RESIDUAL EFFECT OF ETOFENPROX (TREBON 20% WP) AS A NEW INSECTICIDE ON DIFFERENT SURFACES IN SOUTH OF IRAN

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Abstract

The residual activity and air-borne efficacy of Etofenprox (trebon 20% WP) were studied on different surfaces in hut scale trial , in Kazeroun , south of Iran , in 1992. The bio-assay contact mortality tests with trebon against *Anopheles stephensi* showed similar responses on pluster , cement and mud surfaces (except wooden surfaces). i.e. at 250 , 400 and 500 mg/m^2 , trebon had residual activity for about 75 to 82 , 95 and 110 days respectively. On wooden surfaces , trebon showed longer residual activity than the latter surfaces , i.e. at 250 , 400 and 500 a.i. mg/m^2 , trebon had residual activity for 90, 110 and 127 days respectively. Fumigation test with trebon at different rates of application showed no remarkable effect on *An.stephensi*.

Based on the results of this study , trebon at 500 , 400 and 250 mg/m^2 had a residual activity for about 4 , 3 and 2.5 months on different surfaces and hence the recommended dosages for continuation study could be 500 and 250 mg/m^2 in a large scale trial in south of Iran.

Introduction

There is a continuing need for testing new chemical for vector control because of development of physiological resistance to some currently used insecticides. In south of Iran *Anopheles stephensi* Liston has been known to be resistant to DDT (4) , dieldrin (3) and malathion (2). After appearance of malathion resistance in *An.stephensi* , house spraying was continued with a number of adulticides e.g. propoxur from 1978 to 1993 for 13 successive years , actellic and propoxur from 1991 to 1992 and since 1993 both

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lambdacyhalothrin (icon 10 WP) and propoxur have been used for malaria control in south of Iran.

Long term use of insecticides for vector control in south of Iran has shown that , *An.stephensi* as a multiple resistant strain has a good ability to develop resistance to different insecticides. In order to avoid further devel opment of resistance in *An.stephensi* , evaluation of some new insecticides and regular monitoring of resistance in an insecticide resistance management , have the main priority in vector control programmes in malarious areas.

Etofenprox with insecticide activity like pyrethroids is a new candidate insecticides for malaria vector control programme (3,4). In Philippines , the residual activity and impact of house spraying with etofenprox on population density of vectors at 100 and 200 mg a.i. mg/m^2 were studied (1). Etofenprox at the later dosages on the treated surfaces showed the residual activity for about 5-7 months.

The aims of this study is to evaluate the insecticide activity of trebon in hut scale trials on different surfaces in south of Iran.

Materials and methods

Etofenprox with empirical formula of $C_{25}H_{28}O_3$ available under trade name "trebon" or "vectron" (20% WP) , supplied by Mitsui Toatso chemical, Inc. Hut-scale trial was used in a village (Jadas) , in city of Kazeroun , Fars provence , south of Iran , in 1992.

In hut scale trial different dosage of trebon i.e. 250 , 400 and 500 mg a.i/m^2 were evaluated on different surfaces such as plaster , wood , cement and mud , using Hudson X-pert compression sprayer holding 10 litters suspension of known quantity of trebon.

To determine the residual effect of trebon at 250 , 400 and 500 a.i mg/m2 on different wall surfaces like cement , Pluster , wood and mud , bioassay tests were carried out against blood fed of adult females of *An.stephensi* (4-5 days old) at 10 days intervals for each dosage during the course of study. The adults were provided from an insectary in Kazeroun Training Centre (KTC) , south of Iran. The bioassay tests were carried out

according to the method recommended by WHO , using plastic conical chamber (8,9). Total number of 10 adult females were released in each plastic chamber (10 replicates) by means of an aspirator and held for 30 minutes on the treated surfaces. At the end of exposure time , the adults were transferred into clean paper cup and mortalities were recorded , following 24 hr of holding time. In this assay the effective residual activity of insecticide was calculated based on decrease of mortality of *An.stephensi* from 100% to about 60% during the course of study.

Vapour toxicity of trebon in treated rooms was assessed , using a metal cylinder cage covered with metal mosquito netting with dimensions of 16 and 10 cm for height and diameter respectively. Twenty five adult females were released into each cage and the cages were hanged on the 4 different corners of ceiling , at distances of about 50 cm apart from the wall and ceiling for 6 hr in treated and untreated rooms. At the end of exposure times , the mortality count was made following 24 hr of holding times.

Results

The residual effect of trebon at different rates of application on different surfaces against *An.stephensi* are presented in Figs 1-3.

The residual effect of trebon at 250 , 400 and 500 mg/m^2 on mud surfaces was assessed based on reduction of mortality of An.stephensi from 100% to about 60% during the course of study. At 250 , 400 and 500 a.i. mg/m^2, trebon had a residual activity for about 82 , 95 and 110 days respectively.

Bio-assay tests with trebon at 250 , 400 and 500 a.i. mg/m^2 on cement surfaces showed that the mortalities of *An.stephensi* remained over 60% after 75, 95 and 110 days of hut spraying respectively.

Trebon tests on pluster surfaces , showed similar residual activity with the latter surfaces. i.e. at the 250 , 400 and 500 a.i. mg/m^2 , the mortality remained between 60-100% for 77 , 95 and 110 days after house spraying respectively.

On wooden surfaces at the same rates of application , trebon showed longer residual activity than the two former surfaces. At 250 , 400 and 500 a.i. mg/m^2 , trebon had The residual activity for 90 , 110 and 127 days after house spraying respectively.

The air borne effect of trebon on different surfaces at 250 , 400 and 500 a.i mg/m^2 for 6 hours exposure times was also evaluated. The results indicated that , trebon at 250 and 400 mg/m^2 had no air borne effect on *An.stephensi* , but slight vapour effect was observed when the adults were exposed at 500 mg/m^2 , i.e. 41% and 7.5% mortalities were recorded , 5 and 20 days after hut spraying respectively.

Discussion

The bio-assay tests with trebon at different rate of application against *An.stephensi* showed similar responses on pluster , cement and mud surfaces (except wooden surfaces). i.e. at 250, 400 and 500 mg/m^2 , trebon had residual activity for about 75 to 82 , 95 and 110 days respectively. On wooden surfaces , trebon showed longer residual activity than the latter surfaces , i.e. at 250 , 400 and 500 a.i. mg/m^2 , trebon had residual activity for 90 , 110 and 127 days respectively. Fumigation test with trebon at different rates of application showed no remarkable effect on *An.stephensi*. In a village scale trial , the residual activity of trebon and impact of house spraying on population density of vectors at 100 and 200 mg a.i. mg/m^2 were studied in Philippines (1). Trebon at the later dosages on the treated surfaces showed the residual activity for about 5-7 months.

In our study , bio-assay mortality tests in south of Iran indicated that trebon at 500 , 400 and 250 mg/m^2 has the residual activities for about 4, 3 and 2.5 months on different surfaces. Based on the results of this study and regarding the seasonal activity of anophelinae mosquitoes and duration of malaria transmission in malarious areas in different parts of Iran , 500 mg/m^2 and 250 mg/m^2 could be the candidiate rates for continuation of study in large scale trial in south of Iran.

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