MRLs & Import Tolerances: definitions and background information

Santiago de Chile
November 25-26, 2013
A few background facts…..

- Growing world population and buying power (~6.8 billion)
- Farmers grow for a global market
- Food exports/imports on the rise
- Retailers/Consumers expect year-round fresh fruit/veggies
**MRL Definition**

**Maximum Residue Level** of pesticide legally allowed in/on food or animal feed after use of a crop protection chemical according to Good Agricultural Practice (GAP)
Post-harvest Uses

- Post-harvest treatments to control storage rots and insect pests.....

Also need to be covered by MRL
Import Tolerances

- MRL set on basis of a foreign GAP
- Commodity not grown in Import Country
- Pesticide not registered in Import Country
- Residues higher in exported produce than in produce of Import Country (default-MRL)
Major Export Flows which drive need for harmonized MRLs
MRL Reality: Grower-Exporter’s Nightmare
MRL Harmonization: Grower-Exporter’s Ideal World
Exceedance of an MRL is a Foreign Trade Violation

Consequences:
- Rejection of produce
- Negative publicity
- Supply contracts cancelled
- Possible regulatory action
- Additional conditions, e.g. residue testing
- Handlers/Shippers not paid
- Economic loss!
Major factors for MRL Disharmony

1. Regional/Country GAPs
2. Crop Group Disharmony
3. MRL Residue Definitions
4. MRL Calculation Procedures
5. MRL Consumer Evaluations

MRL disharmony: an inconvenient reality that must be managed!
Residue Trials run according to critical GAP from Use Directions on Product Label

GAP = (Good Agricultural Practice)

- Timing of application
- Max application rate
- Max number of applications
- Minimum interval between applications
- Minimum Pre-Harvest Interval (PHI)

MRL may be based on residue from countries with different GAP → different residues → different MRL!
1. MRL & GAP Harmonization

Different GAP may be needed in different countries!
To account for:
Different spectrum of pests
Different pest intensity
Different frequency of infestations

Need to identify Critical GAP for global registration
same GAP → same residues → same MRL!

Critical-GAP is the one conducing to the highest possible residues to enable global MRL harmonization.
2. Crop Groups conundrum

- Increasing trade in minor crops; more MRLs needed
- Minor Crop registrations/MRL setting require data!
- Not sustainable for companies to generate data on minor crops
- Resources within Regulatory Authorities limited

How can we establish registrations and set MRLs on minor crops?
Minor Crop Registrations/MRL setting: pragmatic solution

- Apply concepts of **Crop Groups**- **Extrapolation**, **Mutual Acceptance**, **Proportionality**

**Example: OECD Residue Guidelines & Guidance**

“Residue data for representative crop(s) are generated and extrapolated to establish MRL for entire crop group (or subgroup)”

“comprehensive global programs”

“proportionality of rate”

“zoning concept”
Global Crop Group challenges

- Some Countries/Regions use Crop Groups; others do not
- Crop Groups not harmonized between countries (12-33)
- What crops should be included in a Crop Group?
- Need few crops to represent a Crop Group for data generation?
- How to agree on rules of Extrapolation?

Global harmonization of Crop Groups is really a major challenge!
Crop Groups: revision and harmonization efforts

- US, EU and Codex Crop Groups undergoing revision
  - US Crop Groups being revised based on IR-4 petitions, which are developed from work of International Crop Grouping Consulting Committee (ICGCC) (EPA, USDA, ~ 40 countries)
  - Codex revising Codex Classification of Foods and Animal Feeds based on work of ICGCC/EPA/IR-4 (12 groups, so far)
  - EU revising Crop Groups as part of new Reg (EC) 396/2005

- Minor Use Summits– creates awareness, capacity building!
4. Residue Definition for MRL monitoring/enforcement

Parent 0.05 ppm + Metabolite 0.05 ppm = MRL 0.1 ppm

Vs.

Parent only 0.05 ppm = MRL 0.05 ppm

Residue Definition OECD guideline should be more applied!
5. MRL Calculation challenges

- Different countries/regions use different procedures to set MRLs
  
  Same residue data → different MRLs
  
  - Ideal method needs to be based on statistical procedures
  
  - Statistics only valid with many data points where statistical distributions become definable
    - Numbers of minor crop residue trials are often too few
  
  - Most used currently is OECD-MRL calculator

Standardize MRL Calculation → MRL Harmonization
Cálculo de Tolerancia (LMR)

• Se basa en los datos cuantitativos de residuos de los ensayos de campo, de acuerdo al peor escenario en cuanto a GAP/BPA:
  – máxima dosis, máximo número de aplicaciones
  – mínimo IPC, e intervalo entre aplicaciones

• Métodos de cálculo
  – FAO/JMPR
  – UE (método 1 y método 2)
  – NAFTA (cinco métodos):
    • EU Método I normal y lognormal, II distribución-libre
    • Método California (u+3 sigma)
    • UPLMedian95th
  – OECD Calculator v2.0
    • Normal, lognormal, Weibull distribution
    • Science policies (ceiling values, # points, <LOQ, ND, etc)
## OECD Calculator - example

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<tr>
<th>Residues</th>
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<tr>
<td></td>
<td>0.004</td>
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<table>
<thead>
<tr>
<th>Total number of data (n)</th>
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<tbody>
<tr>
<td>Percentage of censored data</td>
<td>0%</td>
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<tr>
<td>Number of non-censored data</td>
<td>20</td>
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<tr>
<td>Lowest residue</td>
<td>0.003</td>
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<tr>
<td>Highest residue (HR)</td>
<td>0.087</td>
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<td>Median residue (STMR)</td>
<td>0.011</td>
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<td>Empirical ceiling</td>
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### 'Distributional' approaches

<table>
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<tr>
<th>Approach</th>
<th>Shapiro-Francia test on distribution shape</th>
<th>95% upper confidence limit on 95th percentile</th>
<th>99th percentile</th>
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<tbody>
<tr>
<td>Normal</td>
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<td>0.069</td>
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<td></td>
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<td>99th percentile</td>
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<tr>
<td>Lognormal</td>
<td>Accept</td>
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<td>99th percentile</td>
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<td></td>
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<tr>
<td>Weibull</td>
<td>Reject</td>
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MRL estimate for 'distributional' approaches: 0.143

### 'Alternative' approaches

<table>
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<tbody>
<tr>
<td>Mean+3SD</td>
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<tr>
<td>UCLMedian95th</td>
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MRL estimate for 'alternative' approaches: 0.059

### Proposed MRL estimate

- Unrounded: 0.143
- Rounded to the next MRL class: 0.15
5. MRLs: dietary risk to consumers

- Why is risk to consumers different between countries?
  - Human Reference Endpoints: ADI/ARfD can be set differently amongst agencies
  - Country/Regional consumption diets are different
  - Consumer Risk Assessments: chronic/acute RAs may include different crops $\rightarrow$ different RA calculations $\rightarrow$ might support all MRLs, or some

MRLs are **not** Safety Limits, but are set only if risk to consumers is proved acceptable!
MRL vs. Human Safety limits

- MRL is not a Human Safety Limit,
- It’s a GAP-monitoring standard, also Trading Standard
- MRL set only if supported by acceptable Human Risk Cups

A factor of at least 100 is applied between NOAEL and ADI/ARfD

Increasing Consumer Risk

Zone 1: MRL compliance, legal for trade, safe for human health. The vast majority of measured samples fall in this zone.

Actual residues are typically below the MRL, i.e. in this range.
International efforts underway

NAFTA Technical Working Group - MRL Harmonization

Global Work-Shares & Joint Reviews

Regulation (EC)396/2005

Codex/JMPR work

ASEAN Harmonization of MRLs

Minor Use Summits

NAFTA/OECD MRL Calculator

OECD Residue Chemistry Expert Group

OECD Expert Group for Minor Uses

FAO revision of classification of Foods and Animal Feeds

International Crop Grouping Consulting Committee (US EPA/IR-4/PMRA)
Global MRL Harmonization in summary

- Industry recognises need to harmonize the GAP.....supports where possible
- OECD guidelines are happening more and more currently
- It depends on incorporation of best practices into national/regional legislations
- Governments must have the will to work together to harmonize and consider global consequences of their national policies
- Consensus building within industry, within governments and across governments must continue
- Change comes slowly, but....

Lots of good things are happening globally!
THANK YOU

for Your Kind Attention