

Evaluation of Neuro Protective Effects and Mechanism of *Polygonum minus* Extract on *C. elegans* an Alzheimer's Disease Model by using Metabolomics Approach

SYARUL NATAQAIN BAHARUM

Institute of Systems Biology (INBIOSIS), Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia

*nataqain@ukm.edu.my

Abstract:

Alzheimer's disease is a neurodegenerative disease classified as a mental health problem under the dementia spectrum. This disease usually affects the elderly aged 65 years and over. As many as 46.8 million of the world's population are estimated to have this disease and the prevalence of this disease in Malaysia is estimated at 0.126 percent. Alzheimer's causes a disorder of cognitive function due to neuron degradation followed by lack of neurotransmitter, acetylcholine. To date, no treatment has been found capable of curing the disease completely. Therefore, natural extracts and compounds from plants are now garnering attention for their use in treatment of Alzheimer's disease. *Polygonum minus* or better known as kesum in Malaysia is a plant widely used in traditional medicine. This study hypothesizes that the plant may contain one or more bioactive compounds that may play a role neuroprotection. Ethanolic leaf extract was prepared. LC-MS/MS was performed to identify various active compounds in the extract. The most notable compounds identified were kaempferol, quercetin, luteolin, isorhamnetin, pelargonidin-3-O-glucoside, delphinidin-3-galactoside, and cyanidin. The anticholinesterase activity for *P. minus* ethanolic extract was 159.4 ± 0.1811 $\mu\text{g/ml}$ respectively. The anti-amyloid activity of the *P. minus* ethanolic extract was 439.5 ± 0.0755 $\mu\text{g/ml}$. The ethanolic *P. minus* extract was found to ameliorate glutamate toxicity in HT22 cells and dopamine toxicity in N2A APP Swe cells while relieving LDH release due to glutamate toxicity in *in vitro* Alzheimer models. Neuroprotective effects of *P. minus* on *C. elegans* model were established by extending the nematode's lifespan. Based on these findings, *P. minus* extract can be further investigated as a neuroprotective agent for Alzheimer's disease in the future.

Keywords: kesum; Alzheimer Disease; anti-amyloid; metabolomics; *in-vitro*