

ABSTRACT

Background : Lack of memory due to exposure to cigarette smoke can cause the toxic compounds in tobacco smoke to accumulate in the brain. The result of phytochemical screening analysis shows that the ethanol extract of *Solanum betaceum* contains phytochemical compound including flavonoid, tannin, gallotannin and terpenoid and. These phytochemical compounds were reported to have beneficial effects on memory function.

Objective: The aim of this study was to evaluate the neuroprotective role of *Solanum betaceum* against memory impairment due to chronic cigarette smoke exposure in rat brain.

Methods: Adult male albino rats were exposed to cigarette smoke for a period of 28 days, 3 pc cigarettes/day and simultaneously administered with *Solanum betaceum* in group K2,K3,K4 (100 mg/kg b.w/day; 200 mg/kg b.w/day ; 400 mg/kg b.w/day) respectively. The level of N-Methyl-D-Aspartate receptor (NMDAR), c-AMP Response Element Binding Protein (CREB), Brain Derived Neurothropic Factor (BDNF), number of neuron and glia cells, and memory were also measured.

Results: *Solanum betaceum* administration could prevent memory impairment significantly ($p < 0,05$) by decreasing time to reach the target at Y-Maze and maintained the levels of CREB, BDNF, neuron and glia cells (microglia, astrocytes, oligodendrocytes) significantly ($p < 0,05$), but significantly decrease NMDA levels in some groups ($p < 0.05$).

Conclusion: Exposure to cigarette smoke could compromise the memory spatial function. The mechanism of *Solanum betaceum* to prevent memory impairment is through the activation of CREB, a transcription factor which further enhances the formation of BDNF; neurotrophic factors. A positively correlated BDNF increase triggers the activation of the glia to protect brain cell from damage, thus preventing memory impairment due to cigarette smoke exposure.

Keywords : *Solanum betaceum*, CREB, BDNF, neuron, memory