Abstract

The present study unravels the ‘antioxidant approach’ as therapeutic intervention in Parkinson’s disease (PD) by understanding probable mechanism of neuroprotection at the biochemical, cellular and molecular levels. The extracts and fractions of Ocimum sanctum, L (Os) were quantitatively evaluated for plant phenolics including flavonoids by spectrophotometric methods and subjected to in vitro antioxidant activity assessment. Any correlation between iron chelatory activity and the content of phytochemicals in the extracts was estimated. Quantitative chemical profiling using HPTLC studies was performed on active hydromethanolic (HM) and EtOAc fraction of Os using ursolic acid as a marker. Similarly, L-DOPA rich (HM) and L-DOPA free (butanolic) fractions of Mucuna pruriens (a positive herbal control) was prepared and standardized using calibration curve of L-DOPA. Acute toxicity studies and screening of neuroprotective property of active extract of Os were carried out in a modified Anti-Parkinson’s MPP model (MPTP as a neurotoxin + probenecid as an adjuvant) in male mice. Any synergism in neuroprotective property by co-administration of bromocriptine with HM extract of Os was also evaluated. The essential oil (EO) of Os hydro distilled from fresh leaves of Os was standardized, evaluated for the total phenolic content and antioxidant activity. It was further screened for neuroprotective property for selected biomarkers in MPP model. On in vitro level, the sagittal slices of whole brain of the decapitated animal were simulated in cold artificial cerebrospinal fluid (ACSF) and effects of ursolic acid and eugenol were studied on brain slices for few selected biomarkers. The findings supported that Os exhibited reduction in oxidative stress and improved the biochemical and neurochemical biomarkers, which were significantly affected in MPTP-inflicted experimental animals thus providing an approach to its therapeutic role as ‘neuroprotective’ primarily through its influences on stress markers.

Keywords: O. sanctum, biomarkers, neurotoxin, essential oil, synergism, Mucuna pruriens, sagittal slices, ursolic acid, neuroprotection