Larvicidal Effect of Pseudomonas Mosselii Against Larvae of Dengue Vector Mosquito Aedes Aegypti

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Due to limitations and drawbacks associated with current mosquito control strategies, there is a growing demand for innovative methods, such as the utilization of entomopathogenic microorganisms. In this study, we investigated the larvicidal properties of toxins produced by the bacterium *Pseudomonas mosselii*. The bacterium was isolated from the egg surface of *Aedes* mosquitoes and cultured in Luria Broth medium for five days at 30 °C. The bacterium culture with an optical density (OD) of 1.7 was used to assess larvicidal activity against *Ae. aegypti*, the primary vector of dengue disease. Third instar larvae (n=15 per concentration with four replicates) were utilized for all assays. Initially, the larvae were exposed to supernatants of the bacteria culture ranging from 0.170 to 0.068 OD. Freeze-dried cell-free supernatant and freeze-dried bacterial culture were also evaluated for toxicity. Larval mortalities were recorded at 24, 48, and 72 hours, and the percentage mortality data were subjected to log probit analysis to estimate the Lethal Concentrations required to kill 50% and 90% of larvae (LC_{50} and LC_{90}). Respective LC_{50} values of 0.093, 0.092, and 0.089 OD were obtained for 24-, 48-, and 72-hour exposures to the supernatant of bacterium culture, with corresponding LC_{90} values of 0.157, 0.152, and 0.146 OD. LC_{50} values of 2729 ppm, 2644 ppm, and 2632 ppm with LC_{90} values of 2991 ppm, 2990 ppm, and 2968 ppm were obtained for freeze-dried supernatant for the respective time intervals of 24, 48, and 72 hours. Freeze-dried bacterial culture showed relatively high toxicity with LC_{50} values of 2572 ppm, 2511 ppm, 2440 ppm, and LC_{90} values of 3131 ppm, 3018 ppm, and 2948 ppm. A significant positive correlation was observed between treatment concentrations and percentage mortalities ($r=0.9$, $p<0.05$). Overall, the results indicate strong larvicidal activity of *P. mosselii* bacterial metabolites, suggesting its entomopathogenic activity against *Aedes aegypti* larvae.

Keywords: Biological Control, Dengue Vectors, Entomopathogenic Microbes, Larvicides

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