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Assessment of the Antinociceptive effect of a Folklore Plant: *TiliacoraacuminataMiers*

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Abstract

*Tiliacoraacuminata*Miers (syn:*Tiliacoraracemosa*Colebr)is a Menispermaceae member commonly seen as a weed. It is a common plant used in folklore medicine as an antidote to snake venom. It is also known to be used by some traditional practitioners in conditions like *vatakandakam.* Antinociceptive study was done in Balb/c mice in acetic acid induced writhing reflex model. Aspirin was used as the standard drug in a dose of 100mg/kg body wt. The test drug was administered in three different doses- 125mg/kg body weight, 250mg/kg body weight and 500mg/kg body weight. The assessment was done by counting the number of writhings in 20 minutes. The antinocicepive study showed significant reduction in the number of writhings in all the test drug treated groups when compared to the control group. But none of the test drug treated groups showed results comparable with that of the standard drug.

Keywords

Tiliacoraacuminata, Antinociceptive, Analgesic, Writhing Reflex

Greentree Group

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INTRODUCTION

*Tiliacoraacuminata*Miers popularly known as *Vallikanjiram* in Malayalam is seen as a weed in the roadsides and in open fields. This plant is a creeper of the Menispermaceae family. Though called *vallikanjiram*, this species is not related to nux-vomica[1]. This drug is not mentioned in the classical text books of *Āyurveda* though *Ācarya* P.V Sharma gives this drug as the botanical identity for *Krṣṇavetra*. This plant has been in folklore practice as an anti-inflammatory and analgesic drug. But these effects have not been scientifically validated.

MATERIALS AND METHODS

Collection and processing of drug

The plant *Tiliacoraacuminata*Miers was collected from Puthuparambu, Kottakal. The whole plant collected was washed 3-4 times in water and shade dried. The shade dried plant was crushed and then made into powder.

Twenty grams of this powder was taken and soaked in 60 ml of double distilled water. Then the decoction was prepared by standard *Ayurvedic* procedures. i.e., 8 times water (160ml) was added and was reduced to one fourth by boiling. This decoction was filtered and centrifuged. The supernatant was collected and further evaporated in a water bath till the extract was dry. The yield obtained was 6.2g. This was reconstituted in 35ml of autoclaved double distilled water and stored in freezing temperature. This prepared drug was used for the whole experiment.

Drugs and chemicals

Aspirin	Cipla
Sodium chloride	Merck
Glacial acetic acid	Merck

0.6% acetic acid

0.6ml glacial acetic acid was mixed in 100ml distilled water

Animals

Male Balb/c mice (4-8 weeks old, 20-30g body weight) were obtained from the animal breeding section of Amala Cancer Research Centre, Thrissur. The animals were maintained in well ventilated polypropelene cages under standardized environmental conditions (22 -28^0 C, 60 – 70% relative humidity, 12 hr dark / light cycle) and fed with standard mouse feed (Lipton India) and water *ad libitum.* A total of 90 animals were used in the whole study. All the animal experiments were

carried out at Amala Cancer Research Centre by prior permission ofInstitutional Animal Ethics Committee (IAEC) (No.149/1999/CPCSEA).

Antinociceptive study

Thirty male balb/c mice aged 4-6 weeks weighing 20-25g were selected and grouped into 5 groups.

Control: Received no treatment

Standard: Received Aspirin in the dose of 100mg/kg body weight

Group1: Received the test drug in a dose of 125mg/kg body weight

Group 2: Received the test drug in a dose of 250mg/kg body weight

Group 3: Received the test drug in a dose of 500mg/kg body weight

Aspirin and the test drug in the corresponding doses were administered orally to the respective groups consecutively for 6 days. On the 6^{th}day,thirty minutes after the 6^{th} dose, pain was induced by an intra peritoneal injection of 200µl 0.6% acetic acid. The characteristic writhing reflex i.e., constriction of abdominal muscles with the stretching of at least one hind limb was counted for each animal for 20 minutes.

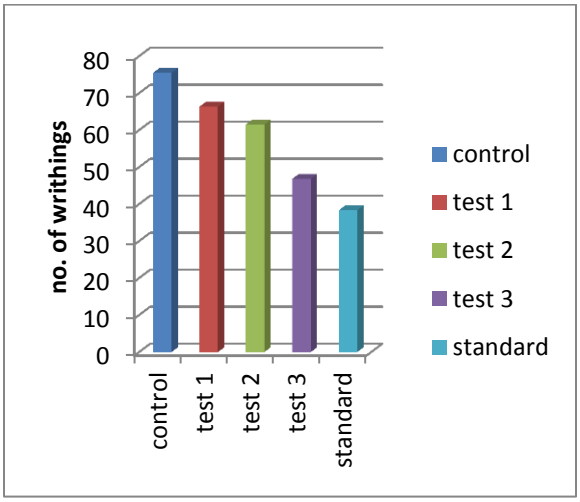
Statistical analysis

The statistical analysis of the data was done by using InstatGraphpad software

RESULTS AND DISCUSSION

In the antinociceptive study, all the groups showed significant reduction in the number of writhings when compared to the normal control group. The test drug treated groups showed a dose dependent reduction in the number of writhing reflexes i.e., the double dose group showed the most reduction in the number of writhings and the half dose treated group showed the least reduction in number of writhings. But none of the test drug treated groups showed results comparable with that of standard drug (Graph 1).

Graph 1 Graph showing the number of writhings in each group



All the groups showed significant reduction in the number of writhing when compared to the control group. The standard drug showed 49.23% inhibition in the writhing when compared to the control group. The double dose group showed 37.97% inhibition, the therapeutic dose showed 18.54% and half dose showed 12.15% inhibition in the writhing when compared to the control group (Table 1). All the test drugs treated groups showed significant antinociceptive activity compared to the control group but none of the groups showed activity compared to that of standard drug. Acetic acid induced writhing reflex experiment is used to test both peripheral and central analgesia[2]. So this method is used as a simple screening method for analgesic activity. From this it can be inferred that the test drug possess either central or peripheral analgesic property.

Table 1 Percentage inhibition of Writhing's

Group	**Percentage inhibition of writhings**
Test group 1	12.15%
Test group 2	18.54%
Test group 3	37.97%
Standard control	49.23%

Pain sensation in acetic acid induced writhing method is elicited by triggering localized inflammatory response resulting release of free arachidonic acid from tissue phospholipid via cyclooxygenase (COX), and prostaglandin biosynthesis[3]. In other words, the acetic acid induced writhing has been associated with increased levels of PGE_2 and $PGF_{2\alpha}$ in peritoneal fluids as well as lipoxygenase product[4]. The increase in prostaglandin levels within the peritoneal cavity then enhances inflammatory pain by increasing capillary permeability. The acetic acid induced writhing method was found effective to evaluate peripherally active analgesics[5]. The agent reducing the number of writhing will render analgesic effect preferably by inhibition of prostaglandin synthesis, a peripheral mechanism of pain inhibition[6]. The effect of the extracts against the noxious stimulus may be an indication that it depressed the production of irritants and hereby reduction in the number of writhes in the animals. The significant pain reduction of the plant extract might be due to the presence of analgesic principles acting with the prostaglandin pathways.

Phytochemical screening of the plant reveals the presence of tannin, reducing sugars, flavonoids and alkaloids. Flavonoids were reported to have a role in analgesic activity primarily by targeting

prostaglandins[7]. Tannins also play a role in antinociceptive and anti-inflammatory activities in some studies[8]. Besides, alkaloids are well known for their ability to inhibit pain perception[9]. Therefore it is possible that these phytoconstituents are responsible for its analgesic activity.

The alkaloids tiliacorine, tiliacorinine, nor tiliacorinine A, tiliamosine, N-methyl tiliamosine, tiliaresin, tiliarine, N methyl tiliarine have been found in this plant.It was found that tiliacorine potentiated the analgesic effect of morphine and meperidine. The analgesic activity was further supported by its anti stretching activity in mice. So tiliacorine can be considered as a non narcotic analgesic. The narcotic analgesic potentiation may be due to its CNS depressant action.Another chemical constituent present in *Tiliacoraacuminata*Miers, called corine showed a curariform activity and acted as a myoneuronal inhibitor which may be contributive to the analgesic activity of the drug[10].

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