Evaluation of Materials as Sunlight Protectants of Nucleopolyhedrovirus of Armyworm, *spodoptera litura* fab. (Lepidoptera: noctuidae)*

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Introduction

For the development of virus insecticide, ultra violet (UV) spectrum of sunlight is the main obstacle. In many cases, field applied viral pathogen loses their activity within several days. SpltNPV lost all activity after 12h of exposure to direct sunlight (Bakir et al., 2000). Many attempts were taken to protect the virus from sunlight activation. Protectants to be used must not adversely affect the viral activity and safe to humans and environment. In this experiments materials were tested as sunlight protectants with the objective of using the materials to protect the virus from sunlight inactivation.

Materials and Methods

The nucleopolyhedrosis virus was produced in vivo using 4th instar larvae of *Spodoptera litura*. Polyhedral inclusion bodies (PIBs) semi purified solution were counted using a standard hemocytometer (Weber, England). Four materials, tinopal LPW, riboflavin, crude sugar and palm oil at 1% concentration (wt/vol) were tested as sunlight protectants of SpltNPV, viral suspension were added to protectant materials, pipetted onto petri dishes and exposed to direct sunlight for 16h with open upper lids. After the exposure, viral suspensions were bioassayed using 3rd instar larvae of *S. litura*. Virus in autoclaved distilled water served as standard. Control larvae were given 1% protectant materials without virus.

Results and Discussion

Tested materials gave significantly different results in their activity as virus protectant against sunlight ($F = 2834.72$, $P = 0.0001$). Tinopal gave 100% protection of SpltNPV against direct sunlight. Other materials however, gave variable protection. Virus exposed with riboflavin and crude sugar produced 29.17%, 24.17% larval mortality respectively. Palm oil could not provide any viral protection against sunlight. Tinopal not only provided 100% protection to SpltNPV< it also reduced LT_{50} value compared with that of unexposed virus. A reduction of 1.14 fold LT_{50} value was obtained for virus exposed with tinopal compared with unexposed virus, even after sunlight exposure. The activity ratio of unexposed virus and virus exposed with tinopal remained the same (Alvos et al., 1992), riboflavin 0.29, crude sugar 0.24, palm oil and treated virus 0. Tinopal absorbs UV radiation and transmit light in the blue portion of the visible spectrum. As UV-A absorber it provides excellent protection for virus. Furthermore tinopal enhances the viral activity to infect the columnar cell nuclei in the tissue of midgut and quickens the larval mortality (Shapiro, 1992). Riboflavin absorbs radiation over wider spectrum than 290-310 nm (Shapiro, 1985). Crude sugar (Dhandapani et al., 1992) and vegetable oil (Alvos et al., 1992) showed virus protection against sunlight, however, in this experiment crude sugar provided some protection but none by palm oil.

Conclusions

Tinopal LPW could be used in viral insecticide formulation as it protects the virus from sunlight inactivation and enhance the viral activity.

Benefits from the study

Nucleopolyhedrosis virus has the potential to be developed into a biopesticide for controlling armyworm, *Spodoptera litura*. As a biopesticide, the virus is host specific and leaves no residue that is harmful to the environment and harmless to animals including human. The formulated viral preparation can be used as an alternative to chemical pesticides or it may be used as a tool in resistant management of *S. litura*.

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