IMIDACLOPRID (206)

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EXPLANATION

Imidacloprid, a neonicotinoid insecticide, was first evaluated by the JMPR in 2001 for toxicology when an ADI of 0–0.06 mg/kg bw and an ARfD of 0.4 mg/kg bw were established, and in 2002 for residues, when residues were defined as the sum of imidacloprid and its metabolites containing the 6-chloropyridinyl moiety for compliance with MRLs and for estimation of dietary intake for plant and animal commodities. Imidacloprid was further evaluated for residues in 2006, 2008, 2012 and 2015.

This compound was scheduled at the 48th session of the CCPR (2016) for the evaluation of additional MRLs in 2017 JMPR. The Meeting received residue trial information on pistachio nut from Iran.

RESIDUE ANALYSIS

Analytical methods

Pistachio

Parent and its metabolite imidacloprid-olefin were analysed with extraction by QuEChERS method and determination by LC-MS/MS. Parent was determined with transition ions of 256.1>209.7 m/z and for imidacloprid-olefin, 254.1>236.4 m/z. The LOQ values for imidacloprid and imidacloprid-olefin were < 0.005 mg/kg and 0.01 mg/kg, respectively. Recoveries of parent and the metabolite were 95–108% (RSD, <10%) and 96–115% (RSD, 5%) at fortification levels of 0.01–0.2 mg/kg. In the pistachio trials, the total residues, converted to 6-chloronicotinic acid based on a common moiety, were not analysed. Residues for parent and imidacloprid-olefin were summed.

Table 1 Recovery of parent imidacloprid in pistachio

Analyte	Fortification level, mg/kg	n	Range of recoveries, %	Mean recovery, %	RSD, %	LOQ, mg/kg
Imidacloprid	0.01	3	95-108	102	6	0.005
	0.1	3	96-100	98	4	
	0.2	3	98-100	99	10	
Imidacloprid-olefin	0.01	3	105-115	110	4	0.01
	0.05	3	98-102	100	3	
	0.2	3	96-100	98	5	

Stability of residues in stored analytical samples

The treated pistachio samples were stored frozen at -20 °C for a maximum of 20 days.

USE PATTERN

Imidacloprid is a systemic insecticide, which is used widely in various crops. Registered use in Iran of imidacloprid on pistachio is shown below.

Table 2 Registered uses of propiconazole relevant to evaluation by 2017 JMPR

Country	Crop	Formulation	Application					PHI (days)
			Method	No.	Interval days	Water (L/ha)	Rate (kg ai/ha)	

Country	Crop	Formulation	Application					PHI (days)
			Method	No.	Interval days	Water (L/ha)	Rate (kg ai/ha)	
Iran	Pistachio	SC 350 g/L	High volume spraying at immature fruit and fruiting	3	20-30	1000	0.14	Not specified

RESIDUES RESULTING FROM SUPERVISED TRIALS ON CROPS

Pistachio

Four trials were conducted in Iran in 2015. Foliar applications of SC formulation (350 g/L) were made three times with intervals of 20–30 days at rates of 0.14 kg ai/ha. Triplicate samples of at least 1 kg were collected 28–31 days after the last application and stored frozen within 4 hours after harvest. The nut shells were removed prior to residue analysis.

Table 3 Residues in pistachio following foliar application of imidacloprid (EC 350 g/L)

Location, Year (Variety)	Application				DALA (days)	Sample analysed	Parent	Imidacloprid-olefin	Sum
	kg ai/ha	Water L/ha	RTI (days)	No.					
GAP: Iran	0.14	1000	20-30	3	PHI, not specified	Nutmeat			
IRAN, Zarand, 2015 (Fandoghi)	0.14	1000	20-30	3	28	nutmeat	0.24 0.33 0.34 Mean: 0.30	0.07 0.10 0.11 Mean: 0.093	0.31 0.44 0.44 Mean: 0.40
IRAN, Kerman, 2015 (Fandoghi)	0.14	1000	20-30	3	28	nutmeat	0.82 0.71 0.78 Mean: 0.77	0.26 0.23 0.27 Mean: 0.25	1.1 0.95 1.1 Mean: 1.0
IRAN, Qazvin, 2015 (Kale Bozi)	0.14	1000	20-30	3	29	nutmeat	0.18 0.27 0.25 Mean: 0.23	0.15 0.16 0.14 Mean: 0.15	0.33 0.43 0.40 Mean: 0.39
IRAN, Qhom 2015 (Abbas Ali)	0.14	1000	20-30	3	31	nutmeat	0.40 0.40 0.30 Mean: 0.37	0.18 0.19 0.11 Mean: 0.16	0.58. 0.59 0.42 Mean: 0.53

APPRAISAL

Imidacloprid was last evaluated by the JMPR in 2015 for residues. An ADI of 0–0.06 mg/kg bw and an ARfD of 0.4 mg/kg bw are established by the JMPR. The residue definition for compliance with MRLs and for estimation of dietary intake for plant and animal commodities is the sum of imidacloprid and its metabolites containing the 6-chloropyridinyl moiety, expressed as imidacloprid.

This compound was scheduled by the 48th Session of the CCPR (2016) for the evaluation of additional uses by the 2017 JMPR. The Meeting received residue trial information on pistachio nut from Iran.

Methods of analysis

Pistachio

Imidacloprid and its metabolite imidacloprid-olefin in pistachio nutmeat were analysed with extraction by QuEChERS method and determination by LC-MS/MS. LOQ values were 0.005 mg/kg for imidacloprid and 0.01 mg/kg for imidacloprid-olefin and the recoveries of the analytes were satisfactory. In the submitted pistachio trials, total residues, converted to 6-chloronicotinic acid based on a common moiety, were not analysed.

Stability of residues in stored analytical samples

Information on stability was not required as samples were analysed within 20 days of collection.

Results of supervised residue trials on crops

Pistachio

Four independent residue trials were conducted on pistachio in 2015. The GAP in Iran is for 3 × 0.14 kg ai/ha with a spray interval of 20-30 days and no PHI specified. The trials provided did not match the GAP in Iran as they had longer PHIs. In addition, total residues were not analysed. As a result the Meeting could not estimate a maximum residue level.

REFERENCES

Author(s)	Year	Study title, Institute
Ramezani, M.K.	2016	Determination of maximum residue limit for imidacloprid in pistachio under national GAP. Department of Pesticide Research, Iranian Research Institute of Plant Protection (RIPP)