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Evaluation of anxiolytic activity of fruits of *Feronia elephantum corr.*

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ABSTRACT

The objective of this study was to evaluate anxiolytic activity of aqueous extract of fruit of *Feronia elephantum* Corr. The models of anxiety, employed, were elevated plus maze and light dark exploration paradigm. These models are pharmacologically validated. Aqueous extract of fruit at a concentration of 800 mg/kg showed significant anxiolytic activity by elevated plus maze test as well as extract at 1000 mg/kg dose showed good activity by light and dark exploration paradigm method.

KEYWORDS

Anxiolytic activity;
Feronia elephantum;
Rutaceae;
Elevated plus maze test;
Light and dark exploration test.

INTRODUCTION

Feronia elephantum Corr (Rutaceae) is indigenous in India, Ceylon, Java and Cambodia and used medicinally in India and Cambodia. A modern size tree has straight sharp strong spines 1.2-3.7cm long[1]. The fruit is sour, sweet and acrid, with flavour and taste. The unripe fruit is alexipharmic, astringent to the bowels; remove itching of the body. The fruit is aromatic and used as a stomachic and stimulant in paediatric diseases. It is cardio-tonic, tonic to the liver and the lungs and also acts as diuretic, strengthening the gums[2].

MATERIALS AND METHODS

Plants material and extract preparation

For the present study the plant was procured from the reliable source of Sangli region and the identity of the drug was established by morphological study[2] at the Department of Botany, Swami Vivekanand Shikshan Sanstha's Padmabhushan Dr. Vasantrao Dada Patil Mahavidyalaya, Tasgaon, Dist. -Sangli. The fruit were cut shade dried at 37^0C to 40^0C and coarsely powdered through mesh 20. The powdered drug was again shade dried for 5 days and finely powdered through mesh 80. The powdered plant material was macerated using 10% chloroform water at room temperature for 7 days. The extract was tested for the anxiolytic activity by two different methods. The extract was administered orally in the concentration of 200, 400 and 800 mg/kg in elevated plus maze test while it was administered in the concentration of 500, 750, 1000 mg/kg in light and dark exploration paradigm method.

Animal

Male Swiss mice (20-25 g) in five groups containing five animals in each group were used throughout the experiments from the animal house of the Appasaheb Birnale College of pharmacy, Sangli. The protocol of this study was approved by the Institutional Animal Ethical Committee. Mice were maintained in plastic cages with controlled 12 hour light and dark cycle, tempera-

Full Paper

ture of 25-30^{0}C, food and water are freely available.

Methods

Elevated plus maze test [3]

The elevated plus maze for mice[4] two open arms (37×5)[5] and two enclosed arms (37×5×12) with 12 cm high wall arranged so that the arms of the same type were opposite to each other, with central square of 5 cm. The wooden apparatus was used and was elevated to a height of 25 cm. above the floor.

Light and dark exploration test

This model[6,7] is based on natural aversion of mice to brightly light places. The apparatus consists of two compartments box; one dark and the other brightly light. Since anxiolytic reduce the natural aversion to light compartment. A typical apparatus consists of a wooden box (45×27×27 cm). The box is open topped and dimly illuminated (10W white bulb). Mice were placed individually in the centre of the light compartment and observed for the next 5 minutes for the time spent in the light and dark compartment.

Statistical analysis

All results are presented as mean±s.e.m. Analysis of variance was followed by Dunnett's test as the post -hoc test. Results were considered significant at P<0.001.

RESULTS

The elevated plus maze test (TABLE 1) oral administration of extract of fruits of *Feronia elephantum* increases number of entries in open arm and number of entries in closed arm only at highest dose 800 mg/kg.

The values are reported as means±s.e.m. for the number of mice shown in parenthesis* P<0.001 verses controls (analysis of variance and Dunnett's test as the post hoc test).

It increases the number of entries in open arm by 147% (10.4±1.4) as compare to control (4.2±0.6); also showed significant increase in time spent {F (4, 19) = 7.68, P<0.001} Diazepam (1 mg/kg) orally used as positive control, increased number of entries in open arm by 195% (12.4±1.3) and time spent in open arm by 200% (153.9±2.84) as compare with the controls (51.6±1.69).

TABLE 1: Effect of aqueous extract of fruits of *Feronia elephantum* on elevated plus maze test in mice

Group	Dose	No.of entries (n)		Time spent (s)	
		Open arm	Closed arm	Open arm	Closed arm
Control	--	4.2±0.6	10.2±0.2	51.6±1.69	249.1±3.81
Diazepam	1 mg/kg	12.4±1.3*	5.9±0.7	153.9±2.84*	147.3±2.21
Test	200 mg/kg	5.1±0.8	6.4±0.6	70.4±2.1	229.1±4.86
	400 mg/kg	7.2±1.1	7.8±0.8	103.9±2.7	195.9±2.85
	800 mg/kg	10.4±1.4*	8.1±1.2	141.6±2.9*	159.8±3.34

TABLE 2: Effect of aqueous extract of fruits of *Feronia elephantum* on Light and dark exploration paradigm in mice

Group	Dose	No.of entries (n)	Time spent (s)	
		Light	Light	Dark
Control	--	3.33±0.4	36.2±2.6	262.8±3.7
Diazepam	1 mg/kg	9.1±1.1	139.3±3.1*	170.6±4.5*
Test	500 mg/kg	3.2±1.4	44.2±1.8	265.9±6.6
	750 mg/kg	3.6±0.9	69.7±2.8	270.1±7.4
	1000 mg/kg	4.1±1.6	101.4±3.5*	198.1±8.4*

The values are reported as means±s.e.m. for the number of mice shown in parenthesis* P<0.001 verses controls (analysis of variance and Dunnett's test as the post hoc test).

In light and dark exploration test (TABLE 2)

Diazepam (1 mg/kg) treated mice increases the number of entries into the light compartment {F (4, 19) = 5.16, P<0.01} by 175% and the time spent {F (4, 19) = 6.67, P<0.001} by 286%. The acute administration of extract of fruit of *Feronia elephantum* increased number of entries in light compartment at highest dose (1000 mg/kg) after oral administration. extract of fruits of *Feronia elephantum* (1000 mg/kg) increases number of entries in light compartment by 24% (4.1±1.6) and shows significant increase in time spent {F(4,19) = 7.21, P<0.001} by 180% (101.4±3.5) as compare with control (36.2±2.6).

DISCUSSION

In this study the number of entries in the open arms, percentile ratio of open arm to total arm entries and the percentage of time spent in open arms of the elevated

plus maze paradigm and percentage of time spent in light compartment of light and dark exploration paradigm were taken as a measure of anxiety. Benzodiazepines show a strong anxiolytic profile[8], hence, diazepam was used as positive control to compare the results of the test drugs.

In light and dark exploration tests among the all concentrations of extract of fruits of *Feronia elephantum* tested in elevated plus maze model only in concentration of 1000 mg/kg of test drug showed a similar anxiolytic profile as that of standard anxiolytic diazepam. Such difference has also been demonstrated with various drugs including some of the clinically established anxiolytics in various models of anxiety[9]. In addition, extract of fruits of *Feronia elephantum* may interact with receptors of various neurotransmitters. Thus the possible mechanism involved behavioural non-inhibitory effect of this drug could not only due to its primary action, but also due to interaction with serotonergic receptors. Since the anxiolytic profile differs amongst the various concentration of drug a detail study to define their precise mechanism and interaction with the various other anxiety related receptor are needed.

REFERENCES

[1] N.P.Singh, S.Kartikeyan; Flora of Maharashtra State, **(2000)**.

[2] K.R.Kirtikar, B.D.Basu; 'Indian Medicinal Plant', Perodical experts Book Agency; Delhi, **3**, **(1991)**.

[3] S.K.Kulkarni; 'Handbook of Experimental Pharmacology', 3rd edition, Vallabh prakashan, Delhi, **(1999)**.

[4] R.G.Lister; Psychopharmacology, **92**, 180-185 **(1987)**.

[5] S.Pellow, P.N.Chopin, S.F.File, M.Briely; J. Neurosci.Methods, **14**, 149-67 **(1985)**.

[6] B.Costall, A.M.Domeny, P.A.Gerrad, M.E.Kelly, R. Naylor; J.Pharma.Pharmacol., **40**, 302-305 **(1988)**.

[7] J.N.Crawley, F.K.Goodwin; Pharmacol.Bichem. Behav., **15**, 595-599 **(1981)**.

[8] H.J.Little; Neuropeptides, **19**, 11-14 **(1991)**.

[9] M.Briley, P.Chopin, C.Moret; Psychopharmacology, **101(2)**, 187-189 **(1990)**.