C.C.E. Larvicide: Cassia Cinnamon Crude Extract as a Novel, Cost Effective and Eco-Friendly Mosquito Larvicide

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Mosquitoes of the genus Aedes, Culex and Anopheles transmit diseases such as Dengue, West Nile Virus and Malaria, killing more than 755,000 people globally per year, costing around 25.2 billion USD annually in treatment and vector control. For decades, the use of synthetic larvicides has been proven to be very toxic to aquatic organisms, endangering the ecosystem. This research proposes Cassia Cinnamon Crude Extract (CCE) as an eco-friendly larvicide, inexpensive and easily extracted from the bark of Cassia cinnamon tree. The CCE was extracted from Cassia cinnamon sticks via ethanol/water extraction. GC-MS spectra showed that cinnamaldehyde and coumarin were the main compounds in CCE. The effect of CCE on the larvae mortality of A.aegypti, C.quinquefasciatus and the mosquito larvae predator T.splendens, was studied and compared to a synthetic larvicide(temephos). The experiments consisted of 152 larvicidal bioassays with concentrations of CCE from 60ppm to 150ppm, at 10ppm-intervals. Results showed that percentage mortality increased with CCE concentration. All A.aegypti and C.quinquefasciatus larvae were effectively eliminated within 24 hours at 150ppm and 130ppm of CCE respectively (LC50=113.926ppm, LC50=103.557ppm) while the synthetic larvicide killed all larvae starting from 15ppm. The effect of CCE on the mortality of the mosquito larvae predator T.splendens at 72 hours (8.625±4.953)% was also significantly lower than A.aegypti (54.250±12.007)% and C.quinquefasciatus (71.375±10.864)%, ($F(2,99)=891.890$, $p=0.000$, 2-way ANOVA), demonstrating the use of CCE as a target specific larvicide. This study shows that CCE is a novel, effective and eco-friendly larvicide that benefits both humanity and the environment, solving problems of mosquito borne diseases and pollution.

Awards Won:
First Award of $3,000