

5.15 METHOPRENE (147)

RESIDUE AND ANALYTICAL ASPECTS

Methoprene is an insect growth regulator with activity against a variety of insect species. It was first evaluated by JMPR in 1984 and has been re-evaluated for residues several times. The ADI was established as 0–0.09 mg/kg bw for racemic methoprene, 0–0.05 mg/kg bw for S-methoprene; and an ARfD was considered unnecessary in 2001. Methoprene was scheduled at the 47th Session of the CCPR (2015) for the evaluation of additional MRLs in 2016 JMPR.

The residue studies on sunflower seeds and analytical method were submitted by the manufacturer for additional MRLs for oilseeds.

Methods of analysis

The Meeting received information on the analytical method used for the determination of S-methoprene residues on sunflower seeds. Samples with 50 mL HPLC-grade methanol were shaken for a minimum of 5 hours on a shaker at a minimum of 250 rpm. Then the samples were allowed to sit or shake for 19 additional hours. After 5 mL of dibutyl phthalate (DBP) was added as internal standard, the samples were shaken by hand and filtered into an autosampler vial. S-methoprene residues were analyzed by reverse-phase HPLC-UV (264 nm). The LOD was 0.003–0.007 mg/kg. The concurrent recoveries in supervised residue trials on sunflower seeds were 82–110%.

Results of supervised residue trials on crops

The Meeting received supervised trial data for post harvest application of S-methoprene on sunflower seeds. The residue trials were conducted in the USA. Labels in the USA were available describing the registered uses of S-methoprene.

Sunflower seed

Data were available from supervised trials on sunflower seeds in the USA.

The GAP of the USA is post-harvest treatment for seeds of maximum 34.6 g ai/1000 bushels (2.4–3.2 g ai/t).

S-methoprene residues in sunflower seeds from independent trials in the USA matching GAP were (n = 4): 1.8, 1.9, 2.0 and 2.6 mg/kg.

The Meeting noted that use pattern for ‘Any’ (all grains, spices, feeds and seeds) also covers all commodities of oilseeds. Therefore, the application rates of oilseed were calculated as shown in the Table below. The Meeting recognized that there was more than 25% deviation between the application rate of trials on sunflower seed and GAP rate for peanuts.

Commodities of oilseed	Weight/volume, kg/bushel (t/1000 bushels)	Maximum application rate	
		g ai/1000 bushels	g ai/t
Peanuts, unshelled			
Virginia type	7.7	34.6	4.5
Runners, southeastern	9.5	34.6	3.6
Sunflower seed			
Oil type	10.9-14.5	34.6	2.4-3.2
Confectionary type	11.3	34.6	3.1
Other	-	-	2.2

Ref.: Weight, Measures, and Conversion Factors for Agricultural Commodities and their Products; USDA Agricultural Handbook, No. 697, 1992

Since GAP in the USA is post-harvest application, the Meeting agreed to extrapolate the residues in sunflower seeds to those in oilseed except peanut.

The Meeting estimated a maximum residue level of 4 mg/kg, an STMR value of 2.0 mg/kg and a highest residue value of 2.6 mg/kg for S-methoprene in oilseed except peanut.

Residues in animal commodities

The 2016 JMPR evaluated residues of S-methoprene in oilseed, which is listed in the OECD feeding table. The Meeting noted that the estimation did not result in a significant change of the dietary burdens of farm animals. The previous recommendations of maximum residue levels for animal commodities were maintained.

RECOMMENDATIONS

On the basis of the data from supervised trials, the Meeting concluded that the residue levels listed below are suitable for estimating maximum residue limits and for IEDI and IESTI assessment.

Plant and animal commodities:

Definition of the residue for plant and animal commodities (for compliance with the MRL and for estimation of dietary intake): *methoprene*

DIETARY RISK ASSESSMENT

Long-term dietary exposure

The International Estimated Daily Intakes (IEDIs) of methoprene were calculated for the 17 GEMS/Food cluster diets using STMRs/STMR-Ps estimated by the 2005 and current Meeting (Annex 3). The ADI for S-methoprene is 0–0.05 mg/kg bw and the calculated IEDIs were 10–60% of the maximum ADI (0.05 mg/kg bw). The Meeting concluded that long-term dietary exposure to residues of methoprene, resulting from the uses considered by the current JMPR, are unlikely to present a public health concern.

Short-term dietary exposure

The 2001 JMPR decided that an ARfD is unnecessary. The Meeting therefore concluded that the short-term dietary exposure of methoprene residues is unlikely to present a public health concern.