Abstract

After Alzheimer's disease, which affects 1-3% of the population, Parkinson's disease (PD) is the second most prevalent neurological condition. The current study intends to investigate the beneficial effect of extracts of *Acorus calamus* (AC) on a rotenone (ROT) induced mouse model of PD. In the current investigate behavioral and histological alterations in ROT-induced mice treated with AC rhizome extract were examined. The aqueous (AqAC) and ethanolic (EthAC) extracts of rhizomes of AC were prepared. Adult male Swiss albino mice (8 weeks old) were randomly divided into five groups—the Control group, the ROT-treated group, Sinemet+ROT, EthAC+ROT, and AqAC+ROT—were used in this investigation. To elicit PD symptoms, 2.5 mg/kg of ROT was administered. The ROT group was given ROT at a dose of 2.5 mg/kg subcutaneously (s.c.), while the Sinemet+ROT group was administrated with Sinemet dissolved in water at a dose of 20 mg/kg orally and ROT (2.5 mg/kg) s.c., the EthAC+ROT group received EthAC extract and ROT at a dose of 200 mg/kg orally and 2.5 mg/kg respectively, and the AqAC+ROT group was given AqAC extract and ROT at a dose of 200mg/kg orally and 2.5mg/kg respectively. The medications and extracts were given over the course of 21 days. The mice were trained for behavioural assessment. Following the prescribed therapy for 21 days, behavioral tests including the beam walk, pole test, stepping test, open field, tail suspension test, and stride length were carried out to look for signs of Parkinson's disease and the return of locomotor activity. By cervical dislocation, mice were put to death, and the brain was removed for histological study. The ROT group displayed PD symptoms include bradykinesia, prolonged periods of inactivity, shortened strides, and poor motor coordination. While the groups that received treatment—AC rhizome extract and Sinemet—displayed protection against ROT-induced motor dysfunctions and substantia nigra histopathology. The histological analysis revealed that the substantia nigra region of the ROT group had increased neurodegeneration, cytoplasmic shrinkage, and vacuolation around multipolar cells while the EthAC, AqAC, and Sinemet groups had reduced vacuolation and a lower percentage of neurodegeneration. According to this investigation of behavioural and histological data, AC rhizome extract can be employed as a protective medication for the treatment of PD.