

New deployment of Transfluthrin effects into a long-lasting insecticide paint formulation with dual action

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INTRODUCTION

Transfluthrin is a volatile pyrethroid with quick KD (Knock down) and mortality of flying insects¹. It is used in household insecticide products like coils, electric vaporizers or aerosols. Due to its molecular structure, pyrethroid resistance breaking properties have been discussed for this active ingredient². The integration of transfluthrin into the Inesfly paint technology^{3,5} has been tested, and this has resulted in a long-lasting vector control formulation with contact and vapour-phase activity. First results of laboratory efficacy studies with transfluthrin paints against *Aedes*, *Culex*, *Anopheles* and *Phlebotomus* are reported.

MATERIALS & METHODS

1.Trial: WHO-cone bioassays were used to evaluate contact and vapour-phase efficacy of transfluthrin paints.

Glazed tiles were treated with transfluthrin at concentrations of 0.005%-0.05%. *Aedes albopictus* females were exposed to 1 day and 1 week treated boards. Contact and vapour effect (5 cm from the painted substrate) were tested. After 1h KD was recorded, and the mortality was estimated after 24h.

2.Trial: WHO-cone bioassays for long-lasting efficacy of 0.5% Transfluthrin paint against *Aedes albopictus*, *Culex pipiens* and *Phlebotomus papatasi* were performed.

0.5% Transfluthrin paint was applied on wooden boards at a rate of 125ml/m² (875 mg a.i./m²). The toxic effect against mosquitoes was tested after 1, 4, 12 and 22 months after treatment of boards and different storage mode (indoors and outdoors).

3.Trial: WHO-cone bioassays with 0.5% Transfluthrin paint against local *Anopheles gambiae* in Nigeria.

The paint was applied at a rate of 125 ml/m² (875 mg a.i./m²) on primed cement plaster. KD was determined after 30 and 60 minutes and mortality after 24 hours. The trial has been undertaken for 6 months.

CONCLUSIONS

1. Paint application of insecticides are currently included as a Residual Surface Treatment intervention type for vector control by WHO⁶. Insecticide paints may become an alternative or supplementary tool for mosquito control, and the available bio-efficacy results with a 0.5% transfluthrin paint (INESFLY VESTA) are very encouraging.
2. The results obtained using WHO-cone bioassay suggest long-lasting activity of 0.5% Transfluthrin paint on treated surfaces. On field collected *An. gambiae* in Nigeria, the results obtained in the met the WHO efficacy criteria for IRS during the 6 months test period.

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RESULTS

1.Trial: Complete KD and mortality of *Aedes albopictus* was obtained at concentrations of 0.025% and 0.05% Transfluthrin paint both for 1 day and for 1 week treated boards. The efficacy was confirmed through tarsal contact and vapour-phase.

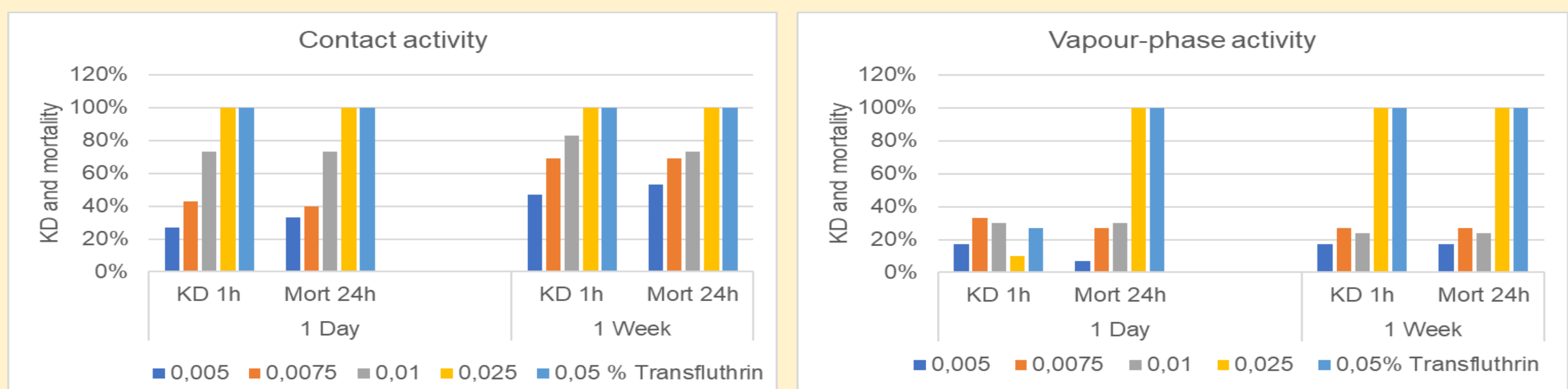


Fig.1 Contact and airborne dose-finding of transfluthrin paint with *Ae. albopictus* exposed to treated glazed tiles 1 day and 1 week after application (WHO cone bio-assay test).

2.Trial: *Aedes albopictus* KD and mortality remained 100%, for indoors storage for 22 months, nevertheless, for 12- and 22-months outdoors storage, KD was 100% and mortality decreased to 83% in longer period. *Culex pipiens* exposed to the 22 months indoors stored aged boards showed 100% KD, but 63% mortality, while *Phlebotomus papatasi* showed complete KD and mortality.

Ageing conditions	MAT	<i>Ae. albopictus</i>		<i>Cx. pipiens</i>		<i>Ph. papatasi</i>	
		%KD 1h (SD)	%Mort 24h (SD)	%KD 1h (SD)	%Mort 24h (SD)	%KD 1h (SD)	%Mort 24h (SD)
Indoor	1	100 (0)	100 (0)				
	4	100 (0)	100 (0)				
	12	100 (0)	100 (0)				
	22	100 (0)	100 (0)	100 (0)	63 (12)	100 (0)	100 (0)
Outdoor	12	100 (0)	86 (16)				

Table 1: Contact efficacy of 0.5% transfluthrin paint against *Ae. albopictus*, *Cx. pipiens*, and *Ph. papatasi* exposed for up to 22 months painted wooden boards stored indoors and outdoors.

3.Trial: KD of *Anopheles gambiae* specimens exposed to treated primed cement plaster was between 90-99% for the 6 months trial period. 24h mortality was 100% at all evaluation times. The results obtained meet the WHO criteria for Indoor Residual Spraying (KD 1h > 95% and/or Mortality 24 h > 80%).

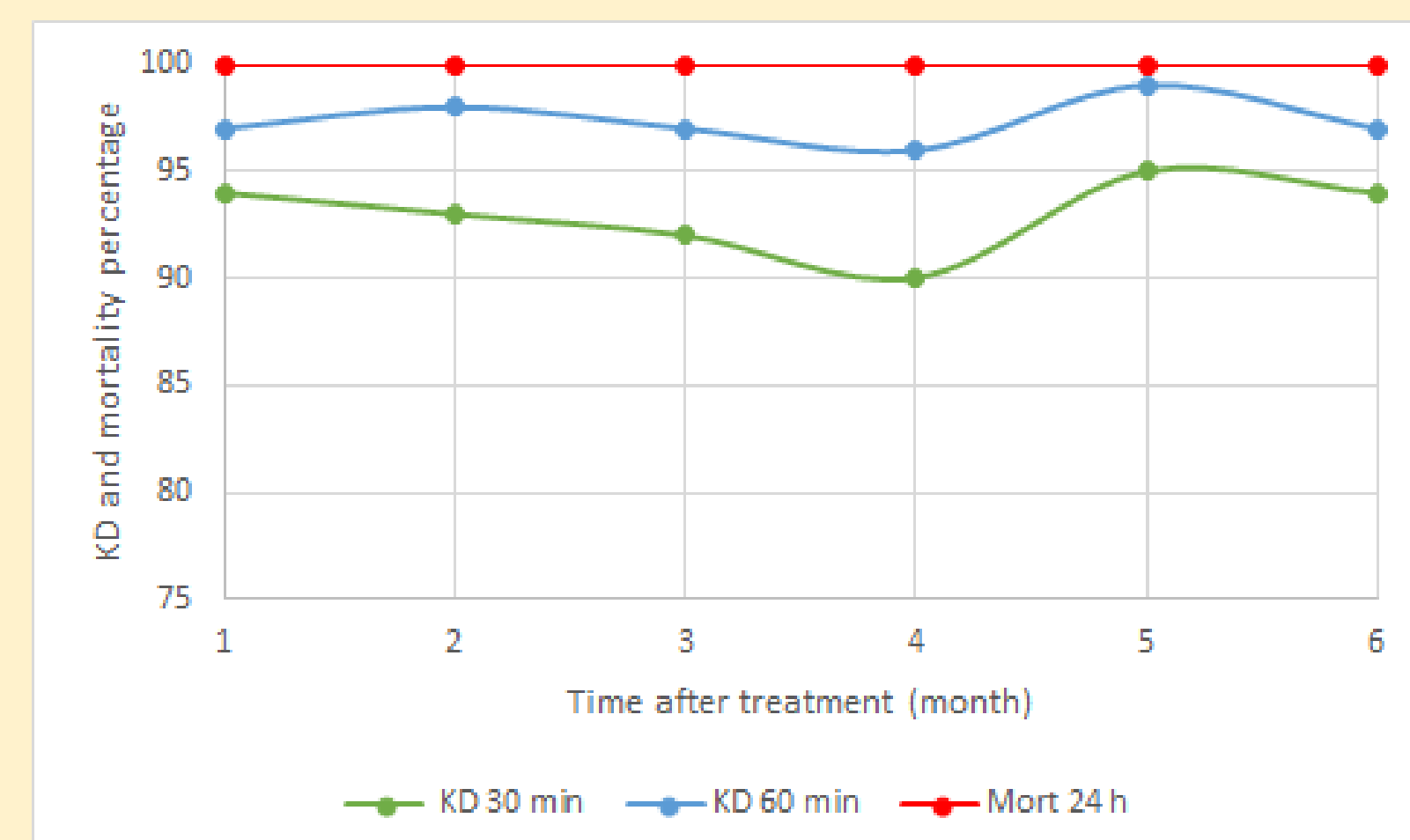


Fig. 2 Long-lasting contact efficacy of 0.5% transfluthrin paint against field collected *An. gambiae* s.l. in Nigeria exposed for up to 6 months primed painted cement plaster

