

GENERIC RISK ASSESSMENT MODEL FOR INSECTICIDES USED FOR LARVICIDING AND MOLLUSCICIDING

SECOND EDITION



World Health
Organization

Generic risk assessment model for insecticides used for larviciding and mollusciciding

2nd Edition



**World Health
Organization**

World Health Organization
Communicable Diseases cluster
Department of Control of Neglected Tropical Diseases
Vector Ecology and Management
&

Climate and Other Determinants of Health cluster
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The Secretariat revised the document based on these comments; advice was then sought on open questions during an expert consultation from Health Canada of the Government of Canada, the British Health and Safety Executive, the Finnish Institute of Occupational Health and the Dutch National Institute for Public Health and the Environment (RIVM). The document was then finalized by the Secretariat as the second edition. Comments received during peer review and the views of experts consulted during the expert consultation were advisory in nature, and the contents of the document are the responsibility of the Secretariat.

Terminology, abbreviations and acronyms

ADI	acceptable daily intake
a.i.	active ingredient
ARfD	acute reference dose
AUC	area under curve
BCF	bioconcentration factor
BMD	benchmark dose
CICAD	Concise International Chemical Assessment Document
C _{max}	peak plasma concentration
DDD	daily dietary dose
DFI	daily food intake
EC	European Commission
EC50	concentration having a 50% effect on test populations against a specific end-point
EFSA	European Food Safety Authority
EPPO	European and Mediterranean Plant Protection Organization
ETR	exposure–toxicity ratio
EU	European Union
EUROPOEM	European Predictive Operator Exposure Model
GHS	Globally Harmonized System of Classification and Labelling of Chemicals (United Nations, 2015)
GLP	good laboratory practice
guideline scenario	exposure scenario which assumes that the product is used according to the instructions given on the product label and in WHO guideline information
IARC	International Agency for Research on Cancer
IPCS	International Programme on Chemical Safety
JMPM	Joint Meeting on Pesticide Management
JECFA	Joint FAO/WHO Expert Committee on Food Additives
JMPR	Joint Meeting on Pesticide Residues
lax standard scenario	exposure scenario in which no personal protective equipment other than light clothing covering the trunk is assumed
LC50	concentration killing 50% of the test organisms
LOAEL	lowest-observed-adverse-effect-level
LOEC	lowest-observed-effect concentration
NOAEL	no-observed-adverse-effect-level
NOEC	no-observed effect concentration
NOED	no-observed effect dose (terminology used in environmental risk assessment (EPPO, 2003))
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
RfC	reference concentration
RfD	reference dose
RPE	respiratory protective equipment
TSD	tolerable systemic dose
TSD _{AC}	tolerable systemic dose, acute exposure
TWA	time-weighted average
TWAC	time-weighted average concentration
UF	uncertainty factor
UKPOEM	UK Predictive Operator Exposure Model
USEPA	United States Environmental Protection Agency
WHO	World Health Organization
WHOPES	World Health Organization Pesticide Evaluation Scheme
WP	wettable powder formulation, diluted in water before use

This generic risk assessment model can be applied for both larviciding and mollusciciding products. The terms “insecticide” or “pesticide” are used in this document as generic terms and should be understood to refer also to chemical products used to control larvae, snails and relevant life-cycle stages as appropriate. A risk assessment model for vector traps which use larvicides or adulticides is annexed to this document.

A number of products can be used in larviciding.¹ These are chemical insecticides, including insect growth regulators and juvenile hormone mimics; biological/microbial formulations (e.g. bacterial larvicides); petroleum and other types of oils; and monomolecular surface films. The WHO-recommended larvicide classes are: bacterial larvicides; benzoylureas; juvenile hormone mimics; organophosphates; and spinosyns. The end-use larvicide products include liquid formulations (emulsifiable concentrates and suspension concentrates) as well as solid formulations (tablets for direct application; granules; matrix release formulations; water-dispersible granules; and wettable powders). The solid formulations are designed either for immediate release of their active ingredients into water, or their solid matrix provides a slow and prolonged release of the active ingredients giving a prolonged residual action of weeks or months, and applied in certain habitats, e.g. water-storage containers.

Schistosomiasis is an acute and chronic neglected tropical disease caused by infection with the larval forms of parasitic worms. Fresh-water snails are an intermediate host of the causative agent, the trematode worms of the genus *Schistosoma*. Mollusciciding, i.e. decreasing the populations of the host snails by application of molluscicides, is a component

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