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**ANTI-EPILEPTIC ACTIVITY OF VANDA TESSELLATA ROXB. ON
MAXIMAL ELECTROSHOCK INDUCED SEIZURE IN ALBINO
WISTAR RATS**

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ABSTRACT

Vanda tessellata Roxb. (Family: Orchidaceae) plants have been used in the indigenous medicine such as Ayurveda and local traditional medical practices. The petroleum ether extract of *Vanda tessellata Roxb.* (PVT) was subjected to acute toxicity and then screened for anticonvulsant activity on Maximal Electroshock (MES) induced seizures model in albino wistar rats. Acute toxicity of extract was non toxic up to the recommended dose 2000 mg/kg. p.o. Animals were treated with PVT at doses of 250 and 500 mg/kg body weight. Study results showed, the mean duration of extensor phase of treated groups reduced significant level than compared to control group. PVT showed anti-epileptic activity against MES animal models. However, further studies still needed to be carried on exposure of the extract to humans.

Keywords: Anti-epileptic activity, *Vanda tessellata Roxb.*, Maximal Electroshock (MES).

INTRODUCTION

Epilepsy is a common chronic neurological disorder characterized by seizures. These seizures are transient signs and/or symptoms of abnormal, excessive or synchronous neuronal activity in the brain. People have seizures when the electrical signals in the brain misfire. The brain's normal electrical activity is disrupted by these overactive electrical discharges, causing a temporary communication problem between nerve cells. About 50 million people worldwide have epilepsy, and nearly two out of every three new cases are discovered in developing countries.

Epilepsy is more likely to occur in young children or people over the age of 65 years, however, it can occur at any time. As a consequence of brain surgery, epileptic seizures may occur in recovering patients. Epilepsy is usually controlled, but cannot be cured with medication, although surgery may be considered in difficult cases. However, over 30% of people with epilepsy do not have

seizure control even with the best available medications. Not all epilepsy syndromes are lifelong some forms are confined to particular stages of childhood. Epilepsy should not be understood as a single disorder, but rather as syndromic with vastly divergent symptoms but all involving episodic abnormal electrical activity in the brain [1].

Traditional medicinal practices have remained as a component of health care system of many societies in spite of the availability of well-established alternatives [2]. Epilepsy is a condition, which causes seizures to occur. It is one of the most common chronic diseases affecting human beings. According to several publications this can amount to 70% of the people with epilepsies, with a high prevalence of about 0.8% in children below the age of seven years [3]. These observations have led to a shift in focus to the use of herbal remedies in the management of epileptic seizures, probably because these measures fit into the cultures of people and are not usually as expensive as the more refined orthodox drugs. Besides, these orthodox drugs possess many side effects, contraindications and possible interactions with drugs used simultaneously.

The alternative drug therapy for the management of this disease can be by the use of medicinal plants and

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their active principles. In the present study plants from India with a traditional claim of anti-epileptic activity and neuro protective properties were selected and a poly herbal extract was prepared in petroleum ether medium.

Vanda tessellata Roxb. (Family: Orchidaceae) plants have been used in the indigenous medicine such as Ayurveda and local traditional medical practices. The leaf juice is used for the treatment of certain inflammatory conditions. It is also instilled into the ear as a remedy for otitis. The leaves in the form of a paste are applied to the body to bring down fever. The leaves are used in rheumatism, dysentery, nervous problems, bronchitis, dyspepsia, convulsion and fever. Unani practitioners hold it to be laxative and tonic to the liver. It is also used to treat hiccough, piles, boils on the scalp, etc. This plant leaves is reported to contain an alkyl perulate and beta sistosterol -D-glucoside. The dried whole herb also contains long chain alkanes and alkanol sistosterol, resin, saponin, tannins, fatty acids, colouring agents, etc. Medicinal orchids, in general, are not subjected to detailed pharmacological studies. Scientific studies on medicinal orchids can lead to the development of invaluable drugs to certain medical conditions [4]. On the basis of the traditional use of the plant for treating convulsion, but no previous pharmacological (or) clinical study was carried out to test the antiepileptic activity of this plant. Since the antiepileptic effect of *Vanda tessellata* Roxb. has been experimentally not confirmed. Therefore, the aim of the present investigation was to evaluate the claimed antiepileptic activity of *Vanda tessellata* Roxb. in albino wistar rats.

MATERIALS AND METHODS

Plant collection

The leaves of *Vanda tessellata* has been collected from Sri Venketeswara University near Tirupati, Andhra Pradesh during the month of August 2011 and dried under shade. The plant was authenticated by Mr. K. Madhava chetty, Assistant Professor, Department of Botany of S. V. University, Tirupati. The voucher specimen of the plant was deposited at the college for further reference.

Preparation of extracts

Leaves of *Vanda tessellata* were shade dried, and the dried leaves were powdered to get coarse granules. The coarse powder was subjected to continuous hot extraction in Soxhlet apparatus using petroleum ether. The solvent was removed by distillation under reduced pressure, which produced a greenish sticky residue (yield 10%w/w with respect to dried plant material). The concentrated crude extract were stored and used for the further study.

Animals used

Adult albino rats (Wistar strain) of either sex with weighing 150 - 180gm were used. The animals were maintained on the suitable nutritional and environmental

condition throughout the experiment. The animals were housed in polypropylene cages with paddy house bedding under standard laboratory condition for an acclimatization periods of 7 days prior to performing the experiment. The animals had access to laboratory chow and water *ad libitum*. The experimental protocols were approved by institutional Animal Ethical Committee & a written permission from Institutional ethical committee has been taken to carry out and complete this study.

Acute Toxicity Study

The acute toxicity of petroleum ether extract of *Vanda tessellata* was determined as per the OECD guideline no. 423 (Acute Toxic Class Method). It was observed that the test extract was not mortal even at 2500mg/kg dose. Hence, 1/10th (250mg/kg) and 1/5th (500mg/kg) of this dose were selected for further study [5].

Anti-epileptic activity

Effect on Maximal electroshock (MES) induced seizures

Albino wistar rats of either sex weighing 160 to 220 gm were divided into four groups of six animals each. The first group received vehicle control (1% w/v SCMC, 1ml/100 g) whereas Group-II received standard drug (Phenytoin, 25mg/kg) intraperitoneally, Group-III and IV, received petroleum ether extract of *Vanda tessellata* Roxb. L. (PVT) (250 and 500 mg/kg body weight) *p.o* respectively for 20 days. On the 20th day, Seizures are induced to all the groups by using an Electro convulsimeter. Maximal electroshock seizures were elicited by a 60 Hz alternating current of 150 mA intensity for 0.2 sec. A drop of electrolyte solution (0.9% NaCl) with lignocaine was applied to the corneal electrodes prior to application to the rats. This increases the contact and reduces the incidence of fatalities. The duration of various phases of epilepsy were observed. The percentage protection was estimated by observing the number of animals showing abolition of Hindleg Tonic Extension (or) extension not greater than 90° [6].

Statistical analysis

The data were expressed as Mean \pm S.E.M. and statistically analyzed using one way ANOVA followed by Tukey-Kramer's Multiple comparison test, $p < 0.05$ was considered significant.

RESULTS

Effects of PVT on MES Induced Epilepsy

The PVT at doses of 250 mg/kg and 500 mg/kg were protect animals from seizures and significantly ($p < 0.01$) reduced the duration of tonic hindleg extension. Whereas, the standard drug phenytoin treated animals exhibits abolished tonic hindleg extension. Phenytoin treated animals have shown 100% protection against MES induced seizures whereas PVT 250 mg/kg and 500 mg/kg

have shown 63.72% and 78.27% protection respectively (Table-1).

DISCUSSIONS AND CONCLUSION

In India, studies have reported the prevalence rate of epilepsy varying from 1710 from 9780 cases per million populations. The modern conventional antiepileptic drugs (AEDs) are effective in approximately 50% of patients, many cases still remain resistant to AED treatment [7].

These drugs are associated with vast array of side effects including chronic toxicity, teratogenicity, adverse effects on cognition and behaviour among others [8]. Thus, due to aforementioned reasons and others, it is pertinent to look for affordable and conventional alternative medicine with view to providing a better protection and activities-particularly medicinal plants.

The MES test is the most frequently used as an animal model for identification of anticonvulsant activity of drugs for the generalized tonic-clonic seizures "grand mal" [9,10]. This model based on observation of the stimulation by repeated electrical pulses induce in different neuronal

structures one characteristic standard of epileptic activity [11]. In our present study, it is found that treatment with PVT on rats significantly reduces in tonic hindleg extensor stage in MES induced epilepsy. The MES model – to identify compounds which prevent seizure spread, corresponding to generalized tonic-clonic seizures in humans [12,13]. Currently used anticonvulsant drugs (e.g. phenytoin, carbamazepines) effective in therapy of generalized tonic-clonic and partial seizures have been found to show strong anticonvulsant action in MES test [14,15]. Since, PVT significantly inhibited generalized tonic-clonic seizures in MES test; it suggests the presence of anticonvulsant compounds.

The study concluded PVT possesses an anticonvulsant effect which results from potentiate the activity of GABA. However, more precise mechanisms of PVT anticonvulsant activity and the relationship between the seizure and GABA_A receptor subunits and the other neurotransmitter systems which may explain how PVT produce anticonvulsant effect must be investigated further.

Table 1. Effect of methanolic extract of *Vanda tessellata* Roxb. L. (PVT) On MES induced seizures in rats

Group	Design of treatment	Flexion	Extensor	Clonus	Stupor	Recovery	% protection
I	Vehicle control	7.2±0.14	17.12±0.14	22.21±0.34	37.47±0.12	182.24	0
II	Phenytoin 25mg/kg, i.p.	3.5±0.24	0**	9.19±0.23**	14.29±0.21**	95.18	100
III	PVT 250mg/kg, p.o	7.4±0.33*	6.21±0.1.14*	14.14±0.33	33.41±0.12	124.26	63.72
IV	PVT 500mg/kg, p.o	4.33±0.24**	3.72±0.16**	11.14±0.14*	17.24±0.51**	102.22	78.27

Values are expressed as mean ± SEM of six observations. Comparison between Group I Vs Group II, Group II Vs Group III & Group IV. Statistical significant test for comparison was done by ANOVA, followed by Dunnet's test. *p<0.05;** p<0.01; ns-non significant.

REFERENCES

- Blume W, Lüders H, Mizrahi E, Tassinari C, van Emde Boas W, Engel J. Glossary of descriptive terminology for ictal semiology: report of the ILAE task force on classification and terminology. *Epilepsia*, 42, 2001, 1212-1218.
- Oyeka IC. *Interciencia*, 6, 1981, 156.
- Ndoye NF. *Eur. J. Epilepsy*, 14, 2005, 7.
- Madhava chetty K. et al. "*Vanda tessellata*" Flowering Plants of Chittoor District, Andhra Pradesh, India. 2008.
- OECD 2002. Acute oral toxicity. Acute oral toxic class method guideline 423 adopted in: Eleventh Addendum to the OECD, guidelines for the testing of chemicals organisation for economical co-operation and development.
- Balakrishnan S, Pandhi P, Bhargava VK. Effects of Nimodipine on the efficacy of commonly used anti-epileptic drugs in rats. *Ind J Exp Biol*, 36, 1998, 51-54.
- Heinemann UE, Draghun E, Fickern J, Stabel and Zhang CL. Strategies for the development of drugs for pharmacological resistant epilepsies. *Epilepsia*, 35, 1994, S10- S21.
- Raza MF, Shaheen MI, Choudhary A, Suria AU, Rahman S, Sombati and Delorenzo RJ. Anticonvulsant activities of the FS-1 Sub-fraction isolated from roots of *Delphinium denudatum*. *Phytother. Res*, 15, 2001, 426-430.
- Loscher W, Schmidt D. Which animal models should be used in the search for new antiepileptic drugs? A proposal based on experimental and clinical consideration. *Epilepsy Res*, 2, 1988, 145-181.
- Oliveira FA, Almeida RN, Sousa MFV, Barbosa-Filho JM, Diniz SA, Medeiros IA. Anticonvulsant properties of *N*-salicyloyltryptamine in mice. *Pharmacol Biochem Behav*, 68, 2001, 199-202.
- Quintans-Júnior LJ, Almeida RN, Falcão ACGM, Agra MF, Sousa MFV, Barbosa-Filho JM. Avaliação da Atividade anticonvulsivante de plantas do Nordeste Brasileiro. *Acta Farm Bonaerense*, 21, 2002, 179-184.
- Stables JP, Kupferberg HJ. The NIH Anticonvulsant Drug Development (ADD) Program: Preclinical Anticonvulsant Screening project. In: *Antiepileptic Drugs*, 4th edn. Ed. Levy RH, Mattson RH, Meldrum BS, Raven Press, New York. 1995, 4-17.

13. Kupferberg HJ. Antiepileptic drug development program: a cooperative effort of government and industry. *Epilepsia*, 30(Suppl 1), 1989, S51–S56.
14. Macdonald RL and Kelly KM. Antiepileptic drug mechanisms of action. *Epilepsia*, 36, 1995, S2-S12.
15. White HS. Clinical significance of animal seizure models and mechanism of action studies of potential antiepileptic drugs. *Epilepsia*, 38(Suppl. 1), 1997, 9.