



## EFFECT OF *REMUSATIA VIVIPARA* (ROXB) SCHOTT TUBERS ON ANIMAL MODELS OF DEPRESSION

MAYUR R. BHURAT\*

Shree Sureshdada Jain Pharmaceutical Education and Research Center, Jamner, Tal: - Jamner, Dist: - Jalgaon, State: - Maharashtra 424206  
Email: bhuratmayur@gmail.com

Received: 08 Sep 2010, Revised and Accepted: 12 Oct 2010

### ABSTRACT

The present study was under taken to investigate effect of *Remusatia vivipara* (roxb.) schott (RV) tubers on Animal model of Depression by using Tail Suspension (TST), Forced Swim Test (FST) and Actophotometer. The ethanolic extract of *Remusatia vivipara* (roxb.) schott (100 and 200 mg/kg, p.o.) and Imipramin (10 mg/kg, i.p.) was administered in Swiss albino mice 30 min before experiment. The result indicates, significantly increases duration of immobility in TST and FST while it showed significant CNS depression by reducing locomotor activity in mice. Thus, in conclusion the ethanolic extract of *Remusatia vivipara* (roxb.) schott has potent CNS depression action.

**Keyword:** *Remusatia vivipara*, Depression, Tail Suspension Test, Forced Swim Test, Actophotometer.

### INTRODUCTION

Depression is a common, life-threatening sickness with a significant incidence in the population. Mental depression is a chronic illness that affects a person's mood, thoughts physical health and performance and may range from a very mild condition, bordering on normality, to severe depression and called as "psychotic depression" which is accompanied by hallucinations and delusions (Fountoulakis *et al.*, 2003). Patients with major depression have a symptom that shows changes in brain monoamine neurotransmitters, particularly norepinephrine, serotonin and dopamine (Gold *et al.*, 1988).

The family Araceae consists Genera 105, species more than 3300 (8 genera, 10 species in the flora; species in 10 additional genera may persist locally within flora area, nearly worldwide, primarily tropical regions, distributed mostly in the tropics and sub-tropics (Croat, 1979). *Remusatia vivipara* (Roxb) Schott is a very rare plant belonging to the family Araceae. Plant *Remusatia vivipara* (Roxb) Schott is commonly known as Hitchhiker Elephant Ear. By tribal people in the region of Nandurbar District, Maharashtra it also known as 'Lalkand'. According to the tribal people its tubers are used for wound to dispel any worms and germs (Manandhar *et al.*, 1998), Whooping cough (Ratheesh *et al.*, 2007), antifungal (Mali *et al.*, 2008).

### MATERIALS AND METHODS

#### Plant Material and Extraction:

The plant was collected from forest region of Nandurbar District, Maharashtra in the month of September. The plant was authenticated by Dr. G. S. Chaudhari, Department of Botany, M. J. College, Jalgaon, Maharashtra. The tubers were washed and dried under shade. After completion of drying, tubers were crushed in mixture and extracted in Soxhlet assembly for continuous 72 hour in Ethanol solvent (95%) and extract were stored in amber color bottle.

#### Phytochemical investigation:

Preliminary Phytochemical investigation was carried out as per standard procedure given by Khandelwal, 2000; Trease and Evans, 1996; Kokate *et al.*, 2003.

#### Animals:

Male Swiss albino mice of weighing 18-22 g were used for the study. The animals were procured from Animal House, Department of Pharmacology, S.S.J.I.P.E.R., Jamner (M.S.) India. The animals were placed at random and allocated to treatment groups in polypropylene cages with paddy husk as bedding. Animals were housed at a temperature of 24±2°C and relative humidity of 30-70%. A light and dark cycle was followed. All animals were fed on

standard balanced diet and provided with water ad libitum. Experiments were carried out between 09:00 and 14:00 h. All the experimental procedures and protocols used in the study were reviewed and approved by the Institutional Animal Ethical Committee (IAEC) and care of laboratory animals was taken as per the guidelines of Committee for the purpose of control and supervision of experiments on animals (CPCSEA), Govt. of India (Registration No.1130/ac/09/CPCSEA.)

#### Drugs

The drugs used were: *Remusatia vivipara* (Roxb) Schott 100 and 200 mg/kg p.o., imipramine hydrochloride (Sigma-Aldrich, St. Louis, USA) 10 mg/kg i.p. were used in the present study.

#### Acute toxicity studies

Acute oral toxicity of alcoholic extract of *Remusatia vivipara* (Roxb) Schott was determined by using male mice weighing 18-22 g. The animals were fasted for 3 hrs prior to the experiment. OECD guideline no. 425 (Up and down procedure) was adopted for toxicity studies. Animals were administered with single dose of extract and observed for their mortality during 48 hours study period (short term) toxicity. LD50 was calculated as per OECD guidelines 425 [OECD, 2001].

#### Tail suspension test

In the tail suspension test, mice suspended by the tail show initial struggling, followed by periods of immobility that increase in duration across the six min test. The total duration of immobility induced by tail suspension was measured according to the method described by Steru *et al.*, (1985) as a facile means of evaluating potential antidepressants. Mice were hung individually 58 cm above the floor by the adhesive tape placed approximately one cm. from the tip of the tail. Immobility was recorded during six min period in which initial immobility of two min discarded. Animal was considered to be immobile when it did not show any movement of body and hanged passively.

#### Forced swim test

Behavior despair was proposed as a model to test for antidepressant activity by Porsolt *et al.* (1977, 1978). Mice were forced to swim individually in a glass jar (25×12×25 cm<sup>3</sup>) containing fresh water of 15 cm height and maintained at 25°C. After an initial 2 min period of vigorous activity, each animal assumed a typical immobile posture. A mouse was considered to be immobile when it remained floating in the water without struggling, making only minimum movements of its limbs necessary to keep its head above water. The total duration of immobility was recorded during the next 4 min of a total 6 min test. The changes in immobility duration were studied after administering drugs in separate groups of animals.

**Actophotometer**

The locomotor activity can be easily studied with the help of actophotometer, for this Male Swiss albino mice weighing between 18-25g were divided into five groups, each group comprising of six animals, each animal was placed individually and the basal activity score was recorded for all the animals. 30 min, 60 min and 120 min after the oral administration of the vehicle or Standard or extract each mouse was retested for activity for 10 min. The difference in the activity was recorded considering before treatment values and after vehicle or standard or extract treatment values. Finally percentage decrease in locomotor activity was calculated [Alagarwamy et al., 2006].

**Statistics**

All the data shown as mean ± SEM. Statistical Analysis was performed with one way ANOVA followed by Dunnett's test. Differences of p<0.05 considered as statistically significant.

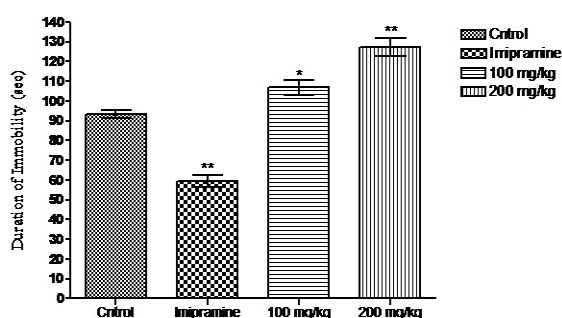


Fig. 1: Effect of *Remusatia vivipara* (Roxb.) schott tubers on immobility period of mice using tail suspension test (TST)

**RESULTS**

**3.1 Effect of RV on immobility time in the tail suspension test**

In the tail suspension test, RV exhibited an increased in duration of immobility. The results were statistically significant for both doses levels as shown in fig 1.

**3.2 Effect of RV on immobility time in the forced swim test**

In the forced swim test, RV exhibited an increased in duration of immobility in the mice. The results were statistically significant for both doses levels as shown in fig 2.

**3.3 Effect of RV on locomotor activity**

In the actophotometer, RV exhibited a decrease in locomotor activity. The results were statistically significant for both doses levels as shown in fig 3.

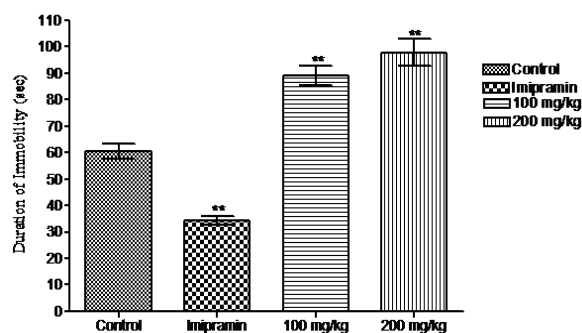


Fig. 2: Effect of *Remusatia vivipara* (roxb.) schott tubers on immobility period of mice using forced swim test (FST)

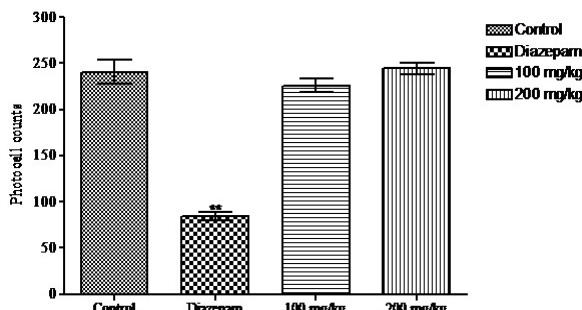


Fig. 3: Effect of *Remusatia vivipara* (roxb.) schott tubers on Locomotor activity (Actophotometer) in mice

**DISCUSSION**

In the present study, *Remusatia vivipara* extract (100 and 200 mg/kg) produced significant depressant effect in mice in TST, FST and actophotometer. Both TST and FST models of depression are widely used to screen new antidepressant drugs (Porsolt et al., 1977, 1978, 1979; Steru et al., 1985) which are quite sensitive and relatively specific to all major classes of antidepressant drugs including tricyclics, serotonin-specific reuptake inhibitors, MAO inhibitors, and atypicals (Porsolt et al., 1977; Steru et al., 1985; Detke et al., 1995). Drugs which depleted brain monoamines (reserpine) and/or reduced noradrenergic release (adenosine or clonidine) are reported to enhance immobility period (despair behaviour) (Parale et al., 1986, Kulkarni et al., 1985, Borsini et al., 1988). Similarly in our study we observed that *Remusatia vivipara* extract enhance immobility period in TST and FST. Since it did not show any significant change in locomotor function of mice as compared to control. This indicates that increased motor activity

was not involved in the action seen in both FST and TST. Thus *Remusatia vivipara* extract may deplete brain monoamines like adrenaline, serotonin and dopamine and shows depression action.

**CONCLUSION**

Thus *Remusatia vivipara* has depression activity. Further more clinical interaction between *Remusatia vivipara* and depressive drug should consider.

**REFERENCE**

1. Fountoulakis KN, O'Hara R, Iacovides A, Camilleri CP, Kaprinis S, Kaprinis G, et al. Unipolar late-onset depression: a comprehensive review. *Ann Gen Hosp Psychiatry*. 2003;2:11.
2. Gold PW, Goodwin FK, Chrousos GP. Clinical and biochemical anifestations of depression in relation to the neurobiology of stress: Part 1. *N Engl J Med* 1988; 319:348- 53.

3. Khandelwal KR. Practical Pharmacognosy: Technique and Experiments. 8<sup>th</sup> Ed. Pune: Nirali Prakashan, 2000;149-53.
4. Kokate CK, Purohit AP, Gokhale SB. Pharmacognosy, 24<sup>th</sup> Eds. Pune: Nirali Prakashan, 2003; 207-25.
5. Trease GE, Evans WC. Pharmacognosy. 13<sup>th</sup> Ed. London: Hawoust Brace and Company, 1996: 293-99.
6. Steru L, Chermat R, Thierry B, Simon P. The tail suspension test: a new method for screening antidepressants in mice. *Psychopharmacology* 1985;85:367-70.
7. Porsolt RD, Bertin A, Jalfre M. Behavioral despair in mice: a primary screening test for antidepressants. *Arch Int Pharmacodyn Ther* 1977;229:327- 36.
8. Porsolt RD, Anton G, Deniel M, Jalfre M. Behavioral despair in rats: a new animal model sensitive to antidepressant treatments. *Eur J Pharmacol* 1978;47:379-91.
9. OECD 2001-gudeline on acute oral toxicity (AOT) Environmental health and safety monograph series on testing and adjustment No.425.
10. Alagarwamy V, Thangathirupathy A, Mandal SC, Rajasekaran S, Vijaykumar S, Revathi, et al. Pharmacological evaluation of 2-substituted (1,3,4) thiadiazolo quinazolines. *Ind. J. Pharm Sci* 2006; 68(1):108-11.
11. Parale MP, Kulkarni SK. Clonidine-induced behavioural despair in mice: Reversal by antidepressants. *Psychopharmacology* 1986; 89:171-4.
12. Kulkarni SK, Mehta AK. Purine nucleosides-mediated immobility in mice : Reversal by antidepressants. *Psychopharmacology* 1985;85:460-3
13. Borsini F, Meli A. Is the forced swimming test a suitable model for revealing antidepressant activity. *Psychopharmacology* 1988; 94: 147-60.
14. Manandhar NP. Native phototherapy among the Raute tribes of Dadeldhura district. *Journal of Ethnopharmacology*, 1998; 60 (3):199-206.
15. Ratheesh. RK, Narayanan A, Kumar A. Gendered knowledge & changing trends in utilization of wild edible greens in western ghats India. *Indian Journal of Traditional knowledge*. 2007; 6(1): 204-16.
16. Mali PY, Bhadane VV. Some rare plants of ethnomedicinal properties from Jalgaon district of Maharashtra. *International Journal of Green Pharmacy*. 2008;2 (2): 76-8.