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CNS ACTIVITY OF THE METHANOL LEAF EXTRACTS OF *SOPHORA INTERRUPTA* BEDD,  
*KIGELIA PINNATA* DC, *HOLOPTELEA INTEGRIFOLIA* PLANTS IN EXPERIMENTAL  
ANIMAL MODELS

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### Abstract

The aim of the present study is to investigate Central Nervous System (CNS) activity of the methanol extract of leaves of *Sophora interrupta* (Papilionaceae), *Kigelia pinnata* (Bignoniaceae), *Holoptelea integrifolia* (Ulmaceae) in Swiss albino mice. A daily dose of 200mg/kg, 200mg/kg and 250mg/kg (Dose selected according to literature) of extracts was administered respectively to the animals for 15 days, after which various CNS experiments such as Exploratory behavior and muscle relaxant were recorded and compared with the control animals.. The results revealed that the methanol leaves extract of *Sophora interrupta*, *Kigelia pinnata* and *Holoptelea integrifolia* caused significant reduction in exploratory behavioral pattern in head dip test, a reduction in muscle relaxant activity in rota rod and traction tests. The results suggest that methanol extracts of *Sophora interrupta*, *Kigelia pinnata* and *Holoptelea integrifolia* exhibit CNS depressant activity in tested animal models.

**Keywords:** *Sophora interrupta*, *Kigelia pinnata*, *Holoptelea integrifolia*, CNS activity, Experimental animals.

### Introduction:

*Sophora Interrupta* Bedd belongs to family Papilionaceae found in Tirumala and it is commonly called as Adavibillu. Since past it is used as Antibacterial, Antifungal and Anticancer<sup>1</sup>. *Kigelia pinnata* DC family Bignoniaceae is a medium sized tree that is widespread in tropical Africa, has a low branching sometimes tortuous trunk with large spreading crown<sup>2</sup>. Parts of Nigeria, the leaves enjoy the greatest use as an abortifacient, as an aphrodisiac, tonic and in the treatment of impotence. The leaves are commonly used by traditional healers

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as an antidiarrheal remedy especially in children and the effectiveness is highly acclaimed<sup>3</sup>. *Holoptelea integrifolia* plant family Ulmaceae is a large deciduous tree distributed throughout the greater part of India and is commonly called as Kanju, Papri, Dhamna, Banchilla, Chilbil, Begana<sup>4</sup>. Since past, it is used as antimicrobial antioxidant and wound healing<sup>5</sup>.

## **Materials and methods:**

### **Plant materials and Extraction:**

The plants *Sophora interrupta*, *Kigelia pinnata* and *Holoptelea integrifolia* was collected in March 2011, from the SV University Tirupathi, A.P., India. The plant material was taxonomically identified by the botanical survey of India. Tirupati and the voucher specimen was retained in our laboratory for future reference. The dried powder material of the plant leaves of *Sophora interrupta*, *Kigelia pinnata* and *Holoptelea integrifolia* was extracted with 2500 ml of petroleum ether to remove the fatty material and 2500 ml of methanol extract was then distilled, evaporated and dried in vacuum. The resulted extract yield was 8.50% and the appearance of the extract was dried little powder in nature.

### **Experimental Animals:**

Studies were carried out using Swiss albino mice 30-35g of either sex. They were obtained from the animal house. The animals were grouped and housed in polyacrylic cages (38X23X10cm<sup>3</sup>) with not more than eight animals per cage, and maintained under standard laboratory conditions (temperature 25± 2<sup>0</sup>C) with dark and light cycle (12 hours). They were allowed free access to standard dry pellet diet (Hindustan lever) and water ad libitum. The mice were acclimatized to laboratory condition for 10days before commencement of experiment. Institutional Animal Ethical Committee (IAEC) Constituted under CPCSEA approved the experimental protocol (IAEC ref. No: 1447/PO/a/11/CPCSEA).

### **Preliminary Phytochemical Analysis:**

The methanol extract of leaves of the *Sophora interrupta*, *Kigelia pinnata* and *Holoptelea integrifolia* was subjected to preliminary phytochemical screening.

### **Exploratory Behavior:**

This was performed by head dip test.

### **Head dip test:**

The evaluation of certain components of behavior of mice such as curiosity or exploration has been attempted in head dip test. Five groups of albino mice (n=6) were placed on top of a wooden box with 16 evenly spaced holes, 30min after administration of the methanol extract of *Sophora interrupta* (200mg/kg), *Kigelia pinnata* (200mg/kg) and *Holoptelea integrifolia* (250mg/kg), vehicle (1ml of normal saline), and Diazepam (5mg/kg) respectively. The number of times that each animal dipped its head into the holes was counted for the period of 3min<sup>6</sup>.

### **Muscle Relaxant activity:**

The effects of extracts on muscle relaxants activity was studied by the traction test and rota rod test.

### **Traction test:**

The forepaws of the mice was placed in a small twisted wire rigidly supported above the bench top, and the screening of animal was performed for traction test normally the mice group the wire with the forepaws and place at least one hind foot on the wire without 5 s when allowed to hang free. The test was conducted on five groups of animals (n=6) that were previously screened, on the 15<sup>th</sup> day 30 min after the administration of methanol extract of *Sophora interrupta* (200mg/kg), *Kigelia pinnata* (200mg/kg) and *Holoptelea integrifolia* (250kg/kg) and Diazepam (5mg/kg i.p.) the test was carried out. Inability to put up at least one hind foot is considered as failure in the traction test<sup>7</sup>.

### **Rota rod test:**

The test is used to evaluate the activity of drugs interfering with motor coordination. Fresh mice were placed on a horizontal rotating rod at a speed of 25 rpm. The mice capable of remaining on the top for 3 min or more, in three successive trials were selected for the study. The selected animals were divided into five groups (n=6). After administration of dose on test day each group of animals was then placed on the rod after 30 min. the animals failed more than once to remain on the rotarod for 3 min were considered as passed the test<sup>8</sup>.

### **Statistical analysis:**

The results were expressed as mean  $\pm$  S.E.M. Statistical analysis was carried out by using ANOVA followed by Dunnett's multiple comparison tests.

**Results:**

The methanol extracts of *Sophora interrupta*, *Kigelia pinnata* and *Holoptelea integrifolia* was found to be non-toxic up to the dose of 2 g/kg and did not cause any death of the tested animals. The results of the preliminary phytochemical test of methanol extracts of *Sophora interrupta*, *Kigelia pinnata* and *Holoptelea integrifolia* have been presented in **Table 1**. The Phytochemical tests with the methanol extract of *Sophora interrupta*, *Kigelia pinnata* and *Holoptelea integrifolia* indicated the presence of glycosides, terpenes and, saponins.

**Table-1: Preliminary phytochemical test of *Sophora interrupta*, *Kigelia pinnata* and *Holoptelea integrifolia* methanol extracts.**

S. No.	Phytochemical Tests	Results
1.	Test for Alkaloids	-
2.	Test for Carbohydrates	+
3.	Test for Proteins	-
4.	Test for Steroids	-
5.	Test for Sterols	-
6.	Test for Phenols	+
7.	Test for Flavonoids	+
8.	Test for Gums and mucilage	+
9.	Test for Glycosides	+
10.	Test for Saponins	+
11.	Test for Terpenes	+
<b>‘+’ Indicates the presence of compounds; ‘-’ Indicates the absence of compounds.</b>		

The results obtained from different experiments for effect on Exploratory Behavioral profiles are presented in **Table.2**. The animals treated with methanol extracts of *Sophora interrupta*, *Kigelia pinnata* and *Holoptelea integrifolia* at the dose of 200mg/kg, 200mg/kg, 250mg/kg respectively showed a marked decrease in Exploratory behavior compared with control.

**Table-2: Effect of methanol extract of *Sophora interrupta*, *Kigelia pinnata* and *Holoptelea integrifolia* on**

**Head dip test**

S.No.	Group	Mean $\pm$ S.E.M	% Protection
1	Control	12.16 $\pm$ 0.603	-
2	Standard	4 $\pm$ 0.366*	66.94
3	S. interrupta	5 $\pm$ 1.597*	58.88
4	K. pinnata	9.5 $\pm$ 1.18*	21.4
5	H. integrifolia	5.5 $\pm$ 0.766*	54.5

Values are the number of head dips in 3 min (n=6), significantly difference between control group and treated group; \*p<0.001, ANOVA followed by Dunnett's Multiple comparison's test.

In the traction test, the mice treated with methanol extract of *Sophora interrupta*, *Kigelia pinnata* and *Holoptelea integrifolia* showed a significant failure in traction at 200mg/kg, 200mg/kg & 250mg/kg dose tested respectively.

**Table 3**

**Table-3: Effect of methanol extract of *Sophora interrupta*, *Kigelia pinnata* and *Holoptelea integrifolia* on muscle relaxant activity (Traction test).**

S.No.	Group	Mean $\pm$ S.E.M		% Protection
		Basal	After Treatment	
1	Control	49	51.5 $\pm$ 1.733	-
2	Standard	48.83	9 $\pm$ 3.033*	82.52
3	S. interrupta	49.16	23.16 $\pm$ 1.017*	55.02
4	K. pinnata	49.16	33 $\pm$ 1.319*	35.92
5	H. integrifolia	49.16	19.33 $\pm$ 2.370*	62.46

Values are the number of fall off times in 3 min (n=6), significantly difference between control group and treated group; \*p<0.001, ANOVA followed by Dunnett's Multiple comparison's test.

The result obtained from the Rota rod test, showed that methanol extract of *Sophora interrupta*, *Kigelia pinnata* and *Holoptelea integrifolia* at 200mg/kg (55%), 200mg/kg (45%) & 250mg/kg (25%) respectively significantly reduced the motor co-ordination of the tested animals **Table 4**.

**Table-4: Effect of methanol extract of *Sophora interrupta*, *Kigelia pinnata* and *Holoptelea integrifolia* on muscle relaxant activity (rotarod test).**

S.No.	Group	Mean $\pm$ S.E.M	% Protection
1	Control	20 + 0.577	-
2	Standard	8 + 0.577*	60
3	S. interrupta	9 + 0.577*	55
4	K. pinnata	11 + 0.577*	45
5	H. integrifolia	15 + 0.573*	25

Values are the number of fall off times in 3 min (n=6), Significantly difference between control group and treated group; \*p<0.001, ANOVA followed by Dunnett's Multiple comparison's test.

### Discussion:

The myorelaxant effect was observed only with the higher dose of methanol extracts of *Sophora interrupta*, *Kigelia pinnata* and *Holoptelea integrifolia* which resulted in an increase in the number of falls and a decrease in the time on the bar as detected by the rotarod test. The intensity of reduction in exploratory behaviors in the treated animal groups which reflects the same line of action like the standard reference drug benzodiazepine, which acts as an anxiolytic (at low doses), anticonvulsants and also produce sedation and a myorelaxant effect at higher doses. A significant lack in motor coordination and muscle relaxant activity was also noted in animals treated with the extracts.

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