THE DSRNA BASED GREEN PESTICIDES FOR THE CONTROL OF COLORADO POTATO BEETLE, *LEPTINOTARSA DECEMLINEATA* SAY (CHRYSOMELIDAE: COLEOPTERA)

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Potato is strongly believed as a strategic crop from a food security point of view worldwide. However, the crop is constantly exposed to the threat of insect pests and diseases. Among these pests, Colorado potato beetle (CPB) is notorious pest, larvae and aphid incur significant yield losses and even result in zero economic yield in certain circumstances. Furthermore, CPB has developed resistance against chemical insecticides that are widely adopted worldwide. There is a dire need to develop an alternate approach to control CPB. RNA interference (RNAi) serves as a versatile genetic tool capable of selectively inhibiting the expression of specific genes, providing a promising avenue for preventing crops from being infested by insect pests and diseases. In our recent projects, we employed RNAi against Colorado Potato Beetle (*Leptinotarsa decemlineata* Say) and achieved excellent results. The double-stranded RNAs (dsRNAs) were synthesized using *L4440* vector in *Escherichia coli HT115* strain to silence the *L. decemlineata* Vacuolar ATPase (*V-ATPase*), Ultra spiracle protein (*USP*), Ecdysone receptor (*EcR*), Cuticle protein, GSS and p450 mRNAs which are essential for a range of physiological and developmental processes. The results revealed that RNAi increased mortality rates, significant effects on larval weight gain, reduced foliage consumption, and suppression of egg-laying behavior in *L. decemlineata*. The targeted downregulation of gene expression, as evidenced by reduced mRNA levels, confirmed the efficacy of RNAi. Additionally, combining ds*USP* and ds*EcR* showed a synergistic effect, demonstrating the greatest mortality rate recorded at 90% in larvae, with 88% reduction in the number of laid eggs compared to their individual applications in feeding bioassays. This study shows that employing RNAi technology has the potential to effectively control this devastating potato pest by providing a targeted approach to suppress its population.