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CNS DEPRESSANT ACTIVITY OF THE METHANOLIC EXTRACT OF SIMPLE ASCIDIAN DISTAPLIA NATHENSIS

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ABSTRACT

The methanolic extract of simple ascidian Distaplia nathensis belongs to the family Holozoidae was investitaged for CNS depressant activity using actophotometer in swiss albino mice. Reduction in locomotor activity, prolongation of phenobarbitone sodium sleeping time and reduction in onset of phenobarbitone sodium was observed in mice, treated with methanolic extract of ascidian Distaplia nathensis. The CNS depressant activity produced by methanolic extract of Distaplia nathensis was evaluated statistically by student "t" test.

Key words : CNS Depressant activity, Ascidian Distaplia nathensis.

INTRODUCTION

Emergence of new diseases and increasing incidence of bacterial resistance has necessiated the mankind to look constantly for new alternative source of medicines. Marine animals possess unique compounds of biomedical importance. The sedentary marine animals, especially, exhibit characteristic chemical defense, which has become the focus of research worldwide. The ascidians ranked third of overall activity next to sponges and bryozoans. Ascidians are wholly marine with 2000 species, where more than 130 natural products have been isolated from them. It has been found that the natural products derived from ascidians have tremendous potential in pharmaceutical and biomedical fields. Quershi[1] isolated a new indole, 3,6–dibromo indole from the ascidian Distaplia regina. Flam[2] reported anticancer activity for the natural products derived from two ascidians. Wright[3] reported anti–tumour activity for tetrahydro isoquinoline alkaloids isolated from the ascidian Ecterinascidia tubinata. Kato[4] reported antibacterial and antifungal activity from the hepatopancreas of the ascidian Halocynthia roretzi. Ricco[5] reported anti–HIV activity for the tunicate Didemnum molle. Kobayashi[6] reported potent antineoplastic activity and anti–leukemic activity for didemnum sp.

In continuation of the pharmacological screening of biologically active ascidians, the CNS depressant activity was investigated for Distaplia nathensis in Tuticorin water.

EXPERIMENTAL

Preparation of methanolic extract of Distaplia nathensis

The simple ascidian Distaplia nathensis were collected from the oyster cages inside the port of Tuticorin. The ascidian tissues were cut into small pieces and air dried for 24 hours. Then it was extracted with methanol. This methanolic extract was cold percolated at – 18°C and filtered by using Whatman filter paper. Filtrate was then lyophilized.

Evaluation of CNS depressant activity

(a) Evaluation of Locomotor Activity[7] : Healthy and adult male albino swiss mice weighing 20–30 g, fasted for 24 hours before the experiment, were divided into eight groups of six animals each. The basal activity score for all the animals are recorded and numbered. The graded doses of methanolic extract of Distaplia nathensis [25, 50, 75, 100, 125 and 150 mg/kg (b.w.)] were administered in the form of 10% v/v Tween 80 suspension interperitonially. The control group was given only 10% v/v Tween 80 suspension. One group of animals were administered intraperitonially the standard drug diazepam in a dose of 4 mg/kg. Scores were recorded after 30 minutes for all the animals and the percentage change in the activity was calculated by the following formula and the results are presented in Table 1.

$$\% \text{ change in motor activity} = (A-B) / A \times 100$$

where A = Basal Score

B = Score after treatment

b. Evaluation of Phenobarbitone Sodium Induced Sleeping Time[7] : Healthy and adult male albino swiss mice weighing 20–30 g, fasted for 24 before the experiment, were divided into seven groups of six animals each. The graded doses of methanolic extract of Distaplia nathensis [25, 50, 75, 100, 125 and 150 mg/kg (b.w)] were administered in the form of 10% v/v Tween 80 intraperitonially. The control group was given only 10% v/v Tween 80 suspension intraperitonially. After half–an–hour, pentobarbitone sodium was administered, intraperitoneally to all the groups at a dose of 20 mg/kg (b.w).

The time of administration of test compounds and the phenobarbitone sodium, the time of loss and gain of righting reflex were recorded in all the groups of test animals and the percentage effect on phenobarbitone – induced narcosis by test compounds was calculated using the formula given below, considering righting reflex in control as 100%. The results of the evaluation are presented in Table 2.

$$\% \text{ Effect} = \frac{\text{Average duration of loss of righting reflex in the test group}}{\text{Average duration of loss of righting reflex in control}}$$

RESULTS

All the methanolic extract of Distaplia nathensis reduced the spontaneous locomotor activity of mice and potentiated the phenobarbitone induced sleeping time. It is clear from Table 1 and 2 that increase in concentration of methanolic extract of *Distaplia nathensis*, decreases the spontaneous locomotor activity and increases phenobarbitone induced sleeping time in mice.

Table 1. Effect of the Methanolic Extract of Distaplia Nathensis on Locomotor activity

Treatment	Dose mg/kg i.p route	Locomotor activity scores in one minute*		Percentage change in activity
		Before treatment	After treatment	
Control	0.5 mL	33.56	33.52	0.119
Diazepam	4	40.66	9.24	77.27
Methanolic Extract of Distaplia Nathensis	25	38.65	30.25	21.73
	50	36.50	27.74	24.00
	75	39.75	28.15	29.19
	100	39.66	25.93	34.62
	125	38.95	23.99	38.41
	150	37.88	22.32	41.07

* Average of 6 determinations.

Table 2. Effect of the Methanolic Extract of Distaplia Nathensis on Phenobarbitone Sodium Induced Sleeping Time

Treatment	Dose mg/kg i.p route	On set of action in min	Sleeping time in min (mean ± SEM)	Percent effect
Control	20	15.50 ± 2.07	34.43 ± 3.09	100
Methanolic Extract of Distaplia Nathensis	25	14.40 ± 2.02	65.20 ± 2.20	189.30
	50	13.30 ± 1.99	70.30 ± 2.12	203.89
	75	12.30 ± 2.01	78.42 ± 2.01	227.76
	100	11.26 ± 2.05	81.45 ± 1.92*	236.56
	125	10.36 ± 1.44	89.48 ± 1.43*	259.88
	150	09.42 ± 1.34	93.44 ± 1.42*	271.39

* $p < 0.05$ compared with control.

CONCLUSION

The methanolic extract of *Distaplia nathensis* exhibited CNS depressant activity in mice tested by actophotometer and phenobarbitone sodium induced sleeping time method. The methanolic extract of *Distaplia nathensis* caused a dose dependant reduction in motor activity in mice. The methanolic extract of *Distaplia nathensis* potentiated the activity of phenobarbitone sodium induced sleeping time. The possible mechanism of CNS depressant activity by the methanolic extract of *Distaplia nathensis* may be due to enhancement of GABA in brain.

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