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REPORT OF THE THIRD WHOPES WORKING GROUP MEETING

WHO/HQ, GENEVA
23-24 SEPTEMBER 1999

REVIEW OF:

DELTAMETHRIN 1% SC AND 25% WT
ETOFENPROX 10% EC AND 10% EW

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1. Introduction

Dr Lorenzo Savioli, Co-ordinator of Strategy Development and Monitoring for Parasitic Diseases and Vector Control (PVC), Communicable Diseases Control, Prevention and Eradication (CPE) opened the meeting. He presented the new organizational chart of the Communicable Diseases and explained how different vector-borne disease control programmes, especially Roll Back Malaria, interact within the Communicable Diseases Cluster (CDS). He also informed participants of the specific role and function of Vector Control Group, within CDS.

Dr Morteza Zaim, Scientist in charge of the WHO Pesticide Evaluation Scheme (WHOPES) recalled that the first and second meeting of the WHOPES Working Group, the scientific committee to assist WHOPES in the review of the reports of testing/evaluation of pesticides in the Scheme, were held in 1997 and 1998[1,2]. He informed that the present meeting was convened to review the reports of the testing/evaluation of deltamethrin 10% suspension concentrate (SC) and 25% water dispersible tablet (WT) (AgrEvo, Germany), as well as etofenprox 10% emulsifiable concentrate (EC) and 10% emulsion, oil in water (EW) (Mitsui Chemicals, Japan), for impregnation of bednets for malaria vector control.

Dr Zaim emphasized that one of the mandates of WHOPES is to collect, consolidate and disseminate information on the use of pesticides for public health use.

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[1] Report of the first WHOPES Working Group meeting, WHO/HQ, Geneva, 26-27 June 1997, World Health Organization (CTD/WHOPES/97.5).

[2] Report of the second WHOPES Working Group meeting, WHO/HQ, Geneva, 22-23 June 1998, World Health Organization (CTD/WHOPES/98.10).

The collection of data includes the information, which is already available in the literature, reports provided to WHOPES by Member Countries, or through the studies directly supervised by WHOPES.

Once a product is found to meet the requirements of the Scheme, specifications are prepared and published[3]. The specifications are part of the International Code of Conduct on the Distribution and Use of Pesticides and are used in international trade for quality control.

Dr Zaim also emphasized that the main objective of the WHOPES testing/evaluation of insecticides is to study the properties of the products and their impact on the vector population. Therefore, safety, determination of the application dose, residual activity, efficacy in different ecological settings, ease of application, acceptability, resistance assessment and cost-effectiveness are the main objectives of the programme. Epidemiological studies are only carried out where appropriate.

Dr Zaim noted that diagnostic concentration has been established for deltamethrin and etofenprox, for adult malaria vectors, as 0.05 and 0.5%, respectively, using WHO standard test tubes and one hour exposure.

The meeting was attended by 7 scientists (see list of participants, Annex 2). Mrs R. Njau was appointed as Chairperson and Dr J. Lines as Rapporteur. The meeting was convened in plenary sessions at WHO/HQ in Geneva, 23-24 September 1999, and the reports of the WHOPES supervised trials, relevant published literature, as well as the reports submitted by the national disease and vector control programmes (see bibliography, Annex 1) were fully

[3] WHO specifications for public health pesticides are available on WHO homepage on Internet (www.who.ch/ctd).

discussed. Recommendations on the use of the above-mentioned products were made.

2. Review of Deltamethrin SC and WT

Deltamethrin was the first of the single-isomer alpha-cyano pyrethroids to be used widely: it was made in 1974 and first marketed in 1977. Suspension concentrate (SC) formulations of deltamethrin have been available for several years; the water dispersible tablet (WT) formulation (which is a freeze-dried SC) was developed more recently, specifically for treatment of mosquito nets.

The International Programme on Chemical safety (IPCS) (reference) has reviewed the human and environmental safety of deltamethrin (IPCS, 1990). The IPCS concludes that under recommended conditions of use, deltamethrin is not likely to present a hazard to the general population or to those who are occupationally exposed, and that it is not likely to attain levels of adverse environmental significance. Nevertheless, like all pyrethroids, deltamethrin is highly toxic to fish and aquatic invertebrates.

The following are the extracts of the IPCS Environmental Health Criteria on deltamethrin and the observations of the Group:

- deltamethrin is readily absorbed by the oral route, but less so dermally; the rate of absorption is strongly dependent on the carrier or solvent. Absorbed deltamethrin is readily metabolised and excreted.

- Deltamethrin is relatively immobile in the environment, as it is adsorbed strongly onto particles in soil and water. Degradation to less toxic products is rapid.

- The vapour pressure of deltamethrin is 2.0×10^{-6} Pa at 25 °C and it is practically non-volatile.

- Deltamethrin is not a skin sensitiser in the guinea pig. Absorbed deltamethrin is rapidly metabolised and excreted; it does not accumulate. Rats and mice showed no systemic toxicity or raised tumour incidence after two years of feeding on 50 - 100 mg/kg. However, rats given 10 mg/kg per day showed hyperirritability. In a 2 year study on dogs, the no-observed-effect-level (NOEL) was 1 mg/kg per day (the equivalent for a 10 kg child would be 10 mg, or about one fortieth of the amount on a net, per day).

- Deltamethrin can induce skin sensations in exposed workers. Several non-fatal cases of poisoning have been reported, involving symptoms of numbness, itching, tingling, etc. [Such symptoms of paraesthesia are well-known to those professionally involved in dipping nets.] In all the reported cases, these symptoms were invariably transient, even in production workers who claimed to be regularly exposed.

- It appears to be quite difficult to kill oneself with deltamethrin. For example, a young man and a teenage girl swallowed 70 and 200 ml, respectively, of a 2.5% EC formulation. Although she lost consciousness and needed a stomach pump, he suffered no signs of neurotoxicity and both