



**INTERNATIONAL JOURNAL OF
PHARMACEUTICAL SCIENCES**
[ISSN: 0975-4725; CODEN(USA):IJPS00]
Journal Homepage: <https://www.ijpsjournal.com>



Research Article

Evaluation Of Anti-Parkinsonian Effect Of Ethanolic Leaf Extract Of *Allium*, *Jacquemontia* And *Tabernaemontana* On Experimental Mice

Adiba Afreen^{1*}, Shaik Mohd Khasim¹, Saniya Begum², Shahnaz Zainab², Shaik Shahnaz Begum², Aman Khan², Md. Ajaz Kaiser¹

¹Department of Pharmacology, Shadan College of Pharmacy, Peerancheruvu, Hyderabad, Telangana, India-500091.

²Shadan College of Pharmacy, Peerancheruvu, Hyderabad, Telangana, India-500091.

ARTICLE INFO

Received: 18 May 2024

Accepted: 22 May 2024

Published: 01 June 2024

Keywords:

Polyherbal formulation,
Allium fistulosum,
Jacquemontia caerulea,
Tabernaemontana divaricata,
EEAJT, Parkinson's disease,
Haloperidol.

DOI:

10.5281/zenodo.11409910

ABSTRACT

Objectives:

The study aims to evaluate phytochemical screening and assess the anti-parkinsonian effect of polyherbal formulation containing ethanolic extract of *Allium fistulosum*, *Jacquemontia caerulea* and *Tabernaemontana divaricata* (EEAJT) in Haloperidol induced Parkinson's disease on experimental mice.

Methods:

The anti-Parkinsonian activity of polyherbal formulation (EEAJT) was studied in Haloperidol (1mg/kg i.p.) induced Parkinson animal model. Mice were subjected to treatment with EEAJT and standard drug for a period of 8 days. The mice were then assessed for behavioral changes i.e., catalepsy, locomotor activity, head dips, line crossing and muscle relaxant activity during the treatment duration.

Results:

The cataleptic score and head dipping of the experimental mice on treatment with EEAJT was significantly reduced while the locomotor activity and grip strength was significantly increased in EEAJT treated animals (125,250,500 mg/kg) when compared with normal and standard group.

Conclusion:

The study shows that the Ethanolic Extract of *Allium fistulosum*, *Jacquemontia caerulea* and *Tabernaemontana divaricata* (EEAJT) possesses significant anti-Parkinson's effect and helpful in treating motor dysfunction and reducing oxidative stress which may be associated with its antioxidant potential.

***Corresponding Author:** Adiba Afreen

Address: Department of Pharmacology, Shadan College of Pharmacy, Peerancheruvu, Hyderabad, Telangana, India-500091.

Email ✉: adibafreen12@gmail.com

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



INTRODUCTION

Parkinson's disease (PD) is a chronic neurodegenerative disorder in which dopaminergic neurons progressively degenerate, which causes depletion of dopamine (DA) levels in the striatum. The physiology of cholinergic neurons and dopaminergic neurons in striatum are out of balance leading to PD. The disease is characterized by features such as postural imbalance, tremor, dystonia, myotonia, bradykinesia and dyskinesia, etc.[1]. It is considered to be the second most severe neurodegenerative disorder after Alzheimer's disease and is reported in about 2-3% after 65 years of age. The pathological study depicts that the brain of PD patients show the loss of dopaminergic neurons in the substantia nigra pars compacta (SNpc) of the midbrain, the aggregation of protein called Lewy bodies, and accumulation of cytoplasmic inclusions containing insoluble α -synuclein[2]. In the recent past it has been studied that oxidative stress, impaired mitochondrial function, inflammation, apoptosis, dysfunction of proteolysis, and loss of neurotrophic factors also contribute to the pathogenesis of PD [3]. Herbal medicine, also referred to as Herbalism, Botanical medicine or Herbology deals with the use of plants, in various forms for their therapeutic value. Herbs produce and possess a wide variety of chemical compounds that act upon the body and are used to prevent or treat disease or promote health and wellbeing. Herbal drugs are widely used throughout the world since last few decades which is evident by rapidly growing global and national markets of herbal drugs. India is the second largest exporter of medicinal plants. With advanced and detailed study on Pharmacological and Phytochemical investigations provide extensive knowledge and information for the medicinal use of herbal plants by demonstrating the presence of active principles in them and their therapeutic effect on living beings. Hence, it has

become of utmost importance for screening and collecting plants for exploration of new and safe medicinal agents [4]. With the implication of side effects from synthetic drugs more stress and importance is being laid on medicines from natural origin. Plant extracts and the phytoconstituents present in them are good source of antioxidants. The antioxidant property of the plant extracts is due to the presence of secondary active constituents such as flavonoids, tannins and alkaloids. Flavonoids mainly serve as potent antioxidant and play a crucial role in neuroprotective effect [5-8]. The present study utilized the leaves from 3 different plants namely, *Allium fistulosum*, *Jacquemontia caerulea* and *Tabernaemontana divaricata* which were then shade dried and soaked in ethanol by Soxhlet extraction. The Ethanolic Extract of *Allium fistulosum*, *Jacquemontia caerulea* and *Tabernaemontana divaricata* was then obtained after distillation. The extract thus obtained was subjected to Phytochemical Screening and Acute Toxicity Study. All these plants exhibit potent antioxidant property and hence were used to prove Anti-Parkinsonian effect which was assessed by using different models such as Hole Board Test, Locomotor activity, Catalepsy or Catatonia and Grip Strength.

MATERIALS & METHODS

COLLECTION, IDENTIFICATION, AND EXTRACTION OF PLANT MATERIAL:

The leaves of *Allium fistulosum*, *Jacquemontia caerulea* and *Tabernaemontana divaricata* were obtained from an authorized plant supplier and underwent authentication by the Department of Botany at Sri Venkateshwara University in Tirupati-517 502, Andhra Pradesh, India. The leaves were air-dried in the shade for a duration of 15 days and were coarsely powdered using a blender. The plant material was taken up for the extraction using ethanol and water in 70:30 ratio. The extraction was carried out by soxhlet



extraction followed by distillation and subsequently stored in the refrigerator.[9]

PREPARATION OF EXTRACT:

300g of leaves of *Allium fistulosum*, *Jacquemontia caerulea* and *Tabernaemontana divaricata* were collected, washed thoroughly and dried in shade. Leaves were made into coarse powder. The powder of the leaves was extracted in a soxhlet extractor with successive ethanol solvent. The extract was then subjected to distillation and heated on water bath for semisolid consistency and then placed in the refrigerator.[10]



Fig 1. Powdered Leaves Of Allium Fistulosum, Jacquemontia Caerulea And Tabernaemontana Divaricata



Fig.2. Soxhlet Extraction

PRELIMINARY PHYTOCHEMICAL SCREENING

The preliminary Phytochemical Screening of Ethanolic Extract of *Allium fistulosum*, *Jacquemontia caerulea* and *Tabernaemontana divaricata* (EEAJT) was assessed for the presence

of steroids, flavonoids, saponins, glycosides, tannins, carbohydrates, oils, phenols and fats. The phytochemical screening tests for active principles was carried out by using standard procedures [11-13].

TEST FOR CARBOHYDRATES AND GLYCOSIDES

A small quantity of extract was dissolved in 4ml of distilled water and filtered. The filtrate was subjected to the following tests to detect the presence of carbohydrates and glycosides.

MOLISCH'S TEST:

The filtrate was treated with 2-3 drops of 1% alcoholic alpha-naphthol and 2ml of concentrated Sulphuric acid was added along the sides of the test tubes. Appearance of brown ring at the junction of two liquids shows the presence of carbohydrates.

FEHLING'S TEST:

The filtrate was treated with 1ml of Fehling's A and B and heated on a water bath. A reddish precipitate was obtained shows the presence of carbohydrates. Another portion of extract was hydrolyzed with dilute hydrochloric acid for few hours on a water bath and the hydrolysate was subjected to the following tests to detect the presence of glycosides.

LEGAL'S TEST:

To the hydrolysate 1ml of pyridine and few drops of sodium nitroprusside solution were added and then it was made alkaline with sodium hydroxide solution. Appearance of pink to red colour shows the presence of glycosides.

BORNTRAGER'S TEST:

Hydrolysate was treated with chloroform and the chloroform layer was separated. To this equal volume of dilute ammonia solution was added. Ammonia layer acquires pink colour shows the presence of glucosides.

DETECTION OF FIXED OILS AND FATS

FILTER PAPER TEST:

Small quantity of extract was pressed between the papers. Appearance of oil stain on the paper indicates the presence of fixed oils.

SAPONIFICATION TEST:

Few drops of 0.5 N alcoholic potassium hydroxide were added to small quantity of extract along with a drop phenolphthalein. The mixture was heated on water bath for 1-2 hours. Formation of soap indicates the presence of fixed oils and fats.

DETECTION OF PROTEINS AND FREE AMINOACIDS:

A small quantity of extract was dissolved in few ml of water and they were subjected to the following tests.

MILLON'S TEST:

The above-prepared extract was treated with Millon's reagent. Red colour was formed shows the presence of proteins and frees amino acids.

BIURET TEST:

To the above prepared extract equal volume of 5 % sodium hydroxide and 1% copper sulphate solution were added. Violet was produced which shows the presence of proteins and amino acid.

NINHYDRIN TEST:

The extract was treated with ninhydrin reagent. Purple colour was produced on heating which shows the presence of proteins and free amino acids.

DETECTION OF TANNINS AND PHENOLIC COMPOUNDS:

Small quantity of each extract was taken separately in water and test for the presence of phenolic compounds and tannins was carried out with the following reagents. 5 % Ferric chloride and 1 % Solution of gelatin containing-Violet Colour 10 %Sodium Chloride-White Precipitate 10 % Lead acetate solution -White Precipitate Above findings shows the presence of phenolic compounds and tannins.

DETECTION OF PHYTOSTEROLS:

Small quantity of each extract was dissolved in 5 ml of chloroform separately. Then this chloroform

solution was subjected to the following tests to detect the presence of phytosterols.

SALKOWSKI TEST:

To 1 ml of above prepared chloroform solution, a few drops concentrated sulphuric acid was added. Brown colour was produced shows the presence of phytosterols.

LIBERMANN BURCHARD TEST:

The above prepared chloroform solution was treated with a few drops of concentrated sulphuric acid followed by the few drops of diluted acetic acid, 3 ml of acetic anhydride. A bluish green colour was appeared indicates the presence of phytosterols.

DETECTION OF GUMS AND MUCILAGES:

A small quantity of each extract was added separately to 25ml of absolute alcohol with constant stirring and filtered. The precipitate was dried in air and examined for its swelling properties. No swelling was observed indicates the absence gums and mucilages.

DETECTION OF FLAVONOIDS:

1. Small quantity of each extract was dissolved separately in aqueous sodium hydroxide. Appearance of yellow colour indicates the presence of flavonoids.
2. To the small portion of each extract, concentrated sulphuric acid was added. Yellow orange colour was obtained shows the presence of flavonoid.

SHINODA TEST:

Small quantity of each extract was dissolved in alcohol. To those pieces of magnesium followed by concentrated hydrochloric acid was added drop wise and heated. Appearance of magenta colour shows the presence of flavonoid.

EXPERIMENTAL ANIMALS USED

Albino mice of both genders weighing around 25-30 grams were obtained from the animal facility at Shadan College of Pharmacy in Peerancheruvu, Hyderabad. The mice were acclimatized to standard environmental conditions, including



ambient temperature, relative humidity, and a 12/12-hour light-dark cycle, for one week before the commencement of the experiment. Throughout this period and the experiment, the animals had unrestricted access to standard pellet diet and water. All procedures involving animals adhered to the guidelines set by the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA). Additionally, the experimental protocol received approval from the Institutional Animal Ethical Committee.

ACUTE TOXICITY STUDY (OECD GUIDELINE 425)

Acute oral toxicity study was performed on mice in accordance with the OECD guidelines 425. The animals were kept on fasting for 24 hours. Firstly, the limit test was done at a dose of 2500 mg/kg bw., p.o and were continuously noticed for 3-4 hours for any changes in their general behavior, morbidity and finally death during a period of 24 hours. When there were no marks of harmfulness at a dose of 2500mg/kg three dosage levels were selected in such a manner that, the middle dose (250 mg/kg) was approximately one tenth of the determined dose throughout acute toxicity studies and a low dose (125 mg/kg) which was half of the one tenth of the determined dose and a high dose (500 mg/kg) which was twice of the one tenth dose of the maximum dose. For common behavior, neural, autonomic profiles and to find out proportion of death remarks were charted according to Irwin's table [14].

EVALUATION OF ANTI-PARKINSON'S ACTIVITY OF EEAJT IN INVIVO MODELS CATALEPSY



Fig.3. Catalepsy Model

Principle:

Catalepsy, well-defined as a reduction in the capability to start motion and letdown to precise unusual position, which was examined by means of the block examination. For the examination mice were placed so that their hind legs were on the workbench, and their forelimbs relaxed on a 1 cm width flat block, 6-9 cm beyond the workbench. The length of time that animal maintained this position was recorded by stopwatch to a maximum of 180s (mean of three consecutive trials; interval: 1 min). Animals would determine judge to be cataleptic if they maintain this position for 30s or more.

Instrument used:

Horizontal Bar

Test drug used:

Haloperidol

Standard drug used:

Levodopa Carbidopa

Procedure:

The mice were distributed into 6 groups having 6 mice in every group.

Group 1-

was treated as normal with 10ml/kg normal saline.

Group 2-

was treated with Haloperidol 1 mg/kg i.p

Group 3-

was treated with Levodopa + Carbidopa (30mg/kg, p.o.) along with Haloperidol. was given 30 mins before the haloperidol administration for 08 days of investigational time.

Group 4-

was treated with Herbal formulation (100mg/kg, orally) along with Haloperidol

Group 5- was treated with Herbal formulation (200 mg/kg, orally) along with Haloperidol.

HOLE BOARD TEST



Fig.4. Hole Board Model

Principle:

Head dipping is an exploratory behavior of the animals in the hole board test which is deliberate rated to be an indicator of anxiety. Animals were located in a box (50 x 50 cm, walls 30 cm high) with 16 equally spaced holes (2.5 cm diameter, 10 cm separately after every holler) in the floor and the box was raised to a height of 25cms from the ground. A mouse was positioned in the middle of the hole-board and is permitted to easily travel in the tool for 5 min. The total no. of lines crossed and the sum of head dipping were recorded. A skull dip was counted if both the eyes gone into the hole.

LOCOMOTOR ACTIVITY

Principle: This trial processes the consideration and the controlled movement inside an enclosed Motor action was attained by using an actophotometer. The mice were inside an enclosed X 30cm dark metallic compartment with a shade bottom and a light-tight cover one into of light were focused 2cm above the floor. Every ray disruption was recorded as an episode. The light beam breaks were counted for 5mins.



RESULTS

Fig.5. Actophotometer Model

ROTAROD TEST

Principle: The rotarod machine comprises of a motor rod with a drum of 7.0 cm diameter. It was adjusted to a speed of 25rpm during the test session. Swiss mice (20-30g body weight) undergo a pre-test on the apparatus. Thirty minutes afterwards intraperitoneal management of test/standard drug, the mice were positioned on the rotarod for 3 min. The latency to fall in trial period of 180s was taken as a degree of motor coordination.



Fig.6. Rotarod Test Model

STATISTICAL ANALYSIS

The results for electrically haloperidol induced Parkinson's disease were shown as Mean $\pm$ Standard Error of Mean. Paired Student's t-test was used to analyze the level of significance. A P value of <0.05 was considered as statistically significant. The results for biogenic amines were indicated as Mean $\pm$ Standard Error of Mean. The Significance of differences among the group was assessed using one way analysis of variance (ANOVA). The test followed by Dunnet's test p values less than 0.05 were considered as statistically significant. It was done using GraphPad Prism 8.6 software version.

PRELIMINARY PHYTOCHEMICAL SCREEING RESULTS :**Table 1.: Note: + indicates presence and- indicates absence of phytoconstituents**

Sr. No	PHYTOCHEMICAL TESTS	RESULTS (COMPOUND)
1.	Carbohydrates • Molish's Test • Fehling's Test • Legal's Test	+ + +
2.	Alkaloids • Dragendroff's test • Hager's test • Wagner's test	+ + -
3.	Tannis • Ferric chloride Test • Lead Acetate Test	+ -
4.	Fixed Oils and Fats • Filter paper Test • Saponification Test	+ +
5.	Proteins and Free Amino acids • Millon's Test • Buret Test • Ninhydrin Test	+ - +
6.	Flavonoids • Shinoda Test	+
7.	Phytosterols • Salkowski Test • Liberman Burchard Test	+ +
8.	Fixed Oils and Fats • Filter paper Test • Saponification Test	

ACUTE TOXICITY STUDIES:

EEAJT was proved to be harmless at the maximum dose of 2500mg/kg body weight by oral route. After 24 hours, animals were found well tolerated.

No signs of harmfulness and no death was observed. General behaviour. neurological and autonomic profiles were normal. The effects have been tabulated in.

TABLE 2: Acute Toxicity Study with Test Drug

= normal + Increased/ present - Decreased /Absent.

Type	Response	Result
Alertness	Behavioral Response	+
Stereotypy		-
Irritability		+
Grooming		+
Restlessness		-
Spontaneous Activity		-
Pain Response		+
Touch Response		+
Fearfulness		+
Limp Tone	Neurological Response	-
Grip Strength		+



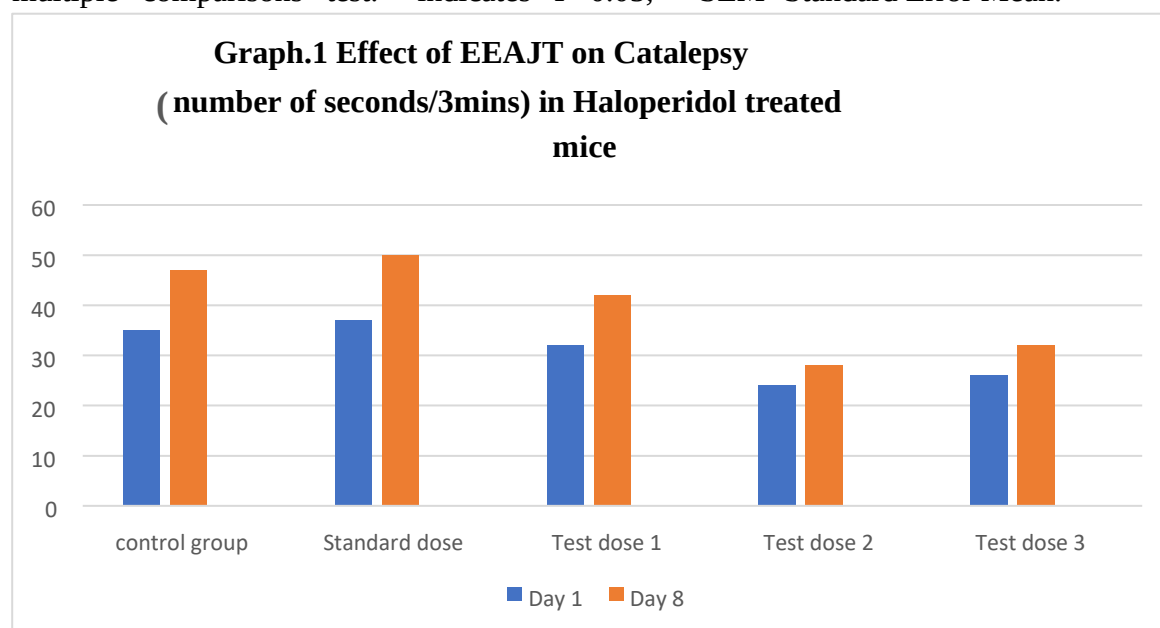
Twitching		-
Abdominal Tone		+
Pinna Reflex		-
Cornea Reflex		-
Strab's Tail		+
Tremors		-
Righting Reflex		+
Convulsions		-
Writhing	Autonomic Response	+
Defecation		-
Urination		-
Piloerection		-
Heart Rate		-
Respiration		-
Pupil Size		+
Skin Colour		-

ANTI-PARKINSONIAN EFFECT OF EEAJT BY CATALEPSY MODEL

Table 3: Effect Of EEAJT On Catalepsy (Number Of Seconds/3mins) In Haloperidol Treated Mice

Sr. No	Groups (Dose)	1 ST DAY (No. of secs/3mins).	8 TH DAY (No. of secs/3mins).
1	Control group	2.63±2.94	6.4±3.4
2	Haloperidol Levodopa+Carbidopa	4±2.30 **	7.8±4.50 **
3	TEST DOSE 1	6.42±3.71 **	2.51±1.45 **
4	TEST DOSE 2	5.13±2.96 ****	4.04±2.33 **
5	TEST DOSE 3	2.51±1.45****	8.08±4.66 ****

Values are stated as mean ± SEM (number of animals, n=6), one-way ANOVA after Dunnett's multiple comparisons test. *indicates P<0.05, **indicates P<0.01, ***indicates P<0.001 when compared to control, ns indicates Nonsignificant, SEM- Standard Error Mean.

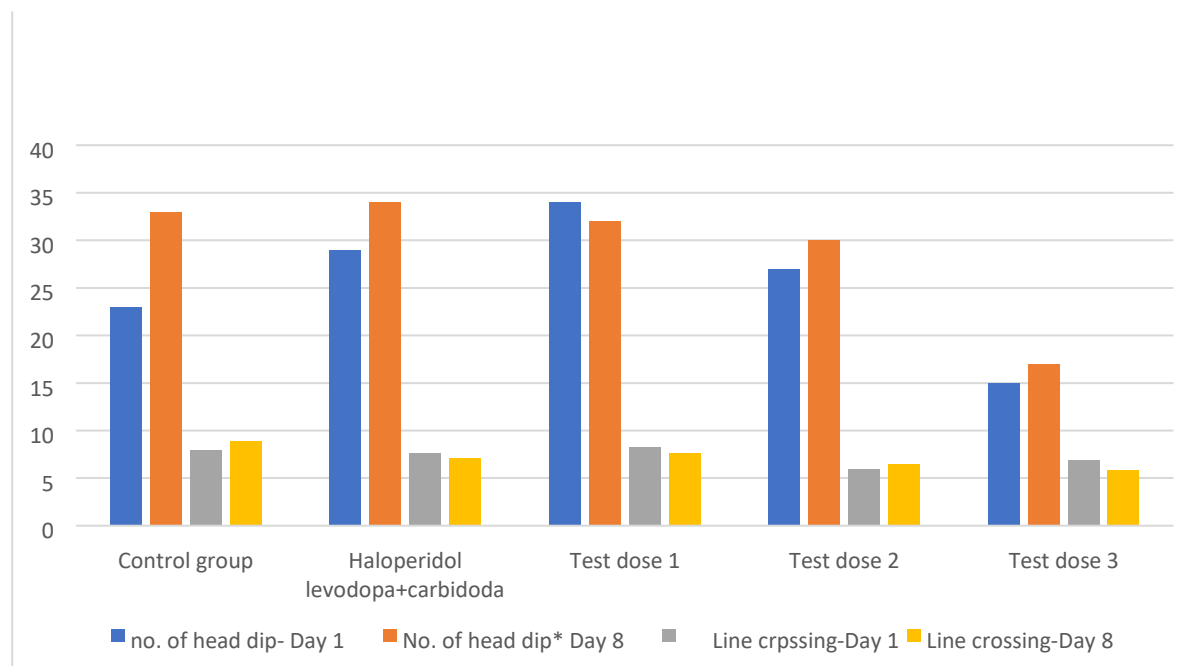


ANTI-PARKINSONIAN EFFECT OF EEAJT ON HOLE BOARD TEST MODEL**TABLE 4: Effect of Herbal formulation on Hole board test in Haloperidol treated mice**

Sr. No	GROUPS (DOSE)	1 ST Day No. of Head Dips	8 TH Day No. of Head Dips	1 ST Day Line Crossings	8 TH Day Line Crossings
1	Control group	0.36±0.26	3.45±	0.68±0.64	1.3±0.56
2	Haloperidol Levodopa+Carbidopa	0.57±0.33 **	3.05±1.76 **	1±0.57 **	1.54±0.66**
3	TEST DOSE 1	2.08±1.20 **	3.51±2.02**	0.57±0.33**	0.57±0.33**
4	TEST DOSE 2	2.51±1.45***	4.50±2.60 ***	0.5±0.3***	1.52±0.88**
6	TEST DOSE 3	3.51±2.02 ***	4.04±2.33 ***	1±0.5 **	1.52±0.89***

Values are stated as mean ± SEM (number of animals, n=6), one-way ANOVA after Dunnett's multiple comparisons test. *indicates P<0.05,

indicates P<0.01, *indicates P<0.001 when compared to control, ns indicates Nonsignificant, SEM- Standard Error Mean.

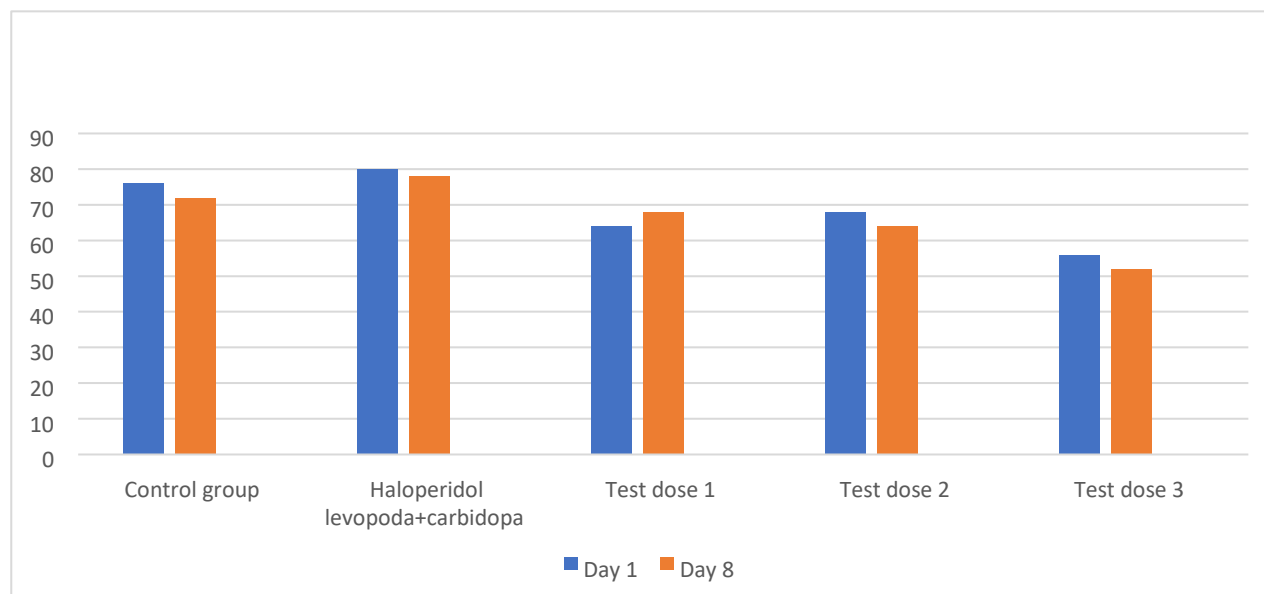
**Graph 2: ANTI-PARKINSONIAN EFFECT OF EEAJT HOLE BOARD MODEL IN HALOPERIDOL TREATED MICE****ANTI-PARKINSONIAN EFFECT OF EEAJT ON LOCOMOTOR ACTIVITY BY USING ACTOPHOTOMETER****Table 5: Effect Of Herbal Formulation On Locomotor Activity (Number Of Counts/5min) In**

Haloperidol Treated Mice

Sr. No	GROUPS (DOSE)	1 ST DAY (No. of secs/3mins).	8 TH DAY (No. of secs/3mins).
1	Control group	7.62±1.68	6.68±6.64
2	Haloperidol Levodopa+Carbidopa	12.01±2.08 **	8.32±4.80 **
3	TEST DOSE 1	11.59±6.69 **	9.48±4.8 **
4	TEST DOSE 2	8.50±3.67 **	13.01±7.51 **
5	TEST DOSE 3	12.01±2.08 ***	9.07±7.34***

Values are stated as mean ± SEM (number of animals, n=6), one-way ANOVA after Dunnett's multiple comparisons test. *indicates P<0.05,

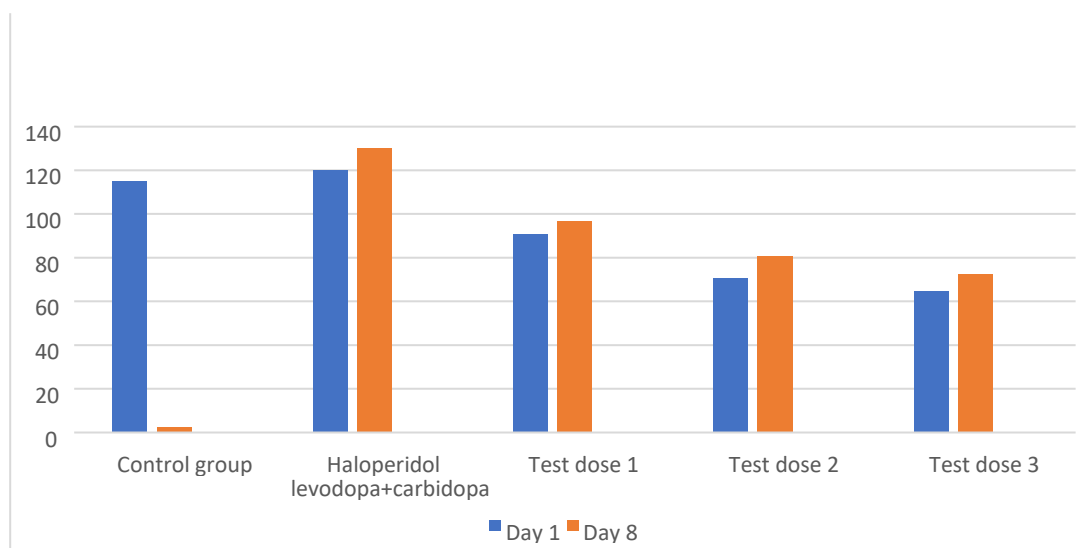
indicates P<0.01, *indicates P<0.001 when compared to control, ns indicates Nonsignificant, SEM- Standard Error Mean.



Graph 3 Anti-Parkinsonian Effect Of Eeajt On Locomotor Activity By Using Actophotometer In Haloperidol Treated Mice

Table 6: Effect Of EEAJT On Rotarod Test (Number Of Seconds/3min) In Haloperidol Treated Mice

Sr. No	GROUPS (DOSE)	1 ST DAY (No. of secs/3mins).	8 TH DAY (No. of secs/3mins).
1	Control group	2.54±1.58	13.3±10.36
2	Haloperidol Levodopa+Carbidopa	60±34.64 **	31.00±17.90 **
3	TEST DOSE 1	17.55±10.13 **	45.82±26.45 **
4	TEST DOSE 2	1.15±0.66 ***	7.57±4.37 ***
5	TEST DOSE 3	4.16±2.40 ***	12.05±6.96 ***



GRAPH 4 ANTI-PARKINSONIAN EFFECT OF EEAJ ON ROTAROD APPARATUS MODEL IN HALOPERIDOL TREATED MICE

DISCUSSION

Parkinson's disease (PD) is a chronic neurodegenerative disorder in which dopaminergic neurons progressively degenerate, which causes depletion of dopamine (DA) levels in the striatum. The physiology of cholinergic neurons and dopaminergic neurons in striatum are out of balance leading to PD. The disease is characterized by features such as postural imbalance, tremor, dystonia, myotonia, bradykinesia and dyskinesia, etc. The pathological study depicts that the brain of PD patients show the loss of dopaminergic neurons in the substantia nigra pars compacta (SNpc) of the midbrain, the aggregation of protein called Lewy bodies, and accumulation of cytoplasmic inclusions containing insoluble α -synuclein. With the implication of side effects from synthetic drugs more stress and importance is being laid on medicines from natural origin. Plant extracts and the phytoconstituents present in them are good source of antioxidants. The antioxidant property of the plant extracts is due to the presence of secondary active constituents such as flavonoids, tannins and alkaloids. Flavonoids mainly serve as potent antioxidant and play a crucial role in neuroprotective effect. The present study utilized

the leaves from 3 different plants namely, *Allium fistulosum*, *Jacquemontia caerulea* and *Tabernaemontana divaricata* which were then shade dried and soaked in ethanol by Soxhlet extraction. The Ethanolic Extract of *Allium fistulosum*, *Jacquemontia caerulea* and *Tabernaemontana divaricata* was then obtained after distillation. The extract thus obtained was subjected to Phytochemical Screening and Acute Toxicity Study. The extract was found to be safe even at dose of 2500 mg/kg body weight. As a result 125,250 and 500 mg/kg p.o test extracts were used for evaluation of Anti-Parkinson's activity. Haloperidol was administered to all the animal groups for inducing symptoms of Parkinson's as it block postsynaptic dopamine (D2) receptors in the mesolimbic system of the brain [15]. All these plants exhibit potent antioxidant property and hence were used to prove Anti-Parkinsonian effect which was assessed by using different models such as Hole Board Test, Locomotor activity, Catalepsy or Catatonia and Grip Strength. Treatment with Haloperidol caused decreased locomotor and behavioral activities in mice which was later restored by administering the animals with test doses. After administration with test dose it was found the animals showed

significant changes in locomotor activity in PD affected mice, thus showing Anti-parkinson's potential. This might be due to presence of Flavonoids which is an antioxidant and hence act on ROS generation by causing oxidative stress.

CONCLUSION

The present study was carried out to assess the Anti-Parkinsonian Activity of Ethanolic Extract of *Allium fistulosum*, *Jacquemontia caerulea* and *Tabernaemontana divaricata*. All the animal groups were given Haloperidol which induced Parkinson's symptoms in the animals by blocking Dopamine receptors. On observing it was found that the Test groups should significant improvement in Parkinson's symptoms when compared with the Standard group. This potential effect against Parkinson's symptoms of the Test extract might be due to presence of phytoconstituents such as flavonoids, alkaloids, etc. which have anti-oxidant property and hence are neuroprotective. Thus the study concludes that EEAJT has Potential effect in reducing symptoms of Parkinson's.

CONFLICT OF INTEREST

All authors approve the final manuscript and declare that there are no conflicts of interests.

ACKNOWLEDGEMENT

The authors would like to acknowledge the support of Director, Shadan College Of Pharmacy, Peerancheruvu, Hyderabad, India for providing necessary facilities and technical assistance in conducting laboratory work.

REFERENCES

1. Simon MK, Nafarnda WD, Obeta SS. Iridoids glycosides isolated from *Combretum molle* stem bark aqueous methanol extract. *Glob Vet* 2012;8(3):237-43.
2. D. K. Simon, C. M. Tanner, and P. Brundin, "Parkinson disease epidemiology, pathology, genetics, and pathophysiology," *Clinics in Geriatric Medicine*, vol. 36, no. 1, pp. 1–12, 2020.
3. A. Ascherio and M. A. Schwarzschild, "The epidemiology of Parkinson's disease: risk factors and prevention," *The Lancet Neurology*, vol. 15, no. 12, pp. 1257–1272, 2016.
4. Colpaert FC. Introduction herbal medicines *Discovery and Evaluation* 1987;26:1431-40
5. Dok-Go H, Lee KH, Kim HJ, Lee EH, Lee J, Song YS, et al. Neuroprotective effects of antioxidative flavonoids, quercetin, (+)-dihydroquercetin and quercetin 3-methyl ether, isolated from *Opuntia ficus-indica* var. *Saboten*. *Brain Res.* 2003;965:130–6. [PubMed] [Google Scholar]
6. Vauzour D, Vafeiadou K, Rodriguez-Mateos A, Rendeiro C, Spencer JP. The neuroprotective potential of flavonoids: A multiplicity of effects. *Genes Nutr.* 2008;3:115–26. [PMC free article] [PubMed] [Google Scholar]
7. Abbasi E, Nassiri-Asl M, Shafeei M, Sheikhi M. Neuroprotective effects of vitexin, a flavonoid, on pentylenetetrazole-induced seizure in rats. *Chem Biol Drug Des.* 2012;80:274–8.
8. C. Ramassamy, F. Clostre, Y. Christen, and J. Costentin, maceration technique "Prevention by a Ginkgo biloba Extract (GBE 761) of the Dopaminergic Neurotoxicity of MPTP," *Journal of Pharmacy and Pharmacology*, vol. 42, no. 11, pp. 785-789, 1990.
9. Olinan MSR. 2010. Antimicrobial, Toxicity and Phytochemical Screening from the Bark of *Jacquemontia Paniculata* (himag). Undergraduate Thesis, Mindanao University of Science and Technology, Cagayan de Oro City
10. Palmes ND, Del Rosario RM. 2012. Antioxidative capacities of phytochemicals in selected fruit peels. *Mindanao Journal of Science and Technology* 10(1), 1-1.



11. Harborne JB. Phytochemical Methods: A Guide to Modern Techniques of Plant Analysis. 3rd ed. London: Chapman and Hall; 1998. p. 120.
12. Sofowora A. Medicinal Plants and Traditional Medicine in Africa. Vol. 2. New York: John Wily and Sons; 1993. p. 6-56.
13. Trease GE, Evans WC. Pharmacognosy. Vol. 14. London: W. B. Scandars Company Ltd.; 1989. p. 269-300.
14. Organization economic for cooperation and development (OECD). Guidelines 425 for testing of chemicals. Acute Oral Toxicity-up and down procedure France:OECD;2001.p.126
15. F. Cao, S. Sun, and E. T. Tong, "Experimental study on inhibition of neuronal toxical efect of Haloperidol & levodopa by ginkgo biloba extract on Parkinson disease in rats," Journal of Huazhong University of Science and Technology Medical Sciences, vol. 23, no. 2, pp. 151-153,2003

HOW TO CITE: Adiba Afreen, Shaik Mohd Khasim, Saniya Begum, Shahnaz Zainab, Shaik Shahnaz Begum, Aman Khan, Md. Ajaz Kaiser, Evaluation Of Anti-Parkinsonian Effect Of Ethanolic Leaf Extract Of *Allium*, *Jacquemontia* And *Tabernaemontana* On Experimental Mice, Int. J. of Pharm. Sci., 2024, Vol 2, Issue 6, 21-33. <https://doi.org/10.5281/zenodo.11409910>