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Plant Derived Oils as Ultraviolet Protectants for the Beet Armyworm Nucleopolyhedrovirus (SeNPV)

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Abstract

Ultraviolet B (UVB) from sunlight is the main constraint to using the environmentally friendly baculovirus in plant protection, especially in tropical and subtropical countries. Eleven oils emulsified with lecithin were evaluated as UV protectants to improve the persistence of the beet armyworm nucleopolyhedrovirus (SeNPV) in the laboratory. Seven of these (cotton seed, olive, flax, soybean, black seed, wheat germ and safflower) at a concentration of 1 % provided UV protection compared to virus alone (with lecithin) treatment irradiation under UVB for 30 minutes in the laboratory. There was a relatively high rate of protection when plant derived materials, i.e., henna, clove, skullcap, peppermint and Marasperse® (lignin), at the concentration of 0.25 %, were mixed with cotton seed oil at 1 % and exposed to UVB light for 5 hours. The absorption spectra of the materials, either tested singly or in combination with plant derived materials, was reflected in the absorption spectrum, with more absorption providing more protection against UVB.

Field trials with collard showed that the virus alone (with only H₂O) rapidly lost its activity after 2 days. The original activity remaining (OAR%) values were 86.66, 41.37, 0.0 and 0.0 % after 1, 2, 4 and 7 days, respectively. Whereas, addition of cotton seed oil emulsifier to black tea provided the highest rate of protection with OAR% of 96.55, 63.33, 34.62 and 17.24 % for the same days after treatments, respectively. Also, addition of cotton seed oil emulsifier to the lignin provided UV protection to 100, 58, 43.33 and 3.33 % respectively for the same exposure times under the sunny days. The study recommends using of natural oils to improve the persistence of baculoviruses.

Keywords: Additives, baculovirus, oils, protectant, ultraviolet