**Original article:**

# Comparison of efficacy of Withania somnifera in Albino rats with standard drugs Piracetum & Diazepam

**[1]Dr MOHAMMED TAHER ALI* , [2]Dr RUMANA FARRUKH SHAIKH , [3]ASHFAQ AHMED MOHSIN.**

[1]Associate prof in Pharmacology, College of Medicine, University of Dammam, Dammam , Kingdom of Saudi Arabia.

[2]Assistant prof in Pharmacology. College of Medicine, University of Dammam, Dammam ,

[3]Lecturer, College of Clinical Pharmacy, University of Dammam, Dammam. KSA.

Corresponding author*

**ABSTRACT:**

**INTRODUCTION:** Withania somnifera has been proposed that the modern equivalents of rasayanas & medha rasayanas have adaptogenic & nootropic activity respectively. With this background present study was planned to ompare of efficacy of Withania somnifera in Albino rats with standard drugs Piracetum & Diazepam

**MATERIALS AND METHODS: The** study was conducted in Albino (Wistar) rats of either sex weighing between 100-150 grams. They were housed in the Central Animal House, JJM Medical College, Davangere under standard conditions of temperature 25.2°C & 12/12 hrs light, dark cycle, with standard rodent pellets and tap water given ad libitum. All the experiments were performed between 0900-1400 hrs. Food but not water was with-held 12 hrs before experimentation

**RESULTS:** The corresponding mean of number of entries into open & closed arm with their ratios were 6.0±0.52, 8.5±0.56, 0.71±0.06, 9.5±0.43, 6.2±0.40 & 1.56±0.08 and 8.2±0.48, 7.5±0.50 & 1.10±0.06 respectively (P-value <0.01) indicating significant anxiolytic activity.

**CONCLUSION:** It was proved that the powdered root of Withania somnifera exerted an anxiolytic effect by the results of the elevated plus maze. The maximal response was seen at a dose of 140 mg/kg B. W rat.

## INTRODUCTION

Withania somnifera has been proposed that the modern equivalents of rasayanas & medha rasayanas have adaptogenic & nootropic activity respectively.[1] Studies conducted with withaferin-A and two withanolide glycosides isolated from Withania somnifera suggest facilitation of learning acquisition and consolidation of memory in rats'. Withania somnifera, is a 'medhya rasayana' and its roots are used in many central nervous system active Ayurvedic formulations, it was therefore, decided to conduct a study with a view to validate or rule out the claimed therapeutic properties of Withania somnifera as an augmentor of learning and memory. Withania somnifera is commonly prescribed by ayurvedic physicians as a central nervous system sedative. Its root is known to possess central depressant properties.[8] Some of its central effects include anti-stress, anti-anxiety and central nervous system inhibitory properties[2,3] a profile closely linked to the CNS inhibitory neurotransmitter, gamma amino butyric acid (GABA) or the anxiolytic benzodiazepines. Hence, there is a possibility that the central effects of this plant may be related to its ability to interact with GABAergic transmission. With this background present study was planned to



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**MATERIALS AND METHODS**

The study was conducted in Albino (Wistar) rats of either sex weighing between 100-150 grams. They were housed in the Central Animal House, JJM Medical College, Davangere under standard conditions of temperature 25.2°C & 12/12 hrs light, dark cycle, with standard rodent pellets and tap water given ad libitum. All the experiments were performed between 0900-1400 hrs. Food but not water was with-held 12 hrs before experimentation. Institutional Animal Ethics Committee clearance was obtained before carrying out the study.

**MATERIALS:**

**Drugs used:**

Following are the drugs used as positive control in the study

1. Piracetam for the evaluation of Learning & Memory supplied by the Torrent Drugs & Chemicals Pvt. Ltd., Ahmedabad & Brown & Burk Pharmaceuticals Pvt. Ltd. Bangalore
2. Diazepam for anxiolytic testing (Calmpose, Ranbaxy): These drugs were dissolved in distilled water before administration.

4. Test compound- Withania somnifera (root powder). The root of Withania somnifera is the part described for CNS effects and hence, the powder formulation of the root was tried in different doses viz. 70, 140 and 280mg/kg body weight of rats.

**RESULTS**

The study compound Withania somnifera was subjected to various tests for its nootropic and anxiolytic activities in comparison with the standard drugs Piracetam & Diazepam respectively. The results of the present study were grouped under the following headings:

In our study showed the comparative analysis of mean values of Withania somnifera treated groups (III,IV,&V) with control group (I) and standard drug Piracetam treated group (II) . The Training scores for the Withania somnifera treated groups were low as compared to control group (P-value <0.01) and the time taken to learn to climb the pole (active avoidance) was low as compared to control group (P-value 0.01) indicating significant effect on the acquisition of active avoidance learning49

During the relearning trial (i. e., when tested after an internal of 15 days), the Withania somnifera treated groups retained the previously learnt active avoidance task which is evidenced by the less number of days (Retention score P-value <0.01) and less time taken to climb the pole (P-value <0.01) after hearing the buzzer indicating significant retention of learnt activity. Accordingly the Retention indices of Withania somnifera treated groups were 0.79±0.02 (P-value <0.01), 0.84±0.02 (P-value <0.01) & 0.89±0.01 (P-value <0.01) respectively indicating significant retention of previously learnt active avoidance task when tested after an internal of 15 days. The effects of Withania somnifera on Training score, Retention score, Retention Index & the time taken to climb the pole during learning & Relearning trials were dose-dependent with maximum response seen at the dose of 280 mg/kg B. W (P-value <0.01). The values were comparable with standard nootropic agent Piracetam.

Effects on **Anxiety using Elevated plus Maze:** Results showed the mean value of



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control group (I) & standard drug diazepam treated group (II) with that of test compound Withania somnifera treated groups (III,IV&V). The Withania somnifera treated groups (III, IV &V) spent more time in open arm 124.2±5.39(41%), 167.7±2.79(56%) & 140.0±3.42(47%) respectively. Ratios of time spent in open to closed arm were 0.72±0.06, 1.27±0.05 and 0.88±0.55 respectively. The mean number of entries into open & closed arm were 6.0±0.52, 8.5±0.56, 9.5±0.43 & 6.2±0.40 and 8.2±0.48 & 7.5±0.5 respectively. The corresponding ratio of number of entries into open to closed arms were 0. 71±0.06, 1.56±0.08 & 1.10±0.06 respectively.

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Results summarized from tables (13,14) and Graphs (4,5,6,7,8) show comparative analysis of Withania somnifera treated groups (III, IV & V) with control group(I) and standard treated Diazepam treated group(1I). The test compound Withania somnifera treated groups (III, IV & V) spent greater time in the open arm 124.2±5.39(41%), 167.7±2,79(56%) & 140.0±3.42(47%) respectively (P-value <0.01) indicating significantly anxiolytic activity. The corresponding mean ratios of time spent in open arm to closed arm were 0.72±0.06, 1.27±0.05 & 0.88±+0. 05 respectively (P-value <0.01). The corresponding mean of number of entries into open & closed arm with their ratios were 6.0±0.52, 8.5±0.56, 0.71±0.06, 9.5±0.43, 6.2±0.40 & 1.56±0.08 and 8.2±0.48, 7.5±0.50 & 1.10±0.06 respectively (P-value <0.01) indicating significant anxiolytic activity.

**DISCUSSION**

The results indicated that Withania somnifera has a significant nootropic activity, comparable qualitatively with that induced by the standard drug Piracetam. Anxiety is symptom associated with nearly all types of Psychiatric illness and a certain degree of anxiety has been a consistent factor in human behaviour as a means of survival in a hostile environment increasing the general level of awareness. Pharmacotherapy of Anxiety is recommended Jbr a maximum of several weeks. The standard anxiolytic drugs benzodiazepines although provide rapid & effective relief from the anxiety. The long term treatment can lead to disinhibition & pharmacological dependence and other side effects. Withania somnifera is used in Ayurvedic Medicine as central nervous system depressant. Some of its central effects include antistress, anti anxiety & central nervous system inhibitory properties. Hence, the present study was undertaken to evaluate its effect of Anxiety. [4,5,6]

Results summarized from tables 13,14 shows that Withania somnifera treated groups (‘III, IV & 1’) had a significant effect on exploratory behaviour based tests using elevated plus more which is evidenced by greater amount time spent in open arm (P-value <0.01) and an increase in number of entries into open arm (P <0.01) and ratio of number of entries into open to closed arms (P-value <0.01) indicating significant anxiolytic activity. Also, the number of peeps out of closed arm were more as compared to the control group (P-value <0.01) indicating significant anxiolytic activity. 7,8

**CONCLUSION**

It was proved that the powdered root of Withania somnifera exerted an anxiolytic effect by the results of the elevated plus maze. The maximal response was seen at a dose of 140 mg/kg B. W rat.



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