



PHARMACOLOGICAL SCREENING OF *TERMINALIA BELLERICA* FOR ITS ANTIPSYCHOTIC AND ANXIOLYTIC ACTIVITY ON MICE

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ABSTRACT

Objective: To carry out the preclinical evaluation of methanolic extract of the leaves of *Terminalia Bellerica* for antipsychotic and anxiolytic activity. **Methodology:** The preclinical evaluation of standardized diazepam and methanolic extract of the leaves of *Terminalia Bellerica* for antipsychotic and anxiolytic activity was carried out by using the following experimental models: a) Continuous Avoidance test b) Elevated Plus Maze c) IR Actimeter d) Open field test. **Results:** The models for studying drugs or conditions that show antipsychotic and anxiolytic activity was standardized and evaluated by using leaf extracts of *Terminalia Bellerica*. The methanolic leaf extract of *Terminalia Bellerica* has shown significant antipsychotic and anxiolytic activity by all the employed experimental models. **Conclusion:** Screening models for studying drugs or conditions that affect anti-psychotic and anti-anxiety were standardized and evaluated by using methanolic extract of *Terminalia Bellerica*. The leaf extract has shown significant activity of antipsychotic and anxiolytic activity when compared with standard treatment group.

KEY WORDS

Terminalia Bellerica, anxiolytic, Open field test, Elevated plus Maze, IR Actimeter, and continuous avoidance response.

INTRODUCTION

Herbal medicine is the oldest form of healthcare known to mankind. Herbs had been used by all cultures throughout history. It was an integral part of the development of modern civilization. Primitive man observed and appreciated the great diversity of plants available to him. The plants provided food, clothing, shelter, and medicine. Much of the medicinal use of plants seems to have been developed through observations of wild animals, and by trial and error. As time went on, each tribe added the medicinal power of herbs in their area to its knowledge base. They methodically collected information on herbs and developed well defined herbal pharmacopoeias.

Terminalia Bellerica has a wide distribution in the Caribbean. It is most common in the Florida Keys and has a scattered presence in pinelands and hammocks along Florida's east coast, north to Brevard County and

to Manatee County on the west coast. It is a nuisance plant in Bermuda, Australia and on several Pacific Islands including Inflorescences, early January.

MATERIALS AND METHODS

The commonly employed technique for separation of active substance from crude drug is called as 'Extraction' which involves the use of different solvents. The plant material used for extraction should be properly authenticated or identified. The choice of the plant material for extraction depends upon its nature and the components required being isolated. The dried powdered plant material is commonly used for extraction. The solvent used for extraction is called menstruum and the residue is known as marc. Methanol was used as a solvent for the extraction process as it confers a good polarity.

EXPERIMENTAL ANIMALS

Mice (25-30g) were maintained for 7 days in the animal house under standard conditions temperature ($24 \pm 10^\circ\text{C}$), relative humidity (45-55%) and 12:12 light: dark cycle. The animals were fed with standard pellet and water ad libitum. The animals were allowed to acclimatize to laboratory conditions 48 h before the start of the experiment. 5 mice/group were used in all sets of experiments. All the experiments were conducted after obtaining permission from the Institutional Animal Ethics Committee (IAEC).

SELECTION OF DOSE AND TREATMENT PERIOD

Mice (25-30g) of either sex were divided into four groups containing five animals in each. A control group received normal saline solution, while second group received standard drug (Diazepam) and other group the standardized methanolic leaf extracts of "*Terminalia Bellerica*" at doses 100 mg/kg-1 p.o, respectively.

- Group-1- Control group (0.9% Normal saline 2ml/kg orally)
- Group-2 – Standard (Diazepam at a dose of 2 mg/ kg i.p)
- Group-3 – Methanolic extract (100mg/kgorally)

EQUIPMENT

The following equipment was used to evaluate antipsychotic and anxiolytic activity:

- Continuous avoidance apparatus
- Elevated plus Maze
- IR Actimeter
- Open Field Test

Continuous Avoidance Apparatus

Continuous avoidance response involves the acquisition of an operant response that will either terminate (escape) or prevent (avoid) an aversive event. This

equipment provides a convenient test procedure in which the test animal has to anticipate time duration to press a lever to avoid shock. A compact solid-state apparatus, size approx. 45x30x30cms. with wire grid, house light, avoidance key, variable intensity stimulator with variable delay timer and counters to record stimulus avoided and stimulus delivered. The difference in the avoidance increases after the treatment with drug. Thus, it indicates the given drug has antipsychotic activity.

Elevated Plus Maze Test

Mice were carried into the test room in their home cages and were handled by the base of their tails at all times. Mice were placed in the central square of the Plus-Maze facing an open arm and were then allowed to explore the apparatus for 5 minutes. An observer sitting quietly about 1 m from the apparatus recorded the behaviour of the animals on the maze.

IR Actimeter

Infrared (IR) Actimeter allows the study of spontaneous locomotor activity, exploration in rodents. Each frame counts with 16 x 16 infrared beams for optimal subject detection. Each frame may be used for evaluation of general activity (one or more animals), locomotor, stereotypic movements.

Open filed test

Mice were carried to the test room in their home cages and were handled by the base of their tails at all times. Mice were placed into the center or one of the four corners of the open field and allowed to explore the apparatus for 5 minutes.

Behaviours scored: Line crossings, time spent in centre squares, number of centre square entries and rearing.

RESULTS

Antipsychotic activity

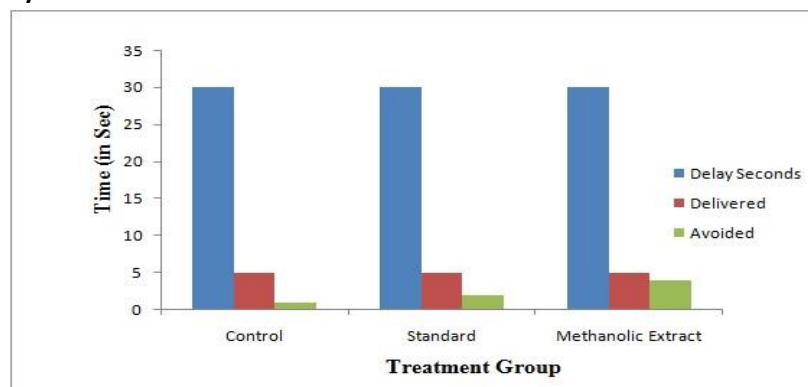


Fig 1: Observations of treatment groups for continuous avoidance response

Anxiolytic / Anti-anxiety activity

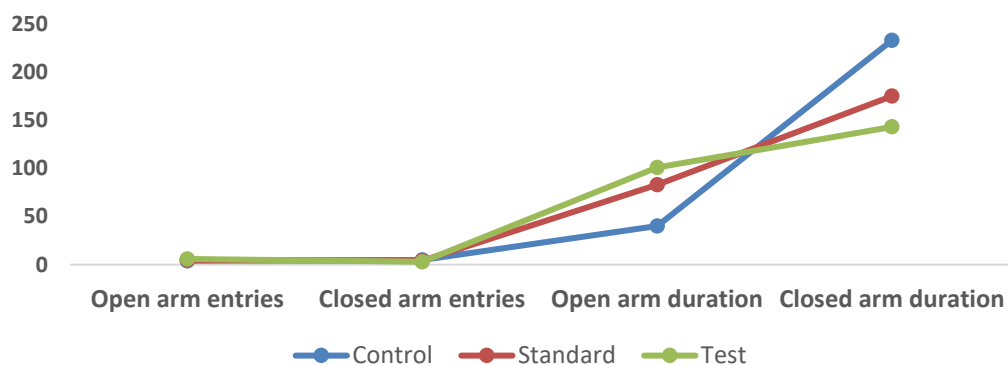


Fig 2: Observations of treatment groups for Elevated plus maze

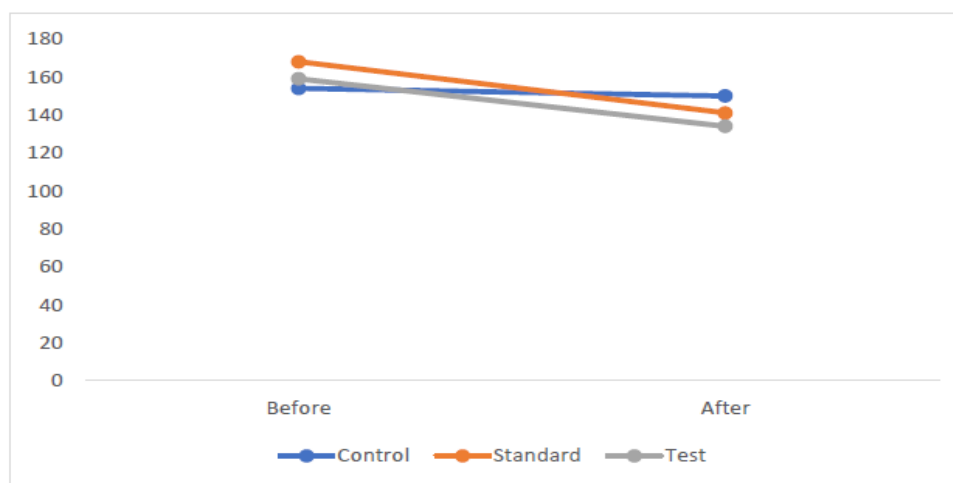


Fig 3: Observations of treatment groups for IR actometer

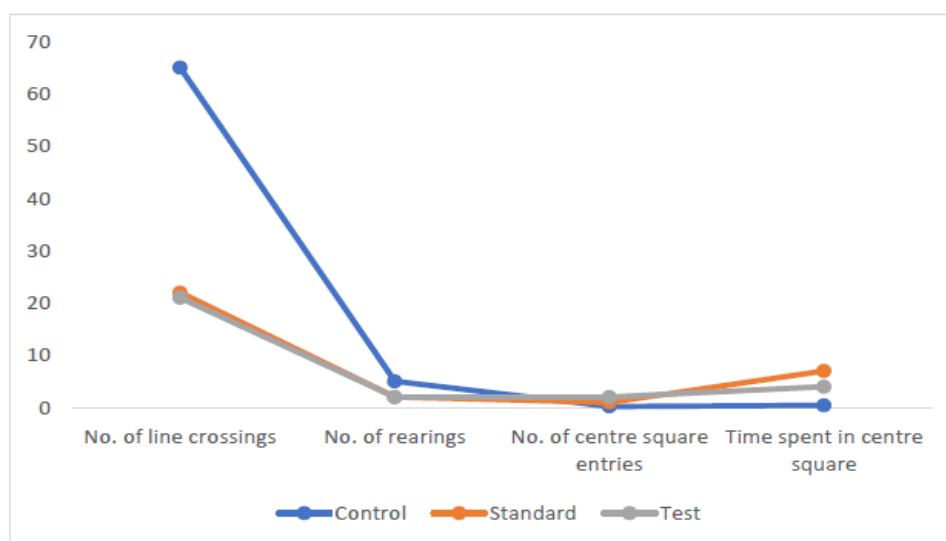


Fig 4: Observations of treatment groups for Open field test

CONCLUSION

Screening models for studying drugs or conditions that affect anti-anxiety and muscle relaxation was standardized and evaluated by using methanolic extract of *Terminalia Bellerica*. The leaf extract has shown significant activity of anti-psychotic and anxiolytic activity when compared with standard treatment group.

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