

EFFICACY OF THE INSECT GROWTH REGULATOR NOVALURON IN THE CONTROL OF DENGUE VECTOR MOSQUITOES

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Sri Lanka is experiencing an alarming rate of dengue incidence with several outbreaks. Vector resistance to synthetic neuro-inhibitory insecticides has become a major problem in vector control programmes. Novaluron is an Insect Growth Regulator (IGR) which inhibits chitin synthesis in immature stages of insects. The present study aimed to evaluate the efficacy of novaluron and determine the dosages to be used in dengue vector control programs. Batches of 25 laboratory-reared third instar larvae of *Ae. aegypti* and *Ae. albopictus* were exposed to formulated emulsifiable novaluron (Rimon ® EC10) (0.00001 ppm - 4ppm) for two fixed exposure periods of 7 days and 14 days to determine LC₅₀ and LC₉₉ values. Percentage inhibition of adult emergence values (IE₅₀ and IE₉₉) were determined by exposing a 14-day period to 0.0005ppb-0.00005ppb concentrations. Mortality data and emergence inhibition data were subjected to probit-regression analysis using SPSS. Water storage buckets (10 L) and plastic barrels (200 L) with 25 third instar larvae per 1L were treated with IE₉₉, 2x IE₉₉ and 10x IE₉₉ under semi-field conditions to assess the residual effect of novaluron on larval emergence. For both larval species, LC₅₀ values were 0.044 – 0.049, and LC₉₉ values were 0.144 - 0.151ppm for the 7-day exposure. For 14-day exposure, LC₅₀ values were 0.002 to 0.005 ppm, and LC₉₉ values were 0.006-0.01 ppm. For both species, IE₉₉ was 0.001 ppb. Under semi-field conditions, the discriminating dosage, 0.002 ppb (2 x IE₉₉) gave 100% emergence inhibition for up to 7 days, >50% inhibition for up to 86 days. After 118 days, it gave 97% adult emergence, declining the IE to 3%. Currently, novaluron Rimon ® EC10 recommended dosage is 200 ppm in Sri Lanka. The results highlight the need for authorities to reduce recommended dosages of novaluron Rimon ® EC10 in minimizing environmental pollution and to preserve non-target insect larvae.

Keywords: *Aedes aegypti*, *Aedes albopictus*, Mosquito larval control, Insect Growth Regulator, Novaluron