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ANTI – INFLAMMATORY AND SEDATIVE – HYPNOTIC ACTIVITY OF THE METHANOLIC EXTRACT OF THE LEAVES OF MENTHA ARVENSIS

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ABSTRAT: *Mentha arvensis* Linn, a plant used as traditional medicine and in perfumery, has now been explored for its pharmacological activities as an anti-inflammatory and also as sedative-hypnotic plant drug. The methanolic extract of the leaves after being processed, was taken for the pharmacological study. Anti-inflammatory activity was carried out on albino rats. Further, the activity was compared to that of a standard anti-inflammatory drug – nimesulide and the percent inhibition of oedema determined. The sedative hypnotic activity, when carried out on mice, showed the potentiation of pentobarbitone induced sleeping time. The data of average recovery time was analyzed to show the standard deviation from the mean.

INTRODUCTION

The revival of Indian traditional medicinal plants led to further exploration of various parts of *Mentha arvensis* Linn variety Piperascens. The plant known commonly as "Japanipudina" belongs to family Labiatae. It is an annual herb available in India and is indigenous of Japan. It is also found in Europe, North and South America and Australia. The compound Menthol is isolated from this plant. The plant has commercial importance in perfumery and flavouring in pharmaceutical preparation[1]. *Mentha arvensis* is a major essential oil bearing plant. The oil was examined by GC-MS for its chemical composition[2]. The leaves are the source of essential oil which exhibited strong fungitoxic activity[3]. As reported recently, the plant extract has also shown antifertility activity[4]. Besides, the leaves are being used for indigestion and has antispasmodic activity in herbal preparations.

The present work emphasizes the effect of the methanolic extract of the leaves of the plant in combating inflammation and explore the sedative hypnotic activity of the extract.

MATERIALS AND METHODS

Fresh leaves of Mentha arvensis Linn were shade dried. The methanolic extract was prepared using soxlet apparatus. The extract after processing was concentrated and methanol removed completely under vacuum. Dry and concentrated methanolic leaf extract was used for the anti-inflammatory and sedative hypnotic study after dissolving it in distilled water just before administration to the animal.

A. Anti-inflammatory Activity

The information was induced by carrageenanan allow rats and the anti-inflammatory study carried out by measuring the reduction in hind paw oedema by the mentholic leaf extract of *Mentha arvensis* Linn plant.

Carrageenan solution was prepared by dissolving carrageennan in normal saline Nimesulide, was chosen as an anti-inflammatory drug (standard) for comparison purpose (Dose – 20 mg/kg).

Animals – Rats weighing 150 -200 grams were chosen. They were housed in properly ventilated animal house in metallic cages at temperature of 25^0C and relative humidity of 60% and fed on a standard pellet water ad libitium. The animals were grouped into 3 groups each group containing 5 animals.

Methodology

The activity of the extract in the present carrageenen induced rat paw oedema test, according to the general procedure described by Winter et al. In this test, the treatments were followed by injection of 0.1 ml of 1.0% w/v carrageenan solution, after an interval of one hour on same paw of each animal of all the groups. All injections were given by subplantar routes of administration.

Observation was made by measurement of paw circumference immediately after carrageenan injection (zero hour) and was repeated after every one hour for three hours. The per cent swelling of the paw of each animal at different times were calculated and average swelling in group II and III were compared with that of control (Group I). The percent inhibition of oedema was determined.

Group I	Control	Received saline sodium chloride 0.9% w/v
Group II	Standard	Received Nimesulide 20 mg/kg
Group III	Test	Received methanolic extract from leaves of *M.arvensis* 100 mg/kg

B. Sedative-Hypnotic Activity

The sedative and hypnotic activity of the methanolic extract of the leaves of *Mantha arvensis* Linn is based on the fact that the CNS depressant drugs potentiate a sub-hypnotic dose of Pentobarbitone. This method is a means of detecting mild sedatives, but also gives positive results with other depressants such as those which hare anti-convulsants, analgesic and anxiolytics. Sodium pentabarbitone was for induction of sleep.

Animals

Mice of either sex weighing 25-30 grams were taken, housed property and fed on standard pellet diet and water. They were divided into four groups each group consisting of three animals.

Group - I	Treatment with Pentobarbitone sodium (15mg /kg)
Group - II	Treatment with methanolic extract (5 mg/kg) followed by Pentobarbitone sodium after 30 minutes.
Group - III	Treatment with methanolic extract (10mg / kg) followed by Pentobarbitone sodium (15mg/kg) after 30 min.
Group - IV	Treatment with methanolic extract (15 mg/kg) followed by Pentobarbitone sodium (15 mg/kg) after 30 min.

Methodology

The methanolic extract was prepared to be administrated intraperitoneally at dose levels of 5mg/kg, 10 mg/kg and 15 mg/kg. Extracts were administered half an hour before administration of sodium pentobarbitone (15 mg/kg).

The onset of action was noted and also the duration of action i.e the time when the mice regains righting reflex. Each mice was so kept that they were not disturbed by the adjacent mice.

RESULTS AND DISCUSSION

A. Anti-inflammatory

The percent swelling of the paw of rats after one, two and three hours of carrageen an injection were calculated with respect to the observation at zero time using the equation.

Per Cent swelling = [V-Vi/Vi] *100
Where,
V = Paw circumference reading at different times after carrageenan injection
Vi =Initial reading at zero time.

The inhibition of oedema formation was determined using equation.

Per Cent inhibition = [Percent swelling in test group/ Percent swelling in control group] *100.

The observations are tabulated in Table I.

Anti-inflammatory activity was shown by the methanolic extract of leaves of *Mentha arvensis* Linn. but the activity was less than that observed by the standard dung nimesulide.

B. Sedative Hypnotic Activity

The observations are depicted in Table II. The dung extract was given at three dose levels to screen the activity in a range from 5mg to15mg per kg wt of mice. The mean and standard deviation from mean was next calculated.

The study results indicate that there was potentiation of sleeping time substantially. Therefore the methanolic extract of *Mentha arvensis* Linn. can be used as sedative-hyphotic plant dung. This pharmacological activity may server as a complementary one together with the fragrance and the cooling effect of the menthol, also extracted from the leaves of the plant.

CONCLUSION

Based upon experimental study it can be concluded that *Mantha arvensis* Linn variety Piperscense may be grown commercially to be formulated as anti-inflammatory, sedative hypnotic plant dung.

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Table – I
ANTI – INFLAMMATORY ACTIVITY

Group No. of Rats	Treatment (one hour before carrageenan inj.)	Observations in (mm) After Carrageenan injection				Percent Swelling			Percentage Inhibition to Oedema formulation		
		0h	1h	2h	3h	1h	2h	3h	1h	2h	3h
I	Control (Saline, 1.0 ml/kg)	3.12	3.72	3.84	3.9	19.23	23.07	25.0	-	-	-
II	Nimesulide (20mg/kg)	3.19	3.56	3.64	3.75	11.59	14.14	17.55	39.74	38.88	29.8
III	Methanolic Extract (100 mg/kg)	3.18	3.62	3.71	3.84	13.83	16.66	20.75	28.08	27.78	17.0

Table – II
SEDATIVE – HYPNOTIC ACTIVITY

S. No.	Group No. of Mice	Treatment	Average of Onset of Action (min)	Average of Recovery time (min)
1	I	Pentobarbitone sodium (15 mg/kg)	2.7	59.33 (1.7)
2	II	Extract (5 mg/kg + Sod. Pentobarbitone (15 mg/kg)	2.8	76.0 (1.414)
3	III	Extract (10 mg/kg + Sod. Pentobarbitone (15 mg/kg) after 30 min	2.66	76.66 (1.886)
4	IV	Extract (15 mg/kg + Sod. Pentobarbitone (15 mg/kg) after 30 min	2.6	81.0 (0.816)

Values in parenthesis standard deviation