphine and NSO on Tail flick latency (TFL)

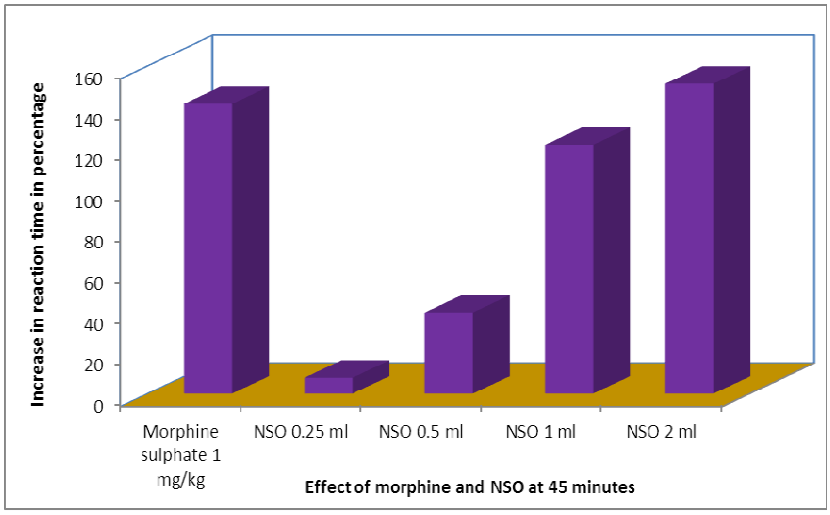
Group	Drugs	Basal TFL in seconds	TFL in seconds ± SEM at different time intervals (minutes)								
			5	15	30	45	60	90	120	150	180
I	Morphine sulphate 1 mg/kg	4.1±0.28	4.6 ± 0.03(b)	6.2 ± 0.55(c)	9.2 ± 0.29(d)	9.9 ± 0.1(d)	9.4 ± 0.22(d)	8.4 ± 0.31(d)	6.6 ± 0.34(d)	5.1 ± 0.31(c)	4.2 ± 0.25
II	NSO 0.25 ml	3.9 ±0.28	4.1 ± 0.28	4.1 ± 0.27	4.1 ± 0.28	4.2 ± 0.33	4.2 ± 0.33	4.1 ± 0.31	4 ± 0.29	4 ± 0.29	4 ± 0.3
III	NSO 0.5 ml	4.3 ± 0.26	4.5 ± 0.22	4.6 ± 0.27	5.1 ± 0.28(d)	6 ± 0.33(d)	5.3 ± 0.4(c)	4.7 ± 0.30(a)	4.5 ± 0.22	4.5 ± 0.27	4.5 ± 0.22
IV	NSO 1 ml	4.2 ± 0.2	5.1 ± 0.23(a)	6.9 ± 0.32(c)	8.5 ± 0.37(d)	9.3 ± 0.3(d)	8.2 ± 0.53(d)	7.5 ± 0.43(d)	5.2 ± 0.29(c)	4.8 ± 0.33	4.5 ± 0.22
V	NSO 2 ml	3.9±0.23	4.8 ± 0.29(d)	6.5 ± 0.5(d)	8.8 ± 0.44(d)	9.8 ± 0.133(d)	9.0 ± 0.33(d)	7.5 ± 0.45(d)	5.3 ± 0.33(c)	4.6 ± 0.16(c)	4.2 ± 0.2

(n = 10)
(a) ⇒P value <0.05, (b) ⇒P value < 0.02 (c) ⇒ P value <0.01 (d) P value ⇒ < 0.001

In case of NSO, given in dose of 1 ml/kg and 2 ml/kg of body weight, TFL was significantly increased from 5 minutes to 120 minutes and 5 minutes to 150 minutes respectively.

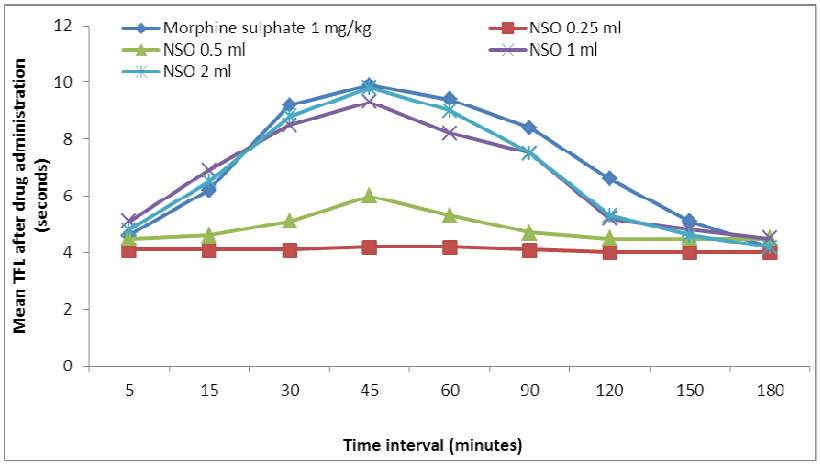
We also observe that the peak analgesic effect of morphine and NSO at all doses were observed at 45 minutes of drug administration.

Figure. 1.
Graph showing the effect of morphine and neem seed oil (NSO) on increase in reaction time of tail flick latency (TFL) at 45 minutes.



The increase in TFL reaction time of morphine (1mg/kg) and NSO 0.25 ml/kg, 5ml/kg, 1ml/kg and 2 ml/kg was found to be 141.46 %, 7.69 %, 39.53 %, 121.43 % and 151.28 % respectively as shown in Fig.1.

Figure. 2.
Line diagram showing the mean TFL (in seconds) after drug administration at various time intervals.



DISCUSSION AND CONCLUSION

The present study showed dose dependent analgesic activity of neem seed oil in the experimental model of Tail flick response. This effect of NSO 2 ml/kg body weight was found to be comparable to that of morphine (1mg/kg body weight). NSO at the dose of 2ml/kg produced better analgesic effect than morphine at 45 minute interval.

NSO is a mixture of many substances and fractionation could yield an active ingredient having better effect than the effect we have achieved and also in comparison to morphine.

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