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ANTICONVULSANT ACTIVITY OF *CLEOME RUTIDOSPERMA LINN.* IN STRYCHNINE INDUCED TONIC CONVULSION IN MICE

Jena Prabhat Kumar *, Das Debojyoti and Nayak Bhabani Shankar
Department of Pharmacognosy, Jeypore College of Pharmacy, Rondapalli, Jeypore – 764002, Koraput, Orissa.India.

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ABSTRACT

Cleome rutidosperma Linn is found in the tribal area of Salipur and extensively used traditionally by the tribal people as stimulant, antiscorbutic, anthelmintic, rubifacient, vesicant, anticonvulsant and carminative. The present study is an attempt to explore the anticonvulsant activity of various extracts like ethanol, petroleum ether, diethyl ether, ethyl acetate and n-butanol extract of aerial parts of this plant. The anticonvulsant activity of above extracts was evaluated by using strychnine induced tonic convulsion in Swiss albino mice. All extracts were able to reduce convulsion in mice except ethanol extracts. The diethyl ether extract of *Cleome rutidosperma* was found to have significant ($p < 0.01$) anticonvulsant activity in comparison to other extracts.

Key words: *Cleome rutidosperma*; *Convulsion; Strychnine Hydrochloride; Capparidaceae; Clonazepam.*

INTRODUCTION

Cleome rutidosperma Linn. belongs to family Capparidaceae. It is a tropical herb in Africa, widely distributed from Senegal to Angola in costal regions. In Nigeria, it occurs as a weed in rice fields, while in West Africa, it is occasionally cultivated as a pot herb [1-3]. It is perennial erect annual herb, branched from base and stem finely glandular pubescent. Leaves, alternate, trifoliate elliptical and glabrous. Flowers occur as bisexual, regular with racemose inflorescence. In Orissa it is called as Banasorisa. The urban people use this plant as nutritional vegetables and medicinally in the form of paste. The literature survey reveals that various parts of *Cleome rutidosperma* have been used as a folklore medicine for curing various ailments like Fibromyalgia, Osteoarthritis, Back Pain, Bursitis, Bone Spur, Bible Bump, Tennis Elbow, Abrasions, Heel Pain, Bruises, Tarlov Cysts, Skin rash, Stiff Neck, Arthralgia, Degenerative Joint Disease, Convulsion, Tired Legs, Cervical Spondylosis, Arthritis, Sprains[4-6]. In the present study, we report the anticonvulsant activity of various extracts of the entire plant of *Cleome rutidosperma*.

MATERIALS AND METHODS

Materials

Sonicator, heating mentle, soxhlet extractor, insulin syringe, mice feeding needle, strychnine, gum acacia and standard drug Clonazepam were supplied by the department of pharmacognosy, Jeypore College of Pharmacy, Rondapalli, Jeypore. All other chemicals and reagents were procured from authorized suppliers and were of analytical grades. The plant material *Cleome rutidosperma,* whole plant was collected from local area of Salipur and authenticated by Botanical Survey of India, Shibpur, Howrah vide Letter No. MJ07/ DBT/ 235 dated 11.06.2007.

Preparation of extract of *Cleome rutidosperma*

The whole plant was taken and air-dried in shade for ten days. Then the dried plant material was made into coarse powder. The extraction was carried out by the Soxhlet extraction apparatus using 95 % ethanol as solvent. The ethanolic extract was fractionated by extracting with the solvents such as ethyl acetate, petroleum ether, diethyl ether and n-butanol in a separating funnel. Then the extracts were concentrated on water bath [7].

Phytochemical study

The ethanolic fractions were subjected to different preliminary qualitative chemical investigation and it was found that *Cleome rutidosperma* contain tannin, lipids, steroids, flavonoids, terpenoids, saponins, sugars[8].

Animals

Healthy Swiss albino mice of either sex were used in the present study. They were housed in standard conditions of temperature (25±2 °C), relative humidity of 45-55 % in animal house of Jeypore College of Pharmacy. They were fed with a standard pellet diet and water *ad libitum*. Animals were caged and all operations on animals were done under aseptic condition.

Drugs

The extract of *Cleome rutidosperma* was tested in single dose in each group of experimental model (200 mg/Kg). Clonazepam was used as the standard drug in strychnine induced tonic convulsion of Swiss albino mice model in a dose of 3 mg/Kg body weight of mice[9].

***Correspondence :** bhabani143@yahoo.co.in, Mob : +919938860284 Fax : 06854-246955.

Experimental protocol

Animals were selected, weighed (20-25 g) and divided in to seven groups (n=5), namely control, standard drug and six groups belonging to five different extract of *Cleome rutidosperma*. Approval for the research work was obtained from the Institutional Ethical Committee of regd. No. HPI/07/60/IAEC/0013 dated 07.05.2007.

Experimental Method

The convulsion inducing agent strychnine along with vehicle gum acacia was used to evaluate the acetylcholine level lowering capacity of plant extract in Swiss albino mice. The convulsion behavior of Swiss albino mice was initiated by administration of strychine[10].

Swiss albino mice were divided into eight groups (5 each). The first group (I) served as normal control which received distilled water only. The second group (II) served as standard control which received Clonazepam (3 mg/Kg b.w, i. p.). Groups (IV) to (VII) received a single dose of extracts of ethanol, petroleum ether, diethyl ether, ethyl acetate and n-butanol (200 mg/Kg b.w, p. o.). After 30 minutes, all animals were injected with a single dose (2 mg/Kg b.w, i. p.) of strychnine. Then onset of anticonvulsant action, number of convulsion and time of death, if any were observed for a period of one hour.

Statistical analysis

The data of biochemical estimations was reported as ±S.E, where n = 5. For determining the statistical significance, analysis of variance (ANOVA) at 1 % level significance and Dunnett's t – test was employed. P values < 0.01 were considered significant[11].

RESULT

The extracts of *Cleome rutidosperma* produced a significant anticonvulsant activity after 30 minutes in the dose of 200mg/Kg body weight as shown in Table1. The anticonvulsant activity of all the extracts were found in the order of diethyl ether>ethyl acetate>petroleum ether>n-butanol.

Table 1: *Anticonvulsant activity of total extracts of Cleome rutidosperma.*

Group	Treatment Dose (mg/kg)		Onset of action (Min) (X± SEM)	Convulsion No. (X± SEM)	Quantal death	Survival (%)	Time of death (X ± SEM)
I	Control (Distilled water)		5.8± 1.2	88± 18	5	0	7.6±2.1
II	Standard (Clonazepam)	3	29.8± 4.6	28±0.6	0	100	-
III	Ethanolic extract	200	7.4±0.9	58± 18	4	20	13.2±2.7
IV	Petroleum ether extract	200	29.0±3.7	18±0.4	1	80	41.0±3.2
V	Diethyl ether extract	200	40.6±3.0 (p < 0.01)	16±0.2	0	100	-
VI	Ethyl acetate extract	200	37.8±6.6	16±0.4	0	100	-
VII	n-butanol extract	200	31.4±3.1	18±0.5	0	100	-

All values are expressed in mean ± standard error mean (n=5)

ANOVA DATA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	17689.6257	1	17689.626	367.9251	0.001222	4.747225
Within Groups	1201.1543	12	100.0962			
Total	18890.78	13				

DISCUSSION

The anticonvulsant effect of the extract obtained from different solvents was comparable with the standard drug and control used in this study. It will be worth mentioning that although different constituents were extracted in different solvents as per polarity but diethyl ether fraction is more effective as compared to other solvent extracts, as the onset of convulsant action of strychnine was delayed in case of diethyl ether fraction with minimum convulsion number, having no quantal death showing 100 % survival. The activity shown by diethyl ether extract is of considerable importance and has justified its use in controlling the convulsion as suggested in the folklore medicine. By employing one-way ANOVA, all data were found to be statistically significant at 1 % level of significant ($p<0.01$) followed by Dunnett's t-test. The extent of activity shown by the crude extracts is more than that of the standard drug Clonazepam and many fold than the control, which justifies its activity as shown in Fig 1.

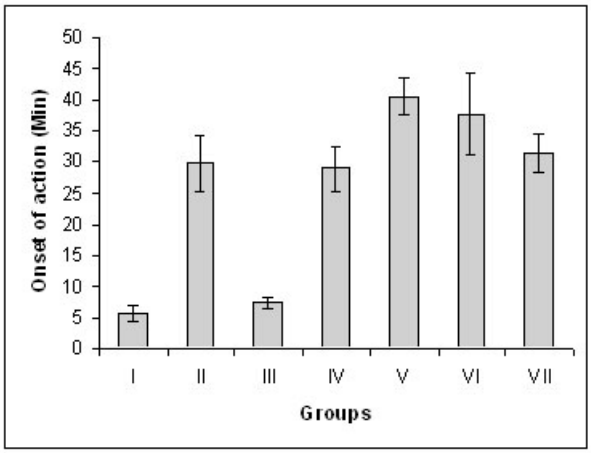

Fig 1. Onset of action of strychnine in presence of control (I), standard drug (II) and various solvent fractions.
Each bar represents mean ± standard error mean.
Group III – Ethanol extract, group IV – Petroleum ether extract, group V – Diethyl ether extract, group VI – Ethyl acetate extract and group VII – n-butanol extract.

CONCLUSION

It could be concluded that the plant *Cleome rutidosperma* is having anticonvulsant activity and better result is obtaining from extract of diethyl ether. Further studies are required to identify the actual chemical constituents present in the crude extracts of this herb which claims to produce anticonvulsant activity.

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