Prakai Thaphan 2011: Characterization of Thai *Bacillus thuringiensis* (Berliner) Strain
Highly Toxic to Diamondback Moth, *Plutella xylostella* (Linnaeus) (Lepidoptera:
Plutellidae). Doctor of Philosophy (Entomology), Major Field: Entomology, Department of
Entomology. Thesis Advisor: Associate Professor Jariya Chanpaisaeng, Ph.D. 122 pages.

The diamondback moth (Plutella xylostella Linnaeus) is the major pest worldwide. One of the alternatives for its control is the utilization of Bacillus thuringiensis, an entomopathogenic bacterium characterized by its production of insecticidal crystal proteins. One hundred and twenty one B. thuringiensis isolates were tested against P. xylostella larvae and selected the high effective isolates in term of high toxicity and UV tolerance. B. thuringiensis were shown to be highly effective isolates namely JCPT76, JCPT106, JCPT118 and JCPT121 with the LC₅₀ values 8.52×10^3 , 1.41 $\times 10^4$, 7.03 $\times 10^3$ and 5.36 $\times 10^2$ spores/ml, respectively. Those isolates were selected for study on UV tolerance. JCPT121 had a higher survival rate at 60 minutes where as JCPT76, JCPT106 and JCPT118 were susceptible. JCPT121 was identified as B. thuringiensis. Morphological characteristics of cell, spore and crystal protein by SEM showed that JCPT121 was rod shape, oval spore and produced bipyramidal crystal proteins. The total genomic DNA and plasmid DNA was extracted and cry genes were detected by PCR method using 20 pairs of specific primers. PCR products were purified, sequenced and subjected to BLAST search at NCBI. The result revealed that 3 cry genes namely cry1Ac, cry1I and cry2A presented in chromosomal DNA while 2 cry genes namely cry1I and cry2A presented in plasmid DNA. The crystal proteins of JCPT121 were purified by discontinuous sucrose gradient method and analyzed protein profile by SDS-PAGE. The results revealed that JCPT121 composed of approximately 130 kDa and 72 kDa proteins. Screening the toxicity of JCPT121 to insect showed toxicity to Spodoptera litura, Spodoptera exigua and Aedes aegypti but no toxicity to larvae of Galleria mellonella, Bactrocera dorsalis, Musca domestica, Tenebrio molitor and Tribolium castaneum.