

## **Silymarin Reverses Scopolamine-Induced Memory Deficit in Object Recognition Test in Rats: A Behavioral, Biochemical, Histopathological and Immunohistochemical Study**

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**Abstract :** Dementia is characterized by impairments in memory and other cognitive abilities. This study aims to elucidate the possible ameliorative effect of silymarin on scopolamine-induced dementia using the object recognition test (ORT). The study was extended to demonstrate the role of cholinergic activity, oxidative stress, neuroinflammation, brain neurotransmitters and histopathological changes in the anti-amnesic effect of silymarin in demented rats. Wistar rats were pretreated with silymarin (200, 400, 800 mg/kg) or donepezil (10 mg/kg) orally for 14 consecutive days. Dementia was induced after the last drug administration by a single intraperitoneal dose of scopolamine (16 mg/kg). Then behavioral, biochemical, histopathological, and immunohistochemical analyses were then performed. Rats pretreated with silymarin counteracted scopolamine-induced non-spatial working memory impairment in the ORT and decreased acetylcholinesterase (AChE) activity, reduced malondialdehyde (MDA), elevated reduced glutathione (GSH), restored gamma-aminobutyric acid (GABA) and dopamine (DA) contents in the cortical and hippocampal brain homogenates. Silymarin dose-dependently reversed scopolamine-induced histopathological changes. Immunohistochemical analysis showed that silymarin dose-dependently mitigated protein expression of a glial fibrillary acidic protein (GFAP) and nuclear factor kappa-B (NF- $\kappa$ B) in the brain cortex and hippocampus. All these effects of silymarin were similar to that of the standard anti-amnesic drug, donepezil. This study reveals that the ameliorative effect of silymarin on scopolamine-induced dementia in rats using the ORT maybe in part mediated by, enhancement of cholinergic activity, anti-oxidant and anti-inflammatory activities as well as mitigation in brain neurotransmitters and histopathological changes.

**Keywords :** dementia, donepezil, object recognition test, rats, silymarin, scopolamine

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