

Variation in Carboxylesterase Activity in *Spodoptera litura* Fabricious (Noctuidae: Lepidoptera) Populations from India

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Abstract : The tobacco caterpillar, *Spodoptera litura* Fab (Lepidoptera: Noctuidae) is a polyphagous pest various field and horticulture crops in India. Pest had virtually developed resistance to all commonly used insecticides. Enhanced detoxification is the prime mechanism that is dictated by detoxification different enzymes and carboxylesterase is one of the major enzyme responsible development of resistance. In India, insecticide resistance studies on *S. litura* are mainly deployed on detoxification enzymes activity and investigation at gene level alteration i.e. at nucleotide level is very merger. In the present study, we collected the *S. litura* larvae from three different cauliflower growing belt viz., IARI, New Delhi (Delhi), Palari, Sonapat (Haryana) and Varanasi (Uttar Pradesh) to study the role of carboxylesterase activity and its gene level variation. The CarE activity was measured using UV-VIS spectrophotometer with 3rd instar larvae of *S. litura*. The elevated activity of CarE was observed in Sonapat strain (28.09 ± 0.09 $\mu\text{mol}/\text{min}/\text{mg}$ of protein) followed by Delhi (26.72 ± 0.04 $\mu\text{mol}/\text{min}/\text{mg}$ of protein) and Varanasi strain (10.00 ± 0.44 $\mu\text{mol}/\text{min}/\text{mg}$ of protein) of *S. litura*. The genomic DNA was isolated from 3rd instar larvae and CarE gene was amplified using a primer sequence, F:5'tccagagttccttgctcaggcac3'; R:5'ctgcatcaagcatgtctc3. CarE gene, about 500bp was partially amplified, sequenced and submitted to NCBI (Accession No. KF835886, KF835887 and KF835888). The sequence data revealed polymorphism at nucleotide level in all the three strains and gene found to have 88 to 97% similarity with previous available nucleotide sequences of *S. litura*, *S. littoralis* and *S. exiqua*. The polymorphism at the nucleotide level could be a reason for differential activity of carboxylesterase enzymes among the strains. However, investigation at gene expression level would be useful to analyze the overproduction of carboxylesterase enzyme.

Keywords : carboxylesterase, CarE gene, nucleotide polymorphism, insecticide resistance, *spodoptera litura*

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