Evaluation Of Anticonvulsant Activity Of Ethanolic Extract Of Murraya Koenigii Leaves In Wistar Rats

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Introduction

- Epilepsy is the second most common neurological disorder after stroke affecting ~ 1% of the worlds population
- It is mainly treated with drugs
- Current antiepileptic drugs are effective in controlling 70% of seizure cases, but their use is often limited by side effects.

- Murraya koenigii is a tropical-subtropical tree of family Rutacea which is native to India.

- Murrya koenigii is commonly known as **curry leaf** tree is used as seasoning for curries.

- It is traditionally used for the treatment of epilepsy.

Materials & Methods

Plant Material:

- Fresh green leaves were obtained from local market of Davanagere.
- Shade dried.
- Powdered mechanically

Preparation of Extract:

- Coarse powdered material was extracted in Soxhlet apparatus using ethanol
- After complete extraction solvent was distilled off and concentrated on a water bath.

Experimental animals

Albino wistar rats of either sex weighing (150-200g)

Dose seletion

- Previous acute toxicity studies had found LD50 of Ethanolic extract of Murraya koenigii (MKEE) leaves in Wistar rats to be 2500mg/kg.
- Three doses – 125mg/kg, 250mg/kg and 500mgkg

Anticonvulsant activity

- Maximal electroshock (MES) model
- Pentylenetetrazole (PTZ) induced convulsion model

MES Model

- 150mA, 50Hz for 0.2 seconds, was delivered through ear electrodes
- Thirty animals were equally divided into five groups. Each group consisting of 3 males and 3 females.

Group A : 1% Tween 80 in distilled water 10ml/kg (Control) P.O

Group B : Sodium Valproate 200mg/kg (Standard) P.O

Group C : MKEE 500mg/kg P.O

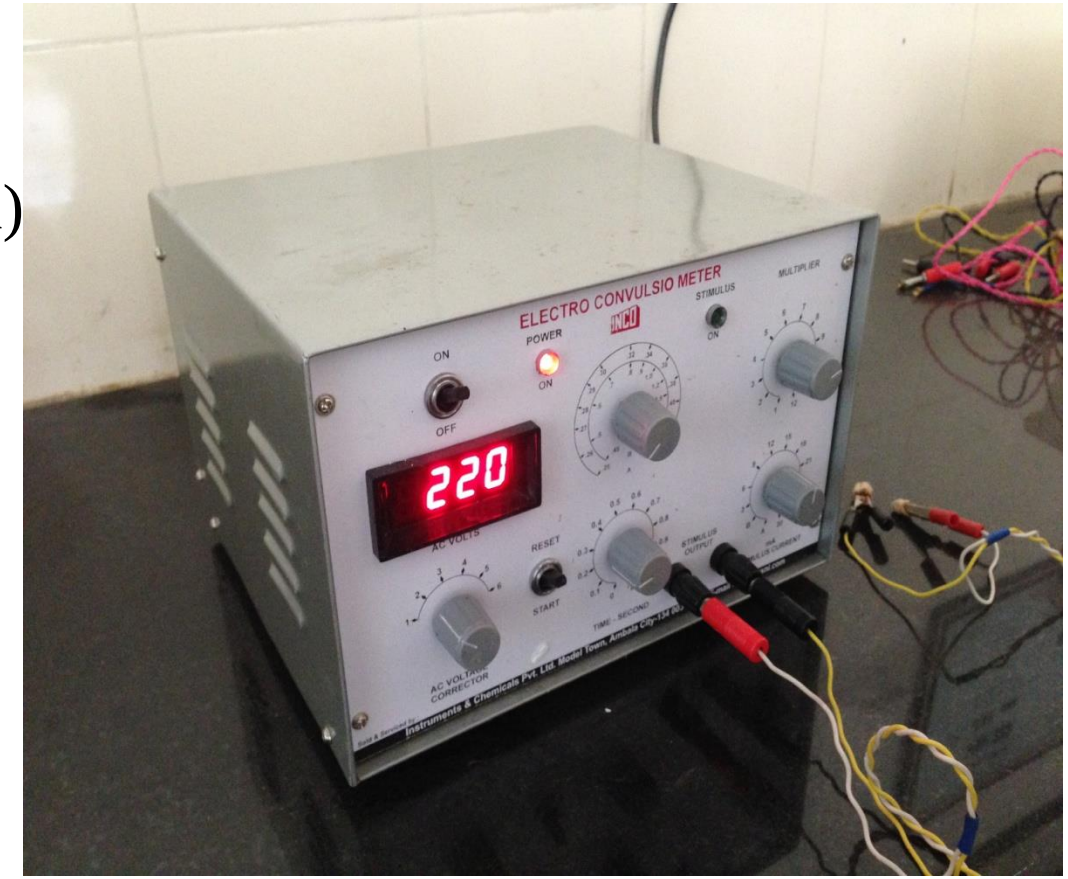
Group D : MKEE 250mg/kg P.O

Group E : MKEE 125mg/kg PO

MES Model

Parameters:

1. Percentage protection
2. Duration of HLTE
   (Hind limb tonic extension)
3. Regain of righting reflex



PTZ Model

- PTZ 50mg/kg I.P was administered to rats
- Animals were observed for a period of 1 hour for convulsion
- Thirty animals were equally divided into five groups. Each group consisting of 3 males and 3 females.

Group A : 1% Tween 80 in distilled water 10ml/kg (Control) P.O

Group B : Sodium Valproate 200mg/kg (Standard) P.O

Group C : MKEE 500mg/kg P.O

Group D : MKEE 250mg/kg P.O

Group E : MKEE 125mg/kg PO

PTZ Model

- Parameter :
  1. Percentage protection
  2. Latency of clonus
  3. Duration of seizure

Statistical analysis

- The results of the study are expressed as Mean ± Standard deviation.
- One way ANOVA was used to analyze and compare the data, followed by Tukey's post hoc test.
- Where P value <0.01, <0.05 was considered as significant.

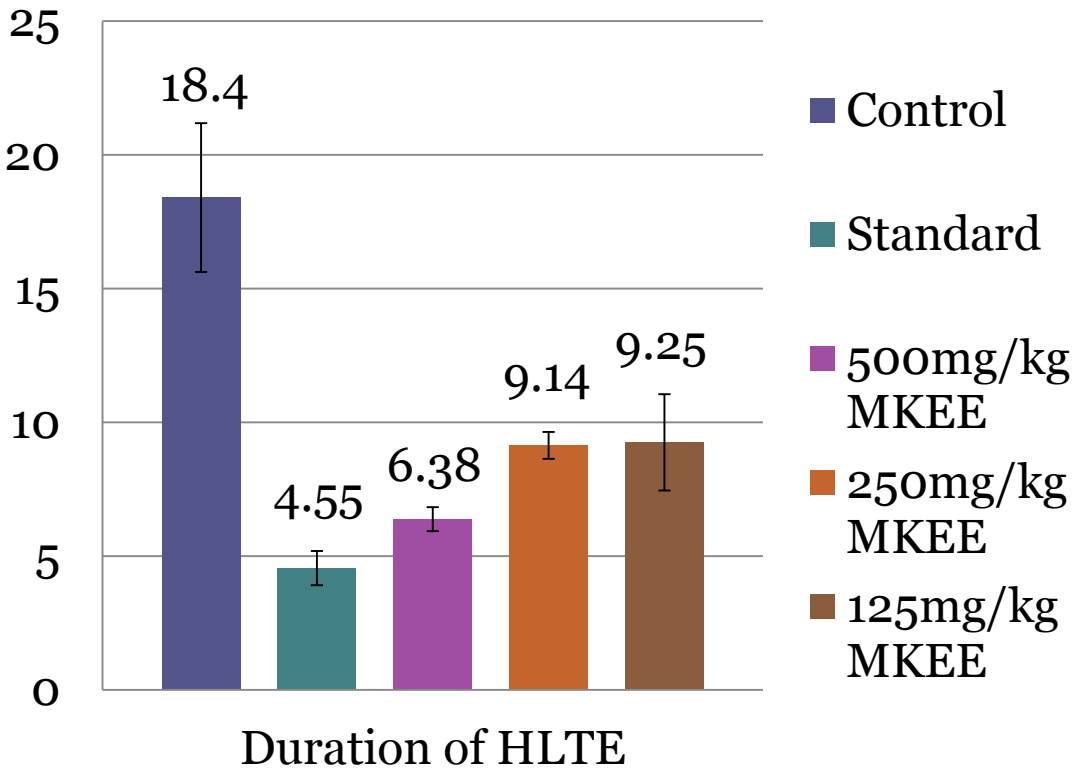
Results

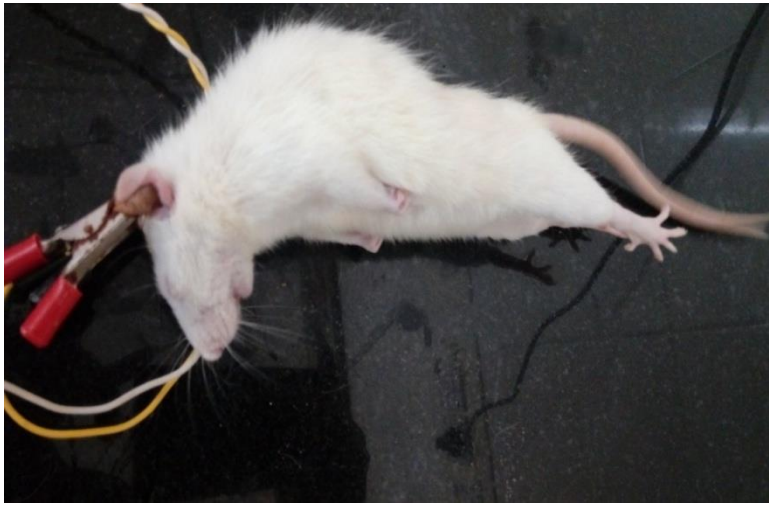
- MES model

Groups	No of animals convulsed/No of animals used	Percentage protection
A (Control) 1% Tween 80 in distilled water 10ml/kg	6/6	0%
B (Standard) Na valproate 200mg/kg	2/6	66%
C MKEE 500mg/kg	4/6	33%
D MKEE 250mg/kg	5/6	16.6%
E MKEE 125mg/kg	6/6	0%

Groups	Duration of HLTE (in sec)
A (Control) 1% Tween 80 in distilled water	18.4 ± 2.78
B (Standard) Na valproate 200mg/kg	4.55 ± 0.64**
C MKEE 500mg/kg	6.38 ± 0.45**
D MKEE 250mg/kg	9.14 ± 0.50**
E MKEE 125mg/kg	9.25 ± 1.8**

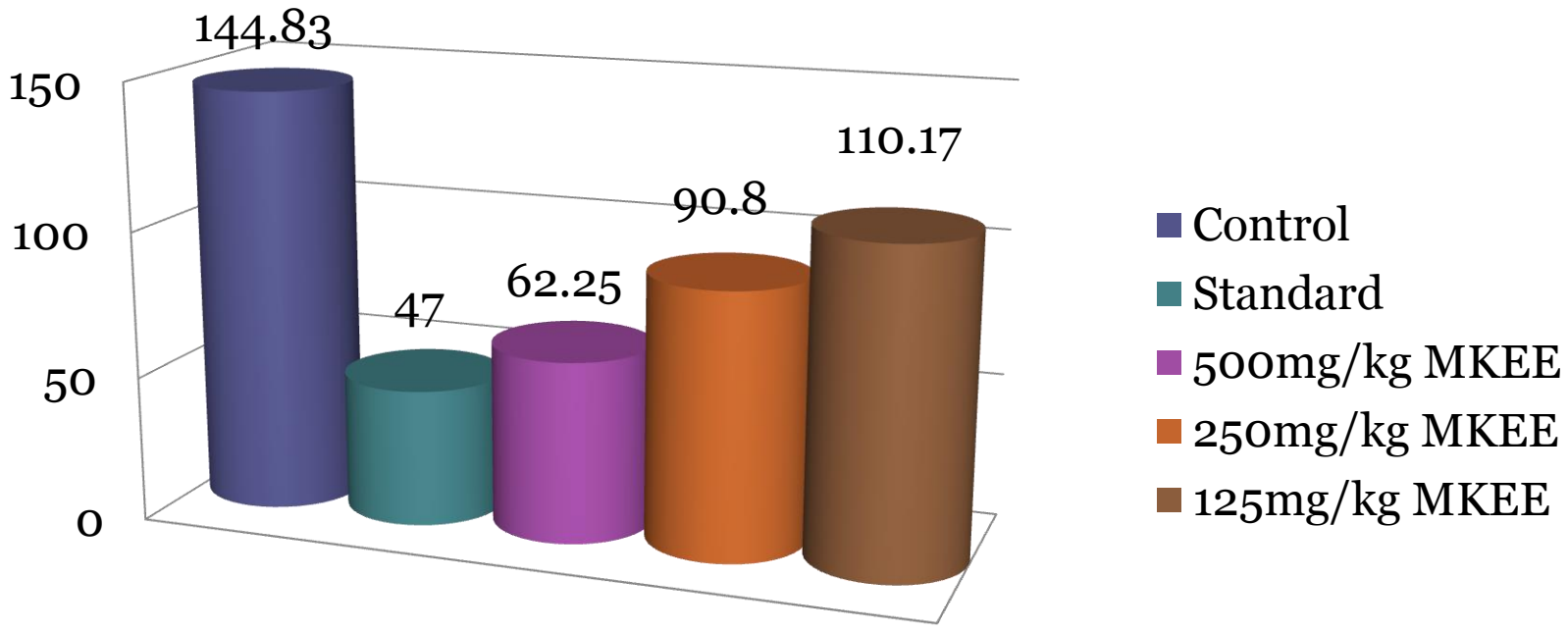
*P value<0.05
**P value<0.01





Groups	Regain of Righting reflex (in sec)
A Control	144.83 ± 39.51
B Standard-Na valproate	47 ± 4.24**
C MKEE 500mg/kg	62.5 ±8.46**
D MKEE 250mg/kg	90.25 ±4.27**
E MKEE 125mg/kg	110.17 ± 13.83*

*P value<0.05
**P value<0.01



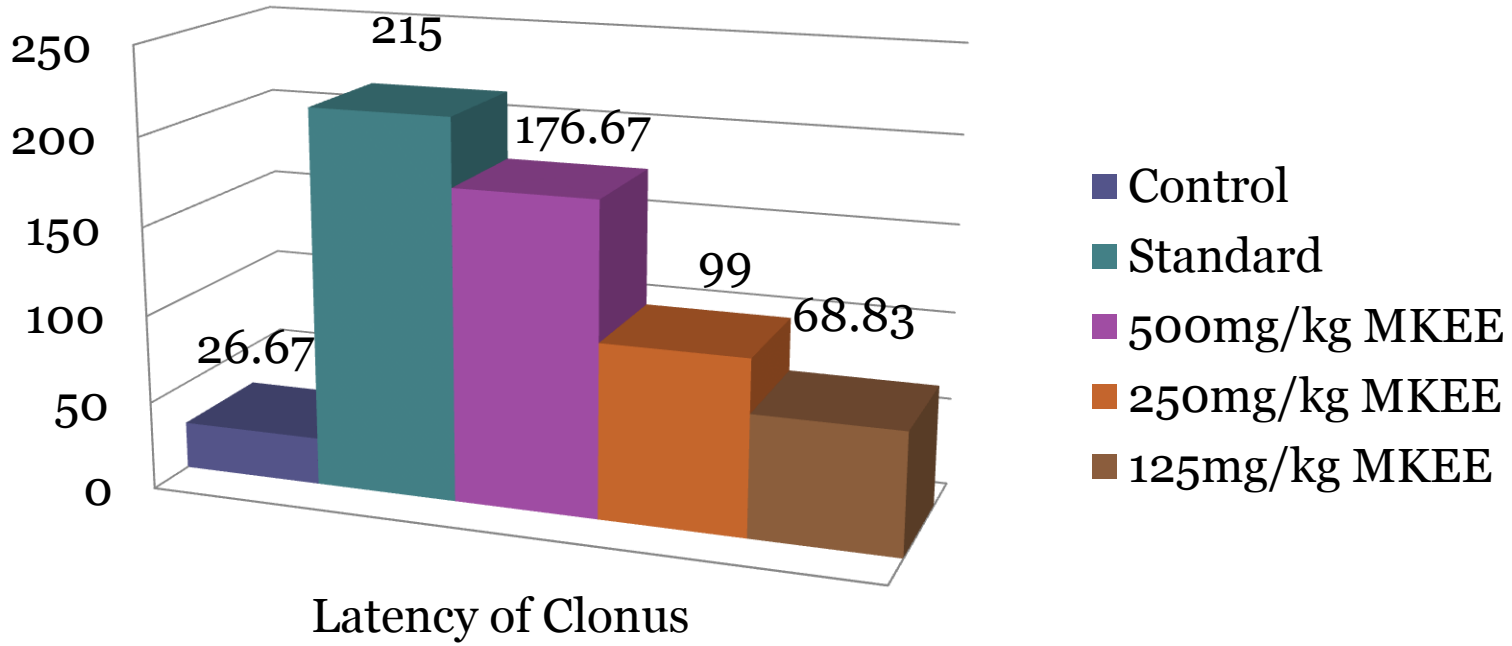
Regain of Righting reflex

PTZ Model

Groups	No of animals convulsed/No of animals used	Percentage protection
A (Control) 1% Tween 80 in distilled water	6/6	0%
B (Standard) Na valproate 200mg/kg	2/6	66%
C MKEE 500mg/kg	3/6	50%
D MKEE 250mg/kg	5/6	16.6%
E MKEE 125mg/kg	6/6	0%

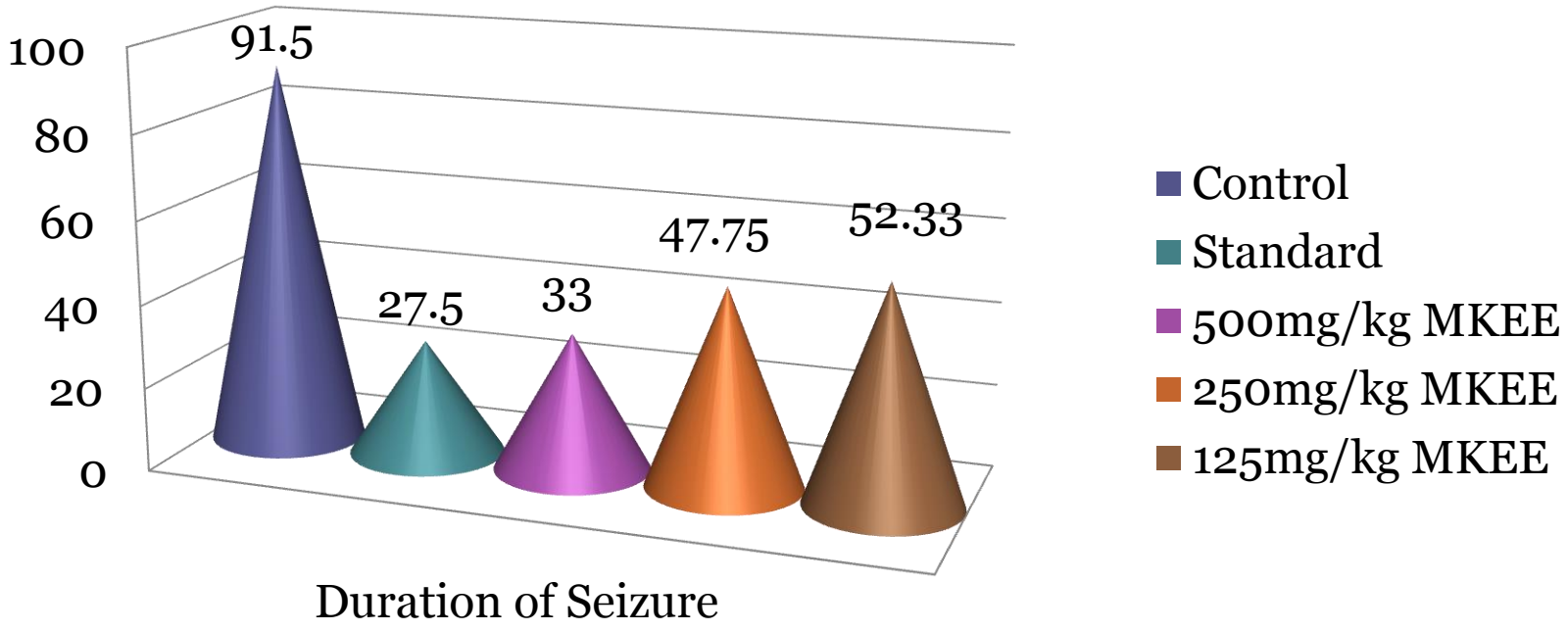
Groups	Latency of Clonus (in sec)
A Control	26.67 ± 17.06
B Standard-Na valproate	215 ± 7.07**
C MKEE 500mg/kg	176.67 ± 15.28**
D MKEE 250mg/kg	99 ± 29.70**
E MKEE 125mg/kg	68.83 ± 11.29**

*P value<0.05
**P value<0.01



Groups	Duration of Seizure (in sec)
A (Control) 1% Tween 80 in distilled water	91.5 ± 45.87
B (Standard) Na valproate 200mg/kg	27.5 ± 7.78**
C MKEE 500mg/kg	33 ± 6.24**
D MKEE 250mg/kg	47.75 ± 6.65*
E MKEE 125mg/kg	52.33 ± 8.12*

*P value<0.05
**P value<0.01



Discussion

- In the present study, our results demonstrate that MKEE has anticonvulsant activity in MES and PTZ induced seizure models.

- Antiepileptic drugs that block MES-induced tonic extension are known to act by blocking seizure spread by causing blockage of voltagesensitive sodium channels/ by blocking NMDA receptors / by enhancing GABAergic mediated neurotransmission.

- Whereas in PTZ model,the drugs that block T-type Ca 2+ current in thalamus or GABA A agonist drugs prevents PTZ induced convulsions.

- It is well known fact that PTZ model mimic absence seizure and MES model represents generalized tonic clonic seizure
- Hence Murraya koenigii can be a potential drug in generalized tonic clonic seizure and absence seizure
- This supports the traditional use of the plant in epilepsy treatment.

Conclusion

- Based on the results of the present study, we conclude that the ethanolic extract of Murraya koenigii leaves possess significant anticonvulsant activity.

- However further studies are necessary to find the exact mechanism of anticonvulsant effect and to isolate the active compond(s) responsible for this pharmacological activity.

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Thank you