GENERIC RISK ASSESSMENT MODEL FOR INDOOR AND OUTDOOR SPACE SPRAYING OF INSECTICIDES

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World Health Organization

Generic risk assessment model for indoor and outdoor space spraying of insecticides

First revision (February 2011)



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Contents

| Acknowledgementsv |
|--|
| Acronyms and abbreviationsvi |
| 1. Introduction1 |
| 2. Purpose1 |
| 3. Background1 |
| 3.1 Probabilistic vs. deterministic risk assessment models2 |
| 3.2 Essential elements of a human health risk assessment model |
| 4. The human health risk assessment model4 |
| 4.1 Hazard assessment4 |
| 4.1.1 Sources of data4 |
| 4.1.2 Types of health hazard data5 |
| 4.1.3 Range of toxicity tests normally required for pesticide |
| approval6 |
| 4.1.4 Evaluation of the toxicity information7 |
| 4.1.5 Insecticides not recommended for use in space spraying8 |
| 4.1.6 Other special considerations in hazard assessment8 |
| 4.1.7 Dose-response assessment and setting of acceptable |
| exposure9 |
| 4.2 Human exposure assessment13 |
| 4.2.1 General parameters for exposure assessment |
| 4.2.2 Algorithms used to estimate exposure and absorbed |
| dose caused by indoor or outdoor space spraying of |
| insecticides19 |
| 4.2.3 Total exposure assessment25 |
| 4.3 Risk characterization26 |

| 5. The environmental risk assessment model | 26 |
|--|----|
| 5.1 Environmental exposure assessment | 28 |
| 5.1.1 Air | 28 |
| 5.1.2 Soil | 30 |
| 5.1.3 Surface water and aquatic sediment | 34 |
| 5.2 Effects | 37 |
| 5.2.1 Aquatic organisms | 37 |
| 5.2.2 Soil organisms and soil function | 41 |
| 5.2.3 Non-target terrestrial arthropods including honeybees | 43 |
| 5.2.4 Terrestrial vertebrates | 43 |
| 5.2.5 Higher terrestrial plants | 46 |
| 6. Conclusions | 47 |
| 7. Summary of the human health risk assessment model and a worked | |
| example | 48 |
| 8. Summary of the environmental risk assessment model and a worked | |
| example | 56 |
| References | 60 |

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Based on experience from use gathered since 2009, and also to make use of emerging new information, the document was revised in February 2011 by the original drafting committee.

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The Department welcomes feedback on the guidelines and suggestions for improvement from national programmes, research institutions and industry in order to improve future editions.

Acronyms and abbreviations

| ADI | acceptable daily intake |
|--------------------|---|
| a.i. | active ingredient |
| ARfD | acute reference dose |
| ATSDR | Agency for Toxic Substances and Disease |
| | Registry |
| BCF | bioconcentration factor |
| BMD | benchmark dose |
| DDD | daily dietary dose |
| DFI | daily food intake |
| DHF | dengue haemorrhagic fever |
| EC | European Commission |
| EC ₅₀ | concentration having a 50% effect on test |
| 30 | populations against a specific end-point |
| EFSA | European Food Safety Authority |
| ETR | exposure-toxicity ratio |
| EU | European Union |
| FUROPOEM | European Predictive Operator Exposure Model |
| GLP | good laboratory practice |
| quideline scenario | exposure scenario which assumes that the |
| guidenne seenano | insecticide is used according to the instructions |
| | given on the product label and in WHO guideline |
| | information |
| INDC | International Agency for Research on Cancer |
| IDCS | International Agency for Research on Cancel |
| | loint Mosting on Desticide Management |
| | Joint Meeting on Pesticide Management |
| JMPR | tranical conditions are accommodated and no |
| | norsenal protective equipment other than light |
| | slothing covaring the trunk only is assumed |
| 16 | cioling covering the trunk only is assumed |
| | Concentration kining 50% of the test organisms |
| | lowest-observed-doverse-enect-level |
| LUEC | IOWEST-ODSERVED-Effect concentration |
| MRL | |
| NOAEL | no-observed-adverse-effect-level |
| NUEL | no-observed effect concentration |
| OECD | Organisation for Economic Co-operation and |
| | Development |
| OEL | occupational exposure level |
| PEC | predicted environmental concentration |
| PNEC | predicted no-observed-effect concentration |
| PPE | personal protective equipment |
| PSD | Pesticides Safety Directorate |
| RfC | reference concentration |
| RfD | reference dose |
| RPE | respiratory protective equipment |
| TSD | tolerable systemic dose |
| TWA | time-weighted average |
| TWAC | time-weighted average concentration |
| UF | uncertainty factor |
| UKPOEM | UK Predictive Operator Exposure Model |
| USEPA | United States Environmental Protection Agency |

1. Introduction

Space spraying is the dissemination of small particles (less than 30μ m) that will remain airborne sufficiently long (usually not more than 30μ m) that make contact with flying target species. Because this type of treatment is not intended to leave a residual deposit, it involves a very low dosage of insecticide. Sequential space-spray applications of insecticides are usually needed to control the emerging adult populations and are commonly used for vector-borne diseases such as dengue and malaria and in public health pest control programmes against nuisance mosquitoes and flies.

There are essentially two methods of creating a space spray – thermal and cold fogging, using portable, vehicle-mounted and aerial equipment. The formulations commonly used for such applications are hot fogging concentrates, ultra-low-volume liquids, oil-in-water emulsions and emulsifiable concentrates.

WHO has already published procedures for space-spray application of insecticides in public health (WHO, 2003), specifications for equipment to apply space sprays (WHO, 2006), and requirements, procedures and criteria for testing and evaluation of insecticides for space spraying (WHO, 2009a).

2. Purpose

This document provides a generic model that can be used for risk assessment of exposure to insecticide products applied as space treatment, both indoors and outdoors, against flying insect vectors and pests of public health importance. It aims to harmonize the risk assessment of such insecticides for public health use. The assessment considers both adults and children and people in the following specific categories:

- those preparing the spray;
- those applying the spray;

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