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Evaluation of anticonvulsant activity of ethanolic extract of *Gomphrena serrata* by using Swiss albino mice

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ABSTRACT

Epilepsy is characterised by abnormal behaviour which is leading to tonic flexon, tonic extension, clonus and stupor. Many novel therapeutic regimens were used to treat these disorders through different ways including altering neurotransmission, but so far there is no specific treatment approach which is satisfactory to the patients in terms of complete cure. Our approach is to make understand the herbal medicines usage towards epilepsy. The ethanolic plant extract of *Gomphrena Serrata* at 400mg/kg, 600mg/kg and 800mg/kg were given to albino mice which were treated with maximum electric shock of 30mA current and pentelene tetrazolium in two different techniques. The results with these extract doses showed significant results which indicated decrease in clonic extension and stupor. Whereas there is no decrease in the tonic flexon observed with all doses. All these results were compared with the standard drug Phenytoin at 25mg/kg I.P. However, the ethanolic plant extract of *Gomphrena Serrata* at 600mg/kg showed marked increase in the therapeutic activity which is equivalent to Phenytoin and can be compared. Apart from these the ethanolic plant extract of *Gomphrena Serrata* at 400mg/kg, 600mg/kg and 800mg/kg showed significant decrease in the recovery times when compared to control group.

Keywords: Convulsions, tonic flexon, clonic extension, stupor, *Gomphrena Serrata* and Phenytoin.

INTRODUCTION

Epilepsy is a chronic disorder in the cerebral function. According to neurological theory it is a paroxysmal, self-limited, cerebral dysrhythmia. It is accompanied by abnormal patterns on the electroencephalograph, and severe seizure may cause a loss of consciousness. Epilepsy is the one of the oldest known diseases and is the most common chronic neurological disorder observed by neurophysician. According to study 55,000 citizens of India, 20,000 in USA and 3, 00,000 in UK. However, 3 to 5% population has seizure sometimes in their life time and half to 1% of the active epilepsy. Most of the experimental methods for detecting anticonvulsant activity involve the artificial induction of convulsions and their inhibition with organic compounds [1]. The epidemiological study suggests that epilepsy incidence follows a dual incidence distribution pattern one during childhood and the other at above 65 years of age. Age verses rate of epilepsy studies shows more than 130 people out of 1, 00,000 above 65 years age and 160 people out of 1, 00,000 above 85 years of age. During recent studies the rate of incidence of epilepsy is about 100 to 180 out of 1, 00,000 people per year. And it is also observed that late childhood to early adulthood is most vulnerable to this disorder. World Health Organization (WHO) has recently described the traditional medicine (TM) as philosophical, organized and rational therapy to a variety of diseases and disorders.

India has a tradition of using plants as medicines as described in ayurvedha from so many years, now a day's most of the developed and developing countries are found this type of Indian traditional medicines. Because of their less side effects and cultural acceptance.

The antiepileptic activity of various plants were identified and evaluated. Still, in order to identify highly efficacious plant we extracted Gomphrena *Serrata* with ethanol and evaluated anticonvulsant activity. The exhaustive literature survey reveals that the anticonvulsant property of this medicinal plant has not been scientifically validated so far. Herbal medicine can be a source for new therapeutics and considering the evidences of the pharmacological property described for this plant, the present investigation was under taken to evaluate the anticonvulsant activity [5].

MATERIALS AND METHODS

Experimental animals

For this study Albino mice of weight 18 to 22 grams of either sex were employed. The animals were obtained from animal house Nirmala college of Pharmacy. The mice were housed for 7 day divided into 06 groups of each 4 mice under standard husbandry condition [6], room temperature 25±2ºC, relative humidity 44-45% and light and dark cycle of 12 hr.

Animals have free access to water and food. Study protocol was approved by the Institutional Animal Ethics Committee (Regd.No:001/IAEC/NCPA/CPCSEA)of Nirmala College of Pharmacy, Atmakuru (Andhra Pradesh), before commencement of the Experimentation. Animal Studies were conducted in accordance to guidelines of CPCSEA.

Plant Materials

The plant materials were procured from Tirupati (Ananthapuram district, Andhra Pradesh) during January 2016. These plant materials were authenticated by botanist Dr. SK.MD.KHASIM, Assistant professor, Department of botany, Acharya nagarjuna University. Leaves were powdered to a coarse sige. The powder was stored in air tight pack.

Extraction process

The powdered leaf was defatted by petroleum ether for 7 continuous days by maceration process.The marc from maceration was subjected to extraction by soxhlet apparatus using ethanol as solvent. The obtained extract was concentrated using rotary vacuum evaporator, and then dried at room temperature and percentage yield was calculated [7].

Evaluation of *Gomphrena serrata* extract against maximal electroshock (MES) induced

Convulsions in mice

Animals were grouped into 10 in each group and dosed for 7 days in the following order:

- Group I - control were administered with distilled water Per oral
- Group II - administered with Phenytoin 25mg/kg I.P before MES induction.
- Group III- administered with 400mg/kg of Extract before MES induction.
- Group IV- administered with 600mg/kg of Extract before MES induction.
- Group V- administered with 800mg/kg of Extract before MES induction.

Animals were dosed with different drugs as started above before MES induction.

On 7th day, 1hr after administration of vehicle/phenytoin and extract, 30mA current was supplied transauricularly for 0.2 sec via small alligator clips attached to the ear using electroconvulsiometer and different phases of convulsion were observed.

The Tonic flexion phase, Tonic extensor phase, Clonus, Stupor, Percentage recovery were recorded during 30 min test session [8]

Statistical analysis

Results were presented as mean ± SEM (n=6). Data was subjected to One-way analysis of variance (ANOVA) followed by Dennett's multiple comparison test. *P* value less than 0.001 considered to be statistically significant compare to control.

**P*<0.05, ***P*<0.01 and ****P*<0.001, when compared with control.

RESULTS

The present study was conducted to screen ethanolic extract of G*omphrena serrata* on seizure-induced by maximal electric shock in mice. The ethanolic plant extract of *Gomphrena Serrata* at 400mg/kg, 600mg/kg and 800mg/kg showed significant results which indicated decreased clonic extension and stupor. In this experiment, phenytoin 25 mg/kg i.p was used as a standard. The treatment of all the drugs was done for 7 days. The effect on tonic flexion phase duration of convulsions were decreased with the increase in the doses which were when treated with *Gomphrena serrata* at 400mg/kg, 600mg/kg and 800mg/kg (Table No:1& Figure No:2). But this decreased time is non significant, whereas effect on hind limb tonic extensor phase of convulsions were decreased with the increase in the doses of *Gomphrena serrata* at 400mg/kg, 600mg/kg and 800mg/kg. The standard drug phenytoin 25 mg/kg i.p decreased time in hind limb tonic extensor phase can be comparable with the *Gomphrena serrata* at 800mg/kg (Table No:2& Figure No:3). However there was a statistical significance of decreased time observed when compared all the treatment groups including standard with control. The effect of *Gomphrena serrata* at 400mg/kg, 600mg/kg and 800mg/kg on clonus phase showed delayed time can be compared with standard drug Phenytoin at 25mg/kg and there was clear statistical significance observed with the treatment groups when compared with the control (Table No:3& Figure No:4). Same type of trend was continued even with the stupor phase after the treatments Table No:4& Figure No:5).

DISCUSSION

Epilepsy is one of the chronic and most common neurological disorders, affecting approximately 50 chore people worldwide. Currently marketed anticonvulsant drugs are able to effectively reduce epileptic seizure in about 50% of the patients, later 25% may show improvement whereas the remains 25% left ineffective by the drugs [9]. These marketed drugs have more side effects sometimes which are difficult to treat so the need to develop new anticonvulsant exists. So as the part of that one of the base is studying naturally available compounds for better treatment and effective treatment of epilepsy [10-11]. Present study focused on the activity of *Gomphrena serrata* as an anticonvulsant activity through decrease in tonic flexon, tonic extension, clonus and stupor. Maximal Electric Shock test is considered to evaluate therapeutic efficacy against generalized tonic–clonic seizures. Many of these approaches center on elucidating the genetic causes and the cellular and molecular mechanisms by which a normal brain becomes epileptic, insights that promise to provide molecular targets for both symptomatic and preventive therapies. *Gomphrena serrata* had produced anticonvulsant activity against seizures induced by kainic acid, Pentelene tetrazole and bicuculine [12-14]. Similarly *Gomphrena serrata* also showed significant anticonvulsant activity.

CONCLUSION

GSE extract contains tannins flavonoids, saponins, glycosides etc., out of all these active constituent's bio flavonoids might have showed anti-convulsant activity. Further isolation of flavonoids, the anti-convulsant activity can be evaluated better. Similarly all these experiments need to be studied at the molecular level in order to identify the compounds mechanism of action in terms of tonic flexon, tonic extensor, clonus, and stupor stage.

REFERENCES

1. Senthil A, Gopalkrishna G, Parthasarathy S. Epilepsy in India I: Epidemiology and public health. Ann Indian Acad Neurol. 2015; 18(3):263-277.
2. Prasanth DSNBK, Mohini Prasanna M, Priyanka M, Neelothpala N, Bhagya Lakshmi P, Mounika Y, *et al*. Pharmacognostic Study of *Gomphrena Serrata* stem. International Journal of Research in AYUSH and Pharmaceutical Sciences. 2017; 1(1):14-20.
3. Tarnam YA, Ilyas MM, Begum TN. Biological Potential and Phytopharmacological Screening of Gomphrena Species. International Journal of Pharma Research & Review. 2014; 3(1):58-66.
4. Rahman AM, Gulshana MIA. Taxonomy and medicinal uses on amaranthaceous family of Rajshahi, Bangladesh. Applied Ecology & Environmental Sciences. 2014; 2(2):54-59.
5. Muhammad Ilyas, Arsia Tarnam, Nargis Begum. Biological Potential and Phytopharmacological Screening of Gomphrena Species. Global Journal of Pharmacology. 2013; 7(4):457-464.
6. Latha S, Rajendran N, Babu G. Anticancer screening of Gomphrena globosa against ehrlich ascites carcinoma in swiss albino mice. Journal of Chemical and Pharmaceutical Research. 2013; 5(2):283-289.
7. Luque de Castro MD, García-Ayuso LE. Soxhlet extraction of solid materials: an outdated technique with a promising innovative future. Analytica Chimica Acta. 1998; 369(1-2):1-10.
8. Loscher W. Critical review of current animal models of seizures and epilepsy used in the discovery and development of new antiepileptic drugs. Seizure 2011; 20:359-68.
9. Azam ATMZ, Hamiduzzaman M, Hasan CM. Isochavicinic Acid and Steroids from Gomphrena globosa L. Dhaka Univ. J. Pharm. Sci. 2012; 11(1):79-81.
10. Adams M, Schneider SV, Kluge M, *et al*. Epilepsy in the Renaissance: a survey of remedies from 16th and 17th century German herbals. J Ethnopharmacol 2012; 143:1-13.
11. Nsour WM, Lau CBS, Wong ICK. Review on phytotherapy in epilepsy. Seizure 2000; 9:96-107.
12. Babu G, Anju P, Biju CR, Rajapandi R. Phytochemical screening of Gomphrena serrata L. Journal of Chemical and Pharmaceutical Research. 2012; 4(7):3396-3399.
13. Faggion SA, Cunha AO, Fachim HA, Gavin AS, dos Santos WF, Pereira AM, *et al*. Anticonvulsant profile of the alkaloids (+)-erythravine and (+)-11-α-hydroxy-erythravine isolated from the flowers of Erythrina mulungu Mart ex Benth (Leguminosae-Papilionaceae) Epilepsy Behav. 2011; 20:441-444.
14. Bhutada P, Mundhada Y, Bansod K, Dixit P, Umathe S, Mundhada D. Anticonvulsant activity of berberine, an isoquinoline alkaloid in mice. Epilepsy Behav. 2010; 18:207-210.

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