Investigating the Neuroprotective Potential of T. ammi Extract on Parkinson's Disease via Gut-Brain Modulation

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Parkinson’s disease (PD) is a common neurodegenerative disease (NDD) that is characterized by the gradual loss of dopaminergic neurons and progressive motor impairment. Recent studies suggest that PD may originate in the gut, highlighting the gut-brain axis (GBA) as a critical area for research. This study investigated the neuroprotective potential of Trachyspermum ammi (T. ammi) oil on PD-associated symptoms using Caenorhabditis elegans (C. elegans) as a model organism. This study assessed various PD symptoms, including impaired locomotion, dopaminergic neuron degeneration, elevated reactive oxygen species (ROS) levels, and gut permeability. PD was induced in C. elegans using genetic models, and varying concentrations of T. ammi oil were incorporated into the worms’ food. Behavioral assays (locomotion, thrashing) as well as physiological assays (oxidative stress, alpha-synuclein levels, and gut permeability), were conducted to assess the impact of T. ammi oil on these parameters. Results from these assays suggested a positive effect of T. ammi on Parkinson’s, with the ajwain-treated groups showing improved locomotion, thrashing, improved survival under oxidative stress, and even lowered alpha-synuclein levels. The findings support the hypothesis that T. ammi oil mitigates PD-like symptoms in C. elegans. The results of this study could be further applied to develop an efficient, cost-effective, and widely available treatment for mitigating PD symptoms in humans.

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