Reducing Dopaminergic Neurodegeneration and Motor Dysfunction Using Crude Ethanolic Bamboo (Bambusa vulgaris) Leaf Extract on a Transgenic Caenorhabditis elegans Model of Parkinson's Disease

Zabat, Roehann Mykael (School: Juan R. Liwag Memorial High School)

Parkinson's disease (PD), the second most common neurodegenerative ailment is characterized by muscular contractions and involuntary movement (dyskinesia). Its hallmarks include loss of movement-regulating dopaminergic (DA) neurons. The standard drug for PD called Levodopa (L-DOPA) can cause muscular contractions and dyskinetic movements that deteriorate motor function (Thanvi et al., 2007). Afflicting more than 6 million worldwide, a cost-efficient PD treatment is desirable. Bamboo (Bambusa vulgaris) grows abundantly in the Philippines, with underutilized leaves. This study aims to assess the potential of crude ethanolic Bamboo leaf extract (BLE) in DA neuroprotection, mechanosensation sustainment, and alleviation of L-DOPA's side-effects. Transgenic UA57 Caenorhabditis elegans induced with dyskinesia by applying 60 mM L-DOPA were exposed to 300 and 1 000 µg/mL concentrations of BLE. Safe concentrations of BLE were determined through nematode lethality tests. BLE's neuroprotective action was evaluated through DA neurons' fluorescence imaging and observation of mechanosensation towards different stimuli. All BLE concentrations exhibited no major lethal effect in the nematodes. In the DA neurodegeneration analysis in nematodes, 1 000 µg/mL BLE exhibited DA neuron protection. Mechanosensation analysis showed that 1 000 µg/mL BLE reduced the reversals of C. elegans actuated by 60 mM of L-DOPA. All BLE concentrations maintained the normal head withdrawals and foraging of nematodes compared with other treatments. Nematodes expressed the highest percentage of response towards the gentle touches, harsh touches and plate taps at 1000 µg/mL BLE. Results suggest that BLE can reduce DA neurodegeneration and protect the nematodes from motor function deficit.

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