GENERIC RISK ASSESSMENT MODEL FOR INSECTICIDES USED FOR LARVICIDING



Generic risk assessment model for insecticides used for larviciding



DEPARTMENT OF CONTROL OF NEGLECTED TROPICAL DISEASES HIV/AIDS, TUBERCULOSIS, MALARIA AND NEGLECTED TROPICAL DISEASES WHO PESTICIDE EVALUATION SCHEME

DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT HEALTH SECURITY AND ENVIRONMENT CHEMICAL SAFETY WHO Library Cataloguing-in-Publication Data

Generic risk assessment model for insecticides used for larviciding.

WHO/HTM/NTD/WHOPES/2010.4

1.Insecticides - toxicity. 2.Risk assessment - methods. 3.Environmental exposure. 4.Larva. 5.Vector control. I.World Health Organization. II.WHO Pesticide evaluation scheme.

(NLM classification: WA 240)

ISBN 978 92 4 159956 1

© World Health Organization 2010

All rights reserved. Publications of the World Health Organization can be obtained from WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland (tel.: +41 22 791 3264; fax: +41 22 791 4857; e-mail: bookorders@who.int). Requests for permission to reproduce or translate WHO publications – whether for sale or for noncommercial distribution – should be addressed to WHO Press, at the above address (fax: +41 22 791 4806; e-mail: permissions@who.int).

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by the World Health Organization to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use.

WHO/HTM/NTD/WHOPES/2010.4

Contents

		P	age
Ac	know	edgements	vii
Acronyms and abbreviations			
1.	Intr	duction	1
2.	Purp	ose	1
3.	Back	ground	2
		Probabilistic vs deterministic risk assessment models Essential elements of a human health risk assessment model	2 3
4.		Hazard assessment (hazard identification and hazard characterization) 4.1.1 Sources of data 4.1.2 Types of health hazard data 4.1.3 Range of toxicity tests normally required for pesticide approval 4.1.4 Evaluation of the toxicity information 4.1.5 Insecticides not recommended for use in larviciding 4.1.6 Other special considerations in hazard assessment 4.1.7 Dose-response assessment and setting of acceptable exposure levels Human exposure assessment 4.2.1 General parameters for exposure assessment 4.2.2 Algorithms used to estimate exposure and absorbed dose caused by larviciding 4.2.3 Total exposure assessment 4.2.4 Uncertainties in exposure-determining factors and risk calculations Risk characterization	4 4 4 5 7 8 8 9 9 14 15 18 22 22 22
5.	5.1	Environmental risk assessment model Environmental exposure assessment 5.1.1 Air 5.1.2 Soil 5.1.3 Surface water and aquatic sediment Effects 5.2.1 Aquatic organisms 5.2.2 Soil organisms and soil function 5.2.3 Non-target terrestrial arthropods including honeybees 5.2.4 Terrestrial vertebrates 5.2.5 Higher terrestrial plants	23 25 25 26 30 33 33 37 39 41
6.	Con	lusions	41
	wor	mary of the human health risk assessment model and a sed example	42
8.		mary of the environmental risk assessment model and a sed example	49
Re	feren	-	53

Acknowledgements

The first draft of these generic models was prepared by a drafting committee appointed by the World Health Organization (WHO) and composed of Dr Milja Mäkinen, Finnish Institute of Occupational Health, Kuopio, Finland; Dr Tiina Santonen, Finnish Institute of Occupational Health, Helsinki, Finland; Dr Antero Aitio, private consultant, Helsinki, Finland; Dr Stuart Dobson OBE, Birchtree Consultants Ltd., Peterborough, UK; and Dr Morteza Zaim, WHO Pesticide Evaluation Scheme (WHOPES), Geneva, Switzerland. None of the drafting committee members declared an interest in the subject matter of these guidelines.

The first draft of the guidelines was peer reviewed by individuals and institutions known for their expertise in the subject. The peer review group comprised Dr Marc Baril, Institut de recherche Robert-Sauvé en santé et en sécurité au travail (IRSST), Montreal, Canada; Dr Nida Besbelli, United Nations Environment Programme (UNEP), Geneva, Switzerland; Dr Mark Birchmore, Syngenta Ltd., Basel, Switzerland; Dr Louise Blake, Syngenta Ltd., Surrey, UK; Dr Richard Brown, WHO Programme on Chemical Safety, Geneva, Switzerland; Dr Henk Bouwman, School of Environmental Sciences and Development, North-West University, Potchefstroom, South Africa; Dr Rajendra S. Chhabra, National Institute of Environmental Health Sciences, Research Triangle Park, NC, USA; Dr Otto Hänninen, National Institute for Health and Welfare (THL), Kuopio, Finland; Dr Mark Latham, Manatee County Mosquito Control District, Palmetto, FL, USA; Professor Dr Graham A. Matthews, Imperial College, Ascot, UK; Dr David J. Miller, Dr Matthew Crowley and Dr Jeff Evans, United States Environmental Protection Agency (USEPA), Office of Pesticide Programs, Health Effects Division, Washington DC, USA; Dr Laurent Patty, Bayer Environmental Science, Lyon, France; Dr Luba Tomaska and Dr Matthew Bulters, Australian Commonwealth Department of Health, Office of Chemical Safety, Canberra, Australia; Dr Carolyn Vickers, WHO Programme on Chemical Safety, Geneva, Switzerland; and Dr Ohri Yamada, French Agency for Environmental and Occupational Health Safety (Afsset), Maisons-Alfort, France.

The above-mentioned drafting committee considered all comments received and prepared a second draft. This revised draft was reviewed and discussed at a WHO consultation held at the Finnish Institute of Occupational Health in Helsinki (Finland) on 23–25 June 2009. The experts appointed by WHO were Dr Nida Besbelli, Dr Henk Bouwman, Dr Otto Hänninen, Dr Mark Latham and Professor Dr Graham A. Matthews. Dr Carolyn Vickers (WHO Programme on Chemical Safety) and Dr Morteza Zaim (WHOPES) took part in reviewing the revised draft. None of the experts participating in the consultation declared an interest in the subject matter of these guidelines.

The WHO Department of Control of Neglected Tropical Diseases acknowledges the individuals and institutions listed above for their important contributions to this work. It also expresses its sincere thanks to Professor Matthews for his valuable support and technical advice in all phases of the drafting process. The financial support provided by the Bill & Melinda Gates Foundation is also gratefully acknowledged.

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



https://www.yunbaogao.cn/report/index/report?reportId=5_28661

