Risk Assessment or Assessment of The Risk in Fresh Produce, That's the Question

Thursday 12 May, 8.30-10.00

IAFP’s European Symposium on Food Safety 2016, Athens, Greece
Developing Practical Risk Assessment for Fresh Produce Industrial Practice

Issues faced while putting ‘formal MRA’ into industrial practice.

Dr Roy Betts, Campden BRI, UK
Assessing and Managing Safety in Foods

- Movement away from Quality/Safety Control
- Towards Quality/safety assurance
- Away from testing product safety
- Assuring product safety

- You cannot test a food safe
- You design and manufacture a food safe
What does this mean?

• It means we are:
  – Assessing / analysing hazards
  – Considering / designing in controls
  – Assessing risk
  – Managing risks

• Confused with what this all means?
Managing the Safety Issue--Risk versus Hazard

• Risk and Hazard- what’s the difference
  – Hazard- a tangible thing that causes harm
  – Risk- the likelihood a person is harmed by the hazard

• Example
  – A spillage of water on the stairs is a Hazard
  – If the stairwell is closed off the Hazard remains but the risk is low.
  – Why is the risk low
    • Because exposure has been reduced
Difference between Hazard and Risk

- Hazard—is always a hazard
- Risk varies depending on the exposure

- Hazard based and risk based approaches are different in managing food safety.
Risk Assessment has a formal method of operation

From: Codex / WHO
The Problem

• At National Level the understanding of “Doing Risk Assessment” is well understood

• At Food Producer (FBO) level this is not the case

• But FBO’s are being asked to do Risk Assessments
  – Data, experience, statistics, modelling
## The Way Forward

<table>
<thead>
<tr>
<th>Formal Codex MRA</th>
<th>Grower MRA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative</td>
<td>Qualitative</td>
</tr>
<tr>
<td>Covers whole food production chain</td>
<td>Can cover limited parts of a production chain</td>
</tr>
<tr>
<td>Tends to focus on one microbiological hazard at a time</td>
<td>Takes a holistic approach - can cover all relevant microbiological hazards</td>
</tr>
<tr>
<td>Based on large amounts of quantitative data</td>
<td>Based on qualitative judgements of hazards and risks</td>
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</tbody>
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The Challenge

• Imagine being the primary producer of Fresh Produce (e.g. Leafy Greens)
• Your job is to plant & grow and harvest leafy greens to supply to a further processor (not in your control) who will process/supply them on.
• You are asked to do a microbiological risk assessment of your practices
• You have no specialist microbiological knowledge
• Minimal access to experts
• Limited previous information/data
• What do you do?
The Fresh Produce Issue

• Populations are being encouraged to consume more fresh produce
• Increasing supply of “prepared” ready to eat produce
• There are few ways of eliminating organisms from produce
• Produce causes outbreaks.
Is there a Problem with Fresh Produce?

<table>
<thead>
<tr>
<th>Geography</th>
<th>No. Outbreaks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe 2004-2012</td>
<td>197</td>
</tr>
<tr>
<td>USA 2004-2012</td>
<td>377</td>
</tr>
</tbody>
</table>

Datasets cover: salads, leafy greens, tomato, sprouts, berries, melon, juices

- Center for science in the public interest Dec 2015: “Fresh Produce Responsible for most Foodborne Illnesses in the USA”
- NHS Choices UK 19/7/13: “Food Poisoning Warning over Fruit and Veg”
- Mail online (Daily Mail UK): Health section: “When fruit and vegetables are BAD for you: Getting your five-a-day is responsible for HALF of all food poisoning cases
- Daily Telegraph online 22/3/13: “Salad is more dangerous than beefburgers, leading food expert warns”

  Callejón Raquel M., Rodríguez-Naranjo M. Isabel, Ubeda Cristina, Hornedo-Ortega Ruth, Garcia-Parrilla M. Carmen, and Troncoso Ana M.
- Barfblog. Jan 17th 2015
- CDC: Outbreaknet foodborne disease online database
- EFSA Summary Reports
The Primary Producer Issue

- Sources seed/ young plant
- Plants
- Irrigates & Looks after
- Harvests

- May or may not transport to processor
- Once grown, it is difficult to reduce microbial load on produce.
Developing a Qualitative Risk Assessment for the Primary Producer

• What can and cannot be done
  – Hazard Identification
    • Done at a basic level- identify the range of potential pathogens that may be present from available information sources.
  – Hazard Characterisation
    • Not done
  – Exposure Assessment
    • Done qualitatively – an assessment that contamination of a significant amount occurs
  – Risk Characterisation
    • Not done
  – Intervention assessment
    • How likely is it that an individual intervention will reduce contamination
  – Exposure Assessment following intervention
    • An assessment that contamination of a significant amount occurs after single or multiple mitigation steps
Hazard Identification

• As in HACCP
• Very simple using available Literature sources (internet based)
• E.g. EFSA 2013; Uyttendaele 2015: main hazards in leafy salads
  – Salmonella, E.coli O157, Norovirus, Cyclospora
  – Contamination route: direct/indirect faecal contamination
• So- the generic hazard is faecal contamination
• No discrimination needed between microbial types
• Issues: irrigation water, harvest conditions, sanitation practices, worker hygiene, storage conditions.
• Identify production stages where faecal contamination could occur.
Exposure Assessment

- Any route of contamination is considered an issue
- If there are multiple routes of contamination (hazards) develop a separate exposure assessment
- Classify them: (can contamination occur at levels associated with illness)
  - Negligible
  - Very low
  - Low
  - Medium
  - High
  - Very high
Intervention Assessment

• Assess the efficacy of any intervention
• Can be quantitative (if available)
  – E.g. Water filter removes 4 logs of an organism (with validation data)
• Or qualitative
  – E.g. Expert opinion
• Categorise efficacy
  – Effective (validated reduction)
  – Partially effective (non-validated, exposure risk may not be reduced to negligible levels)
• In any system- single or multiple interventions may be present
Assess exposure following Intervention

Simple consistent & transparent approach documenting likelihood of exposure following intervention

<table>
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<tr>
<th>Probability of significance contamination before intervention</th>
<th>Effectiveness of intervention</th>
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<tbody>
<tr>
<td></td>
<td>Effective</td>
</tr>
<tr>
<td>Negligible</td>
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<td>Very low</td>
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Risk Assessment or Assessment of Risk?

• Primary producers have a need to undertake Risk Assessment
• The “formal” approach to quantitative MRA is not open to them
• This approach has the advantage of:
  – Using information they have got/can easily obtain
  – Allowing an individual approach to Hazard Identification to match the procedures they use
  – Simplifies Exposure Assessment- to a probability of significant contamination occurring. Introduces classification for this.
  – Introduces a need to assess efficacy of (single/multiple) intervention strategies
  – Allows a transparent documentation of effect of interventions, and their acceptability
Risk Assessment or Assessment of Risk?

• Simple to use
• Allows use of own information
• Other information sources should be readily available
• Effective at documenting Hazards and Potential exposure
• Allows documentation of effect of interventions
• Provides evidence of a clear Assessment of Risks associated with primary produce.