

## ABSTRACT

Baculoviruses are invertebrate-specific pathogens and baculoviral infections cause alternations in the physiology, metabolism and morphology of insects, it is important to recognize these physiological and symptomological changes to understand baculovirus infection cycle and biology. For this reason, in our study we isolated *SeNPV* from different cotton and sugar cane fields and five different concentrations from the occlusions bodies produced by this virus isolate were tested against neonate, 2<sup>nd</sup> and 4<sup>th</sup> instar larvae of *S.exigua*. When a viral concentration of  $5 \times 10^9$  PIB/ml was utilized, larval mortality started on six day and reached approximately 100% to the three larval instar tested. We also studied the host range of *SeNPV* and our results demonstrated that *SeNPV* is very specific to *S.exigua*.

The external effect of virus on the larval body was examined by SEM which revealed complete destruction of larval exoskeleton, also sections of tissue from infected larvae at different hours post-inoculation stained with haematoxylin and eosin reflected highly disrupted morphology of midgut epithelial cells.

The nucleotide sequence of polyhedrin gene of *SeNPV* was determined. An open reading frame (ORF) of 608 nucleotides was detected. This ORF encoded a protein of 201 amino acids. The

nucleotides and amino acids were compared with the sequences of ten other *NPV* polyhedrins, the *SeNPV* polyhedrin was most closely related to *S.litura NPV* polyhedrin.

**Key words:** *Spodoptera exigua*, Baculovirus, polyhedrin gene, morphological, Histological and molecular characterization.

## List of abbreviation

|                                    |  |
|------------------------------------|--|
| <b>BAW</b>                         | <b>Beet army worm</b>                                      |
| <b>BM</b>                          | <b>Basement membrane</b>                                   |
| <b>BV</b>                          | <b>Budded virus</b>  |
| <b>CC</b>                          | <b>Columnar cell</b>                                       |
| <b>DNA</b>                         | <b>Deoxyribonucleic acid</b>                               |
| <b>dNTPs</b>                       | <b>Deoxyribonucleotide triphosphate</b>                    |
| <b>EDTA</b>                        | <b>Ethylene-diamine-tetra-acetic acid</b>                  |
| <b>Egt gene</b>                    | <b>Ecdy-steroid-glucosyl-transferase gene</b>              |
| <b>g</b>                           | <b>Gram</b>  |
| <b>GC</b>                          | <b>Goblet cell</b>   |
| <b>GV</b>                          | <b>Granulovirus</b>  |
| <b>IPM</b>                         | <b>Integrated pest management</b>                          |
| <b>KCL</b>                         | <b>Potassium chloride</b>                                  |
| <b>KDa</b>                         | <b>Kilo Dalton</b>   |
| <b>KH<sub>2</sub>O<sub>4</sub></b> | <b>Potassium phosphate monobasic</b>                       |
| <b>Kbp</b>                         | <b>Kilo base pair</b>                                      |
| <b>LC<sub>50</sub></b>             | <b>Lethal concentration required to kill 50% of larvae</b> |
| <b>LT<sub>50</sub></b>             | <b>Lethal time required to kill 50% of larvae</b>          |
| <b>M</b>                           | <b>Mole</b>  |
| <b>µg</b>                          | <b>Micro gram</b>  |
| <b>MgCl<sub>2</sub></b>            | <b>Magnesium chloride</b>                                  |
| <b>µl</b>                          | <b>Micro liter</b>   |

|  |   |
|--|---|
| <b>µm</b>  | <b>Micro meter</b>  |
| <b>Na<sub>2</sub>HPO<sub>4</sub>.7H<sub>2</sub>O</b> | <b>Sodium Monohydrogen Phosphate heptahydrate</b>             |
| <b>NCBI</b>  | <b>National Center for Biotechnology Information</b>          |
| <b>nm</b>  | <b>Nanomol</b>  |
| <b>NPV</b>   | <b>Nuclear polyhedrosis virus</b>                             |
| <b>OB</b>  | <b>Occlusion body</b>   |
| <b>ODV</b>   | <b>Occlusion derived virus</b>                                |
| <b>ORF</b>   | <b>Open reading frame</b>                                     |
| <b>OsO<sub>4</sub></b>                               | <b>Osmium tetroxide</b>                                       |
| <b>PCR</b>   | <b>Polymerase chain reaction</b>                              |
| <b>PH</b>  | <b>Potential for hydrogen ion concentration</b>               |
| <b>PM</b>  | <b>peritrophic membrane</b>                                   |
| <b>RC</b>  | <b>Regenerated cells</b>                                      |
| <b>rpm</b>   | <b>Revolutions per minutes</b>                                |
| <b>SEM</b>   | <b>Scanning electron microscopy</b>                           |
| <b><i>SeNPV</i></b>                                  | <b><i>Spodoptera exigua</i> Nuclear polyhedrosis virus</b>    |
| <b>TAE</b>   | <b>Tris-acetate-EDTA-Buffer</b>                               |
| <b>Taq</b>   | <b>Thermus aquaticus</b>                                      |
| <b>UV</b>  | <b>Ultra Violet</b>   |
| <b>VACSERA</b>                                       | <b>Holding Company For Biological Products &amp; Vaccines</b> |
| <b>Wt/Vol</b>  | <b>Weight per volume</b>                                      |

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