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EVALUATION OF ANTICONVULSANT ACTION OF CANANGA ODORATA LEAVES IN ALBINO WISTAR RATS

Pharmacology

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ABSTRACT

Epilepsy is one of the common neurological disorder in India and all over World. The present antiepileptic treatment is usually associated with adverse effects and complications. Hence there is always a need to find alternative treatment options, like that of plant origin. Cananga Odorata plant has been used extensively in aromatherapy where it has shown anxiolytic, sedative and other properties. This study was done to evaluate anticonvulsant action of Cananga Odorata leaves on Albino wistar Rats. Plant extract was administered to the Rats at doses of 200mg,400mg & 800mg. Anticonvulsant action was evaluated against seizures induced by Maximal electric shock stimulation[MES] method. It was observed that the Leaf extract of Cananga Odorata had significant anticonvulsant action in Albino Wistar Rats.

KEYWORDS

Cananga Odorata, MES, Anticonvulsant.

INTRODUCTION

Epilepsy refers to disorder of brain function characterized by the periodic and unpredictable occurrence of seizures. Seizure refers to a transient alteration of behaviour due to the disordered, synchronous, and rhythmic firing of populations of brain neurons [1]. Approximately 50 million people worldwide have epilepsy, thus making it one of the most common neurological diseases globally [2]. Epileptic seizures originate from an excessive, synchronous and sustained discharge of certain group of neurons. The common feature of all types of epileptic seizures is a persistent increase of neuronal excitability. Abnormal firing of neurons may be associated with a variety of contributing factors like oxygen deprivation, tumours, infection, trauma and metabolic disosrders . But in nearly half of the patients suffering from Epilepsy Causative factors is not usually identified [3]. In epilepsy there is typically a shift in the balance between the inhibitory nuero transmission (eg ;GABA) and the excitatory (glutamate) neurotransmission, often excitatory transmission dominating the inhibitory. This imbalance may occur due to either selective loss of inhibitory or GABA-ergic neurons after precipitating epileptogenic insults (e.g., status epilepticus, stroke, and traumatic brain injury) and there is reorganization of neuronal circuits that favour hypersynchrony of neuronal populations (e.g., aberrant connections formed by the axons of dentate granule cells of the dentate gyrus, known as mossy fiber sprouting). Deficit in GABA-mediated signalling and augmentation of glutamatergic transmission that have been documented in many types of epilepsy represent the basis for the pharmacotherapy of the disease [4]. The pharmacological treatment includes drugs like phenytoin, sodium valproate, carbamazepine etc, to newer agents like lamotrigine, topiramate , Zonisamide etc. the drugs used currently not only fail to control seizure activity in some patients, but frequently cause unwanted effects that range in severity from minimal impairment of the CNS to death from aplastic anaemia or hepatic failure, incidence of withdrawal suicidal tendency has been noted. Hence there is always a need for studies to develop newer anticonvulsant agents [5,6,7].

Cananga Odorata is a plant gaining popularity in aromatherapy. In recent studies it has shown a wide range of medical properties ranging from antimicrobial, hypoglycaemic, antioxidant, anti-inflammatory etc to effect on cognition, blood pressure. It has effects as Central nervous system depressants exhibiting anxiolytic, analgesic, hypnotic actions among others [8]. This study evaluates the anticonvulsant action of Ethanolic Extract of Cananga Odorata leaves [EECOL} in Albino Wistar Rats.

MATERIALS AND METHODOLOGY

Institutional Animal Ethics Committee [IAEC] permission was obtained. CPCSEA guidelines were followed throughout the study [9].

Experimental Animals:

Male Albino Wistar Rats were obtained from Central Animal House, SNMC Bagalkot. Animals were divided into 5 groups with 10 animals in each group [n=10].

Group 1: Control group: Normal saline
Group 2: Standard. Inj Phenobarbitone 10mg/kg body weight
Group 3: EECOL at a dose 200mg/kg body weight per orally[PO] [10]
Group 4: EECOL at a dose of 400mg/kg bw PO [10]
Group 5: EECOL at a dose of 800mg/kg bw PO

Preparation of Extract: Dried leaf powder was obtained from AGHP chemical enterprises Chennai. Ethanolic extract was prepared using Soxhlet apparatus. Dried powder was placed in the Soxhlet with ethanol as solvent for about 8-9 hrs at 55 degrees. The crude residue was collected. It was further placed in hot air oven and semisolid preparation was obtained. This extract was used for the study [11].

Maximal electric shock method [12,13]: This method was developed by Merritt & Putnam. It mainly is used as model to elicit grand mal epilepsy and the end is Tonic Hind Limb Extension[THLE], evoked by electric stimuli [14]. The agents tested through this model are considered having anticonvulsant property if they suppress THLE. The electric stimuli are given by electrodes [corneal or ear]. When used for Rats, 150mA, 50Hz is given for 0.2sec.

Procedure: After dividing to specific groups, all the animals were screened 5 days before. Animals were fasted overnight. On the day of the study fresh extract was prepared. Group 2 rats were given inj phenobarbitone and group 3,4,5 were given EECOL at dose of 200mg,400mg,800mg respectively. After 1 hr MES was given by ear electrodes. Normal saline was applied over the ear lobes, 150ma was given for 0.2 sec via ear electrodes. onset of THLE and duration was observed and recorded. Animals were observed for recovery and any adverse effects.

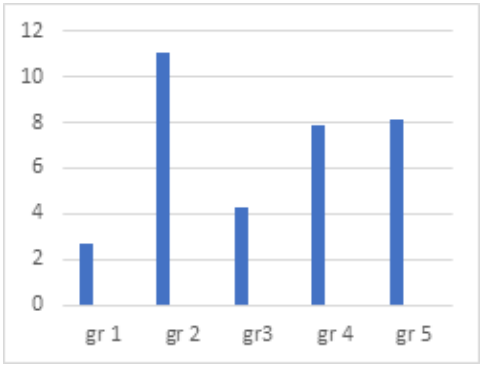
OBSERVATIONS AND RESULTS

The above observations were statically analysed by ANOVA and Post Hoc tests.

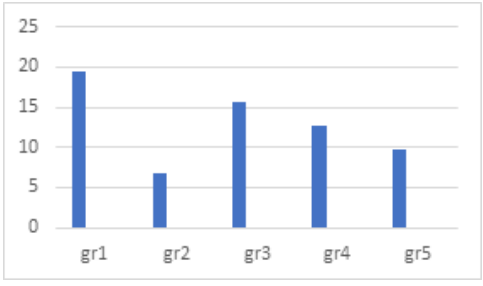
Table 1: onset and duration of THLE of each group

Groups	Onset of THLE in sec [mean ± SE]	Duration of THLE in sec [mean ± SE]
1	2.67 ± 0.14	19.34 ± 0.74
2	11.03 ± 0.32	6.77 ± 0.25
3	4.30 ± 0.23	15.63 ± 1.05
4	7.83 ± 0.65	12.60 ± 0.81
5	8.10 ± 0.59	9.82 ± 1.11
P value	<0.001	<0.001

Graph : 1 showing onset of THLE in each group



Graph : 2 showing Duration of THLE in each groups



As seen from above table the onset of THLE is increased [i.e., protected] significantly in rats treated with 200mg, 400mg & 800mg of EECOL compared to control group. The duration of THLE is reduced significantly in rats treated with EECOL. The effect produced especially at higher dose (400mg &800mg) is comparable to that of control (phenobarbitone).

CONCLUSION :

EECOL produces significant increase in onset of THLE and reduces the duration of THLE compared to control. Hence it can be concluded that Ethanolic Extract of Cananga Odorata leaves may have anticonvulsant action against seizure produced by MES in Albino Wistar Rats.

DISCUSSION:

Cananga Odorata plant is widely used in cosmetic industry apart from its ethnomedical history, this plant has shown wide range of uses on different systems. Many recent studies have isolated vital components from its extract. Liriodenine extracted from it is a potent Topoisomerase II inhibitor. cananodine , guaipyridine sesquiterpenes, cryptomeridiol 11-α-L-rhamnoside , and γ-eudesmol 11-α-L-rhamnoside , γ-eudesmol [a previously known eudesmane sesquiterpene] were isolated recently , these compounds exhibited cytotoxicity against hepatocarcinoma cancer cell lines, Hep G2, and Hep[8]. Cananga odorata essential oil inhalation has also shown to exhibit sedative and cognition changes {15,16}. Thus, research and studies are needed that may notify its uses and mechanism of action especially on CNS which may contribute to it being used as an anticonvulsant.

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