

Isolation of a Potential Microbial Agent for Controlling Dengue Vector Mosquitoes in Sri Lanka

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Controlling dengue vector mosquito is the most appropriate controlling method for dengue in the absence of an effective drug or a vaccine for dengue viruses. Vector control can be performed using variety of approaches such as environmental management, chemical and biological control etc.; which have been used in recent vector control activities. Due to the development of resistant varieties against chemical insecticides, the present study attempted to identify larvicidal activity of bacteria collected from the natural environment, as an ideal environmental friendly and effective strategy for controlling *Aedes aegypti* (Linnaeus), a dengue vector mosquito species. Zero dengue infection was reported in Pudumurippu area in the District of Kilinochchi, Northern Province of Sri Lanka in a preliminary survey. Spore forming microbes were isolated through spread plate technique using water and sediment samples collected from a reservoir in Pudumurippu. Larvicidal activity of each isolate was tested by *Ae. aegypti* third instar Larvae (L3) in vitro. The highest larvicidal activity was observed in an isolated bacterium from a reservoir water sample under laboratory and field conditions. This bacterium was presumptively identified and subjected to 16s-rRNA sequence analysis. Larvicidal activity of this bacterium was compared with a currently used *Bacillus thuringiensis israelensis* (Bti). As well as optimum physiological characteristic features of isolated strain was determined by growing the bacteria strain on nutrient agar supplemented with different NaCl concentrations and different pH values. Isolated bacterium was confirmed as a new strain of *Bacillus cereus* (SL001; MG827268). This bacterial strain showed the highest larvicidal activity at 5% (1×10^5 CFU/ml), with mean cumulative mortality rate $92 \pm 4.1\%$ and $84.2 \pm 5.3\%$ at 48 hours' post challenged under laboratory and field conditions respectively. When compared with Bti, this novel strain showed significantly higher ($p < 0.05$) larvicidal activity. *B. cereus* (SL001) displayed high growth rate while tolerating wide range of salinity (0-30g/L) and pH (6-10). Based on the findings, *B. cereus* (SL001) with the highest larvicide efficiencies could be an ideal candidate for biological controlling of *Ae. aegypti* dengue vector mosquitoes in Sri Lanka. Further analysis of this bacterium is on going at present.

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