STRUCTURE-FUNCTION RELATIONSHIP OF THE GENE ENCODING 130-kDa-MOSQUITO LARVICIDAL PROTEIN

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF

THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE

(BIOCHEMISTRY)

IN

FACULTY OF GRADUATE STUDIES

MAHIDOL UNIVERSITY

1987

BANGKOK, THAILAND

Abstract

The gene encoding 130 kDa-mosquito larvicidal protein of Bacillus thuringiensis var israelensis crystal that was previously cloned in Escherichia coli [Angsuthanasombat, C. 1985] has been studied by deletion and fusion analysis. The peptides produced by the recombinant strains bearing deletions and fusions of the toxin gene have been analyzed for toxicity and sizes in order to delineate the portion of the gene which encodes the minimal toxic peptide. The recombinants produced the peptides whose sizes were related to the length of the deleted gene. The amino terminal 70 kDa-peptide (60% of the total protein molecule) was found to give toxicity, but at a lower level than the full-length gene product. The gene fusion (5'-end deletion of the gene) to the 18th codon allowed the synthesis of toxic polypeptide, the fusion to the 46th codon, however, did not. 3'-end deletion up to the 677th codon allowed the synthesis of the peptide with about 20 fold decrease in toxicity, whereas a deletion to the 614th codon yielded a non-toxic and non-immunoreactive peptide. The result demonstrated that the minimal toxic peptide resided between the 18th codon and the 677th codon of the 1136 codon peptide.