

4. DIETARY RISK ASSESSMENT FOR PESTICIDE RESIDUES IN FOODS

At the present Meeting, compounds with recommended maximum residue levels and estimated STMRs were assessed for risks associated with long-term dietary intake. International estimated daily intakes (IEDIs) were calculated by multiplying the concentrations of residues (STMRs and STMR-Ps) by the average estimated daily per capita consumption for each commodity on the basis of the 13 GEMS/Food Consumption cluster diets.³⁰ IEDIs are expressed as a percentage of the ADI for a 55 kg or 60 kg person, depending on the cluster diet.

The percentages are rounded up to one whole number up to nine and to the nearest 10 above that. Percentages above 100 should not necessarily be interpreted as giving rise to a health concern because of the conservative assumptions used in the assessments.

Hexythiazox was evaluated toxicologically at the current Meeting under the periodic re-evaluation programme, with the previous ADI confirmed. The long-term dietary risk assessment for this compound will be considered at a subsequent Meeting's periodic review of residues.

The assessment for boscalid was not conducted, as STMR values could not be estimated for plant commodities due to a lack of data on follow crops. Consequently a complete dietary risk assessment could not be performed.

The evaluations of bifenazate, carbaryl, chlorpropham, diphenylamine, oxamyl and spinosad performed at this Meeting do not supersede the long-term dietary assessments conducted by previous Meetings of the JMPR for these compounds.

An ADI for prothioconazole was established by the present Meeting. As this parent compound is present in food commodities at very low levels, the residue definition for dietary intake assessment is:

- prothioconazole-desthio metabolite only for plant commodities;
- prothioconazole-desthio plus its 3- and 4-hydroxy derivatives and their conjugates, expressed as prothioconazole-desthio in animal commodities.

Therefore, the long-term dietary risk assessment for prothioconazole was based on prothioconazole-desthio residues and the relevant ADI.

The triazole fungicide metabolites 1,2,4-triazole, 1,2,4-triazolyl-3-alanine and 1,2,4-triazole-1-yl- acetic acid have been considered by the present Meeting following recommendation from the 2007 Meeting of the JMPR (General Consideration 2.3). ADIs were established for 1,2,4-triazole and for 1,2,4-triazolyl-3- alanine/1,2,4-triazole-1-yl acetic acid. These ADIs are intended to provide future guidance in the event these metabolites are found as residues in food commodities. No long-term dietary risk assessment was performed.

A summary of the long-term dietary risk assessments conducted by the present Meeting is presented in Table 7. The detailed calculations of long-term dietary intakes are given in Annex 3. Calculations of dietary intake can be further refined at the national level by taking into account more detailed information, as described in the Guidelines for predicting intake of pesticide residues.³¹

³⁰ <http://www.who.int/foodsafety/chem/gems/en/index1.html>

³¹ WHO (1997) Guidelines for predicting dietary intake of pesticide residues. 2nd Revised Edition, GEMS/Food Document WHO/FSF/FOS/97.7, Geneva

Table 7 Summary of long-term dietary of risk assessments conducted by the 2008 JMPR

CCPR code	Compound Name	ADI (mg/kg bw)	Range of IEDI as % of maximum ADI
229	Azoxystrobin	0–0.2	2–10
173	Buprofezin	0–0.009	0–9
096	Carbofuran	0–0.001	20–70
230	Chlorantraniliprole	0–2	0
146	Cyhalothrin/lambda cyhalothrin	0–0.02	3–10
118	Cypermethrin (includes alpha and zeta cypermethrin)	0–0.02	5–20
027	Dimethoate	0–0.002	20–100
035	Ethoxyquin	0–0.005	0–40
206	Imidacloprid	0–0.06	1–5
049	Malathion	0–0.3	0–3
231	Mandipropamid	0–0.2	0–3
094	Methomyl	0–0.02	0–3
171	Profenofos	0–0.03	1–10
232	Prothioconazole ^a		
	Prothioconazole-desthio	0–0.01	0–1
233	Spinetoram	0–0.05	0–1
234	Spirotetramat	0–0.05	1–10
189	Tebuconazole ^b	0–0.03	1–8

^a Based on prothioconazole-desthio

^b The assessment includes residues at MRL level for some commodities

Assessment of risk from short-term dietary intake

Available consumption data was reviewed at the present Meeting to assess the risks associated with short-term dietary intake for compounds with estimated STMR and HR values and established acute reference doses (ARfDs). The procedures for calculating the short-term intake were defined primarily in 1997 at an FAO/WHO Geneva Consultation³², then refined both at the International Conference on Pesticide Residues Variability and Acute Dietary Risk Assessment sponsored by the Pesticide Safety Directorate, and at subsequent JMPR Meetings.

Data on the consumption of large portions were provided to GEMS/Food by the governments of Australia, France, The Netherlands, Japan, South Africa, Thailand, the UK and the USA. Data on unit weights and per cent edible portions were provided to GEMS/Food by the governments of Belgium, France, Japan, Sweden, the UK and the USA. The body weights of adults and children aged ≤ 6 years were provided to GEMS/Food by the governments of Australia, France, the Netherlands, South Africa, Thailand, the UK and the USA. The consumption, unit weight and body weight data used for the short-term intake calculation were compiled by GEMS/Food.³³ The documents are dated April, 2008 (large portions and body weights) and May, 2003 (unit weights). The procedures used for calculating the International Estimated Short-term Intake (IESTI) are described in detail in Chapter 3

³² WHO (1997) Food consumption and exposure assessment of chemicals. Report of a FAO/WHO Consultation. Geneva, Switzerland, 10–14 February 1997, Geneva

³³ http://www.who.int/foodsafety/chem/acute_data/en/

of the 2003 Report of the JMPR. Detailed guidance on the setting of ARfD is described in Section 2.1 of the 2004 Report of the JMPR.³⁴

On the basis of data received by the present or previous Meetings, JMPR considered the establishment of an ARfD to be unnecessary for azoxystrobin, bifentazate, boscalid, chlorantraniliprole, hexythiazox, mandipropamid, spinetoram, spinosad and the triazole fungicide metabolites 1,2,4-triazoyl-3-alanine and 1,2,4-triazole-1-yl-acetic acid. Therefore, it was not necessary to estimate the short-term intakes for these compounds.

An ARfD for 1,2,4-triazole was established by the present Meeting (0.3 mg/kg bw). This ARfD should provide guidance for future consideration when residues of this metabolite are found in traded food commodities. No short-term dietary intake assessment was performed.

An ARfD for prothioconazole (only for women of childbearing age) was established by the present Meeting. However, as the residue definition for dietary intake does not include the parent compound (see previous section), the short-term dietary assessment was based on prothioconazole-desithio residues and that compounds ARfDs (see Table 8).

The evaluations of bifentazate, chlorpropham, diphenylamine and oxamyl performed at this Meeting do not supersede the short-term dietary intake assessments conducted by previous Meetings of the JMPR for these compounds.

The short-term intake of tebuconazole was estimated by the present Meeting, however the need for an ARfD has not yet been considered by the JMPR. Therefore, the short-term risk assessment for this compound could not be finalized.

The short-term intakes as percentages of the ARfDs for the general population and for children are summarized in Table 8. The detailed calculations of short-term dietary intakes are given in Annex 4.

Table 8 Summary of short-term dietary risk assessments conducted by the 2008 JMPR

CCPR code	Compound Name	ARfD (mg/kg bw)	Commodity	Percentage of ARfD	
				General population	Children aged ≤ 6 years
008	Carbaryl	0.2	All	3–20	10–40
096	Carbofuran	0.001	Banana Cucumber Cantaloupe Mandarins Milks Orange Potato Summer squash Sweet corn on the cob Other commodities	320 510 230 90 190 130 180 360 120 0–40	760 830 700 190 430 290 390 810 280 0–70
173	Buprofezin	0.5	All	0–1	0–3
05	Ethoxyquin	0.5	Pear	20	50
171	Profenofos	1	All	0–6	0–10
146	Cyhalothrin/ lambda cyhalothrin	0.02	All	0–40	0–60
118	Cypermethrin (includes alpha and zeta cypermethrin)	0.04	All	0–40	0–90

³⁴ In: Pesticide Residues in Food–2004. Report of the JMPR 2004, FAO Plant Production and Protection Paper, 178. Rome, Italy, 20–29 September 2004

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CCPR code	Compound Name	ARfD (mg/kg bw)	Commodity	Percentage of ARfD	
				General population	Children aged ≤ 6 years
027	Dimethoate	0.02	Sweet pepper and head lettuce	30–40	80
206	Imidacloprid	0.4	Tree nuts, root and tuber vegetables, berries, animal products	0–10	0–50
049	Malathion	2	Wheat and wheat processed commodities	0–7	0–10
094	Methomyl	0.02	All	0–50	0–100
232	Prothioconazole ^a (Prothioconazole desthio)	1	All	0	0–3
		0.01 ^b	All	0–2 ^b	–
234	Spirotetramat	1	All	0–10	0–40

^a Based on prothioconazole-desthio

^b For women of childbearing age