Hydrocotyle Verticillata Reduces Ethanol Tolerance and Neurotoxic Effects on Cognitive and Motor Function of Drosophila melanogaster

Santos, Arabelle (School: Juan R. Liwag Memorial High School)
Libiran, Jesscel Mae (School: Juan R. Liwag Memorial High School)
Anupol, Giuliana (School: Juan R. Liwag Memorial High School)

Alcohol consumption, which leads to complex disorders involving neurological deficits, is one of the main contributors in chronic diseases around the world with overall global death reaching 3 million annually. Prescriptive drug Disulfiram is commonly used for aversion of alcohol cravings and dependency, however, it is costly, and with unsure long-term effects. Thus, the researchers investigated the potential of Hydrocotyle verticillata Leaf Crude Ethanolic Extract (HvLCEE) in reducing alcohol tolerance in Drosophila melanogaster by means of conducting various assays. Via sedation assay, the HvLCEE's effect on the flies' ethanol tolerance under 35% and 85% EtOH was evaluated. The percentage of active flies shows that HvLCEE, at its highest concentration (1000 µg/mL), successfully heightened ethanol sensitivity and reduced tolerance. Locomotion after chronic ethanol exposure was assessed through the negative geotaxis assay. High concentrations of HvLCEE invoked motor deficits and postural control loss, implying an increase in ethanol sensitivity and decrease in tolerance. Lastly, the aversive phototactic suppression assay was conducted to determine the learning ability after chronic ethanol exposure. The 1000 µg/mL of HvLCEE exhibited the highest mean pass rate of flies on both genders in PC0 and PC6 assessments, suggesting the extract's potential to reduce cognitive impairment and improve memory and learning ability. Moreover, HvLCEE exhibited 32.87% free radical scavenging activity in the DPPH assay, indicating its antioxidative potential. These outcomes suggest that HvLCEE can lower ethanol tolerance and improve cognition of D. melanogaster which could serve as potential treatment in lowering alcohol consumption and preventing its neurotoxic effects.

Awards Won: