Neuroprotective Effect of Centella asiatica Ethanolic Extract on Toluene-Led Neurodegeneration in Caenorhabditis elegans

Leerojanaprapa, Pattaradol (School: Kamnoetvidya Science Academy)
Sanephakdee, Phubet (School: Kamnoetvidya Science Academy)

Neurodegenerative disorder is a wide range of conditions that results from progressive function loss or death of the nerve cells in the nervous system. Many studies confirmed that toluene, a volatile organic compound commonly used as a solvent for polymers and paint, can induce neurodegeneration which resulting in locomotion defects. We aim to study the neuroprotective effect of a local herb, Centella asiatica (CA), that is widely known for its medical uses. Caenorhabditis elegans (C. elegans) is chosen to be an animal model because of its simplicity and universal uses in drug testing and neurobehavior research. C. elegans are fed with different concentrations of CA ethanolic extract from L2 stage, then the young adult nematodes are exposed to 666 ppm toluene in the air for 2 minutes. The 1-minute videos of C. elegans are captured before further processing with Fiji to obtain the C. elegans average speed. Lastly, the data is analyzed using one-way ANOVA and Tukey HSD post hoc test. Here we show that CA ethanolic extract at the dosage of 1.00 mg/ml CA extract in 2% DMSO in distilled water has a neuroprotective effect which is interpreted from a more normal average speed of C. elegans after toluene exposure compared to the control set which has significantly decreased average speed. While lower concentrations of 0.01 and 0.10 mg/ml did not produce a statistically significant result. Therefore, our preliminary study here suggests that CA ethanolic extract has a neuroprotective effect on toluene-induced neurodegeneration.

Awards Won: