
Pesticide Residue Evaluation In China

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Presentation Outline

- Regulation and national standards for pesticide residue management in China
- MRL setting in China
- Perspective



Regulation and National Standards for Pesticide Residue Management in China

Key components of Pesticide Management Regulation of China for Pesticide Residue

- Following Guidelines of Safety Application of Pesticide (GAP in China)
- Cancellation on the use of highly toxic pesticides on vegetables, fruits, tea and Chinese medicinal herbs, etc.
- The crop, food and feed which contain pesticide residue over MRLs cannot be sold in China.



Guidelines for Safety Application of Pesticide

- Conducted more than 900 residue field trials over 240 active ingredients on more than 30 crops
- Issued seven national standards on the safe application of pesticide based on residue data in China
- Requires key information include common name, crops, application rate and method, maximum number of application, PHI, and recommended MRLs.
- Important to establish GAP, pesticides could be used for controlling effectively, but to minimize residue as low as possible.



Maximum Residue Limit (MRL)

- Established 478 MRLs for 136 pesticides in over 30 varieties of agricultural produces by 2005



Residue Data Requirements

Part A. Residues field trials should be conducted in 2 locations for 2 years each. Below are the detailed contents in final report.

- Application dosage (or concentration), method, time, number and tool
- Area of the field (or number of crops), treatment and repeat times, pesticide applied and sampling time intervals
- pH value of soil in the experiment area, soil nature, organic content and climate condition and cultivation system
- Sampling locations, sample handling and storage conditions



Residue Data Requirements (continued)

Part B. Residue analysis method

- Sample extraction, clean-up and instrument operating conditions
- Analytical method and recovery, coefficient of variation, method sensitivity (limit of detection and minimum concentration of detection)
- Experimental results
 - Relationship between residue in crops and time, residue in soil cultivation layer (0-20 cm) and time, residue in water (only for the paddy field) and time (i.e. degradation curve).
 - Final residues in the crops under maximum registered uses, i.e. maximum application dosage, maximum number of applications, minimum pre-harvest interval.



Residues Data Considerations

- The analytical method should determine the residue of parent pesticide and toxic metabolites in crops, soil, and water
- Metabolism in the crops and animals
 - The absorption, distribution, excretion, transformation, final metabolite and degradation product, and their toxicity data should be provided
- The residues data generated in other countries and regions
- MRL adopted by CAC or established by other countries should be submitted



MRL Setting in China

- Necessary components for establishment of MRLs
 - Acceptable Daily Intake (ADI)
 - Chinese national dietary pattern
 - Residue data at maximum label use
- Several key criteria to establish MRLs
 - The highest residue data will be used to estimate MRLs
 - TMDI and NEDI will be calculated
 - If TMDI or NEDI is less than ADI, this registration will be granted
 - MRLs proposals will be submitted and approved to national standardization authority



Acceptable Daily Intake (ADI)

ADI mainly from JMPR or other authorities

Compound	ADI of Codex (mg/kg bw/day)
abamectin	0.002
carbendazim	0.03
cyhalothrin	0.002
diflubenzuron	0.02
fipronil	0.0002
imidacloprid	0.06
iprodione	0.06

Chinese national dietary pattern

Commodity	National diet of China in 2002 (g/person)
Rice and rice products	239.9
Wheat flour and products	138.5
Other cereal grains	23.3
Root and tuber vegetables	49.5
Pulses	4.2
Soybean products	11.8
Leafy vegetables	91.5
Other vegetables	183.7
Vegetables in preservative	10.3
Fruits	45.7
Tree nuts	3.9
Meat from poultry and mammals other than marine mammals	79.5
Milk and milk products	26.3



Chinese national dietary pattern

Commodity	National diet of China in 2002 (g/person)
Eggs	23.6
Fish and crustaceans	30.1
Vegetable oil	32.7
Poultry and mammalian fats	8.7
Sugar and starch	4.4
Salt	12
Sauce	9
Total	1028.6

Supervised trials of seven compounds

Compound	Crop	Locations, year	Form	Rate
abamectin	cucumber	Anhui, Hebei, 1999-2000	EC/1.8%	10.8 g ai/ha
carbendazim	Citrus	Zhejiang, Guangxi, 2002-2003	WP/50%	50 kg ai/hl
cyhalothrin	Wheat	Beijing, Shandong, 1994-1995	EW/2.5%	7.5 g ai/ha
diflubenzuron	Wheat	Beijing, Henan, 1986-1988	WP/25%	37.5 g ai/ha
fipronil	Cabbage	Beijing, Jiangsu, 1996-1997	SP/5%	26.55 g ai/ha
imidacloprid	Chietqua	Guangdong, Hainan, 2001-2002	EC/5%	8.9 g ai/ha
iprodione	Tomato	Beijing, Zhejiang, 2000-2001	SP/50%	750 g ai/ha



Residues from the supervised trials

Compound	Crop	Application number	PHI	Residues in ranked order
abamectin	cucumber	2, 3	1, 2, 3	0.008, 0.007 (3), 0.006 (4), 0.005 (3), 0.004 (5), 0.003 (4), 0.002 (2), 0.001(2)
carbendazim	Citrus	3, 4	20, 30	3.78, 2.62, 2.44, 2.04, 1.91, 1.69, 1.33, 1.20
cyhalothrin	Wheat	1, 2	15, 30, 60	0.04 (2), 0.03, 0.01 (3), 0.008 (2), 0.004, 0.002, <0.002 (10)
diflubenzuron	Wheat	2, 3	20, 30	0.10, 0.070, 0.050 (2), 0.024, 0.023, 0.017 (4), 0.015, 0.013, <0.012 (4)
fipronil	Cabbage	2, 3	3, 5	0.029, 0.022, 0.018, 0.016 (2), 0.013, 0.010 (2), 0.009, <0.005 (7)
imidacloprid	Chietqua	3, 4	3, 5, 7	0.08, 0.07 (2), 0.06 (4), 0.05, 0.04 (10), 0.03 (2), 0.02 (4)
iprodione	Tomato	3, 4	2, 4, 6	0.19, 0.18 (4), 0.17, 0.16, 0.15 (3), 0.14 (2), 0.13, 0.12, 0.11, 0.09 (2), 0.08, 0.06 (3), 0.04



Recommendations for MRLs based on the data from the supervised trials

Compound	Crop	MRLs recommendation
abamectin	cucumber	0.01
carbendazim	Citrus	5
cyhalothrin	Wheat	0.1
diflubenzuron	Wheat	0.2
fipronil	Cabbage	0.03
imidacloprid	Chietqua	0.1
iprodione	Tomato	0.5



Abamectin National Estimated Daily Intake

Commodity	National diet of China in 2002 (g/person)	MRLs	Origin	Intake	ADI%
Rice and rice products	239.9				
Wheat flour and products	138.5				
Other cereal grains	23.3				
Root and tuber vegetables	49.5				
Pulses	4.2				
Soybean products	11.8				
Leafy vegetables	91.5	0.01		0.001	
Other vegetables	183.7	0.01		0.002	
Vegetables in preservative	10.3	0.01		0.0001	
Fruits	45.7	0.02	CAC	0.001	
Tree nuts	3.9	0.1	CAC	0.000	
Meat from poultry and mammals other than marine mammals	79.5				
Milk and milk products	26.3				
				0.0041	



Summary of National Estimated Daily Intake

Compound	ADI (mg/kg bw)	% ADI
abamectin	0-0.002	3.4%
carbendazim	0-0.03	44%
cyhalothrin	0-0.002	75%
diflubenzuron	0-0.02	35%
fipronil	0-0.0002	46%
imidacloprid	0-0.06	19%
iprodione	0-0.06	47%



Perspecitve

- To adopt dietary risk assessment method of JMPR
- Supervised residue trials which should be conducted in China are advanced to the temporary registration stages.
- In light of the new Data Requirements, the residue field trial for major crops should be conducted at least in 3 locations for 2 years each, which is one more place than that of the old Data Requirements.
- To refine national diet data based on further dietary survey



Thank you very much for your kind attention

