

SDS-PAGE analysis of endotoxins of Sri  
Lankan *Bacillus thuringiensis* isolates and  
screening for type 1 $\beta$  exotoxin

By

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## ABSTRACT

Mosquitoes have become a major health concern in Sri Lanka as they act as vectors for a number of diseases such as Malaria, Dengue and Filariasis. Out of these the ever increasing number of deaths due to dengue has warranted proper mosquito controlling methods. In the past chemical control methods such as Dichloro diphenyltrichloroethane (DDT) and Malathion have been quite successful in the control of mosquitoes. However, the prolonged use of such chemicals has developed resistant mosquito strains in addition to the environmental problems such as bioaccumulation. Due to these reasons, biological control of mosquitoes has become an ideal alternative. Among the available options mosquitocidal strains of *Bacillus thuringiensis* (Bt) have become the best for the preparation of the commercial mosquitocidal formulations. However the importation of such strains are quite costly and may not be sustainable in the long run. Therefore, the identification and isolation of the local Bt strains with mosquitocidal activity have become very important. In this study the local strains Bt 4 and Bt 6e were grown on the semi-defined media to identify their basic morphological features. The colonies produced showed the typical hairy edged character. Gram's staining confirmed the Gram positive bacilli of the two strains. These two strains were sub cultured on blood agar and observed the  $\beta$  hemolytic character. Both strains showed  $\beta$  hemolytic character, indicating the presence of *cyt* genes. In order to compare the endotoxin profiles of the local strains with that of the *Bacillus thuringiensis* subsp.*israelensis* (*Bti*), the endotoxins were isolated and subjected to SDS-PAGE analysis. According to the results, both strains produced proteins similar to *Bacillus thuringiensis* subsp.*israelensis*'s (*Bti*) proteins. However, before truly identifying the efficient ways of controlling mosquitoes, these strains need to be screened for free of type 1  $\beta$  exotoxin, as they are nonspecific in their mode of action. Both the local strains were screened for type 1  $\beta$  exotoxin using HPLC. According to the results, the local strain Bt 6e does not produce type 1  $\beta$  exotoxin but Bt 4 produces a significant quantity of type 1  $\beta$  exotoxin. Accordingly Bt 6e could be integrated into mosquito control programs whereas Bt 4 is not ideal due to the production of type 1  $\beta$  exotoxin.