Pesticide residues in food – 2006

Joint FAO/WHO Meeting on Pesticide Residues

FAO PLANT PRODUCTION AND PROTECTION PAPER

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PART I – RESIDUES
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Pesticide residues in food 2006

Evaluations
Part I – Residues

FAO PLANT PRODUCTION AND PROTECTION PAPER

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Sponsored jointly by FAO and WHO

Joint meeting of the FAO Panel of Experts on Pesticide Residues in Food and the Environment and the WHO Core Assessment Group Rome, Italy, 3–12 October 2006

WORLD HEALTH ORGANIZATION FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS Rome, 2007

Monographs containing summaries or residue data and toxicological data considered at the 2006 JMPR, together with recommendations, are available upon request from FAO or WHO under the title:

Pesticide residues in food 2006
Evaluations
Part I: Residues
FAO Plant Production and Protection Paper
and
Part II: Toxicology
WHO

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INTERNATIONAL PROGRAMME ON CHEMICAL SAFETY

The preparatory work for the toxicological evaluation of pesticide residues carried out by the WHO Expert Group on Pesticide Residues for consideration by the FAO/WHO Joint meeting on Pesticide Residues in Food and the Environment is actively supported by the International Programme on Chemical Safety (IPCS).

IPCS is a joint venture of the United Nations Environment Progamme, the International Labour Organization and the World Health Organization. One of the main objectives of IPCS is to carry out and disseminate evaluations of the effects of chemicals on human health and the quality of the environment.

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 $^{^{\}mathcal{V}}$ Evaluated for the Periodic Review Programme of the Codex Committee on Pesticide Residues. $^{\mathcal{V}}$ New compound.

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ABBREVIATIONS

(Well-known abbreviations in general use are not included. Specific abbreviations for pesticide degradation products, etc., may be used in the monographs and these are either identified where first used or in a table within the monograph. Two-letter codes for pesticide formulations are given in the Manual on development and use of FAO and WHO specifications for pesticides, 1st Ed., FAO Plant Production and Protection Paper 173, FAO, Rome, 2002.)

AChE anti-acetylcholinesterase

ACN acetonitrile

ADI acceptable daily intake

AFID alkali flame-ionization detection or detector (equivalent to TSD, forerunner of NPD)

ai active ingredient
AR Applied radioactivity
ARfD acute reference dose

AUC area under the curve for concentration–time

BBCH Biologische Bundesanstalt, Bundessortenamt and Chemical industry.

BMDL₁₀ benchmark-dose lower 95% confidence level

bw body weight

CA Chemical Abstracts

CAC Codex Alimentarius Commission CAS Chemical Abstracts Services

CCN Codex classification number (for compounds or commodities)

CCPR Codex Committee on Pesticide Residues

CCRVDF Codex Committee on Residue of Veterinary Drugs in Food

CEC cation exchange capacity
CI chemical ionization

CV coefficient of variation (RSD)

CXL Codex Maximum Residue Limit (Codex MRL). See MRL

d days

DAT days after (last) treatment

DCM dichloromethane

DFG Deutsche Forschungsgemeinschaft DT_{50} time for 50% decomposition (i.e. half-life)

DT₉₀ time for 90% decomposition

2D-TLC two dimensional thin layer chromatography

dw dry weight

ECD electron capture detection or detector

EI electron-impact (ionization), now more usually electron ionization

EPA Environmental Protection Agency (usually US EPA)

eq residue expressed as ai equivalent

 F_1 first filial generation F_2 second filial generation

FAO Food and Agriculture Organization of the United Nations

FID flame-ionization detection or detector FPD flame-photometric detection or detector

GAP good agricultural practice(s)

x abbreviations

GC gas chromatography; the detector system used is usually also abbreviated as a suffix GEMS/Food Global Environment Monitoring System–Food Contamination Monitoring and

Assessment Programme

GLP good laboratory practice (i.e. the defined system, not in the general sense)

GPC gel-permeation chromatography

GSH glutathione

HPLC high-performance liquid chromatography

HPLC-MS high-performance liquid chromatography – mass spectrometry

HPLC-UV high-performance liquid chromatography with UV absorption detection

hr hour

HR highest residue in the edible portion of a commodity found in trials used to estimate a

maximum residue level in the commodity

HR-P highest residue in a processed commodity calculated by multiplying the HR of the

raw commodity by the corresponding processing factor

IARC International Agency for Research on Cancer

IEDI international estimated daily intake

IESTI international estimate of short-term dietary intake IPCS International Programme on Chemical Safety

IR infrared spectroscopy
ITD ion-trap detector or detection

IUPAC International Union of Pure and Applied Chemistry

JECFA Joint Expert Committee on Food Additives JMPR Joint Meeting on Pesticide Residues

JMPS Joint FAO/WHO Meeting on Pesticide Specifications

LC liquid chromatography

LC-MS liquid chromatography – mass spectrometry

LC₅₀ median lethal concentration

LD₅₀ median lethal dose

LOAEL lowest-observed-adverse-effect level

LOAEC lowest-observed-adverse-effect concentration

LOD limit of detection LOQ limit of quantification

LSC liquid scintillation counting or counter

M molar = mole/L

MID multiple ion detection (mass spectrometric)

MRL Maximum Residue Limit. MRLs include <u>draft</u> MRLs and <u>Codex</u> MRLs (CXLs). The

MRLs recommended by the JMPR on the basis of its estimates of maximum residue levels enter the Codex procedure as draft MRLs. They become Codex MRLs when they have passed through the procedure and have been adopted by the Codex

Alimentarius Commission.

MS mass spectrometry or mass spectrometric detector (suffix to GC- or LC-)

MSD mass-selective detection or detector

MS/MS tandem mass spectrometry

NOAEL no-observed-adverse-effect level NMR nuclear magnetic resonance NPD nitrogen/phosphorus detector

OECD Organization for Economic Co-operation and Development

om amount of organic matter in soil

abbreviations Xi

PES post extracted solids PF processing factor PHI pre-harvest interval

ppm parts per million (used only with reference to the concentration of a pesticide in a

diet, in all other contexts the terms mg/kg or mg/l are used)

P_{ow} octanol-water partition coefficient

RAC raw agricultural commodity

r.d. relative density (formerly called specific gravity)
RfD reference dose (usually in phrase "acute RfD")

RSD precision under repeatability conditions (measurements within one day or one run)

expressed as relative standard deviation (= coefficient of variation)

SD standard deviation

SPE solid-phase extraction (may also describe a post-extraction clean-up process)

STMR supervised trials median residue

STMR-P supervised trials median residue in a processed commodity calculated by multiplying

the STMR of the raw commodity by the corresponding processing factor

t tonne (metric ton)

TAR total applied (or administered) radioactivity

TLC thin-layer chromatography TRR total radioactive residue

TMDI theoretical maximum daily intake

TSD thermionic specific detection or detector (equivalent to AFID, forerunners of NPD)

USDA US Department of Agriculture US FDA US Food and Drug Administration

UV ultraviolet (radiation)

W the previous recommendation is withdrawn, or withdrawal of the existing Codex or

draft MRL is recommended

WHO World Health Organization

USE OF JMPR REPORTS AND EVALUATIONS BY REGISTRATION AUTHORITIES

Most of the summaries and evaluations contained in this report are based on unpublished proprietary data submitted for use by JMPR in making its assessments. A registration authority should not grant a registration on the basis of an evaluation unless it has first received authorization for such use from the owner of the data submitted for the JMPR review or has received the data on which the summaries are based, either from the owner of the data or from a second party that has obtained permission from the owner of the data for this purpose.

INTRODUCTION

The Report of the Joint Meeting of the FAO Panel of Experts on Pesticide Residues in Food and the Environment and the WHO Core Assessment Group (JMPR), held in Rome, 3-12 October 2006, contains a summary of the evaluations of residues in foods of the various pesticides considered, as well as information on the general principles followed by the Meeting (JMPR, 2006). The present document contains summaries of the residues data considered, together with the recommendations made.

The Evaluations are issued in two parts:

Part I: Residues (by FAO); Part II: Toxicology (by WHO).

For those interested in both aspects of pesticide evaluation, both parts and the Report containing summaries of residues and toxicological considerations are available.

Some of the compounds considered at the Meeting were previously evaluated and reported on in earlier publications. In general, only new information is summarized in the relevant monographs but reference is made to previously published evaluations, which should also be consulted. In the case of older compounds which are re-evaluated as part of the periodic review programme of the CCPR, a review of all available data, including data which may have previously been submitted, is carried out. Compounds evaluated for the first time and those evaluated in the CCPR periodic review programme are identified in the Table of Contents.

Summaries of recommended MRLs, STMR and HR levels and assessments of dietary intake, are published as Annexes 1, 3 and 4 in the Report, and reference is made to this report.

The name of the compound appearing as the title of each monograph is followed by its Codex Classification Number in parentheses.

References to previous Reports and Evaluations of Joint Meetings are listed in Annex I.

Acknowledgements

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Note. Any comment on pesticide residues in food and their evaluation should be addressed to the:

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