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ABSTRACT

This work was carried out at the “Insect Virology Unit”, Department of Economic Entomology and Pesticides, Faculty of Agriculture, Cairo University, Giza, Egypt, throughout the period extended from 2006 to 2010. The aim of the study was the laboratory and field evaluations of plant-derived material containing natural antioxidants as UV-protective additives to SpliNPV against natural sun light. The study focuses on testing inexpensive, local and natural products to be used as standard additives to SpliNPV virus product, in order to sustain effectiveness of virus bio-control agents, the tested additive materials were used at the laboratory evaluation as a plant extracts at 1% concentration. Twenty plant-derived products were compared in three successive Phases, Phase “One” where materials were tested in groups that could be arranged in descending order as follows: Group A: cacao, carob pods, green tea, sage garden and vanilla pods. Group B: green coffee, lemon grass, wheat, doum palm, and coriander leaves. Group C: red cabbage, green cabbage, parsley, rugsula and coriander seeds. And Group D: grape vine, grape seed, pomegranate, garlic, and onion. Phase “Two” where the best two additives of each group (i.e., 8 additives, beside green tea as a comparative additive known from literature as a superior protective material), were pooled out and further investigated, with a maximum exposure test period to UV irradiation. The results determined the nine tested additives arranged in a descending following order of efficiency: cacao, red cabbage, green cabbage, coffee, grape vine, carob pods, green tea, lemon grass, and grape seeds. These additives retained 58.30, 30.98, 50.34, 49.99, 28.46, 43.22, 45.35, 28.66, and 50.36 OAR% (10hr), respectively and 821.44, 711.16, 686.05, 594.42, 590.83, 530.02, 505.45, 449.38 and 439.32 LIT₅₀ values (min), respectively (14.40 OAR% (10hr) and 222.14 LIT₅₀ value (min) for the virus alone treatment). In Phase “Three”, the best four additives resulted from Phase “Two” were further investigated under natural field sunny conditions, and evaluated at 5 and 10% concentrations. At 5% concentration: The tested additives were in the following order of efficiency: cacao, red cabbage, green cabbage and green coffee; giving 83.34, 49.78, 53.57 and 44.96 LIT₅₀ values (hr), respectively (7.69 LIT₅₀ value (hr) for the virus alone treatment). At 10% concentration: cacao was again the best protective additive followed by green coffee, red cabbage and green cabbage; giving 113.11, 58.40, 59.22 and 51.91 LIT₅₀ values (hr), respectively. (7.69 LIT₅₀ value (hr) for the virus alone treatment).

In conclusion, cacao gave the maximum protection rate for the NPV at 1%, 5% and 10% concentrations as evident in both laboratory and field evaluations. The other three top additives (green coffee, red cabbage and green cabbage) were promising in the laboratory but not so long in the field as cacao.

Key words: Spodoptera littoralis, nuclear polyhedrosis virus, ultraviolet light, antioxidants