5.13 ETHOXYQUIN (035)

RESIDUE AND ANALYTICAL ASPECTS

Ethoxyquin was reviewed by JMPR in 1999 under the periodic review programme. At the time the Meeting made no maximum residue level recommendation for pears due to uncertainty on the toxicity of the degradation products. The 2005 JMPR established an ARfD for ethoxyquin and noted that both the ARfD and the ADI were defined in terms of the parent and metabolites/degradates methylethoxyquin (MEQ), dihydroethoxyquin (DHEQ) and dehydromethylethoxyquin (DHMEQ).

Methods of Analysis

Available analytical methods determine only parent ethoxyquin. There are no methods for the routine determination of MEQ, DHEQ and DHMEQ as needed for dietary risk assessment.

Previously reviewed studies (JMPR 1999) indicated there was up to a 60% conversion of radiolabelled ethoxyquin to the metabolites/degradates, including MEQ, DHEQ and DHMEQ. This occurred over a 33 week storage interval at –2 °C.

The Meeting concluded that total residues, for dietary intake assessment, may be estimated by multiplying the measured ethoxyquin residue by a factor of 2.5. This reflects the result of the radiolabelled degradation study and typical cold storage conditions for treated pears.

Stability of pesticide residues in stored analytical samples

Ethoxyquin on pears is unstable under conditions of frozen storage at –20 °C in plastic. The apparent concentration of ethoxyquin drops to 33% of the applied dose within one day, but returns to or exceeds 100% over the next 40 days. This may have been due to an interaction between the plastic container and ethoxyquin.

Ethoxyquin on pear is somewhat more stable when stored wrapped in foil in evacuated bags at –20 °C.

The Meeting concluded that pear samples being tested for ethoxyquin should be stored frozen and protected from oxygen to the extent possible. Pears should be prepared for analysis in as short a time as possible following collection.

Results of supervised residue trials on crops

Pear

The Meeting received studies of the post-harvest treatment of pears by spraying, a combination of spraying and wrapping in treated paper, and by thermofogging.

Twelve trials were conducted at the maximum USA GAP (Ethoxyquin EC, 2700 mg ai/L, brush or spray application). Residues in ranked order were: 1.6, 1.7 (2), 1.8 (2), 1.9, 2.0 (2), 2.2, 2.3 (2), 2.4 mg/kg.

Four trials were conducted at the maximum USA GAP (18% ethoxyquin, thermofog application, 16.2 g ai/1000 kg). Residues in ranked order were: < 0.3 (4) mg/kg.

Three trials were conducted at a rate slightly in excess of the maximum USA GAP (EC 460 g/kg, 1000–1500 ppm drench + impregnated paper wraps). The trials involved a spray at a concentration of 1700 ppm followed by wrapping with impregnated paper. The Meeting considered the trials to be within 120% of the maximum GAP and therefore acceptable. The residues in ranked order were: 1.2, 1.5, 1.6 mg/kg.

Based on the 12 post-harvest spray trials of pears, the Meeting estimated an STMR of 5 mg/kg (2.0× 2.5) and an HR of 6.0 (2.4× 2.5) and a maximum residue level of 3 mg/kg.

Residue definition

Definition of the residue (for compliance with MRL) for plant commodities: *ethoxyquin*

Definition of the residue (for estimation of dietary intake) for plant commodities: *ethoxyquin plus degradates methylethoxyquin (MEQ), dihydroethoxyquin (DHEQ) and dehydromethylethoxyquin (DHMEQ).*

DIETARY RISK ASSESSMENT

Long-term intake

The current maximum ADI for ethoxyquin is 0.005 mg/kg bw. The International Estimated Daily Intakes (IEDIs) of ethoxyquin based on the STMRs estimated for one commodity for the thirteen GEMS/Food cluster diets were in the range of 0% to 40% of the maximum ADI. The Meeting concluded that the long-term intake of residues of ethoxyquin resulting from its uses that have been considered by JMPR is unlikely to present a public health concern.

Short-term intake

An ARfD for ethoxyquin of 0.5 mg/kg bw was established by the 2005 JMPR. The IESTIs of ethoxyquin by the general population and by children were calculated for commodities for which HRs were estimated. The IESTI was 20% of the ARfD for the general population and 50% of the ARfD for children.

The Meeting concluded that short-term intake of residues of ethoxyquin from its use on pears is unlikely to present a public health concern.