

# Pesticide residues in food—2003

WHO/PCS/04.1

## Toxicological evaluations

**Sponsored jointly by FAO and WHO  
With the support of the International Programme  
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**Joint Meeting of the  
FAO Panel of Experts on Pesticide Residues  
in Food and the Environment  
and the  
WHO Core Assessment Group**

**Geneva, Switzerland, 15–24 September 2003**

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\* First full evaluation

\*\* Evaluated within the periodic review programme of the Code Committee on Pesticide Residues

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Pesticide Residues in Food and the Environment  
and the WHO Core Assessment Group**

**Geneva, 15–24 September 2003**

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## Abbreviations used

ADI	acceptable daily intake
ai	active ingredient
AUC	area under the curve for concentration–time
bw	body weight
CCN	Codex classification number (for compounds or commodities)
CCPR	Codex Committee on Pesticide Residues
CYP	cytochrome P450
CXL	Codex level
DMSO	dimethyl sulfoxide
ECD	electron capture detection
F <sub>0</sub>	parental generation
F <sub>1</sub>	first filial generation
F <sub>2</sub>	second filial generation
FAO	Food and Agricultural Organization of the United Nations
FOB	functional observational battery
GC	gas chromatography
GCP	good clinical practice
GLC	gas–liquid chromatography
GLP	good laboratory practice
GPC	gel-permeation chromatography
GEMS/Food	Global Environment Monitoring System–Food Contamination Monitoring and Assessment Programme
GSH	glutathione
HPLC	high-performance liquid chromatography
IARC	International Agency for Research on Cancer
IEDI	international estimated daily intake
IESTI	international estimate of short-term dietary intake
ISO	International Standards Organization
JECFA	Joint Expert Committee on Food Additives
JMPR	Joint Meeting on Pesticide Residues
LC	liquid chromatography
LC <sub>50</sub>	median lethal concentration
LD <sub>50</sub>	median lethal dose
LOAEL	lowest-observed-adverse-effect level
LOAEC	lowest-observed-adverse-effect concentration
LOD	limit of detection
LOQ	limit of quantification
MDL	method detection limit
MLD	minimum level of detection
MRL	maximum residue limit
MS	mass spectrometry
MS/MS	tandem mass spectrometry
NAD	nicotinamide adenine dinucleotide
NADP	nicotinamide adenine dinucleotide phosphate
NADPH	nicotinamide adenine dinucleotide phosphate, reduced form
NOAEL	no-observed-adverse-effect level
NOEL	no-observed-effect level

OECD	Organization for Economic Co-operation and Development
RfD	reference dose
TMDI	theoretical maximum daily intake
UV	ultraviolet radiation
WHO	World Health Organization

## Introduction

The toxicological monographs and monograph addenda contained in this volume were prepared by a WHO Core Assessment Group that met with the FAO Panel of Experts on Pesticide Residues in Food and the Environment in a Joint Meeting on Pesticide Residues (JMPR) in Geneva, Switzerland, on 15–24 September 2003.

Four of the compounds evaluated by the Core Assessment Group at the Meeting, cyprodinil, famoxadone, methoxyfenozide and pyraclostrobin, were evaluated for the first time. The other eight substances had been evaluated at previous meetings. For five of these, only information received since the previous evaluations is summarized in “monograph addenda”. Of these, dimethoate, malathion, phosmet and tebufenozide were evaluated for establishment of an acute reference dose. The appropriate earlier documents on the five compounds should be consulted in order to obtain full toxicological profiles. Toxicological monographs were prepared on carbosulfan, paraquat and terbufos, summarizing new data and, where relevant, incorporating information from previous monographs and addenda. Reports and other documents resulting from previous Joint Meetings on Pesticide Residues are listed in Annex 1.

The report of the Joint Meeting has been published by the FAO as *FAO Plant Production and Protection Paper 176*. That report contains comments on the compounds considered, acceptable daily intakes established by the WHO Core Assessment Group, and maximum residue limits established by the FAO Panel of Experts. Monographs on residues prepared by the FAO Panel of Experts are published as a companion volume, as *Evaluations 2003, Part I, Residues*, in the FAO Plant Production and Protection Paper series.

The toxicological monographs and addenda contained in this volume are based on working papers that were prepared by temporary advisers before the 2003 Joint Meeting. A special acknowledgement is made to those advisers. The monographs were edited by Dr H. Mattock, St Jean d’Ardières, France.

The preparation and editing of this volume was made possible by the technical and financial contributions of the lead institutions of the International Programme on Chemical Safety (IPCS), which supports the activities of the JMPR. 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 Central Unit of the IPCS concerning the legal status of any country, territory, city or area or of its authorities, nor concerning the delimitation of its frontiers or boundaries. The mention of specific companies or of certain manufacturers’ products does not imply that they are endorsed or recommended by the IPCS in preference to others of a similar nature that are not mentioned.

Any comments or new information on the biological properties or toxicity of the compounds included in this volume should be addressed to: Joint WHO Secretary of the Joint FAO/WHO Meeting on Pesticide Residues, International Programme on Chemical Safety, World Health Organization, 20 Avenue Appia, 1211 Geneva, Switzerland.

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