5.9 Cypermethrins (including alpha- and zeta-cypermethrin) (118)

RESIDUE AND ANALYTICAL ASPECTS

Cypermethrin is a non-systemic pyrethroid insecticide. The mode of action is non-systemic with contact and stomach action. Cypermethrin was first evaluated by JMPR in 1979 and periodic reviews were conducted in 2006 for toxicology and in 2008 for residues. Further evaluations for additional uses were conducted in 2009 and 2011.

The 2006 JMPR established an ADI of 0–0.02 mg/kg bw and an ARfD of 0.04 mg/kg bw. The 2008 JMPR established a residue definition for compliance with the MRL and dietary risk assessment for plant and animal commodities of *cypermethrin (sum of isomers)*. The residue is fat-soluble.

Cypermethrin was scheduled at the Fiftieth Session of the CCPR for evaluation of additional uses by the 2019 JMPR. The Meeting received information on GAP, residue trials and processing studies on ginseng.

Methods of analysis

The analytical method used for analysis of cypermethrin residues in fresh ginseng and the processed products (dried-, red ginseng, the water extracts) involved extraction with acetone or acetonitrile, partitioning with dichloromethane, clean-up using florisil and determination by GC-ECD. Procedural recoveries ranged from 79-106% (RSDs ≤ 10%) and the LOQ values for cypermethrin were 0.03 mg/kg in fresh ginseng and 0.06 mg/kg in the ginseng processed products.

Stability of residues in stored analytical samples

The 2011 JMPR concluded that cypermethrin is stable for at least 18 months in frozen plant matrices of high water and high oil content. The residue sample storage intervals used in the field trials considered by the current Meeting were covered by the demonstrated stability period.

Results of supervised residue trials on ginseng

The critical GAP for cypermethrin on ginseng in the Republic of Korea is 3 foliar applications at a rate of 0.005 kg ai/hL with a 45 day PHI. Six independent trials conducted in the Republic of Korea matched the critical GAP. Cypermethrin residues in fresh ginseng were < 0.03 mg/kg (n = 6).

The Meeting estimated a maximum residue level of 0.03(*) mg/kg, a STMR of 0.03 mg/kg and a HR of 0.03 mg/kg for cypermethrin in ginseng.

Fate of residues during processing

The Meeting received information on the fate of cypermethrin residues during processing of ginseng. In these studies residues of cypermethrin in the raw agricultural commodity (fresh ginseng) were all less than LOQ. Therefore, the Meeting could not estimate processing factors for ginseng processed products.

The Meeting noted that in all the field trials matching GAP, fresh ginseng samples were washed and dried to produce dried ginseng, or steamed and dried to produce red ginseng. Residues of cypermethrin were measured in the dried and red ginseng and in their water extracts.

Cypermethrin residues in dried and red ginseng were < 0.06 (9), 0.06 (2), and 0.10 mg/kg (n = 12).

Cypermethrin residues in water extracts of dried and red ginseng were < 0.06 (12) mg/kg (n = 12).

The Meeting estimated a maximum residue level of 0.15 mg/kg, a STMR of 0.06 mg/kg and a HR of 0.10 mg/kg for cypermethrin in ginseng, dried including red ginseng. The Meeting estimated a

maximum residue level of 0.06(*) mg/kg, a STMR of 0.06 mg/kg and a HR of 0.06 mg/kg for cypermethrin in ginseng, extracts.

RECOMMENDATIONS

On the basis of the data obtained from supervised trials, the Meeting concluded that the residue levels listed in Annex 1 are suitable for establishing maximum residue limits and for IEDI and IESTI assessments.

Definition of the residue for compliance with the MRL for plant and animal commodities: *cypermethrin (sums of isomers)*

Definition of the residue for dietary risk assessment for plant and animal commodities: *cypermethrin (sums of isomers)*

The residue is fat-soluble.

DIETARY RISK ASSESSMENT

Long-term dietary exposure

The ADI for cypermethrin is 0–0.02 mg/kg bw. The STMRs/STMR-Ps for food commodities estimated by the current Meeting did not affect the International Estimated Daily Intakes (IEDIs) for cypermethrin calculated by the 2011 JMPR. The Meeting concluded that long-term dietary exposure to residues of cypermethrin from uses considered by the JMPR is unlikely to present a public health concern.

Acute dietary exposure

The ARfD for cypermethrin is 0.04 mg/kg bw. The International Estimate of Short Term Intakes (IESTIs) for cypermethrin were calculated for the food commodities (raw and processed commodities) for which HRs/HR-Ps or STMRs/STMR-Ps were estimated by the present Meeting and for which consumption data were available. The results are shown in Annex 4 of the 2019 JMPR Report.

The IESTIs were 0% of the ARfD for children and the general population. The Meeting concluded that acute dietary exposure to residues of cypermethrin from the use considered by the present Meeting is unlikely to present a public health concern.