ORIGINAL ARTICLE

Comparative Study of Analgesic Effect of Moringa Oleifera with Lornoxicam in Rats

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Abstract

***Background**: Moringa Oleifera is widely found in Asian subcontinent and it has been used as an analgesic and anti-inflammatory in Indian folk medicine. This study tries to compare the analgesic effects of Moringa Oleifera Aqueous extracts with standard drug Lornoxicam in Wister Male albino Rats using Digital Analgesiometer.* ***Methods**: Wister albino rats were divided into 5 groups containing placebo (saline) Lornoxicam and 3 groups of Moringa Oleifera using 12.5mg/Kg, 25mg/Kg and 50mg/kg dosages.* ***Results**: Moringa Oleifera 50mg/Kg produced significant antinoceptive action by enhancing tail-flick latency period (8.17 ± 0.41, 9 ± 0.63, 10.67 ± 0.82) at 30 min, 60 min and 120 min as compared to 6.67± 0.52 time recorded at zero minute period and Moringa Oelifera (25mg/Kg i.p) produced significant antinocipetive action by enhancing tail-flick latency period (8.5 ± 0.55, 9.5 ± 0.55, 10.84 ± 0.98) at 30 min, 60 min and 120 min respectively in comparison with (6.67 ± 0.51) at 0 minute. The Standard Drug Lornoxicam increased the latency period of tail-flick response (10.5 ± 0.54, 13.17 ± 0.75, 15.34 ± 0.52) at 30min, 60min and 120 min as compared to zero minute response of (6.8 ± 0.41).* ***Conclusion**: Aqueous extracts of Moringa Oleifera leaves exhibits significant antinociceptive activity by Tail-flick Latency model. However the amount of antinociceptive action produced was lesser as compared to standard drugs like Lornoxicam.*

***Keywords:** Antinociception, Lornoxicam, Moringa Oleifera, Tail-flick Latency*

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Introduction

Moringa Oleifera is widely found, evergreen, deciduas tree. It is abundantly available in Asian subcontinent. It has been used as an analgesic and anti-inflammatory in Indian folk medicine since centuries. Mechanism of action of analgesic effect is by the phytochemical components of leaf which have alkaloids, glycosides, phenols, saponins and tannins [1,2]. The analgesic effect is due to inhibition of the activity of cyclooxygenase-2 (cox-2) which results in the inhibition of prostaglandins synthesis [3]. The extract may also have interfered with G-protein mediated signal transduction, an analgesic mechanism unrelated to inhibition of prostaglandin synthesis. It also may have augmented the peripheral mechanism through interference with the formation of prostaglandins in the central nervous system. These mechanisms have been implicated in the forms of analgesia induced by non-steroidal anti-inflammatory drugs (NSAIDs), including Aspirin and Diclofenac.

Lornoxicam is a Non-steroidal anti-inflammatory (NSAID) drug with analgesic properties. Lornoxicam belongs to the class of oxicams. Lornoxicam is a potent inhibitor of both COX-1 and COX-2 enzymes. It is widely used analgesic and anti-inflammatory drug. [4]

In the present study it was tried to compare the analgesic effects of aqueous extracts of Moringa Oleifera (leaves) with the standard drug Lornoxicam in Wister Male albino Rats by tail flick (radiant heat) method using Digital Analgesiometer.

Materials and Methods

The present study was conducted in the Department of Pharmacology Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation Chinaoutpalli, Krishna (Dist), Andhra Pradesh. It was a placebo controlled Randomized comparative study with prior permission from Institutional Ethics committee and research was executed according to the guidelines of the committee for the purpose of animal experiments (CPCSEA) India. Wistar Albino male rats (200 – 250 g) were selected randomly. They were housed in standard polypropylene cages and kept under controlled room temperature (24 ± 2) degree centigrade relative humidity 60%-70% in a 12 h light-dark cycle. They were divided into 5 groups of 6 animals each (Normal Saline 0.2ml, Lornoxicam 0.82mg/Kg, Moringa Oleifera 12.5mg/kg, 25mg /kgand 50mg/kg). First group of rats were considered as controls and treated with 0.2 ml normal saline intraperitoneally. Second group were considered as standard and were treated with Lornoxicam, at dose of 0.82mg/kg body weight intraperitoneally, Third group were considered as test and treated with Moringa Oleifera at dose of 12.5 mg/Kg, 25mg/Kg, 50mg/Kg, body weight intraperitoneally to find best analgesic action. Model of pain was radiant heat induced pain by analgesiometer (Tail flick method) [1].

Figure- 1: Digital Analgesiometer

Lornoxicam pure powder Hetero Company was used. Moringa Oleifera Aqueous solution was prepared using pure extract of prepared capsules of 250mg [Singru] from Himalaya Drug Company. The capsules were dissolved in 5ml distilled water and appropriate dosages according to weight of the animal were calculated and administered. Tail Flick Latency (TFL) was tested at 30, 60, 120 min. The basal reaction time was taken immediately after giving the drug at zero minute by keeping the tail on Nichrome wire. The time taken for the withdrawal of the tail was considered as Tail Flick Latency. Antinociceptive activity was measured at 30, 60, 120 min. The antinociceptive activity was considered as positive if rat fails to withdraw the tail within 15 seconds of exposure to avoid damage to tail.

Results

There was no analgesic effect seen with normal saline at 0 minutes and 30, 60 and 120 minutes. In Lornoxicam group the response to heat application was positive at 0 minute interval but the reaction was slightly decreased after 30 minutes and Tail flick latency period increased after 60 and 120 minutes (table- 1).

There was negligible analgesic effect seen with Moringa Oleifera 12.5mg/Kg at 0 minute and 30, 60 and 120 min. With a dosage of Moringa Oleifera 25mg/Kg the analgesic effect was shown to increase between 60 and 120 minutes. With dosage of 50mg/kg the analgesic effect was not seen at 0 minutes but increased progressively from 30 minute to 60 min and up to 120 min (Table- 2).

One Way Anova was used followed by post hoc Fischer's Least Significant Difference (LSD) test for inter-drug comparison at Zero minutes, 30 minutes, 60 minutes and 120 minutes (table 3). At zero minute intervals all values calculated were insignificant. Whereas at 30 minute interval values of Normal Saline Vs Lornoxicam, NS Vs MO25, NS Vs MO50 were significant also significant were the values of L Vs MO12.5 and L Vs MO 25 but the values of L Vs MO 50 were not significant. At 30 minute interval NS Vs MO 12.5, L Vs MO 50, MO25 Vs MO 50 was not significant other values were significant. At 60 minute interval NS Vs MO 12.5, MO 25 Vs MO 50 was not significant other values were found to be significant. Similarly at 120 minute interval NS Vs L, NS Vs MO 25, NS Vs MO 50, L Vs MO 12.5 and L Vs MO 25 were found to be significant (Table- 3).

Table- 1: Tail Flick Latency comparison between Normal Saline & Lornoxicam

Normal Saline (0.2ml) group TFL in Sec				Lornoxicam (0.82mg/Kg) group TFL in Sec			
0 min	30 min	60 min	120 min	0 min	30 min	60 min	120min
6	6	7	7	7	10	13	15
7	7	6	7	6	11	14	15
7	7	6	6	7	11	12	16
6	7	7	6	7	10	13	15
7	7	6	6	7	10	13	15
6	6	6	7	7	11	14	16

Table- 2: Tail Flick Latency (Seconds) Moringa Oleifera

Moringa Oleifera 12.5mg				Moringa Oleifera 25mg/Kg				Moringa Oleifera 50 mg/Kg			
0 min	30 min	60 min	120 min	0 min	30 min	60 min	120 min	0 min	30 min	60 min	120 min
7	6	6	7	6	8	9	11	7	8	9	10
6	7	7	7	7	9	10	10	7	8	9	11
7	8	6	7	7	9	10	12	6	8	10	12
6	7	7	6	7	8	9	10	6	8	9	11
7	7	9	7	7	9	9	10	7	9	9	10
6	8	9	7	6	8	10	12	7	8	8	10

Table- 3: Intergroup comparison of Tail Flick Latency

Groups	0 min	30 min	60 min	120 min
NS Vs L	0.26 ^{ns}	2.66 *	1.16 **	3.60 **
NS Vs MO 12.5	0.16 ^{ns}	0.66 ^{ns}	0.86 ^{ns}	1.16 ^{ns}
NS vs MO 25	0.50 ^{ns}	2.86 **	5.16 **	4.16 *
NS Vs MO 50	0.50 ^{ns}	3.18 *	4.16 **	4.80 **
L Vs MO 12.5	0.00 ^{ns}	2.86 *	3.33 **	1.56 **
L Vs MO 25	0.60 ^{ns}	3.33 *	2.18 *	3.18 *
L Vs MO 50	0.66 ^{ns}	2.86 ^{ns}	2.66 *	0.19 ^{ns}
MO12.5 Vs MO 25	0.50 ^{ns}	2.63 *	3.33 *	0.33 ^{ns}
MO 25 Vs MO 50	0.18 ^{ns}	0.66 ^{ns}	0.86 ^{ns}	1.16 ^{ns}

ns – not significant, * P < 0.05, ** P < 0.001, NS- Normal saline, L– Lornoxicam, MO 12.5– Moringa Oleifera 12.5 mg/kg, MO 25 – Moringa Oleifera 25mg/kg, MO 50 – Moringa Oleifera 50mg/kg.

Discussion

Bhattacharya et al in a randomized control study for analgesic effect of ethanolic leaf extract of Moringa Oleifera on albino mice**,** showed that the Moringa Oleifera leaves had significant analgesic activity by acetic acid induced writhing test. They concluded that the analgesic activity of ethanolic leaf extract of Moringa oleifera exhibited analgesic activity shows both central and peripheral analgesic actions [5]. In a similar study by Manaheji et al; found significant reductions in both thermal hyperalgesia and mechanical allodynia in adult Male Wistar rats with CFA-induced arthritis compared to indomethacin 5mg/Kg [6]. Another study by Nitin G et al; found that the seeds of Moringa oleirera Lam. possess marked analgesic activity and is equipotent to standard drug (Aspirin). They concluded that Moringa oleifera Lam seeds can used as regular analgesic [7].

An interesting study by Jurairat Khongrum et al; found that Moringa oleifera Leaves extract attenuates Neuropathic Pain induced by chronic constriction injury. They suggest that Moringa oleifera leaves extract can attenuate neuropathic pain in diabetic condition. The possible underlying mechanism may occur partly via the decreased oxidative stress. However, other mechanisms may also involve. It had been concluded that Moringa oleifera leaves may be the potential novel adjuvant therapy for neuropathic pain management [8].

In a similar study conducted by Kanchan P Upadhye et al; The fresh leaf juice and ethanolic

extract of the leaves of Moringa Oleifera were administered orally at doses of 25, 50, 100 mg/kg in mice and were tested for antinociceptive activities using three models: Acetic acid induced writhing, formalin induced paw licking and tail flick test using Analgesiometer. They observed that the extracts posses both peripheral and central antinociceptive activities with the involvement of opioid receptors, the effect was significantly reversed by the opioid receptor antagonist naloxone indicating the role of both the central and peripheral opioid receptors in alleviating pain. It was in agreement with our research that Moringa Oleifera leaves are having analgesic activity [9]. Sulaiman et al; evaluated the antinociceptive and anti-inflammatory effects of the aqueous extract of the leaves of Moringa Oleifera in lab animals, using the writhing, hot-plate and formalin tests as the antinociceptive assays, and carrageenan-induced paw oedema test as the anti-inflammatory assay. The extract (10, 30 and 100 mg/kg) exhibited significant ($P < 0.05$) antinociceptive activity, which occurred in a dose-dependent manner, in all tests used. The extract also exhibited significant ($P < 0.05$) anti-inflammatory activity in a dose dependent manner [10].

Conclusion

Within the limitations of the present study it was found that Aqueous Extracts of Moringa Oleifera leaves exhibits significant antinociceptive activity by Tail-flick Latency model. However the amount of antinociceptive action produced was lesser as compared to standard drugs like Lornoxicam.

Conflict of Interest: *None declared*
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