



# Making Sampling and Testing Work For You!

**Barbara Hirst**

**IFST Spring Conference 2015**



**Customer Focused, Science Driven, Results Led**

# Welcome

- Who are RSSL?
- Using the current spice situation to illustrate the issues?
- How to choose the right sampling and testing strategy?
- What are the testing lab's responsibilities?
- How do you interpret the results?

# Who Are We?

- We provide scientific analysis, research, consultancy and training
- We understand the needs, problems and issues of industry and work with you to solve your problems and support your business
- Customer Driven, Science Led, Results Focused



People

Technology

Quality

# Allergens Expertise

We provide a range of services including:

- Finished product and ingredient testing
- Cleaning validation and verification studies
- Allergen management technical consultancy
- Allergen training as well as bespoke factory based allergen workshops



# Industry Links

- We are actively involved with the following:
  - Industry Bodies – FDF, FDE, BRC
  - Scientific Panels – EFSA, ILSI, MoniQA, EuroPrevall
  - Regulatory Groups – FSA, European Commission
  - Patient Groups – Coeliac UK, Anaphylaxis Campaign



# Current Spice Issue

- December 2014 – Product recalls in North America due to peanut protein contamination of cumin
- Suspected contaminant – peanut shell at high level
  - Contamination / Deliberate adulteration?
- Dozens of recalls – still ongoing



# How Did The UK Respond?

- January 2015 – UK's FSA start testing of cumin at ports, wholesalers and retailers
- 31<sup>st</sup> January - Bart Ingredients recalls a batch of ground cumin after FSA detects suspected almond





# How Has It Developed?

- 12<sup>th</sup> – 14<sup>th</sup> February - Morrison's Fajita Meal Kit, Aldi Fiesta brand Fajita Dinner Kit and Discovery Taco Seasoning all recalled
- Suspected that a spice mix supplied by Santa Maria UK Ltd used in the three products contained undeclared almond protein in paprika
- Recalls in Denmark, Sweden and Norway





# Challenges

- Levels of almond are much lower than peanut in cumin – unrelated?
- Levels detected are not thought to pose a food safety risk?
- Almond much more expensive than peanut?
- No obvious reason for contamination – nut free supply chain
- Conflicting results between ELISA (protein) and PCR (DNA) test results
- Not much validation previously on spices for nuts!
- Are the results real?

# Issues With Testing

- Cumin – possible cross reactivity with Mahaleb, a spice used in Middle Eastern cuisine from a closely related member of the *Prunus* family
- Paprika – possible cross reactivity with some ELISA test kits and almond
- Cross reactivity appears to be low level
- Changes to protein on smoking / grinding?
- Poor recovery from some spices with test kits
- Some cross reactivity with PCR tests

# What Does Industry Need?

- Do we have a problem?
- How do we understand the supply chain to target the right sampling and testing?
- How do we choose the right test?
- How do we interpret the results?
- How do I know if I can trust them?
- What are the implications of the results?



# How To Choose The Right Sampling And Testing Strategy

- Need to consider the contaminant
  - What might it be?
  - How might it have got there?
  - How might it be distributed?



- These considerations will determine
  - What samples?
  - How many samples?
  - How big the samples are?

Understanding  
the Supply  
Chain

# What Is Contaminating What?



Cumin seeds vs. ground cumin



Ground Almond



Ground Peanut



Peanut Shell

# Supply Chain – Complicated?



# Choosing the Right Lab



- Are they independently accredited?
  - BS EN ISO/IEC 17025
- Both the laboratory and for the test you need?
- Do they have both expertise and experience in this area?
- Can they advise you on sampling?
- Can they advise you on the right test?
- Can they advise you on what the result means?

Good  
sound  
advice

What does  
it mean to  
me?

Scientific Integrity



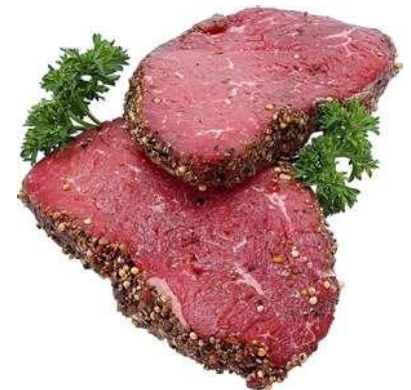
# Testing Lab's Responsibilities

- Use a Commercial kit?
  - Test kit validation report
  - Essential validation by laboratory before launching test
    - Specificity (cross reactivity)
    - Recovery (different samples at different levels)
    - Precision (repeatability and reproducibility)
    - Standard uncertainty (on QC samples)
    - Method detection and reporting limit (LOD and LOQ)
  - On-going validation
    - Spike recovery
- In-House Method?
  - Robust validation program
  - Assess critical parameters
  - Fit for purpose?
  - On-going validation

# Which Test?

- Recommend an ELISA test / DNA test?
  - If the suspected contaminant is peanut shell?
    - ELISA may not detect
    - DNA test will not quantify
- ELISA
  - Detects allergenic proteins
  - Quantitative within a standard range
  - Reports as allergen protein/ total protein / whole food?
- DNA
  - Uses polymerase chain reaction (PCR) to amplify DNA from the allergen
  - Not quantitative
  - Reports as whole food

# Problem Sample Types



# Matrix Interference – Always check!

- Internal validation (spike recovery ELISA/inhibition studies PCR)



# How to Interpret Results?

## ELISA

- Result may be  $< x$  mg/kg (not detected above the reporting limit)
- Result may be  $> x$  mg/kg (more than the top standard)
- Result may be  $x$  mg/kg almond (total almond / almond protein?)

## PCR

- Result may be Detected (detected above the reporting limit)
  - Result may be Not Detected (Not Detected above the reporting limit)
- You need to have confidence that the result is right and accurate

No internationally agreed safe threshold levels or clear definition of what is trace vs. gross contamination

# Conflicting Results?

- Positive ELISA / Negative PCR?
  - Units of Measurement?
  - Limit of Reporting?
  - Is there cross reactivity / Inhibition?
- Negative ELISA / Positive PCR?
  - Units of Measurement?
  - Limit of Reporting?
  - Is there cross reactivity / Inhibition?
- What to do?
  - Alternative validated method?
  - Alternative validated test kit?
  - Sample representative?
  - Maybe no result can be reported?

# Positive Results?

- Legal obligations – From the FSA
  - Businesses are legally required to inform their local authority / port health authority and the FSA if there is reason to believe that food is not compliant with food safety requirements. The FSA will then assist in conducting a risk assessment and advise of any action to be taken.
  - A food incident is an event where, based on the information available, there are concerns about actual or suspected threats to the safety or quality of food that could require intervention to protect customers' interests.



# Risk Assessment - Steps

- What level would be considered a risk to public health / quality of product?
- Consider the portion size / dosing effect
- How much of a product could be used in recipes – different people may use more / less than others?
- Risk assessment always performed on a worst case scenario

# Questions?

**[Barbara.j.hirst@rssl.com](mailto:Barbara.j.hirst@rssl.com)**

0118 918 4076

[www.rssl.com](http://www.rssl.com)