IMIDACLOPRID (206)

First draft was prepared by Arpad Ambrus, Hungary

EXPLANATION

Imidacloprid was evaluated by the JMPR in 2001 and 2002 when an ADI of 0-0.06 mg/kg bw/day and an ARfD of 0.4 mg/kg bw/day were established, and a number of maximum residue levels were estimated, respectively.

The cranberry industry performed a number of supervised trials within the Interregional Research Project No. 4 to provide data for the establishment of US tolerances for imidacloprid residues in cranberry. The relevant labels and reports of supervised trials were submitted for evaluation by the 2006 JMPR.

RESIDUE ANALYSIS

Analytical methods

Samples were analyzed for combined residues of imidacloprid and metabolites M09 (WAK 4140), M06 (WAK 3745), M01 (WAK 4103), and M14 (6-CNA) (Bayer Method 00200). The limit of quantitation (LOQ) was 0.05 mg/kg. No quantifiable residues were observed in the control samples. The concurrent recovery obtained during the analysis of samples was 102% with a CV of 7% and range of 89–114% (n=15).

Stability of pesticide residues in stored analytical samples

The maximum storage interval for field-treated samples in this study was 683 days. To evaluate storage stability, control samples were fortified with imidacloprid, WAK 4140, WAK 3745, WAK 4103, and 6-CNA to a level equivalent to 0.50 mg/kg imidacloprid and analyzed after 655 or 656 days of frozen storage. The results, shown in Table 1, indicate that the residues were stable during the long storage period.

Table 1. Storage stability study performed in conjunction with field trial samples.

Commodity	Cranberry
Duration	655 days (imidacloprid and WAK 4140) 656 days (WAK 3745, WAK 4103, and 6-CNA)
Temperature	-20 ± 5 °C
Percentage of residues measured in stored samples	83, 90, and 92% of 0.50 mg/kg imidacloprid applied 87, 93, and 90% of 0.50 mg/kg WAK 4140 applied[1] 97, 86, and 88% of 0.50 mg/kg WAK 3745 applied[1] 93, 99, and 95% of 0.50 mg/kg WAK 4103 applied[1] 89, 98, and 97% of 0.50 mg/kg 6-CNA applied[1]

Note: 1: Expressed in parent imidacloprid equivalent

USE PATTERN

In the USA, Admire 2 Fl, containing 21.4% active substance, can be applied to protect cranberry as shown in Table 2:

Table 2. Registered uses of imidacloprid

Application					PHI
Method	No	Interval, days	Water L/ha	Rate kg ai/ha	day
Ground[1]	Max 2	NS[3]	Min 187	0.28	30
Chemigation	Max 2	NS[3]	5600-9350	0.28-0.56[2]	30

1. As a soil spray directed to the root or crown area using a minimum of 187 litre water/ha.
2. Maximum dose per season
3. NS: not specified

RESIDUES RESULTING FROM SUPERVISED TRIALS

Field trials were conducted in four geographical regions of the USA (Massachusetts, New Jersey, Wisconsin, and Oregon) (Dorschner, 2000). Each of the five field trial sites consisted of one untreated control plot and two treated plots. Each treated plot received one foliar application of the test substance at a rate of approximately 0.56 kg ai/ha immediately followed by irrigation to move the test substance into the soil. Mature cranberries were harvested from one of the treated plots at each site approximately 30 days following the application. Samples from the other treated plot at each site were harvested approximately 45 days following the application.

Samples of about 1 kg were taken in duplicate from each site. They were shipped deep-frozen to the testing laboratory.

Cranberries were analyzed for combined residues of imidacloprid and metabolites WAK 4140, WAK 3745, WAK 4103, and 6-chloronicotinic acid (6-CNA). Table 3 summarizes the trial conditions and the residues detected.

No quantifiable residues (> 0.05 mg/kg) were observed in any of the samples (Table 3).

Table 3. Summary of combined imidacloprid residues in/on cranberry following a single ground treatment with maximum dosage rate of 0.56 kg ai/ha.

Field Trial Location (City, State)	Spray Volume (GPA)	PHI (days)	Residue (mg/kg)
East Wareham, MA	744	30	< 0.05
(97-MA02)	763	46	< 0.05
Tabernacle, NJ	482	28	< 0.05
(97-NJ27)	618	43	< 0.05
Wisconsin Rapids, WI	225	28	< 0.05
(97-WI16)	226	43	< 0.05
Biron, WI	225	28	< 0.05
(97-WI17)	226	43	< 0.05
Bandon, OR	674	32	< 0.05[1]
(97-OR18)	713	45	< 0.05

1. Trace amounts of residues below the LOQ were detected in one of the samples

APPRAISAL

Imidacloprid was evaluated by the JMPR in 2001 and 2002 when an ADI of 0-0.06 mg/kg bw/day and an ARfD of 0.4 mg/kg bw/day were established, and a number of maximum residue levels were estimated. The residues were defined as the sum of imidacloprid and its metabolites containing the 6-chloropyridinyl moiety for both regulatory and dietary intake assessment purposes.

[1] Trace amounts below the LOQ were detected in one of the treated samples.

Results of supervised trials carried out on cranberry according the US registered uses, were submitted for evaluation.

Results of supervised trials on crops

Five field trials were conducted with foliar applications at the maximum recommended rate (0.56 kg ai/ha). Mature cranberries were harvested at the recommended PHI (30 days) and 45 days post treatment.

The individual residue components were found to be stable under deep freeze conditions (< -20 ^{o}C) for 655–656 days. The longest storage period of samples corresponded with the test period and confirmed the validity of residue data obtained.

Samples were analyzed for combined residues of imidacloprid and metabolites M09 (WAK 4140), M06 (WAK 3745), M01 (WAK 4103), and 6-CNA with a total residue method with average concurrent recovery of 102% obtained during the analysis of samples. The limit of quantification (LOQ) was 0.05 mg/kg. No quantifiable residues were observed in the samples (< 0.05 mg/kg).

Based on the results of these trials < 0.05 (5) mg/kg the Meeting estimated a maximum residue level of 0.05* mg/kg and values for STMR and HR of 0.05 mg/kg.

RECOMMENDATION

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

Summary of recommendations for MRLs, STMRs and HRs for imidacloprid

CCN	Commodity	MRL, mg/kg		STMR or STMR-P, mg/kg	HR or HR/P mg/kg
		New	Previous		
FB 0265	Cranberry	0.05*		0.05	0.05

DIETARY RISK ASSESSMENT

Long-term intake

The GEMS/Food regional diets specify the following long-term cranberry consumption (g/day/person) for various cluster diets: A (0.1); D (0.3); F (0.6); M (2.5). The cranberry consumption in the other regions is nil.

The highest IEDI in the 13 GEMS/Food regional diets, based on estimated STMR was < 0.01% of the maximum ADI (0.06 mg/kg bw).

The Meeting concluded that the long-term dietary intake of imidacloprid residues from use on cranberry will add only marginally to the intake of residues from other uses considered by an earlier JMPR.

Short-term intake

The GEMS/Food regional diet specifies large portion sizes of cranberry as 3.53 g/kg bw for adults and 6.78 g/kg bw for children (both are from the USA).

The IESTIs of imidacloprid calculated on the basis of the large portion size and the estimated HR of 0.05 mg/kg are 0.04% and 0.1% of the ARfD for adults and children, respectively.

The Meeting concluded that the short-term intake of residues of imidacloprid resulting, from the use on cranberry that have been considered by the JMPR, is unlikely to present a public health concern.

REFERENCES

Author, Date, Title, Institute, Report Reference, Document No.

Bayer Method 00200 1994. *Method for the Determination of Total Residues of Imidacloprid in Plant Materials and Beverages*, —Reformatted, Miles Report Number 102624-R1, February 23, 1994.

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