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Bacillus thuringiensis and *Bacillus sphaericus* active against larvae of vector mosquitoes

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Bacillus thuringiensis var. israelensis (*Bt*) and *Bacillus sphaericus* (*Bs*) have been identified as the most efficient and widely used bacterial agents for mosquito control. They synthesise large quantities of insecticidal crystal proteins and are toxic against a wide range of insect species. The objectives of the present study are to isolate and identify Sri Lankan strains of *Bt* and *Bs* and to investigate mosquito larvicidal activity of those isolates grown on solid and broth mediums against *Culex quinquefasciatus* and *Aedes aegypti.*

Soil samples were collected from different climatic zones in Sri Lanka to isolate *Bt* and *Bs*. Two hundred and three isolated *Bacillus* species were screened for mosquito larvicidal activity against *Cx. quinquefasciatus* and *Ae. aegypti* and thirteen of them showed activity. Physical and bio-chemical testes were used in identification tests. *Bacillus thuringiensis* colonies were specifically identified by the presence of parasporal crystals under phase-contrast microscope. Single colonies of *Bt* and *Bs* isolates and ATCC and WHO standards were grown in Luria broth and final whole cultures were lyophilized to obtain the primary powders. *Bt* and *Bs* isolates and standards were also grown in aerobic liquid fermentation using molasses as the fermentation medium. Mosquito larvicidal bioassay for *Cx. quinquefasciatus* and *Ae. aegypti* followed the WHO standard protocol and relative toxicities, LC_{50} were calculated using a probit analysis software package.

Twelve mosquito larvicidal *Bt* isolates and one *Bs* isolate were isolated from Sri Lankan natural habitats. The maximum biomass production with higher larvicidal activity against *Cx. quinquefasciatus* and *Ae. aegypti* was observed for liquid fermented cultures of *Bacillus*. Of the fermenter grown cultures, *Bt* SB125 showed the more activity against *Cx. quinquefasciatus* (LC_{50} 0.02354 ppm) and *Ae. Aegypti* (LC_{50} 0.02551 ppm), an activity comparable with the ATCC standards, *Bti*, *Btk* and *Bs* and WHO standards *Bt* H-14 and *Bs*-2362. Also *Bt* isolates, SB59, SB67, SB142, SB155, SB160, and SB172 and *Bs* isolate SB63 showed potential activity against *Cx. quinquefasciatus* and SB67, SB59, SB107, SB160, SB165, SB172 and SB63 against *Ae. Aegypti.*

This study showed that the *Bt* isolates, SB59, SB67, SB107, SB125, SB142, SB155, SB160, SB165 and SB172 and *Bs* isolate, SB63 could be used as useful biocontrol agents against the local vector mosquito larvae.

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