

# Pesticide residues in food 2006

Evaluations  
Part I – Residues

FAO  
PLANT  
PRODUCTION  
AND PROTECTION  
PAPER

**189/1**

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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  
Rome, Italy, 3–12 October 2006

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 Programme, 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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## 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, 1<sup>st</sup> 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.
BMDL <sub>10</sub>	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 <sub>50</sub>	time for 50% decomposition (i.e. half-life)
DT <sub>90</sub>	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 <sub>1</sub>	first filial generation
F <sub>2</sub>	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)



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
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
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

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.

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- 5 Les systèmes pastoraux sahéliens, 1977 (F)
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- 6/3 Pest resistance to pesticides and crop loss assessment – Vol. 3, 1981 (E F S)
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