ABSTRACT

Parkinson's disease (PD) is the second most commonly occurring neurodegenerative disease after Alzheimer's disease, which affects 1-3% of the population. The objective of this study was to assess the neuroprotective effect of *Moringa oleifera* seeds (MO) extract in the rotenone induced mouse model of PD. The current study was conducted to determine behavioral, biochemical and histological changes in rotenone induced mice after treating with MO seeds extract. Aqueous (AqMO) and ethanolic (EthMO) extracts of MO seeds were prepared were prepared. This experiment was conducted on 5 groups; Control group, Rotenone treated group, AqMO+Rotenone, EthMO+Rotenone and Sinemet+Rotenone. Control group was given 1ml/kg DMSO orally while rotenone group received rotenone at a dosage of 2.5 mg/kg s.c. AqMO+Rotenone received AqMOs extract and rotenone at a dosage of 200 mg/kg; 2.5 mg/kg respectively, EthMO+Rotenone received EthMOs extract and rotenone at a dosage of 200 mg/kg; 2.5 mg/kg respectively for 21 days and Sinemet+Rotenone group received sinemet dissolved in water at a dosage of 20 mg/kg while rotenone at a dosage of 2.5 mg/kg s.c. After 21 days of protocol, behavioral tests such as beam walk, pole test, stepping test, open field, tail suspension test and stride length were conducted to observe PD features and restoration of locomotor activities. Mice were euthanized by cervical dislocation and brain was dissected out to perform biochemical and histological analysis. The biochemical tests include lipid peroxidation (LPO), Reduced glutathione (GSH), Glutathione-s-transferase (GST), and Catalase activity (CAT) tests were conducted to check their level. The rotenone group showed PD features such as bradykinesia, increased immobility time, shorter stride length and weak muscle coordination. While treated groups i.e MO seeds extract and sinemet showed protection in rotenone induced motor dysfunctions, biochemical analysis and histopathology of substantia nigra. The histological study showed that in rotenone group vacuolation around multipolar cells increased in substantia nigra region, cytoplasmic shrinkage and 85% neurodegeneration while EthMO, AqMO and sinemet showed less vacuolation and less %age of neurodegeneration. This study of behavioral, biochemical and histopathological evidence proves that MO seeds extract could be used as protective therapy for the treatment of PD induced through rotenone.