SCREENING OF ANTI-INFLAMMATORY POTENTIAL OF SOME TRADITION INDIAN MEDICINAL PLANTS

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ABSTRACT
The present study was aimed to the pharmacological screening some traditional Indian medicinal plants for its anti-inflammatory activity. The methanolic and aqueous extracts of leaves of Moringa oleifera and Ocimum gratissimum were taken and evaluated for their anti-inflammatory potential using carrageenan induced hind paw edema method. The methanolic and aqueous extracts of Ocimum gratissimum reduced the carrageenan induced rat paw edema by 61.25% and 36.25% respectively on oral administration of 100 mg / kg body wt., while the methanolic and aqueous extracts of Moringa oleifera reduced the edema induced by carrageenan by 60.00% and 33.75% respectively on oral administration of 500 mg / kg body wt., as compared to the untreated control group. Diclofenac sodium at 100 mg / kg body wt. inhibited the edema volume by 75.00% (p<0.05).

KEYWORDS: Moringa oleifera, Ocimum gratissimum, Anti-inflammatory activity, carrageenan, edema.

INTRODUCTION
Inflammation is one of the most important and very complex experiences. Pain has defined as an unpleasant sensory and emotional experience associated with actual or potential injury, or described in terms of such injury¹. Inflammation may be acute or chronic type. Acute pain is commonly well accounted for in terms of nociception giving rise to an intense and unpleasant sensation. In contrast, most chronic pain states are related with irregularities of the normal physiological conduit, giving rise to an improved amount of pain related with a mild harmful stimulus (hyperalgesia), pain evoked by a non-toxic stimulus (allodynia), or impulsive spasms of pain with no precipitating stimulus. The recent evidence suggests that the pain may be postulated to exist in three different groups of processes, each predominating in different painful disorders. These involve noniceptive pain, neuropathic pain and psychogenic pain². Cardinal signs of inflammation as postulated by Celsus in the first century A.D; are Redness (rubor): An acutely swollen tissue appears, Heat (calor): Increase in body, Swelling (tumor): the
accumulation of fluid in the extravascular region, pain (dolor), loss of function: well-known consequences of inflammation, was further added by Virchow (1821-1902) to the list. Celsus of drawn features. Pain inhibits the movement of moderately swollen part while severe swelling may cause the physical immobilization of the tissues\(^3\). Different types of inflammatory diseases including rheumatic disease is a major cause of morbidity of the operational force all over the world. It is called the ‘King of Human Miseries.’ Inflammation is a dynamic progression that is elicited in reaction to mechanical injuries, microbial infections, burns and other harmful stimuli which harms the host. This process includes changes in blood flow rate, increased vascular permeability, tissues destruction via the stimulation and migration of leucocytes along with the synthesis of reactive oxygen derivatives, and the synthesis of local mediators responsible for inflammation, such as prostaglandins, leukotrienes, and platelet-activating factors induced by cyclooxygenases, phospholipase A2, and lipoxygenases\(^4\).

\textit{Ocimum gratissimum} Linn belonging to the family Lamiaceae is a perennial, woody shrub and often cultivated throughout India. It as an imperative edifice block for primary healthcare ISO found in some states of North India like Jammu, Punjab, Haryana and also cultivated in Kerala\(^5\). The plant exhibited various biological activities including anti-diabetic, muscle relaxant, anthelmintic, anti-inociceptive, anti-hypotensive, anti-leishmanial, anti-oxidant activity and anti-convulsant\(^5\). Methanolic extract of \textit{Ocimum gratissimum} has therapeutic potential in this murine model of respiratory allergy to a clinically appropriate human sensitizer allergen\(^6\).

\textit{Moringa oleifera} Lam belonging to the Moringaceae family is as edible plant. It is a perennial softwood tree with timber of stumpy quality. It is well grown in Africa, tropical Asia, Latin America, the Caribbean, Florida and the Pacific Islands. All parts of the Moringa tree are edible and have long been consumed by humans\(^7\)\(^8\)\(^9\)\(^10\). Moringa oleifera tree are fit for human consumption but the roots, which are used as a condiment in the same way as horseradish, contain the alkaloid spirochin, a potentially fatal nerve paralyzing agent\(^9\). It contains sugar, rhamnose, glucosinolates and isothiocyanates\(^8\)\(^11\). Leaves contain two nitrile glycosides known as niazirin and niazirinin\(^12\). It is used to treat heart complaints, eye diseases, fevers, inflammation, dyspepsia and enlargement of\(^13\).

Thus the present investigation was planned to find out the anti-inflammatory potentials of methanolic and aqueous extracts of leaves of plants.

**MATERIALS AND METHODS**

**Collection of materials:** The leaves of \textit{Ocimum gratissimum} and \textit{Moringa oleifera} were collected from Vidyabharti trust campus, Bardoli, Surat, Gujarat. All these plants used in this
research were identified and authenticated by botanist Dr. B. R. Patel, Department of Botany, Patidar Gin Science College, Bardoli, Surat.

**Extraction of plant:** The shade dried leaves of *Ocimum gratissimum* and *Moringa oleifera* were reduced to a fine powder (# 40 size meshes) and about 200 g of powder was exposed to successive hot continuous (soxhlet apparatus) extraction with methanol. Lastly, the powder was macerated with chloroform water. After the effective extraction process, the solvents were condensed off and the extract was then concentrated on the water bath. Final extract achieved with each solvent will be weighed immediately. The methanolic extracts give 7.55 % and 9.1 % w/w yield respectively, while aqueous extracts give 12.15 % and 25.75 w/w yield respectively.

**Anti-inflammatory screening:** The animal activity was approved by institute animal ethics committee (CPCSEA/VBT/IAEC/14/01/60). Wister rats of any sex weighing between 150 g - 200 g were housed in standard metal cages. They were provided with food and water in sufficient quantity. The rats were permitted one-week acclimatization period before the experimental schedule. The rats were distributed into eight groups (each group containing six animals). The first group was assisted as a control group and received normal saline (5 ml / kg, orally.) only, the second group of animals was given standard drug Diclofenac sodium (100 mg / kg i.p.). Remaining groups of animals were treated with different extracts through oral route. A spot was made with the marker on the both hind paws of rats just below the tibiotarsal joint so that each time the paw could be dipped in the column of the plethysmograph up to the spot to ensure the constant paw volume of rats. After 30 minutes of the above therapy, an inflammatory edema was induced in the left hind paw by injecting 0.1 ml of carrageenan 1 % w/v in saline, in the planter tissue of all the animals. The paw volume was checked at first hour and followed by every hour up to the 4\textsuperscript{th} hour after the administration of carrageenan to each group. The difference between the initial and subsequent reading gave the actual edema volume. Swelling was measured as % inhibition by using the formula,

\[
\text{% Inhibition} = 100 \times \left(1 - \frac{vt}{vc}\right)
\]

Where ‘vc’ represents edema volume in control and ‘vt’ edema volume in the group treated with test compound\textsuperscript{[14]}.

The results are shown in table 1 and figure 1.
Table 1: Effect of different extracts of various plants in carrageenan induced rat paw edema

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Group</th>
<th>Mean paw edema volume in ml ± SEM</th>
<th>Difference</th>
<th>% inhibition in paw edema after 4 h.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0 h.</td>
<td>1 h.</td>
<td>2 h.</td>
</tr>
<tr>
<td>1</td>
<td>Control</td>
<td>1.01 ± 0.02</td>
<td>1.10 ± 0.09</td>
<td>1.26 ± 0.01</td>
</tr>
<tr>
<td>2</td>
<td>Standard</td>
<td>1.03 ± 0.09</td>
<td>1.31 ± 0.11</td>
<td>1.20 ± 0.02</td>
</tr>
<tr>
<td>3</td>
<td>MEMO</td>
<td>1.07 ± 0.05</td>
<td>1.42 ± 0.09</td>
<td>1.15 ± 0.13</td>
</tr>
<tr>
<td>4</td>
<td>AEMO</td>
<td>1.09 ± 0.25</td>
<td>1.21 ± 0.14</td>
<td>1.07 ± 0.17</td>
</tr>
<tr>
<td>5</td>
<td>AEOG</td>
<td>1.89 ± 0.13</td>
<td>1.95 ± 0.21</td>
<td>1.82 ± 0.08</td>
</tr>
<tr>
<td>6</td>
<td>MEOG</td>
<td>1.84 ± 0.25</td>
<td>2.00 ± 0.21</td>
<td>1.98 ± 0.14</td>
</tr>
</tbody>
</table>

MEMO – Methanolic extract of *Moringa oleifera*, AEMO – Aqueous extract of *Moringa oleifera*, MEOG – Methanolic extract of *Ocimum gratissimum*, AEOG – Aqueous extract of *Ocimum gratissimum*, * = Significant, ** = highly significant (p<0.05), n = 6, number of animals used in each group
Figure: Effects of different extracts of Ocimum gratissimum and Moringa oleifera on carrageenan induced rat paw edema.

**Statistical Analysis:** Data were expressed as mean ± SEM (standard error mean). Data were analyzed by using analysis of variance followed by Dunnett’s t-test. Differences were considered to be significant at P < 0.05.

**RESULTS AND DISCUSSION**

The methanolic extract of *Ocimum gratissimum* showed significant anti-inflammatory activity on carrageenan induced rat paw edema over the standard drug diclofenac sodium. The aqueous does not show significant anti-inflammatory activity. The results obtained indicate that the methanolic extract had more significant anti-inflammatory activity in rats, while aqueous extract had no significant anti-inflammatory activity. The methanolic and aqueous extracts of *Ocimum gratissimum* reduced the edema induced by carrageenan by 61.25 % and 36.25 % respectively on oral administration of 100 mg / kg body wt., as compared to the untreated control group. Diclofenac sodium at 100 mg / kg body wt. inhibited the edema volume by 75.00 %. The methanolic extract and aqueous extract of *Moringa oleifera* showed moderately to significant anti-inflammatory activity on carrageenan induced rat paw edema over the standard drug diclofenac sodium. The results obtained indicate that the methanolic extract had more significant anti-inflammatory activity in rats, while aqueous extract had no significant anti-inflammatory activity. The methanolic and aqueous extracts of *Moringa oleifera* reduced the edema induced by carrageenan by 33.75 % and 60.00 % respectively on oral administration of
500 mg/kg body wt., as compared to the untreated control group. Diclofenac sodium at 100 mg/kg body wt. inhibited the edema volume by 75.00%.

CONCLUSION

From the results it can be concluded both the plants possess anti-inflammatory effect. Still it is a preliminary study and it requires further studies to identify and isolation of active phytoconstituents responsible for the anti-inflammatory activity.

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REFERENCES


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