**HaNPV persistence improvement using UV protectants and adjuvants**

**Abstract**

HaNPV alone only causes lower larval mortality. However, in combination with adjuvants increases the larval mortality acting as gustatory or phago-stimulant, whereas, UV protectants increase the stability and longer persistence of HaNPV in field conditions. Boric acid and folic acid acts dual role of adjuvant and UV protectant. HaNPV in combination with UV protectants and adjuvants is more effective than HaNPV alone under field conditions. It is also clear that spray can be taken up during evening hours to prevent exposure of HaNPV directly to sunlight and evaporation, which also helps in longer residual of HaNPV in field.

**Introduction**

Among the food crops, pulses are an important group which occupies a unique position in the world of agriculture by virtue of their high protein content. In pulses, chickpea (*Cicer arietinum* Linnaeus) is one of the important crops grown in *rabi* season. It is commonly known as “Bengal gram” or “Gram” which is mainly grown in the Indian sub-continent, Western Asia and in many tropical countries. It is a self-pollinated crop and belongs to the sub family Papilionaceae of the family Leguminaceae. In India, chickpea occupies a predominant position and grown in about 8.70 million hectares with a production of 8.88 million tons with productivity of 1021kg/ha during *rabi*, 2012-13. The production of cereals has increased manifold in the recent past but that of pulses has remained more or less static. Insect pests are probably the main factor limiting the grain legume yields. More than 150 species of insects are known to attack pulse crops in India and of these, about 25 causes serious damage to monsoon and winter pulse crops. Out of them, the gram pod borer, *Helicoverpa armigera* (Hubner) (Lepidoptera: Noctuidae) is a most cosmopolitan and polyphagous pest which attacks numerous crops of agricultural importance and widely distributed for the tropic and sub-tropic.

**HaNPV (Helicoverpa armigera Nucleo Polyhedrosis Virus)**

The indiscriminate use of pesticides for the last 40 years has almost eliminated natural enemies from many crop eco-systems, created complications of environment pollution, pest resurgence and insecticide resistance. This scenario has led to consider the potential of biological control as a component of pest management. Biopesticides based on baculo viruses group especially the nucleo polyhedrosis virus (NPV) offers great scope against *H. armigera*. NPV is known for high epizootic levels and is naturally occurring obligate parasite, self- perpetuating, safe to natural enemies due to host specificity and environmentally friendly.

**Constrain in Usage of Biopesticides**

The important constrains in effective utilization of insect viruses is the lack of persistence in field. The primary factor responsible for inactivation under field conditions has been demonstrated to be the ultraviolet (UV) radiation from the sunlight in the spectral range of 250 to 320nm and loss of efficacy is the most striking feature of the action of UV irradiation on virions.

**How to Improve Persistence in Field Condition?**

The common practice of addition of adjuvants and UV protectants which improved efficacy of microbial insecticides, decreases sunlight degradation, evaporation and increases wettability and also act as gustatory stimulant. Deotale et al. recorded the highest reduction in larval population of *H. armigera* in the HaNPV + folic acid followed by HaNPV + ranipal. He also reported that the addition of folic acid or ranipal with HaNPV spray solution avoid deterioration of the NPV in the sunlight and bring about more reduction in the population of *H. armigera*.

**Conclusion**

HaNPV alone only causes lower larval mortality. However, in combination with adjuvants such as Milk powder and Jaggery increases the larval mortality acting as gustatory or phago-stimulant, whereas, UV protectants like Ranipal and Robin blue increases the stability and longer persistence of HaNPV in field conditions. Boric acid and folic acid acts dual role of adjuvant and UV protectant. Thus, it is clear that the HaNPV in combination with UV protectants and adjuvants is more effective than HaNPV alone under field conditions. It is also clear that spray can be taken up during evening hours to prevent exposure of HaNPV directly to sunlight and evaporation, which also helps in longer residual of HaNPV in field.

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**Conflict of interest**

The author declares no conflict of interest.

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