

# Laboratory and Field Evaluation of IGR Compounds

## Hilmilin

Hilmilin is an insect growth regulator highly effective against immature stages of mosquitoes and does not produce harmful effects on nontarget organisms. Insecticidal activity of diflubenzuron, the active ingredient of Hilmilin is based on interference with the formation of chitin in insect cuticle, thus inhibiting the moulting.

### Laboratory Evaluation

Hilmilin WP 25 and 22 SL formulations were dissolved in distilled water and laboratory reared larvae of *An. culicifacies*, *An. stephensi*, *Ae. aegypti* and *Cx. quinquefasciatus* were exposed to the Hilmilin and observations were made at 24 hours intervals till the emergence of adults and control was run concurrently. Four replicates of each concentration were tested. Different stages—larvae, pupae mosaics and incomplete emergence of adult was taken as dead pupae.  $LC_{50}$  and  $LC_{90}$  values were calculated as per standard procedure. Per cent inhibition was calculated on the basis of untreated control run concurrently.

Result of laboratory evaluation revealed that the Hilmilin formulations were highly effective against larvae of all the species tested. However, anopheline immatures were more susceptible than culicines.  $LC_{50}$  and  $LC_{90}$  values were 0.000869 and 0.0004775 (WP 25) respectively.

### Field Evaluation

Tests were carried out in pools and unused wells against immatures of *An. culicifacies*, *An. stephensi* and *Cx. quinquefasciatus*. Hilmilin WP 25 and Hilmilin 22 SL @ 0.003 and 0.005 ppm respectively were applied. The WP formulation was broadcast manually over the water surface, while 22 SL formulation was sprayed with the help of stirrup pumps. Observations were made till the emergence.

Field evaluation revealed that Hilmilin formulations showed varying degree of inhibition against mosquitoes. Cent per cent inhibition of adult emergence was observed in *An. culicifacies* up to one week as against 95 and 93% in *An. stephensi*.

The persistence of the compound was also variable. The average percentage inhibition obtained @ 0.005 ppm WP 25 was 84.5, 83.16 and 75.16 up to 56 weeks against *An. culicifacies*, *An. stephensi* and *Cx. quinquefasciatus* as against 94.3, 92.0 and 82.5 respectively, with 22 SL.

*Diflubenzuron and Triflumuron*

The IGR compounds Triflumuron and Diflubenzuron produced delayed impact (such as lesser pupal production and inhibition of adult emergence) at very low concentrations. Of the two products, Triflumuron displayed slightly higher toxicity against two mosquito species at EC<sub>50</sub> level but at EC<sub>90</sub> level, Diflubenzuron

was slightly more toxic (EC<sub>90</sub>= 0.0005 ppm) than Triflumuron (EC<sub>90</sub>=0.0024 ppm) against *An. stephensi*, while reverse was observed against *Ae. aegypti* (Table 1). At present IGR compounds are well in use as they do not pose any hazard to mankind and other wild life. These are also nontoxic against fish and can be used for prolonged antilarval effect.

**Table 1. Toxicity of insect growth regulator formulation against *An. stephensi* and *Ae. aegypti***

IGR formulation	Concentration in ppm (mg/l)		
	LC/EC values	<i>An. stephensi</i>	<i>Ae. aegypti</i>
Diflubenzuron (25% WP)	EC <sub>50</sub>	0.0002	0.0004
	EC <sub>90</sub>	0.0005	0.0033
Triflumuron (48% SC)	EC <sub>50</sub>	0.0001	0.0002
	EC <sub>90</sub>	0.0024	0.0026