

## ABSTRACT

Alzheimer's Disease (AD) is most common form of dementia and a neurodegenerative disease characterized by significant decline in cognitive ability that interferes with daily activities. This disease is characterized by accumulation of amyloid- $\beta$ , NFTs, and oxidative stress in the brain of AD patient that leads to inflammation and neurotoxicity. Around 50 million people worldwide suffer from dementia, with nearly 10 million new cases diagnosed each year. Most of the medication available are only relieving the symptoms of AD, but not curing, stopping, or preventing AD. Thus, discovery of effective medication for AD is urgently required. Previous studies reported that leaf of coriander is potential plants to improve memory and slow down AD progression. In patient suffering from AD, decreased in GABA neurotransmitter and the postsynaptic GABA<sub>A</sub>Rs were altered, causing disruption in dynamic balance. By modulating GABA<sub>A</sub>Rs in AD, the dynamic balance of excitatory and inhibitory effect possibly maintained. The aim of this study is to evaluate the antioxidant activity of coriander leaves extracted in 80% ethanol by using DPPH free radical scavenging method and study the gene expression on ddY mice of Alzheimer's like disease by using RT-qPCR to investigate the expression of GABA<sub>A</sub>Rs subunit, which are GABRA $\alpha_1$ , GABRA $\gamma_1$ , and GABRA $\delta$ . The mice were received ten consecutive days treatment of Donepezil (4 mg/kg) and Coriander Extract (200 mg/kg, 400 mg/kg, and 600 mg/kg) orally. On the tenth day, scopolamine was administered to induce memory impairment like AD and then behavioural test, Y maze and novel object recognition (NOR) test, were conducted. After that, the mice were sacrificed and its hippocampus was collected. From the hippocampus region, RNA was extracted using GENEzol, Once the RNA was obtained, the purity and integrity were assessed using NanoDrop and gel electrophoresis. After that, cDNA was synthesis using RevertAid Kit, and then the expression of GABA<sub>A</sub>Rs subunits was assessed using RT-qPCR QuantiNova SYBR Green. The findings are coriander leaves extract was prepared by 3 times maceration of pulverized coriander leaves in 80% Ethanol, yielded in 28.47% which is low. Coriander leaves extracted in 80%

ethanol exert antioxidant activity, with  $IC_{50}$  value of 42.164  $\mu\text{g/ml}$ . However, it is not as potent as ascorbic acid, who has  $IC_{50}$  value of  $4.127 \pm 1.81 \mu\text{g/ml}$ . Moreover, the RNA extracted from the mice's hippocampus have a generally good purity, with A260/280 ratio ranging from 1.6-2.02 and high integrity with distinct bands formation on the agarose gel electrophoresis. The primers used for RT-qPCR are GABRAA1, GABRG1, and GABRAD, with an acceptable efficiency of 103.09%, 97.23%, and 95.67%, respectively, where the standard is ranging from 90-110%, meaning that the PCR condition is sufficient to produce an efficient PCR reaction. The primers are also a specific primer that able to target the desired gene in the animal model of ddY mice. Unfortunately, due to technical difficulties the RotorGene PCR machine the gene expression evaluation of GABRA1, GABRG1, and GABRAD could not be carried out. It is shown from the findings that coriander leaves extract exerts antioxidant activity, which can be used to slow down or to prevent AD progression. Furthermore, better understanding of the content and the mechanism of action of active compounds found in coriander leaves extract are required to discover exact mechanism on mediating anti-Alzheimer activity.

**Keywords:** *Alzheimer's Disease, Coriander leaves extract, Antioxidant activity, RT-qPCR*