INTRODUCTION

Parkinson’s disease (PD) is the most prevalent neurodegenerative disorder caused by a progressive loss of dopaminergic (DAergic) neurons in substantia nigra pars compacta (SNpc)1 and the disorder caused by a progressive loss of dopaminergic (DAergic) neurons in SNpc. It is mainly characterized by four cardinal features which are bradykinesia, resting tremor, rigidity (stiffness of limbs) and postural reflex impairment (gait or balance problem)4,5,6. PD was first described by James Parkinson in 1817 as paralysis agitans, or the “shaking palsy”7,8. Several factors are responsible for the neurodegeneration like mitochondrial complex-I inhibition9,10, interaction between environmental and genetic factors11, endogenous antioxidant molecules such as glutathione (GSH) and superoxide dismutase (SOD), increased levels of nitric oxide (NO), citrulline and lipid peroxidation product malondialdehyde (MDA) in the brain could lead to neuronal death12. These conditions lead to the requirement of using antioxidants as a treatment in PD in addition to other protective agents.

Cynodon dactylon Pers. (Family: Graminae) is a creeping grass found in warm climates all over the world between about 45° south and north altitude21. It is also known as Durva Grass, Bermuda grass, Dog’s tooth grass, Bahama grass, Devil’s grass, Couch grass, Indian doab, Grama and Scutch grass. The plant contains crude proteins, carbohydrates and mineral constituents, oxides of magnesium, phosphorous, calcium, sodium and potassium, vitamin C, carotene, hydroquinone, levoglucosenone, furfural, hexadecanoic acid, ethyl ester, linolenic acid, ethyl ester and d-Mannose22. The juice of the plant is an astringent and is applied externally to fresh cuts and wounds. It is also used in the treatment of catarrhal ophthalmia, dropsy, hysteria, epilepsy, insanity, chronic diarrhea and dysentery. The plant is a folk remedy for anasarea, calculus, cancer, carbuncles, fever, erysipelas, epistaxis, etc. According to the Unani system of medicine, Cynodon dactylon is bitter and acts as a laxative, brain and heart tonic, aphrodisiac, alexipharmic, emetic, emmenagogue, expectorant, carminative and is useful against grippe in children, and for pains, inflammations, and toothache21,22. It has been therapeutically proved to possess anti-diabetic24, anti-diarrhoeal13, diuretic26, antimicrobial27, antiulcer28, immunomodulatory29, anti-epileptic30, anti-inflammatory31, antiarrhythmic32, antibacterial33, and chemoprotective34 and hepatoprotective activities35.
mouse on a horizontal bar 6 cm above and parallel to the base. The cataleptic score was measured by counting the time in seconds until the mouse brought both the front paws down to the base. The maximum cutoff for bar test was fixed at 180 s.

**Statistical analysis**

The data was expressed as mean ± SEM and analyzed by one-way analysis of variance (ANOVA) followed by Tukey test. In all the test the criterion for statistical significance was p<0.05.

**RESULTS**

The vehicle treated control group (Group I) showed a cataleptic score of 4.33 ± 1.76 sec. The cataleptic score for the reserpine treated group (Group II) was found to be 180 ± 1.08 sec which was highly significant (p<0.001) as compared to the vehicle treated control group.

The AECD alone treated control groups (Group IIa and Group IIIb) showed no significant differences in the cataleptic scores (4.16 ± 1.70 and 3.83 ± 1.56, respectively) as compared to the vehicle treated control group (Group I); whereas AECD treatment to mice of Groups IVa and IVb significantly (p<0.001) reduced the severity of reserpine induced catalepsy in a dose dependent manner at 150 and 300 mg/kg (i.p.) with cataleptic scores of 56.33 ± 3.13 and 18.50 ± 2.69, respectively. (Fig. 1)

**DISCUSSION**

Parkinson's disease is a neurodegenerative disorder characterized by the selective loss of dopamine (DA) neurons of the substantia nigra pars compacta. The events which trigger and/or mediate the loss of nigral DA neurons however, remain unclear. Current treatment of Parkinson's disease (PD) is based on dopamine replacement therapy, but this leads to long term complications, including dyskinesia. Plants pose an important and a safer alternative to the treatment of neurodegenerative disorders including parkinsonism. The World Health Organization has also recognized the importance of traditional medicine and has created strategies, guidelines and standards for botanical medicines.

The present study was done to evaluate the role of *Cynodon dactylon*, a plant traditionally used for parkinson's disease, for its effect against reserpine induced catalepsy. Reserpine-induced catalepsy is a widely accepted animal model of Parkinson’s disease. Some authors have demonstrated that reserpine provides a pharmacological model of parkinsonism by interfering with the storage of catecholamines in intracellular granules, resulting in monoamine depletion (norepinephrine, 5-hydroxytryptamine and dopamine) in nerve terminals and in the induction of hypolocomotion and muscular rigidity. Antipsychotic effects and extrapyramidal symptoms are also produced due to dopamine depletion.

Catalepsy, the failure to correct an externally imposed posture, is a measure of akinesia and is assessed using the bar test. In the present study, reserpine (2.5 mg/kg, i.p.) induced significant catalepsy in rats as evidenced by a significant increase in the time spent on the bar in bar test as compared to the control untreated rats.

Treatment with *C. dactylon*, a neuroprotectant, dose-dependently reduced the catalepsy in reserpine-treated rats. The protective effect of *Cynodon dactylon* against reserpine induced catalepsy suggests that this plant has influence on amnergic receptor mediated neurotransmission. This is further supported by a research study carried out in 2009 where it was proved that the administration of ethanolic extract of *C. dactylon* in mice increased the levels of brain catecholamines (including dopamine) and amino acids.

*C. dactylon* has also been proved for its neuroprotective activity against aluminium induced toxicity and also has been proved to inhibit lipid peroxidation in CNS.

**CONCLUSION**

The above findings thus suggest that *Cynodon dactylon* may offer a safer therapeutic approach to the treatment of Parkinson’s disease. Also *C.dactylon* being a neuroprotectant, could be used as an effective adjunct to L-dopa for the treatment of neuroleptic-induced extrapyramidal side effects.

**ACKNOWLEDGEMENT**

The authors would like to thank The Director, Rayat Institute of Pharmacy (Punjab) for providing the necessary facilities for the research work. The authors would also like to thank Chemical Resources, Panchkula (H.R.) and Amsar Pvt. Ltd., Indore (M.P.) for providing gift samples of drugs.

**REFERENCES**