

5.28 TEBUCONAZOLE (189)

RESIDUE AND ANALYTICAL ASPECTS

Tebuconazole a triazole fungicide was last evaluated for residues in 2011 within the periodic re-review programme. It was listed by the Forty-sixth Session of CCPR (2014) for the evaluation in the 2015 JMPR for additional data on residues. Data was submitted for banana, cucumber, ginseng, asparagus, sunflower, onion bulb; and onion, green. The residue definition for plant commodities for enforcement and risk assessment purposes is tebuconazole. The ADI for tebuconazole is 0-0.03 mg/kg bw and the ARfD is 0.3 mg/kg bw.

Method of analysis and stability of residues

A GC-NPD analytical method was satisfactorily validated for the analysis of tebuconazole in fresh ginseng at a LOQ of 0.03 mg/kg up to 0.5 mg/kg and for processed commodities at a LOQ of 0.06 mg/kg up to 1 mg/kg.

Tebuconazole residues were shown to be stable under frozen conditions (at -20 °C) in fresh ginseng for at least 52 days; in dried ginseng for at least 142 days; in red ginseng for at least 96 days; and in ginseng water extracts for at least 121 days.

The sample storage period used in the trials for ginseng and other commodities evaluated by the present Meeting was within the storage period that guaranteed that the residues in the samples were not degraded.

Residues resulting from supervised trials

Banana

In China, the critical GAPs for tebuconazole in banana is 3 × 0.28 kg ai/ha and 35 days PHI for unbagged banana and 3 × 0.25 kg ai/ha and 14 days PHI for bagged banana.

In eleven trials conducted with unbagged banana in China according to GAP, residues in the whole fruit were 0.10, 0.13 (2), 0.17, 0.19, 0.20, 0.21, 0.37, 0.53, 0.54 and 0.74 mg/kg. Residues in the pulp were 0.02, 0.03, 0.05, 0.06, 0.07 (4), 0.09, 0.15 and 0.16 mg/kg.

In eleven trials conducted with bagged banana according to GAP, residues in the whole fruit were < 0.01 (5), 0.01, 0.03 (2), 0.09, 0.15 and 0.42 mg/kg. Residues in the pulp were < 0.01 (9), 0.04 and 0.10 mg/kg.

Residues from trials conducted with unbagged banana gave the highest residues. The Meeting estimated a maximum residue level of 1.5 mg/kg, a STMR of 0.07 mg/kg and a HR of 0.16 mg/kg for tebuconazole in banana. These estimates replace the previous recommendations for tebuconazole in banana.

Onion, bulb and shallots

In the USA tebuconazole can be applied in onion and shallots at 4 foliar applications at 0.19 kg ai/ha or one furrow at 0.65 kg ai/ha plus 2 foliar at 0.19 kg ai/ha. The PHI is 7 days for both. In eight trials conducted in USA at the foliar GAP, residues were < 0.05 (5). 0.06. 0.08 and 0.09 mg/kg. In five trials conducted using furrow plus foliar application, residues were < 0.02, 0.02, 0.04 (2), and 0.06 mg/kg.

The Meeting agreed that the foliar only trials gave the highest residues and estimated a maximum residue level of 0.15 mg/kg, an STMR of 0.055 mg/kg and an HR of 0.09 mg/kg for tebuconazole in onion, bulb. These estimates replace the previous recommendation for tebuconazole in onion bulb.

The Meeting agreed to extrapolate this estimate to shallots.

Spring onion (Onion, green)

In the USA, tebuconazole can be applied in onions, green with 4 foliar applications at 0.19 kg ai/ha and a 7 day PHI. In three trials conducted in the USA and Canada in 1999 at GAP, residues were 0.06, 0.10 and 0.80 mg/kg.

The Meeting estimated a maximum residue level of 2 mg/kg, a STMR of 0.10 mg/kg and an HR of 0.8 mg/kg for tebuconazole in spring onion.

Cucumber

GAP for tebuconazole in cucumber in China is 3×0.12 kg ai/ha and 5 days PHI. In eight field trials conducted in the country according to GAP, residues were 0.02 (2), 0.03, 0.04, 0.06, 0.07, 0.09 and 0.11 mg/kg. In three protected trials residues were 0.03, 0.04 and 0.06 mg/kg.

Based on the residue data from field trials, the Meeting estimated a maximum residue level of 0.2 mg/kg, an STMR of 0.05 mg/kg and an HR of 0.11 mg/kg for tebuconazole in cucumber. These estimates replace the previous recommendations for tebuconazole in cucumber.

Ginseng

Six trials were conducted with tebuconazole in ginseng in Korea according to GAP (3×0.13 kg ai/ha; 21 days PHI). giving residues in fresh ginseng of 0.03 (2), 0.04, 0.06 (2) and 0.08 mg/kg. Three other trials conducted with 6 applications gave similar results.

The Meeting estimated a maximum residue level of 0.15 mg/kg, an STMR of 0.05 mg/kg and an HR of 0.08 mg/kg for tebuconazole in ginseng.

Asparagus

In the USA the critical GAP for tebuconazole in asparagus is to apply up to 3×0.19 kg ai/ha to the developing ferns after harvest of spears is completed; the PHI is 100 days. In three trials conducted in USA at GAP gave residues of $< \underline{0.02}$ (3) mg/kg.

The Meeting estimated a maximum residue level of 0.02* mg/kg and an STMR and HR of 0.02 mg/kg for tebuconazole in asparagus.

Sunflower

In the USA tebuconazole can be applied to sunflowers at a maximum rate of 0.49 kg ai/ha with a 50 day PHI. In seven trials conducted in the USA at GAP residues were < 0.04 (6) and 0.04 mg/kg.

The Meeting estimated a maximum residue level of 0.1 mg/kg and an STMR of 0.04 mg/kg for tebuconazole in sunflower seed.

Fate of residues in processing

Nine processing studies were conducted with ginseng yielding dried ginseng ($\leq 14\%$ water content), red ginseng (50–55% water content) and water extracts of dried and red ginseng. Median processing factors were 2.5 for dried ginseng, 1.0 for red ginseng, 3.35 for dried ginseng extract and 1.87 for red ginseng extract.

Using the estimated maximum residue level and STMR for ginseng (0.15 and 0.05 mg/kg, respectively) and the processing factor for dried ginseng (2.5), the Meeting estimated a maximum residue level of 0.4 mg/kg and an STMR of 0.125 mg/kg for ginseng, dried including red ginseng.

Using the processing factor for water extract of dried ginseng (3.35), the Meeting estimated a maximum residue level of 0.5 mg/kg and an STMR of 0.17 mg/kg for ginseng extracts.

DIETARY RISK ASSESSMENT***Long-term intake***

The IEDI of tebuconazole based on the STMRs estimated by this and previous Meetings for the 17 GEMS/Food regional diets were 2–9% of the maximum ADI of 0.03 mg/kg bw (see Annex 3 of the 2015 Report). The Meeting concluded that the long-term dietary intake of residues of tebuconazole is unlikely to present a public health concern.

Short-term intake

An ARfD for tebuconazole is 0.3 mg/kg bw. The Meeting estimated the International Estimated Short-Term Intake (IESTI) of propiconazole for the commodities for which STMR, HR and maximum residue levels were estimated by the current Meeting. The results are shown in Annex 4. The IESTI represented a maximum of 5% of the ARfD. The Meeting concluded that the short-term intake of tebuconazole residues from uses considered by the current Meeting was unlikely to present a public health concern.

