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EVALUATION OF ANALGESIC ACTIVITY OF *MENTHA PIPERITA* (AQUEOUS EXTRACT) IN SWISS MALE ALBINO MICE

Pharmacology

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ABSTRACT

Background Analgesic drugs used to alleviate pain are laden with adverse effects. Mentha piperita is a herbaceous plant used in traditional medicine.The leaves contain ethereal oil, tannins, flavonoids and they possess diverse medicinal properties.

Aim and Objective: To evaluate the analgesic effect of aqueous extract of leaves of Mentha piperita in adult swiss male albino mice in comparison with aspirin.

Materials and Methods: Analgesic effect was evaluated using Eddy's hot plate method and tail-clip method in 30 inbred male albino mice procured from central animal house, Madurai Medical college and divided into five groups, with six rats in each group . Group I served as control .Group II received T.Aspirin– 100 mg/kg (oral). Group III, IV and V received graded doses of 200,400 ,600 mg /kg of aqueous extract of Mentha piperita (oral).

Results: Mentha piperita at all 3 doses had significant dose dependant analgesic activity when compared to the control groupand the 600 mg/kg dose had analgesic activity comparable to that of aspirin.

Conclusion: The aqueous extract of leaves of Mentha piperita at the dose of 600 mg/kg had analgesic activity comparable to that of aspirin. The analgesic effects may be mediated both centrally and peripherally.

KEYWORDS

Mentha piperita , Aspirin , Analgesic activity, Eddy's hotplate, Tailclip

1. INTRODUCTION :

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage. Often, it is considered as a protective mechanism. It resolves once the noxious stimuli is removed, but sometimes, pain might become chronic or unbearable, thereby reducing the quality of life.

Drugs that are used to alleviate the pain are known as analgesics. Most of the presently used analgesics such as the non steroidal anti inflammatory drugs(NSAID)like aspirin, diclofenac are offset due to their adverse effects. Hence, search for an analgesic with minimal adverse effects is ever present. Herbal remedies, that alleviate pain with minimal disadvantages, especially when used on a long term basis, are being preferred in current scenario[1]. One such herbal extract, the aqueous form of *Mentha piperita* leaves is analysed here for its analgesic activity.

2. Literature Survey :

Mentha vernacularly termed as pudina/पुदीना/ಪುದೀನ/പുതിന/புதினா is a commonly used culinary ingredient. India is world's largest producer and exporter of mint oil[2].The phytoconstituents are used in food, pharmaceuticals,perfumeryand flavouring industries.

The plant is indigenous to Europe and Middle East. The nomenclature is derived from Greek 'Mintha' and Latin 'piper', also known as peppermint. The chemical components of the leaves of peppermint vary with plant maturity, variety, geography and processing conditions. Menthol, menthone, flavanoids, tannins, ethereal oil, rosemary acid, 1, 8 ceneole, pulegone are a few phytoconstituents present in the leaves[3].

Several in vitro studies have proven antioxidant, antitumor, antiallergenic, antiviral, antibacterial, antifungal potential for mentha[4]. Six flavanoid, glycosides, eriocitrin, narirutin, hesperidin, luteolin 7-0 rutinoside, isorhoifolin, diosmin, rosmarinic acid, were isolated from mentha, which had an inhibitory effect on histamine release in invitro studies[5]. Flavanoids have also been proposed to possess analgesic and antiinflammatory properties.

AIM :

To evaluate the analgesic activity of aqueous extract of leaves of *Mentha piperita* in adult swiss male albino mice in comparison with aspirin.

MATERIALS AND METHODS:

Mentha leaves were obtained from the local market, Madurai and identified in Pharmacognosy. *Mentha Piperita* leaves were cleaned and air dried in shade. The leaves were extracted with boiling water and concentrated for a yield of 6.4% and the aqueous extract was procured.

StudyCentre :

The Study was carried out in the Institute of Pharmacology, Madurai Medical College, Madurai after getting clearance from the Institutional animal ethical committee dated 27.03.2017.

Methodology :

24 adult male albino rats weighing 150 -250 gms were obtained from Central Animal House, Madurai Medical College. The animals had free access to food and water ad libitum. The animals were divided into 5 groups of 6 animals each. Group 1 served as control, Group 2 as standard, Group 3, 4 and 5 as test 1, 2, 3 respectively.

Group I - Control -Normal feed and water
Group II – Standard - Normal feed and water + T.Aspirin– 100 mg/kg (oral)
Group III - Test I - Normal feed and water + 200 mg /kg of aqueous extract of *Mentha piperita* (oral)
Group IV – Test II - Normal feed and water + 400 mg /kg of aqueous extract of *Mentha piperita* (oral)
Group V – Test III - Normal feed and water + 600 mg /kg of aqueous extract of *Mentha piperita* (oral)

Methods for evaluation of analgesic effect:

Eddy's hot plate method:

The mice were placed on a hot plate, one at a time, which was maintained at a temperature of 55 ± 0.5^{0}C throughout the test. A cut-off period of 15 seconds was considered as maximal latency to avoid paw injury. The time taken by the animals to lick the hind paw (or) attempt to escape by jumping was taken as the reaction time and measured. Reaction time was observed before drug and after drug at one and two hours.

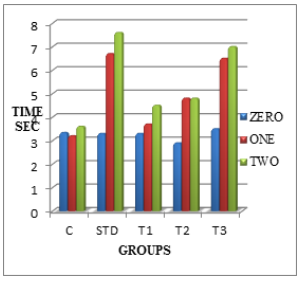
Tail clip Method:
It is the Haffner's method for evaluating analgesic activity. An artery clip was placed near the root of tail of mice. A cut off period of 15 seconds was given. The time taken by the animal to bite or remove the clip was considered as reaction time. Reaction time was observed before drugs and one and two hours after the drugs were given.

RESULTS :
The values obtained were expressed as Mean ± S.D.. Statistical analysis of differences between groups was carried out using one-way analysis of variance(ANOVA).Probability(P) value of < 0.05 was taken as the level of statistical significance.

Table :1 Results of Eddy's hot plate Method:

Time in hours	Time in seconds				
	Control	STD	T1	T2	T3
Zero	3.43± 0.5	3.3± 0.6	3.3± 0.3	2.9± 0.5	3.5± 0.5
One	3.2± 0.3	6.7± 1.1	3.7± 0.3	4.8± 0.7	6.5± 0.6
Two	3.6± 0.4	7.6± 0.8	4.5± 0.4	4.8± 0.5	7.0± 0.8

Graph:1 Comparison of Reaction time between the groups by hot plate Method.



Graph :2 Comparison of Reaction time between control and test 3 group by hot plate Method:

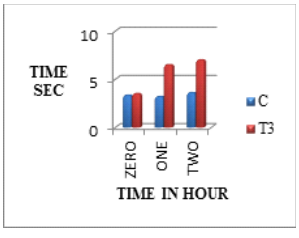
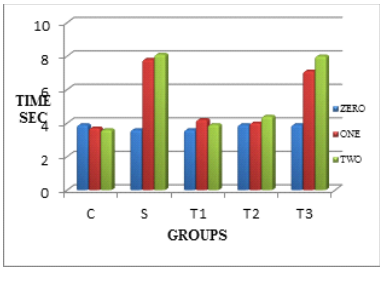


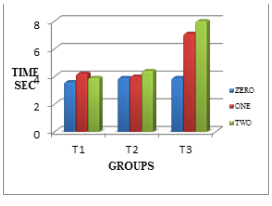
Table :2 Results for Tailclip Method:

Time in hours	Time in seconds				
	Control	STD	T1	T2	T3
Zero	3.9 ±0.4	3.6±0.6	3.6±0.7	3.9±0.8	3.9±0.8
One	3.7 ±0.7	7.8±1.1	4.2 ±0.3	4.0 ±0.3	7.1±1.6
Two	3.6±0.6	8.1±1.2	3.9 ±0.5	4.4±0.4	8.0±1.2

Graph:3 Comparison of Reaction time between the groups by Tailclip Method:



Graph :4 Comparison of Reaction time between test groups by Tailclip Method:



DISCUSSION :
In Eddy's hot plate method, the reaction time was delayed by 7 ±0.8 seconds in the test 3 group. In the standard group, the latency was 7.6 ± 0.8 seconds. All the treated groups showed significant analgesic activity when compared with control. *Mentha piperita* at the dose of 600 mg/kg was found to have analgesic effect comparable to that of aspirin 100 mg/kg.

In tail clip method, the reaction time in standard group was 8.1 ± 1.2 seconds in 2 hours, whereas, it was 8.0 ± 1.2 seconds in test 3 group, and 3.9 to 4.4 ± 0.5 in test 1 and test 2 groups. Hence all treated groups had significant analgesic activity, with the 600 mg/kg dose of *Mentha piperita* having comparable activity to aspirin.

Aspirin, a NSAID, acts by blocking the enzyme cycloxygenase, that catalyses the biosynthesis of prostaglandins from arachidonic acid, which is responsible for analgesia.

The extract of *Mentha piperita* was shown to possess anti nociceptive property both by central and peripheral mediated mechanisms. Menthol especially, blocks voltage gated calcium channels and modulation of these channels is involved in regulation of pain threshold[6].

Similarly, menthol also stimulates the central κ-opioid receptors, which increases the **central** pain threshold. The flavanoids are proposed to reduce the availability of prostaglandins, hence providing analgesia [7-9].

CONCLUSION :
Mentha piperita is easily available and the aqueous extract at 600 mg/kg showed analgesic activity comparable to aspirin. This makes it a promising lead compound for future clinical trials.

REFERENCES :

1) Joseph C.Maroon, Jeffrey W.Bost, Adara Maroon : Natural Anti inflammatory 2010; vol 1:80
2) Aishwarya Balakrishnan. Therapeutic uses of peppermint A review. Jounal of Pharmaceutical sciences and research. 2015, Vol. 7 (7), Pg 474-476.
3) Imael Henri Nestor Bassole et al, composition and Antimicrobial activities of Lippia multiflora moldenke Mentha x piperta L., and Ocimum basilicun L. Essential oils Molecules 2010, 15. pages 7825 - 7839.
4) Diance L. Mckay and Jeffrey B.Blumberg: A review of the Bioactivity and potential Health Benefits of Peppermint Tea. Phytotherapy Research 2006, 20. pages (619 - 633).
5) Toshio inoue,Yukio suginoto et al, Antiallergenic effect of Flavanoid Glycosides obtained from Mentha piperita L.. Biol Pharm Bull (2002) Vol 25, No.2 Pages (256 - 259).
6) Sidell N verity M and Nord E Menthol blocks dihydropyridine - insensitive ca channels and induces neurite outgrowth in human neuroblastona cells. J cell physiology. 1990 - 142 : pages 410-419.
7) Malberg AR and Yaksh TL. Voltage - sensitive calcium channels in spinal nociceptive processing, blockade N and P.type channels inhibits formalin induced nociception. J Neurosci. (1994) 41 : 4882 - 4889
8) Galeotti N Manelli L Gabriela M Bartolini A and Ghelardin C Menthol : a natural analgesic compound (2002) Neuro science 322 : 145 - 148.
9) Hossinzadeh etalAnti inflammatory and acute toxicily effects of Zhumeria majdae extract in mice and rats (2002) phytomedicine 9: (135 - 141).