ABSTRACT

Amyloid $\beta_{25-35}$ (A$\beta$) peptide is neurotoxic during the progression of Alzheimer’s disease (AD). AD is a neurodegenerative disease which has escalated levels of acetylcholinesterase enzyme (AChE), reactive oxygen species (ROS), monoamine oxidase enzyme (MAO- A and B) and impairs the functions of neurotransmitter regulation as well as neurohormonal changes. The utility of folklore medicine is prevalent and plants which posses rejuvenating property are a large source of natural antioxidants that might afford leads for the development of novel drugs in neurodegenerative disorders.

Experimentally the present study was designed to determine the folklore effect of the selected plant drugs and their fractions as well as bioactive molecule in the involvement of AChE, MAO, bigenic amines (dopamine and serotonin), ROS, pro-inflammatory cytokines (TNF-$\alpha$) and neuroendocrine pathways for the learning and memory process. The rhizomes of Alpinia galanga (L) Willd (Zingiberaceae), a ginger substitute for flavouring food was traditionally used as nervine tonic and stimulant and Pseudarthria viscida Wight & Arn is used as rejuvenator in the treatment of neurodegeneration and in memory loss. In this study the ethanolic extracts of Alpinia galanga and Pseudarthria viscida were evaluated for the improvement of learning and memory process in
Alzheimer's disease induced mice. Further the best active plant *Alpinia galanga* was fractionated with (n-hexane, Chloroform and Ethyl acetate) to identify the prime bioactive compound present in it and was evaluated against Aβ(25-35) induced neurodegeneration in mice. Mice were treated with 200 and 400 mg/kg of ethanolic extracts and different fractions and 12.5, 25 and 50 mg/kg with the isolated compound respectively. Neurotoxicity was induced by *intracerebroventricular injection* of Aβ(25-35) on 14th day of drug treatment. Open field test, passive avoidance test and Morris water maze tests were carried to determine habituation memory and hippocampal memory. To estimate the brain biochemical changes and its anti-amnesic potential the AChE, MAO-A and MAO-B and antioxidant enzymes (SOD, GPx, catalase and vitamin C) were determined in brain tissue homogenate for crude extracts treated animals. Further the isolated compound was treated in mice and the biochemical changes in brain such as AChE, MAO-A and MAO-B, membrane bound ATPase, biogenic amines, proinflammatory cytokine level (TNF-α) and corticosterone levels were evaluated to determine the improvement of learning and memory process. We found that anti-amnesic activity was exerted by the extracts, fractions and isolated compound through neuroimmune and neuroendocrine effects. Among the all fractions, preeminent neuroprotection was exerted by chloroform fraction, which has compound, 1’δ-1’-acetoxyeugenol acetate and may