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Salford Professional Development

We warmly welcome you to:

The Future of Food Safety

Thursday 18 May 2017

Conference Producer: Chris Reynolds

Chair: Sarah Delaney

#SafetyofFood

@SalfordUni_SPD @C_Reynolds91

University of Salford MANCHESTER

ONECPD Salford Professional Development

Chair

Sarah Delaney

UK & IE Law and Standards Manager

IKEA Ltd

University of Salford MANCHESTER

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Keynote Address

Professor Carol A Wallace

Professor of Food Safety Management Systems, Co-Director, Institute of Nutritional Sciences and Applied Food Safety Studies

University of Central Lancashire

Impact of Food Safety Culture on Food Safety Management Systems

Prof Carol Wallace

Agenda

- Food safety research at UCLan
- Evolution of Food Safety Management Systems
- Food safety paradox – increasing illness
- Findings from HACCP and Food Safety Research
- Emergence of food safety culture
- Food Safety Culture Who's who and What's what
- Evolving food safety programmes and culture
- Measuring and improving food safety culture
- Food safety culture research
- Systems and Culture – overcoming the complexity

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Food Safety Research at UCLan

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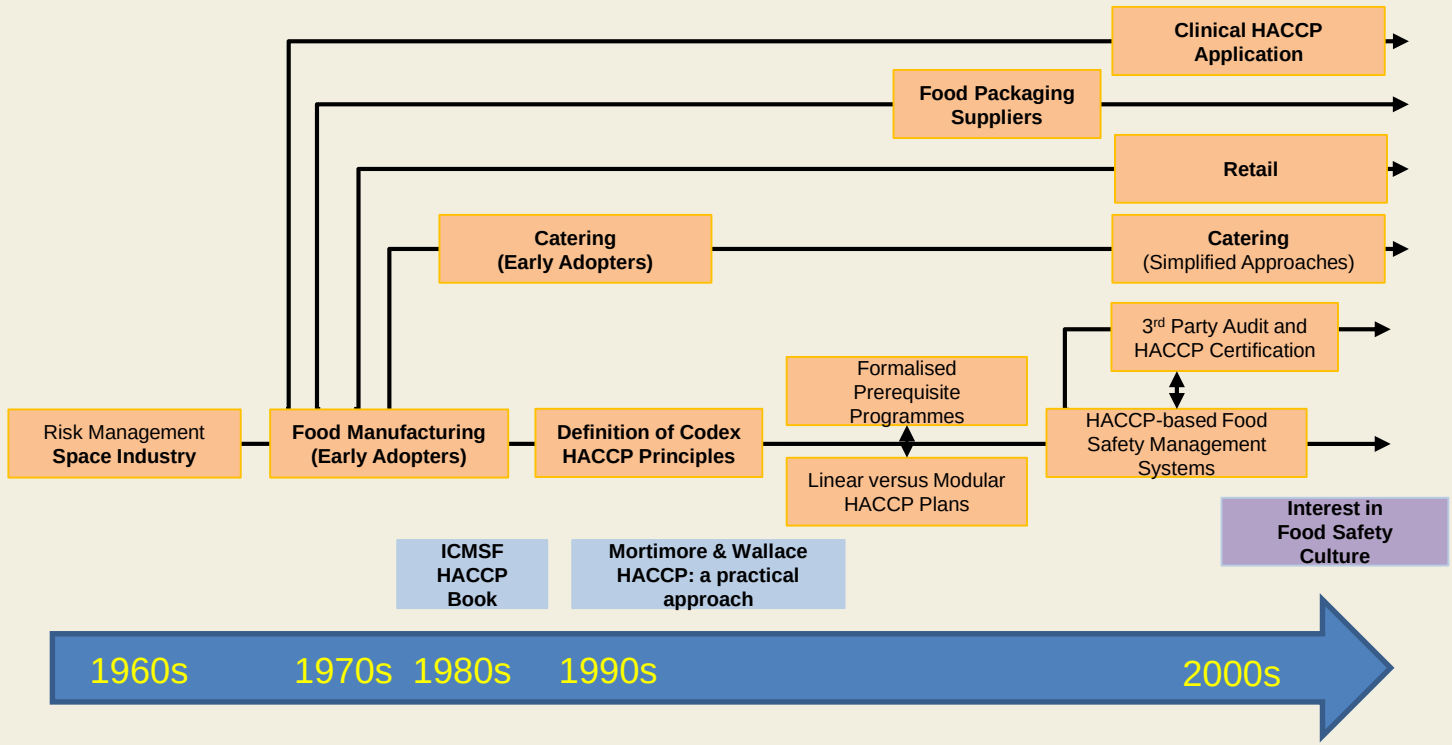
Evolution of HACCP-based FSMS



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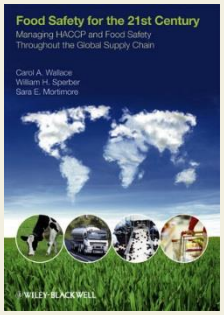
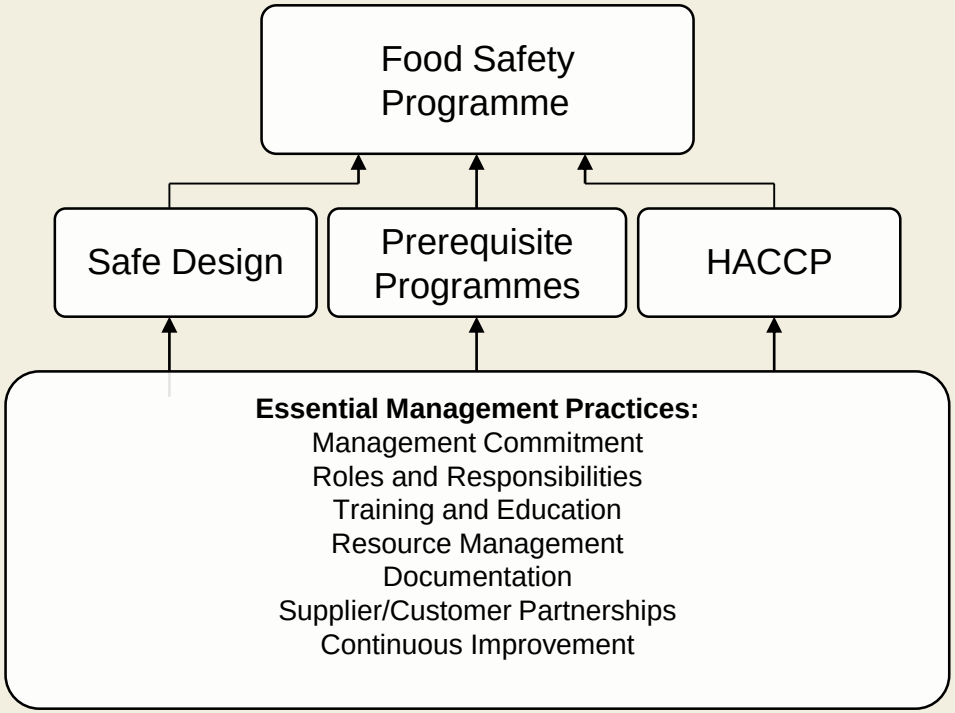
Modern Food Safety Management Systems





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Food Safety Paradox: HACCP-based FSMS use increases but…

- 2005 Cooked meats UK
  - 157 ill; 1 death; *E. Coli* O157:H7
- 2006 Chocolate UK
  - 60 ill; *Salmonella* Montevideo
- 2006 Spinach outbreak USA
  - 200+ ill across 26 states; 4 Dead; *E. Coli* O157:H7
- 2007 Peanut butter USA
  - 650 ill; 9 deaths *Salmonella* Typhimurium
- 2008 Cooked meats Canada
  - 57 ill; 23 deaths*; L. monocytogenes*
- 2011 Canteloupe outbreak USA
  - 147 ill across 28 states; 33 Dead; *Listeria monocytogenes*
- 2011 Sprouted seeds outbreak Germany
  - More than 4000 illnesses; 40 deaths; *E. coli* O104:H4

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Food Safety Paradox: HACCP-based FSMS use increases but…

- We still experience major food safety incidents
- Has HACCP been oversold?
- HACCP can only control identified hazards
- Many outbreaks associated with business issues
  - Lack of knowledge, expertise, awareness & commitment
  - management/leadership failures
  - Prerequisite programme failures
  - Failure to provide resources, etc.
  - Failure to properly implement, verify and maintain the system
- These are not HACCP system failures per se but something is not working….

HACCP-based FSMS Successes and Challenges – Industry Perspectives

- Codex agreement gave us a global food safety system language
- Cross functional input to food safety and a preventative mindset
- Structures for systematic hazard analysis and CCP identification/management
- Real time in-process monitoring and recognition of the *workhorse* role of prerequisites (PRPs)

But we have ….

- Inadequate Pre-requisite programs (PRPs)
- Poorly implemented HACCP systems
- Failure to maintain systems once implemented – HACCP is an afterthought

Slide points courtesy of Sara Mortimore, Land o' Lakes

HACCP Research Perspectives

Food Research International 47 (2012) 236–245

Contents lists available at ScienceDirect

Food Research International

journal homepage: www.elsevier.com/locate/foodres

Re-thinking the HACCP team: An investigation into HACCP team knowledge and decision-making for successful HACCP development

Carol A. Wallace [a,*], Lynda Holyoak [b], Susan C. Powell [c], Fiona C. Dykes [d]

[a] School of Sport, Tourism & the Outdoors, Division of Sport, Exercise and Nutritional Sciences, University of Central Lancashire, Preston, PR1 2HE, United Kingdom
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Food Control 35 (2014) 233–240

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Food Control

journal homepage: www.elsevier.com/locate/foodcont

HACCP – The difficulty with Hazard Analysis

Carol A. Wallace [a,*], Lynda Holyoak [b], Susan C. Powell [c], Fiona C. Dykes [d]

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Development of methods for standardised HACCP assessment

Carol A. Wallace and Susan C. Powell
Lancashire School of Health and Postgraduate Medicine, University of Central Lancashire, Preston, UK, and
Lynda Holyoak
Department of Psychology, University of Central Lancashire, Preston, UK

Abstract

Purpose – Assessment of HACCP systems is a key element in assuring the effective management of food safety. However, there is no accepted approach or common methodology available to HACCP practitioners, auditors or regulatory bodies. This paper seeks to examine this situation

Post-training assessment of HACCP knowledge: its use as a predictor of effective HACCP development, implementation and maintenance in food manufacturing

Carol A. Wallace and Susan C. Powell
Lancashire School of Health and Postgraduate Medicine, University of Central Lancashire, Preston, UK, and
Lynda Holyoak
Department of Psychology, University of Central Lancashire, Preston, UK

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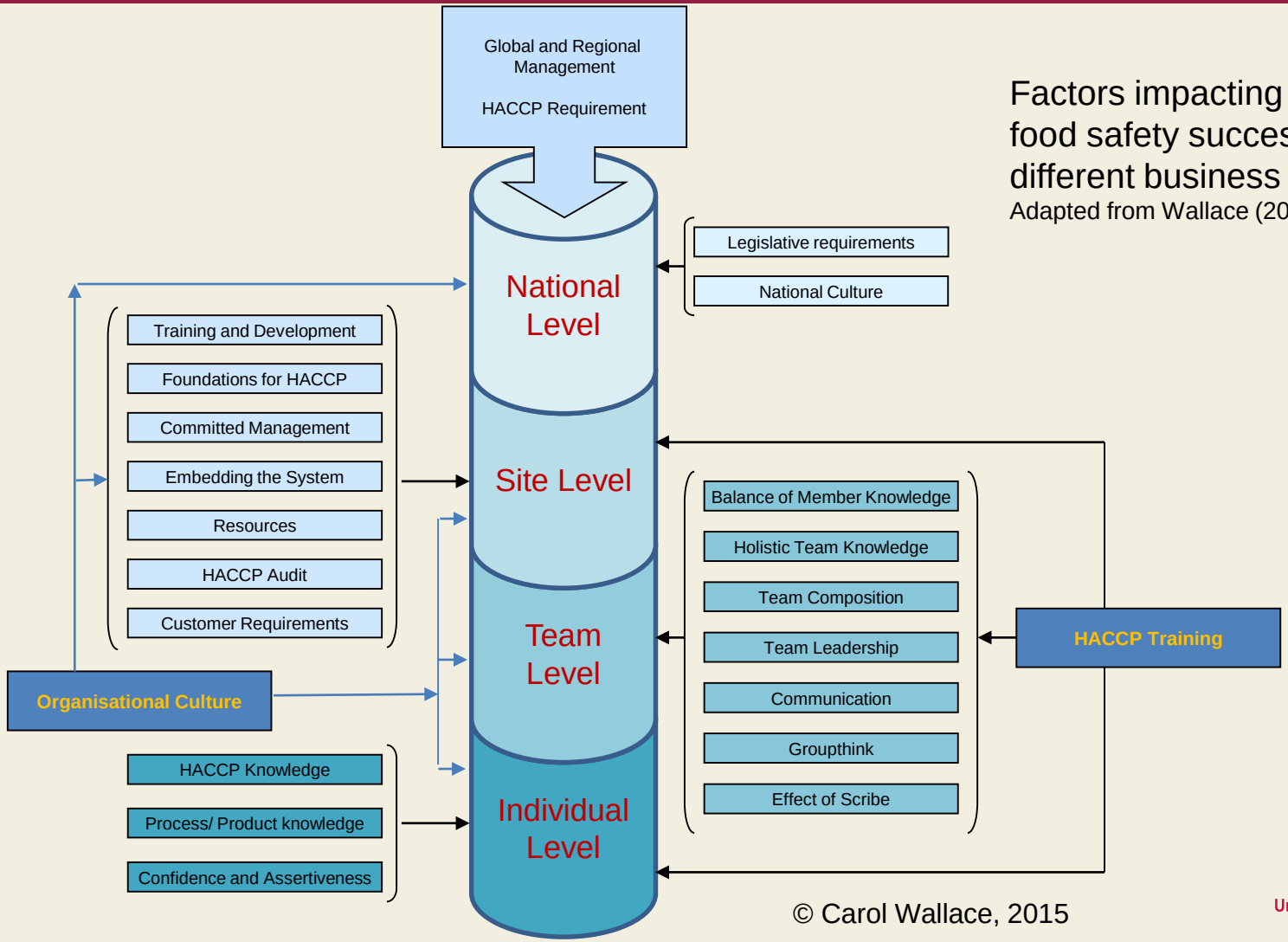
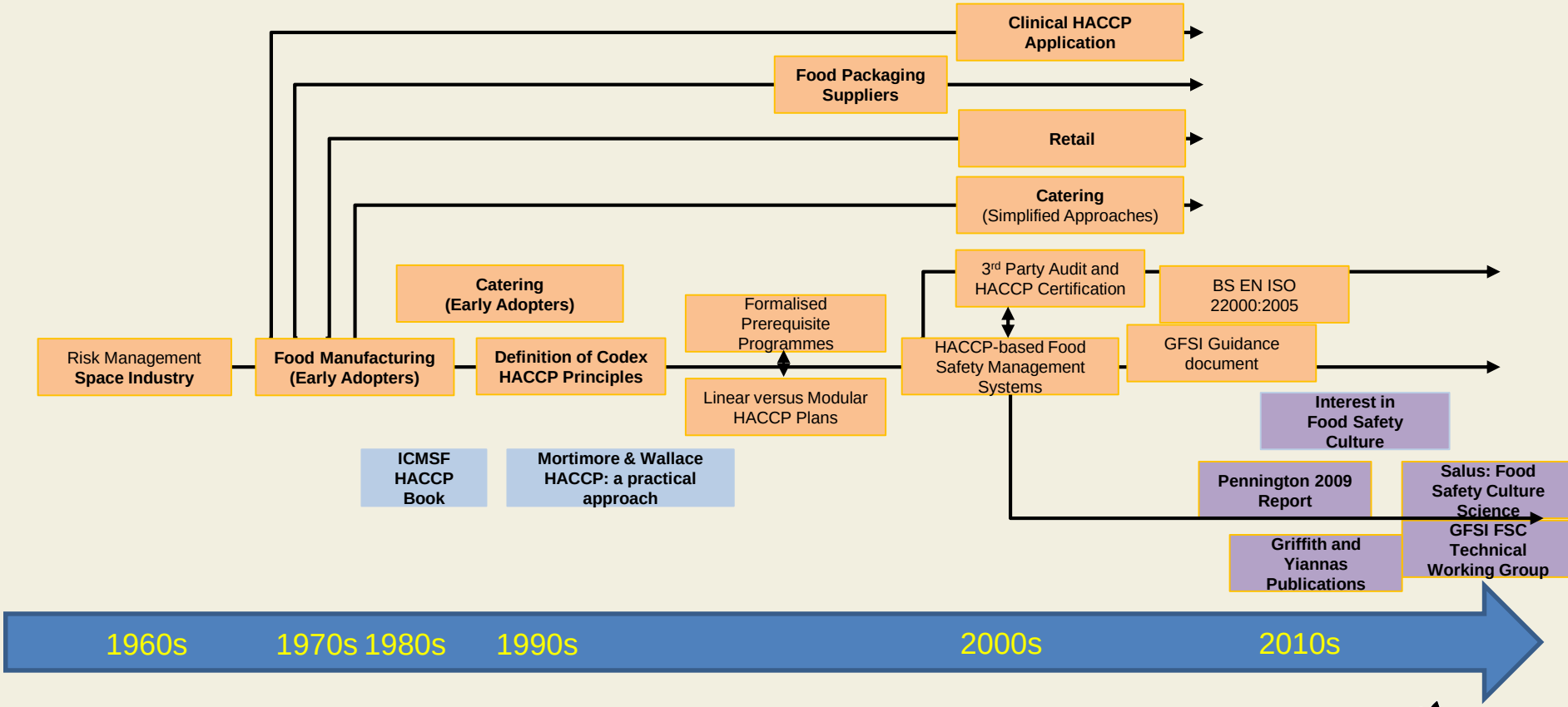
HACCP Research Perspectives



Factors impacting HACCP and food safety success at different business levels

Adapted from Wallace (2009)

Evolution of HACCP-based FSMS and Food Safety Culture



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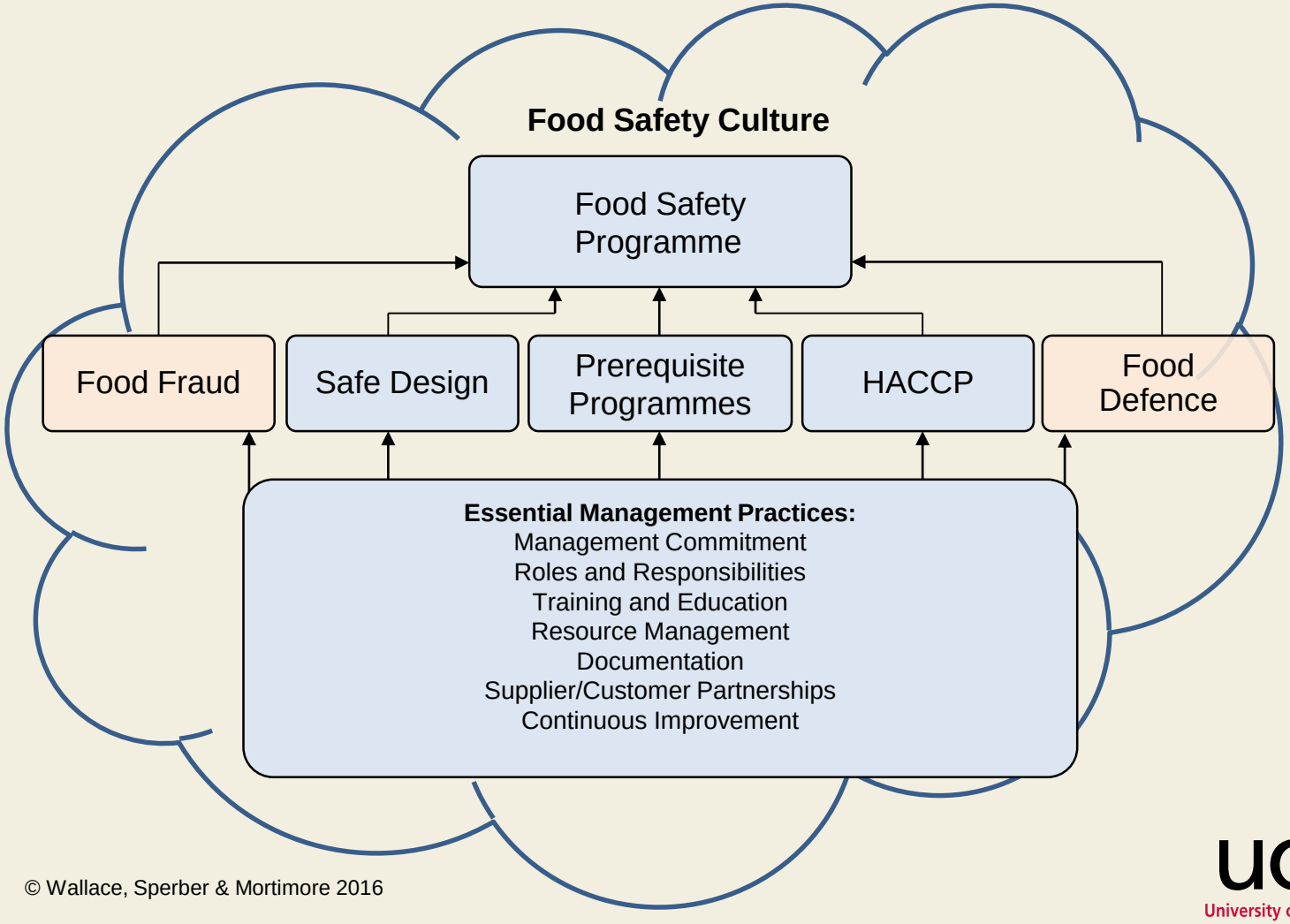
Evolving Food Safety Management Systems



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Where does the FSC concept come from?

- FSC builds on work from:
  - Organisational Culture
  - Organisational Psychology
  - Human Factors research
  - Safety Science
  - Social cognitive science
  - National Culture
- These are very well developed fields in their own right
- FSC needs input from a number of perspectives,
  - not just food safety people but social scientists, psychologists, ethnographers, behavioural specialists
  - Quantitative and qualitative perspectives both important.

What is Food Safety Culture

- Definitions:
- Griffith, 2010 – FSC =

  '*The aggregation of the prevailing, relatively constant, learned, shared attitudes, values and beliefs contributing to the hygiene behaviours used within a particular food handling environment*'
- Schein, 2004 – Organisational Culture =

  A pattern of shared basic assumptions that was learned by a group as it solved its problems. The group found these assumptions to work well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to these problems'
- Jespersen et al, 2016 – FSC =

  'the interlinking of three theoretical perspectives: organisational culture, food science and social cognitive science.'

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Food Safety Culture Evolving Definitions

- Food Safety Culture: *Shared values, norms, and beliefs that affect mindset and behaviours towards food safety across/in/throughout an organisation.*
  (GFSI TWG)

- This definition builds on previous work and definitions in the literature, in particular the definitions of Griffith et al. (2010) and Schein (2004).
- Shared values, norms and beliefs generally seen as a learned pattern of conditions that are taught to new members when they join a group.

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Food Safety Culture Current Perspectives (Who's who & What's what)

SALUS

The Food Safety Culture Science Group

GFSi

Global Food Safety Initiative

International Association for Food Protection

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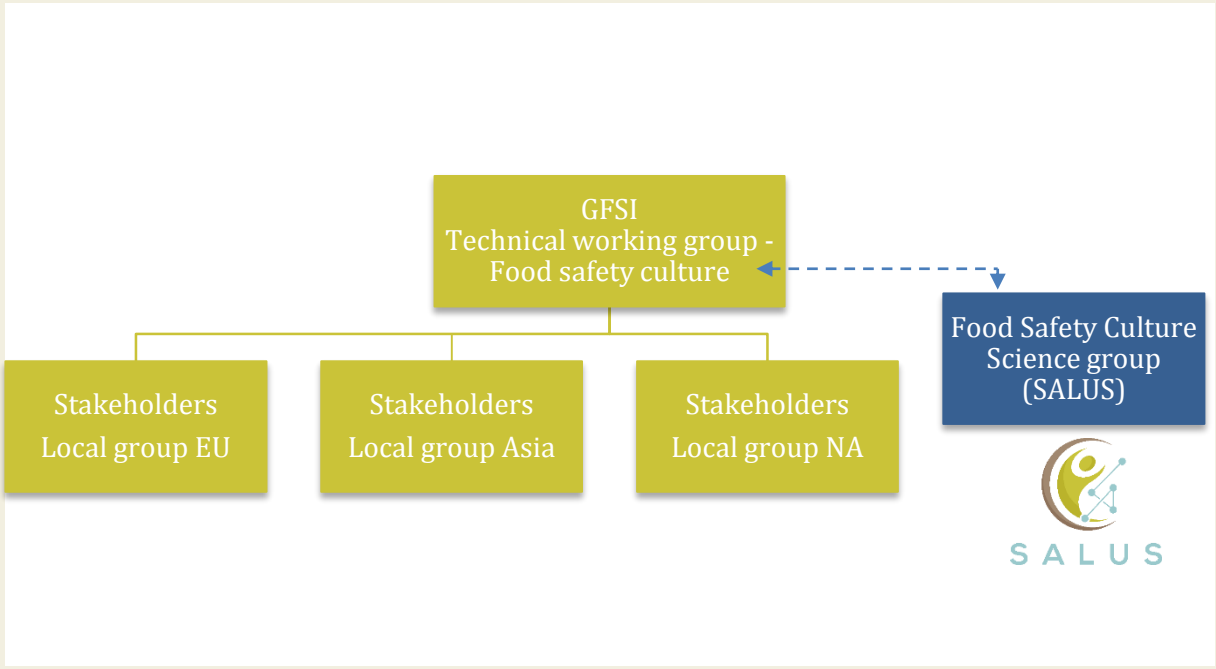
GFSI/Science Group
Food Safety Culture Initiative



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GFSI Food Safety Culture Technical Working Group (TWG)

- Aim: to provide guidance and requirements around food safety culture.
- Consists of practitioner technical experts from retailers, manufacturers, food service operators, service providers, standard owners, certification bodies, and industry associations.

GFSi
Global Food Safety Initiative

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GFSI Technical Working Group FSC

- Established following discussions 2015-16
  http://www.mygfsi.com/news-resources/news/449-gfsi-ramps-up-work-on-food-safety-culture.html
- First meeting Berlin, 2016
- Challenges and opportunities in FS-culture
- FS-culture items (discussion on drivers/challenges, tools & best practices)
  - Policy, strategy, vision
  - Education, training & learning
  - CEO communication
  - Working group/communication
  - Hazards understanding across all employees
  - Performance measurements/tools

Food Safety Culture Science Group (SALUS)

- Academics from 11 Universities, 1 Industry Research Association
- Consultants linked with research institutes (Consultant/Academics)
- International Group
  - UK, Netherlands, Belgium, Canada, USA, Zimbabwe
- Multiple perspectives
  - Food safety, systems theory, psychology, human factors, team behaviour, leadership, decision-making, measurement tool development, etc.
- Chaired by Prof Carol Wallace, UCLan
- Group first met November 2015
- 2nd Meeting June 2016; 3rd Meeting Jan 2017
- Next Meeting November 2017

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The need to assess of food safety culture

Culture factors.. (Griffith et al. 2010)

- Food safety management systems and style;
- Food safety leadership;
- Food safety communication;
- Food safety commitment;
- Food safety environment; and
- Risk perception

So, how do I measure FSC?

- A number of tools are available, e.g.
  - Taylor (2015) Campden BRI/Taylor Shannon
  - Jespersen et al (2016) Maturity Profiling and online survey tool
  - De Boeck et al (2015) Food Safety Climate self-assessment tool
  - Wright et al (2013) FSA Toolkit

- Problems
  - All measuring slightly different things in different ways
  - Need to understand validity and application of tools.

How do food safety culture evaluation tools bring breadth and depth to the assessment, management and evolution of food safety culture?

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Comparative analysis of existing food safety culture evaluation systems

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ABSTRACT

The purpose of the research was firstly, to analyze existing culture evaluation systems for commonalities and differences in research quality, applied validation strategies, and content. Secondly, to suggest a simple structure of food safety cultural dimensions to help unify the culture evaluation field. To achieve these goals, a comparison of eight culture evaluation models applied to varing degrees in the food industry was conducted. The systems were found to vary significantly in applied validation strategies but through deductive, textual data analysis, five dimensions were identified that cover elements present in all the models. Transparency is needed when using applied research methodologies to continually increase quality and trustworthiness of culture research in the food safety domain and this field would benefit from both further commonality of approach to validation strategy and structure and adoption of an overarching structural framework.

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Comparing culture evaluation systems

Constructs (Ball)	Indicators (De Boeck)	Traits (Denison)	Drivers (CEB)	Capability area (Jespersen)	Markers (NSF)	Categories (TSI)	Elements (Wright)
Management commitment	Leadership	Mission	Leadership emphasis	Perceived Value	Culture and Awareness	Purpose	Perception of safety
Supervisor commitment	Commitment	Involvement	Message credibility	People systems	Management	People	Business priority
Training	Communication	Consistency	Peer involvement	Process thinking	Training	Process	Leadership
Infrastructure support	Resources	Adaptability	Employee ownership	Technology enabler	Regulatory Compliance	Proactivity	Ownership of safety
Worker commitment	Risk awareness			Tools and infrastructure	Policies and standard		Competence
Worker behaviours					Auditing		Employee communication
					Traceability		Employee involvement
					IT Systems		Risk perception

Fig. 2. Content comparison of the eight culture evaluation systems. Five affinity groupings emerged from the analysis; red = values and mission, green = people systems, blue = consistency, yellow = adaptability, and purple = risk and hazards.

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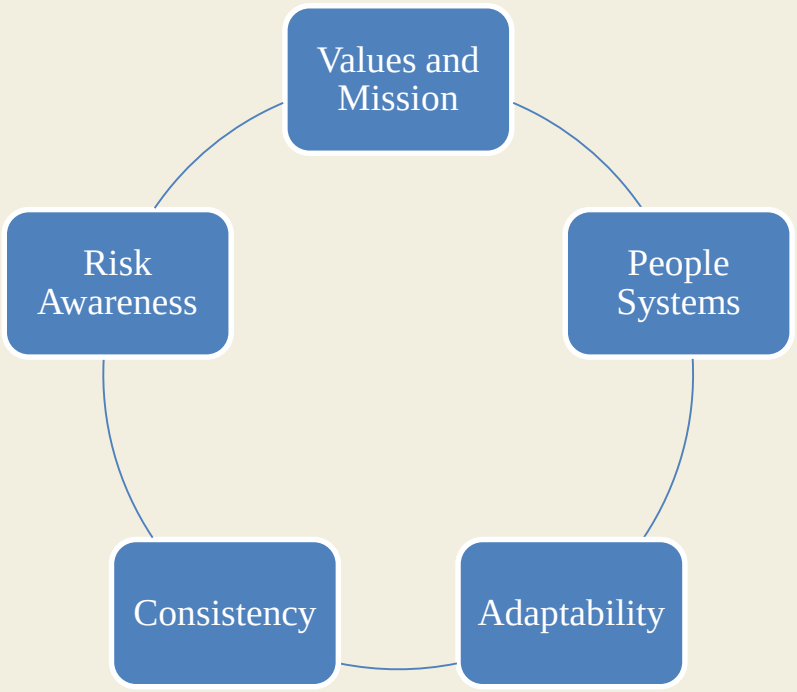
FSC Dimensional Framework



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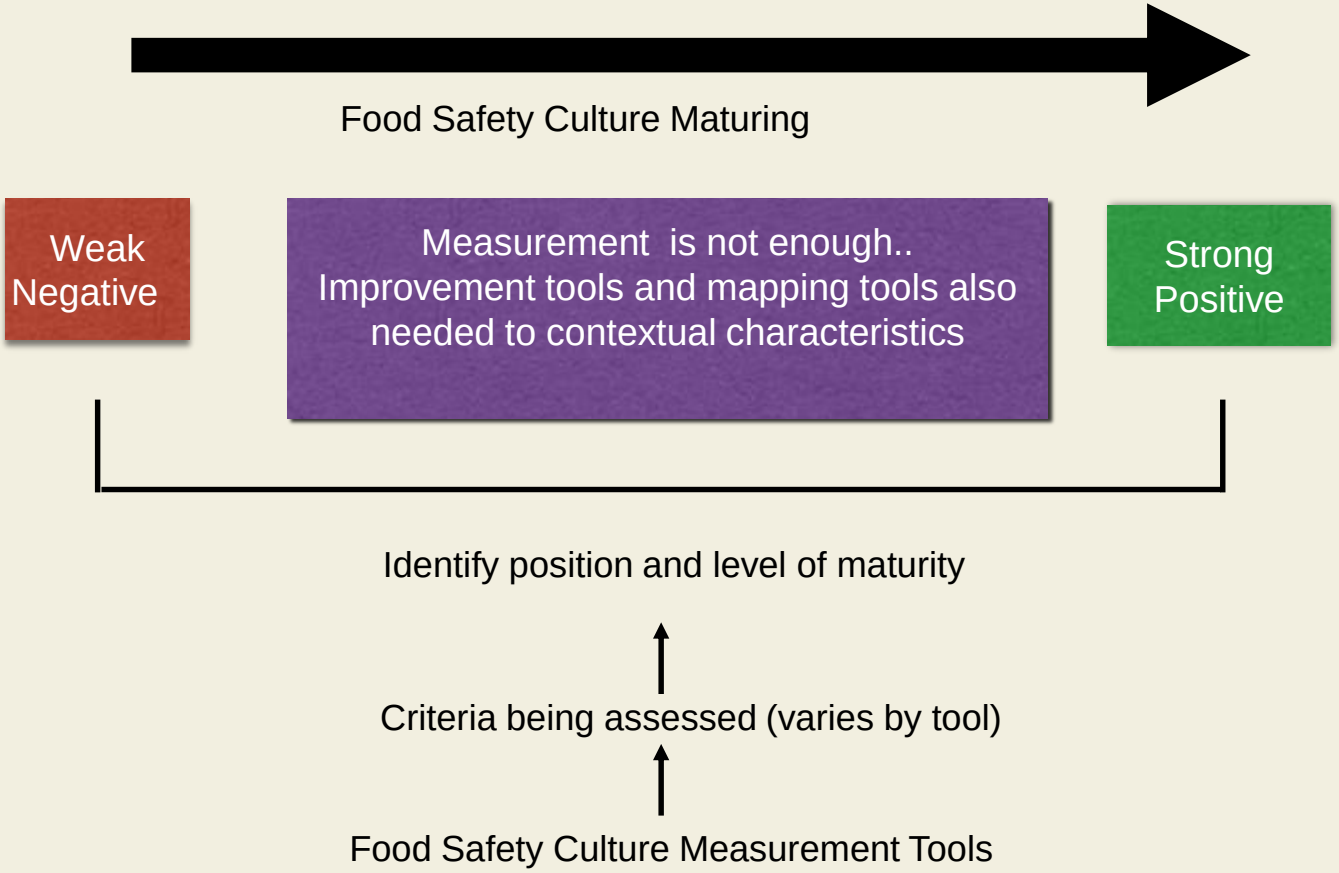
Food Safety Culture - A continuum



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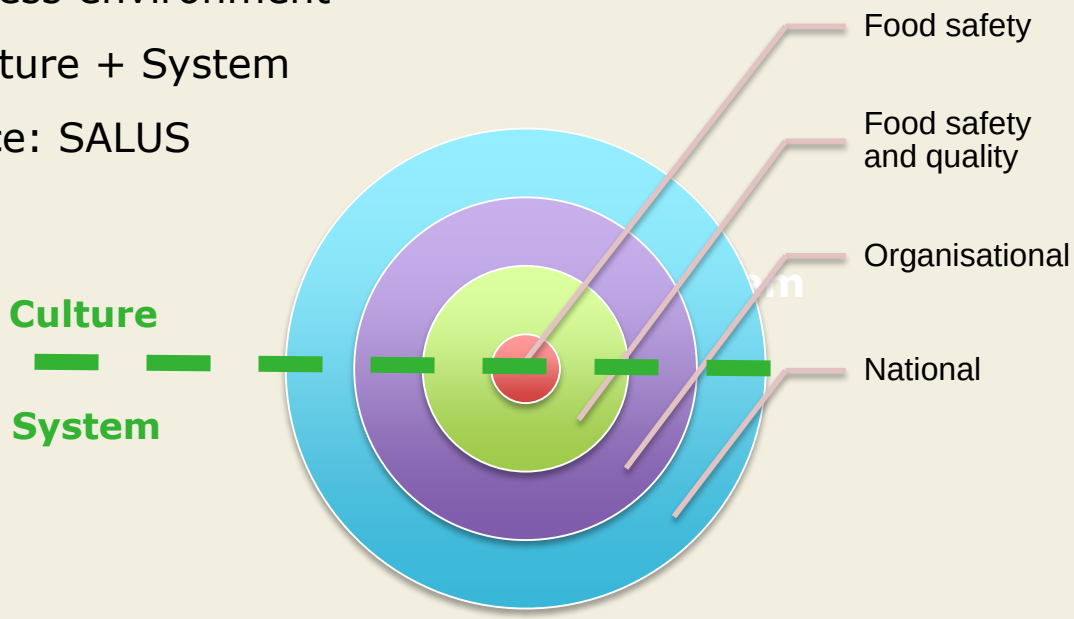
Food Safety and Culture in Business

Business environment

= Culture + System

Source: SALUS



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Salus framework

- What underpins the framework?
- How can it be relevant to all organisations and food manufacturing settings?
- Characteristics …
  - Individual characteristics
  - Group characteristics
  - Internal business context characteristics
  - External business context characteristics

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How do I improve FSC?

- Will require a toolkit of options depending on existing state
- Examples include:
  - Team building approaches and people development
  - Application of behavioural theories and interventions
  - Application of systems theories and interventions
  - Clarification of vision and strategy and linking to what leaders actually do and say
  - Provision of necessary resources, structures, systems and equipment to enable an effective culture.
- Will require research and sharing.

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Food Safety Culture
...Challenges, opportunities, and research

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Thank you……. Questions?

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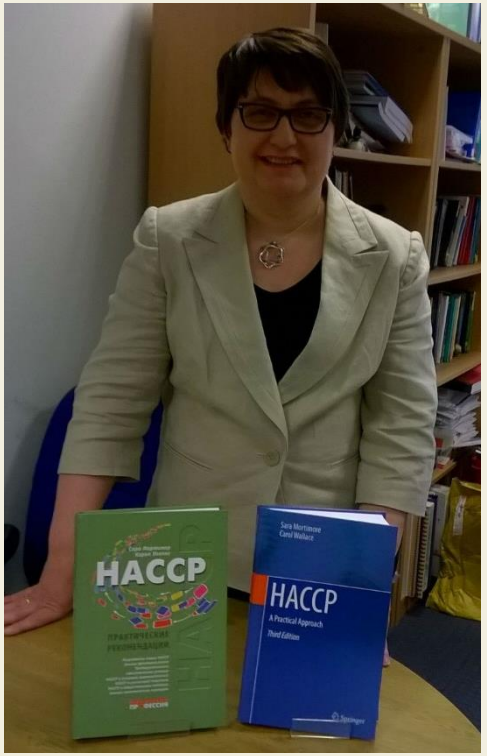
(References List available on request)



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Dr Peter Wareing

Food Safety and Manufacturing Consultant

Leatherhead Food Research

leatherhead food research

Food safety risks in the supply chain

Dr Peter Wareing, Food Safety and Manufacturing Consultant

18 May 2017

Regulatory, sensory and product development consultancy for the food and drink industry

Solving complex challenges for the food & drink industry since 1919

Science Group

science group Defined by science Inspired by technology Delivering innovation	sagentia	Science, technology & product development	oakland innovation	Technology consultancy for the consumer & industrial sectors
	otm	Technology advisory services to the oil & gas industry	leatherhead food research	Science-inspired product innovation and market advisory services for the food & beverage sector

Outline

1 Introduction – food safety risk factors

2 How to determine food safety risks

3 Food industry response to outbreaks and contamination

4 Foodborne diseases and shelf life

5 How to control risks

- Learnings
- Risk assessments
- Awareness
- New technologies

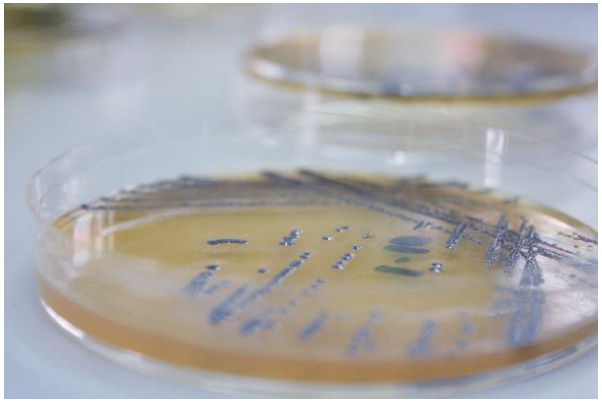
6 Conclusions

Introduction – food safety risk factors

Chemical

Physical

Microbiological



Allergens

Causes

Internal

- Lack of understanding of food processes/ingredients
- Poor/no food safety culture
- Product reformulation
  - Clean labels
  - Regulatory aspects
- Safety vs price vs quality vs delivery

External

- Globalisation
  - Length of supply chain
  - Complexity of supply chain
  - Transparency of supply chain
- Terrorist threat
- Food fraud in relation to food safety

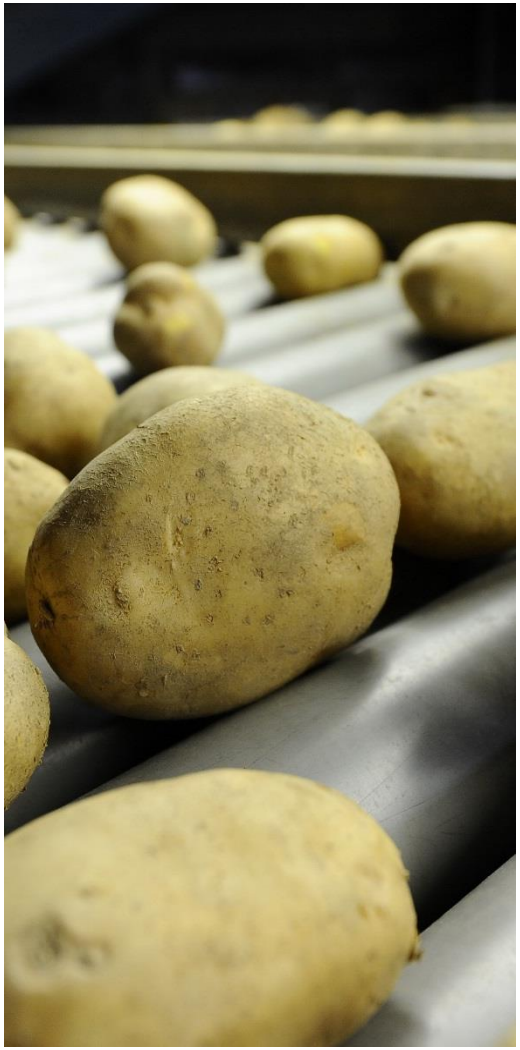
How to determine food safety risks

Internal

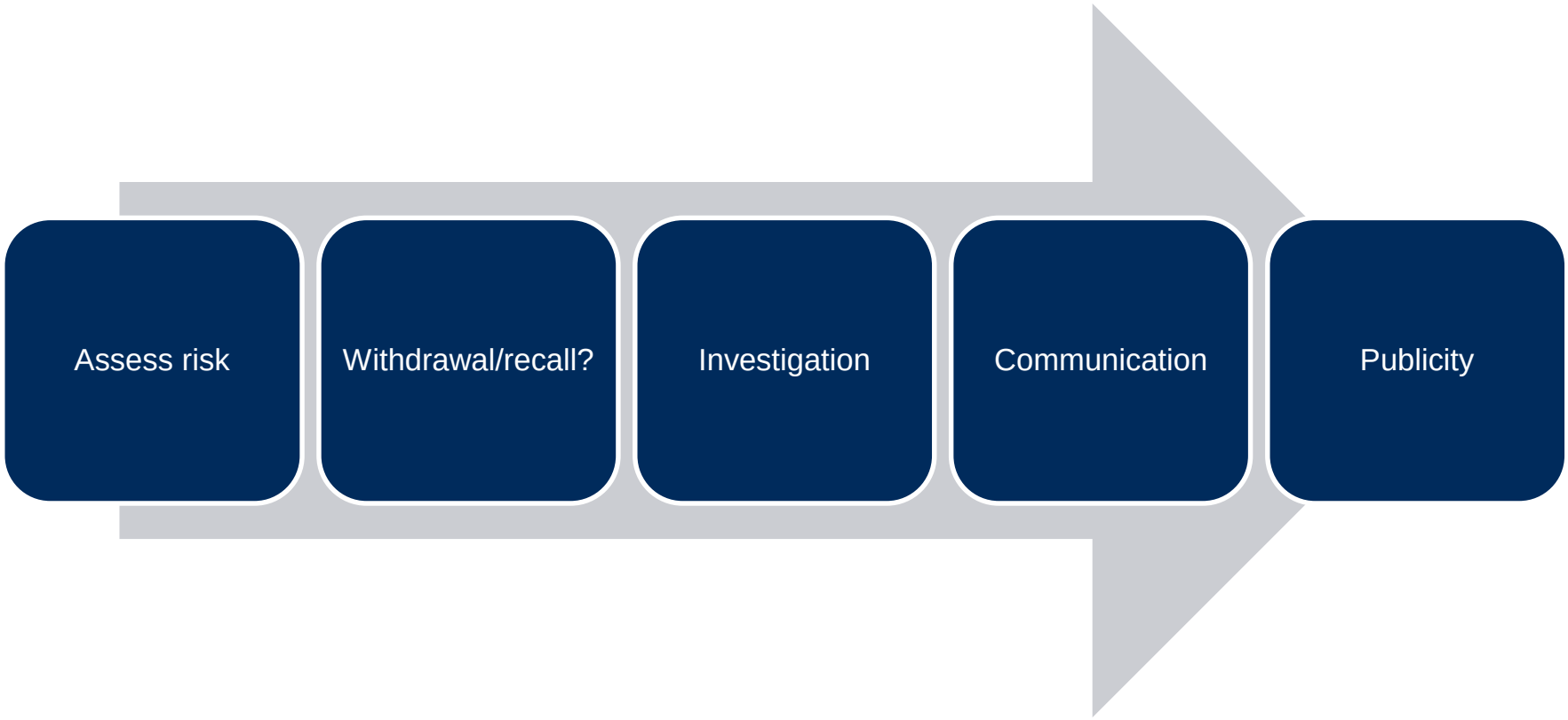
- Know your supply chain
- Experienced staff
- Frequent audit against documented process

External

- Perspective overview
- Information networks
  - FSA
  - RASFF
  - Horizon Scan



Food industry response – what should you do?



Avoids wrong conclusions

What might companies do wrong?

Multiple recall

Destroying the evidence

Taking action on basis of incomplete evidence

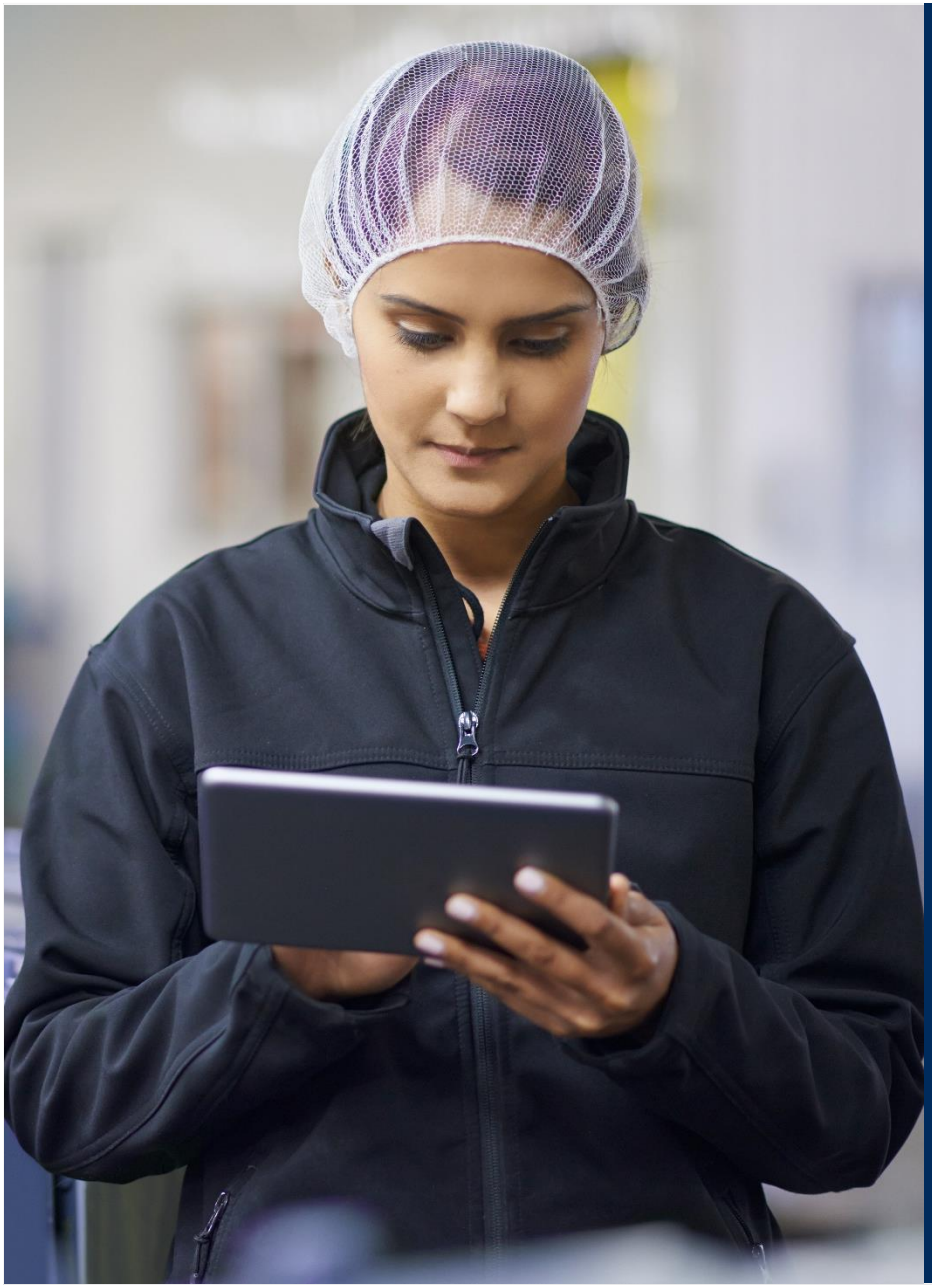
Foodborne diseases in the supply chain

Listeria monocytogenes

E. coli

Salmonella

Campylobacter



How to control risks

- Learnings
- Monitoring
- Awareness
- New technologies

Learnings

- Past mistakes
- All staff – every level
- Contacts
- Knowledge of supply chain risks
- Regional issues
- Understanding of process controls in relation to hazards
- Map supply chain

Risk assessment

Shelf life

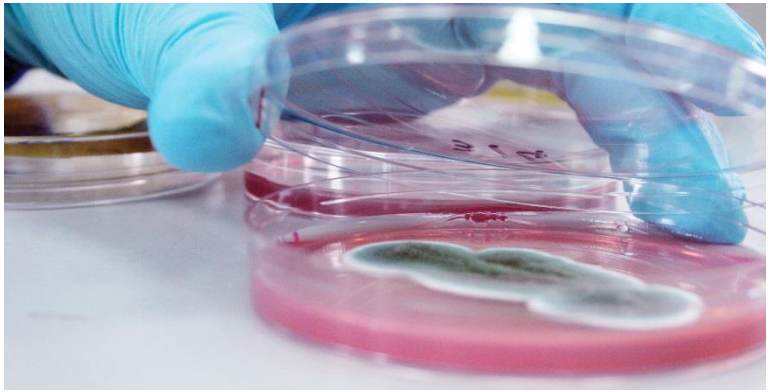
- Production – ongoing
- Abuse trials
- Qualitative and quantitative methods

Audits

- Risk rating for suppliers
  - High, medium and low risk
- Supplier self assessments
- Follow up audit frequency
- NC process
- Audits vs guidance

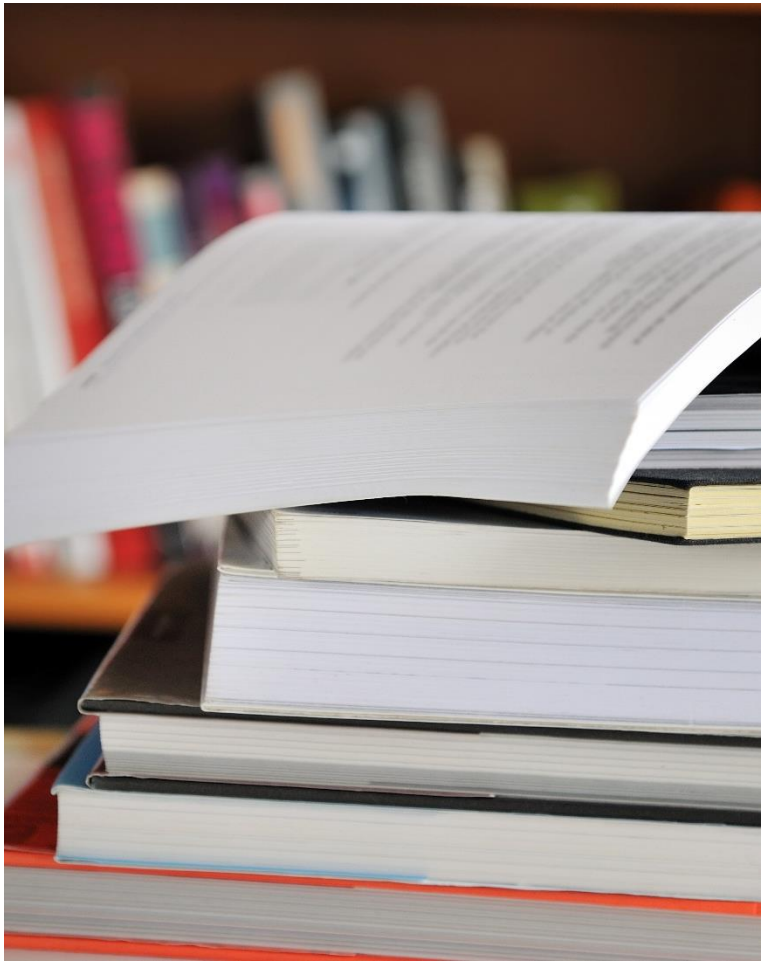
Challenge testing

- Risk assessment and modelling
- Knowledge of process/microflora
- Interactions
- Cost
- Interpretation



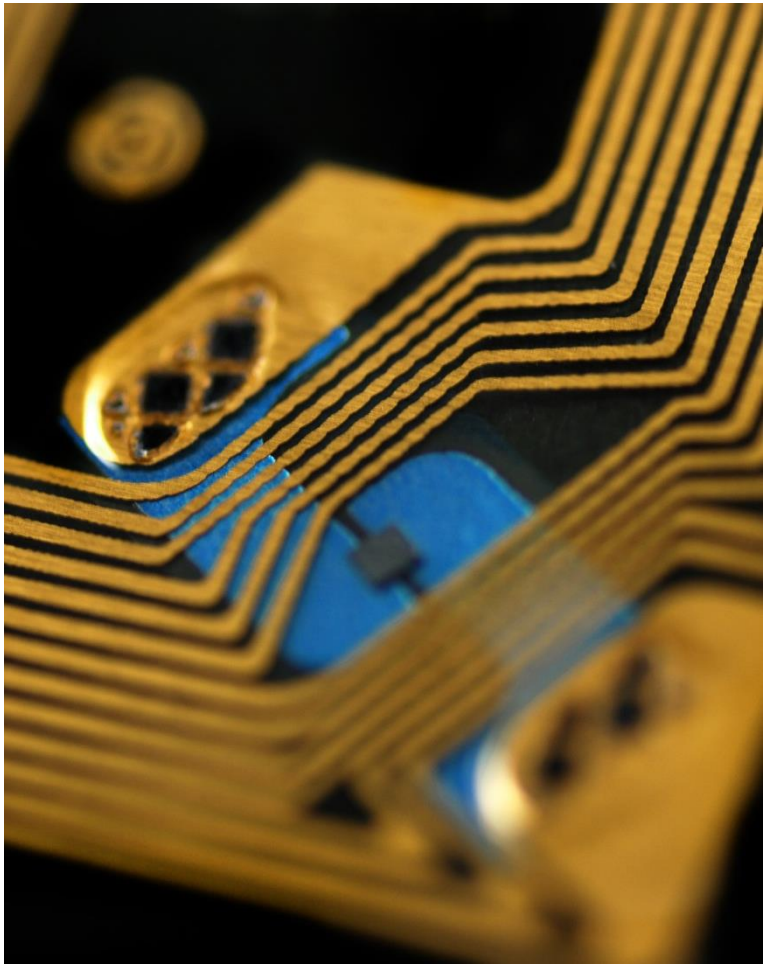
Awareness

- Integrated into HACCP
- Inter relationship of HACCP, TACCP and VACCP
- Horizontal and vertical hazards
- Horizon scanning
- Communication and collaboration across supply chain
- Safety vs price vs quality vs delivery issues



New technologies

- New packaging
- Nano coatings
- RFID
- TTI
- Block chain
- Internet of Things



Any change can introduce risk

Be sensitive to any changes – risk assess

Supply chains are complex

Conclusions

Each additional stage increases risk

How Leatherhead can help

Global Regulatory Services

Expertise in food safety regulation in UK, EU and Rest of World

- Up to date
- Will remain conversant with all changes as the come online
- 100+ countries and 20+ languages covered
- Can help you with small local checks and as you grow internationally

Food Safety Services

Accredited microbiology and food safety labs and personnel

- Risk assessments on your supply chains and processes
- Challenge testing of products and processes

Thank you

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ONECPD Salford Professional Development

Mike Williams

Director

STS, part of the ELAS Group

Protecting your Supply Chain

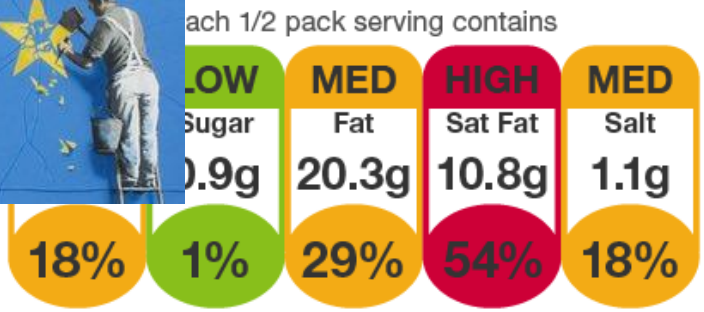
TRAINING . AUDITS . DOCUMENTATION . CONSULTANCY

Introduction

Why Protect The Food Chain?

- Ensure final consumer safety
- Provide your customers with confidence in the product supplied
- Moral duty
- Maintain your reputation
- Legal requirement

Challenges



Source: Food Standards Agency

Third Party Auditing

IFS Food

Food Safety System Certification 22000

Red Tractor Assurance

ISO 22000

STS Excellence in food safety

SALSA Safe and Local Supplier Approval

BRC FOOD CERTIFICATED

Soil Association Organic Standard

GLOBALG.A.P.

Announced or Unannounced?

- Various schemes have unannounced options
- BRC customers such as ASDA and Co-op require unannounced

Announced	Unannounced
Allows for supplier to pre-prepare	No pre-preparation (except for permitted windows)
Avoids difficulties for auditors on the day of the audit	Creates difficulty of lack of technical expertise on site during the audit
Allows supplier to demonstrate their full knowledge	True reflection of any given day operational standards

- STS audit schemes likely to be fully unannounced by 2020

Best Practice

- Know your suppliers
  - Keep your supplier data up to date
- Set your standards
  - Require suppliers to be 3rd party audit certified
  - Develop/obtain specifications for your products
- Visit your suppliers
- Conduct quality checks of products
- Keep records of complaints
  - Log
  - Investigate
- Sampling

What Not To Do

- Do nothing…
- Rely on reputations
- Just accept 3rd party certificates
- Fail to follow up renewal of certification on an annual basis
- Leave others to do all the work for you!

What To Look For

- Interested
- Responsive & sharing
- Certified to 3rd party audit standard (preferably unannounced!)
- Hold highest FHRS rating (Wales) & relevant FSA approvals
- React quickly to complaints and assist in their investigations
- Facilitate trace checks and sampling processes
- Open to assisting with NPD

Questions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Refreshments and Networking Break

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ONECPD Salford Professional Development

Guy Bush

Marketing Manager

Klipspringer


FOOD
SAFETY
and the impact of
PEOPLE
Klipspringer
Compliance with confidence


Klipspringer
Compliance with confidence


what does the
future
of
food safety
look like?
Klipspringer
Compliance with confidence

- Increasing number of allergens.
- Value-add production.
- Trend towards artisan products.
- Smaller production runs, but more of.
- Cannot just keep adding colours.
- Technology isn't the answer to everything.


PEOPLE
your team are the key differentiating factor for every facet of success
Klipspringer
Compliance with confidence


so what about the
PEOPLE
is different?
Klipspringer
Compliance with confidence


CULTURE
IS YOUR BRAND
Klipspringer
Compliance with confidence

What is CULTURE?

Klipspringer

Compliance with confidence


your
WHY
GOT A
REASON?
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Compliance with confidence


VISION
Klipspringer
Compliance with confidence


VALUES
Klipspringer
Compliance with confidence


AUTHENTIC
CONSISTENT
TEAMWORK
INNOVATIVE
OPEN-MINDED
NURTURING
Klipspringer
Compliance with confidence


What does CULTURE achieve?
Klipspringer
Compliance with confidence


BUY-IN
Klipspringer
Compliance with confidence


INTEREST
EAGERNESS
PASSION
PASSION
Klipspringer
Compliance with confidence


ACCOUNTABILITY
Klipspringer
Compliance with confidence


PRODUCTIVITY
Klipspringer
Compliance with confidence


EFFICIENCY
Klipspringer
Compliance with confidence

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Compliance with confidence

The Greencore Way

Klipspringer

Compliance with confidence

The Greencore Way


CULTURE
can be the
DIFFERENCE
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Compliance with confidence


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Please make your way to the seminar room:

Seminar A – room AH012 (main plenary)

Seminar B – room AH010

University of Salford MANCHESTER

ONECPD Salford Professional Development

Simon Wood

Product Manager

Autoscribe Informatics

Food Safety through Environmental Monitoring to meet FSA and modern xGMP standards

Simon Wood PhD

Product Manager, Autoscribe Informatics

May 2017

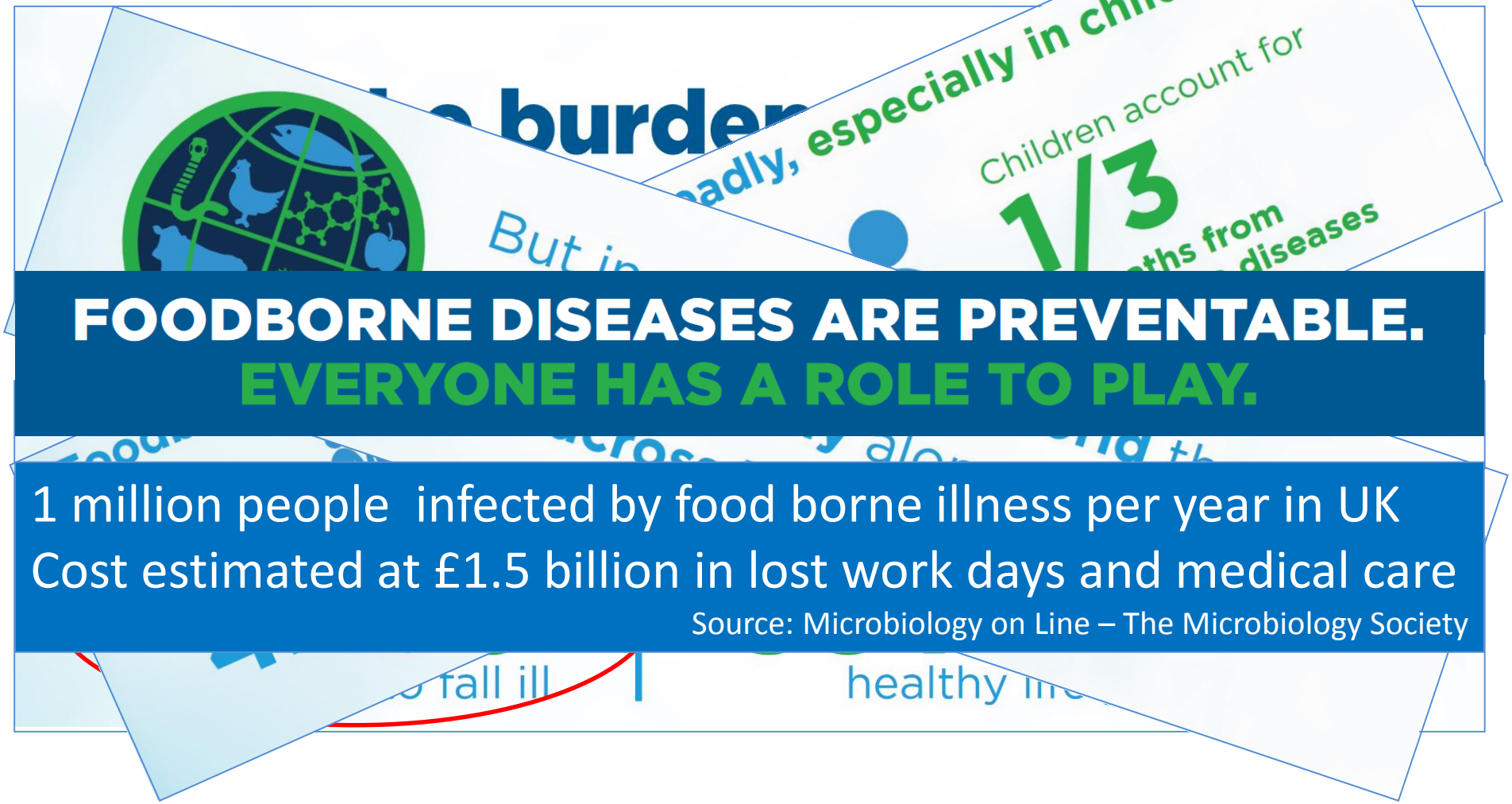
Food Quality Issues are Everywhere

- **Hummus crisis? What hummus crisis?**
- By Cherry Wilson & Habiba Khanom BBC News 26 April 2017
- Sainsbury's and Marks & Spencer were forced to withdraw their hummus following complaints their ranges did not taste as they normally should.
- Sainsbury's said it had taken a number of lines off the shelves because of a "production issue" and were investigating.

FSA Food Alerts 2017

- When its got here it's too late
  - Bleikers Smokehouse Ltd recalls Coldwater Prawns and Tiger Prawns because the products are labelled with incorrect use by dates 21 April 2017
  - Morrisons recalls Trimmed Beans because the product may contain small pieces of metal 20 April 2017
  - Marks and Spencer recalls Chicken and Vegetable Soup following possible chemical contamination 24 March 2017
  - Cleone Foods recalls patties because of incorrect labelling 24 March 2017
  - Douglas Willis recalls various meat products as they may contain small pieces of hard plastic (Wales only) 22 March 2017
  - Quorn Foods Ltd is recalling Quorn Meat Free Mince because the product may contain small pieces of metal 2 March 2017
  - Lotus Bakeries UK Ltd recalls Lotus Biscoff Crunchy Biscuit Spread because the product may contain small pieces of metal 2 March 2017
  - Pets at Home recalls four dry cat food products due to low levels of thiamine 27 February 2017
  - Morrisons recalls Peppered Beef Slices because of the presence of Listeria 18 February 2017
  - Sainsbury's recalls stir fry products due to possible presence of salmonella 9 February 2017
  - Great Northern Sandwich Co recalls six chicken products because of possible contamination 7 February 2017
  - Co-op recalls its Hollow Milk Chocolate Bunny because of possible product tampering 31 January 2017
  - Waitrose recalls Hearty Minestrone Soup because the product may contain blue plastic pieces 25 January 2017
  - Clayton Park recalls Twin Packed Cream Cakes due to incorrect date marking 20 January 2017
  - Thorntons recalls Hollow Milk Chocolate Jolly Santa 19 January 2017
  - Consumers warned about frozen meat and fish products supplied by MDA Products Ltd* (updated Jan 20) January 2017

Food Safety a Major Concern



Food Safety is a Political Issue

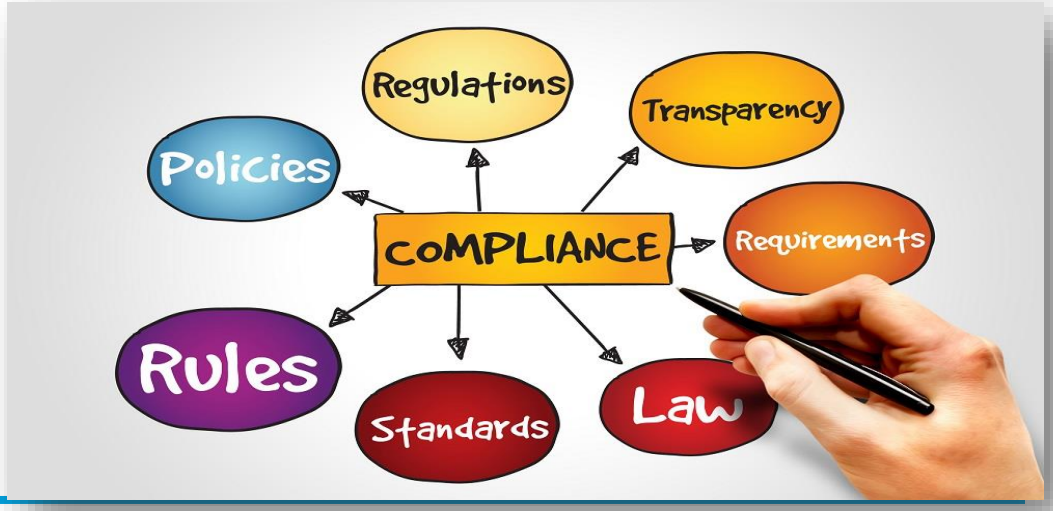
- Foreign Secretary Boris Johnson quipped that a post-Brexit free trade deal with the US might 'liberate the haggis' which currently can't be exported there
- The problem is you can’t just stick it in a container and send it over there

Changing Landscape of Food Safety

- FDA's Foreign Supplier Verification Program (FSVP)
- FDA's Voluntary Qualified Importer Program (VQIP)
  - May require facility certification based on regulatory audits, corrective action planning and review of safety records
- FDA changing approach to control of Pathogens in Ready to Eat Foods
  - More willing to take regulatory action
  - Companies need to implement preventative measures

Changing Landscape of Food Safety

- FSA - Regulating our Future Proposals
  - Assurance achieved through evidence of compliance with standards
    - Opportunity to use business's own data
  - Maintained provided information received is continually satisfactory
  - Potential for 3rd parties to provide accredited assurance
  - Sanctions to tackle non compliance



Data and Information - Supporting Food Safety

- Data and Data Management key in ensuring compliance, reducing risk and maintaining profitability
- Information Management must be a key management focus

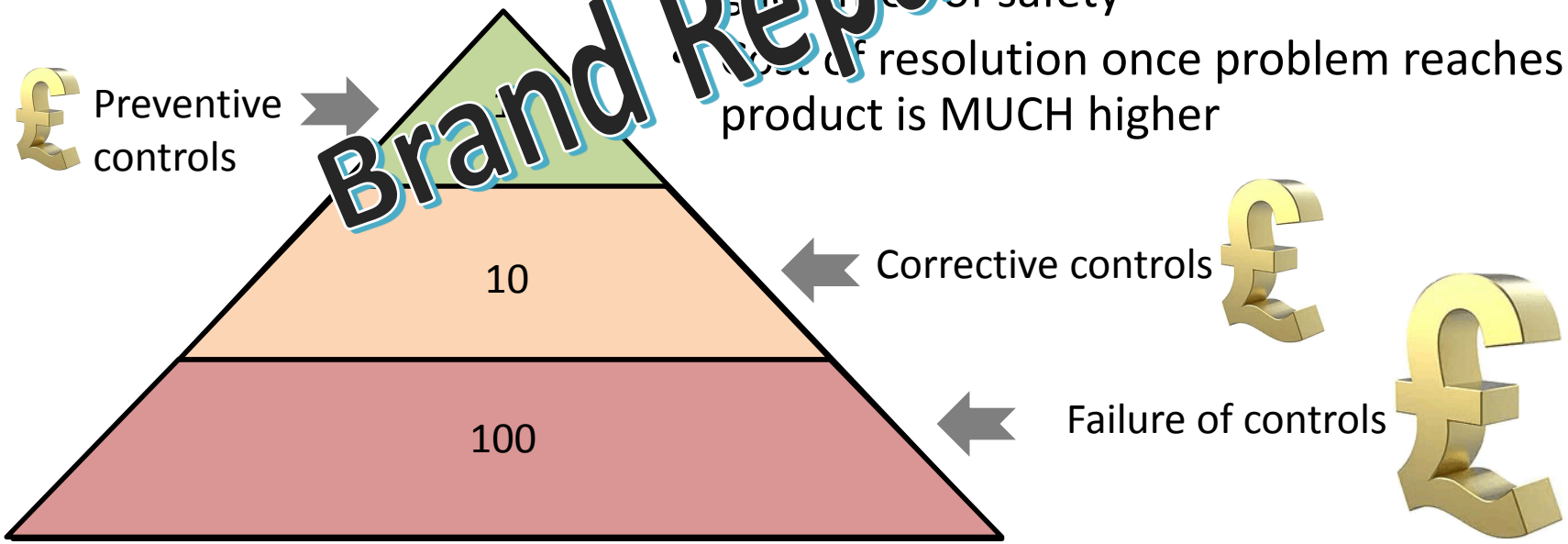
Data and Information – Supporting Food Safety

Business Driver	Data Support
• Shift in focus from screening to prevention and evidence of compliance	• Monitor adherence to preventative action program • Manage data created and identify trends • Drive decision making process • Ensure adherence to Quality Standards
• Increased legal actions against those who fail to demonstrate effective preventative measures	• Manage data required to demonstrate compliance • Deliver data in the correct format • Ensure validity or security of data
• Complexity, extent and cost of recall process	• Use data generated to prevent release of product to market • Batch and Lot management data provides traceability of ingredients and distribution

Why Prevention?

- Preventive Measures cost least
- Detection in the environment can be resolved with less expense than detection in product
- Non-detection in product is not a guarantee of safety
- Cost of resolution once problem reaches product is MUCH higher

Brand Reputation



What If These Had Been Prevented?

- Humbugs contaminated with Arsenic, 1858 Bradford
- Fake oil, 1981 Spain
- Austrian Wine adulterated with Ethylene Glycol, 1985 Austria
- Eggs and Salmonella, 1988 UK
- BSE, 1990s UK
- Beef flavoured fries, 2001 Global
- Peanut products and salmonella, 2008 US
- Sudan 1 in various food products affecting 300 suppliers, 2005 UK
- Horsemeat scandal, 2013 UK

Environmental Monitoring Supported Prevention

- The definition of sampling and testing regimes to monitor and prevent possible contamination of food products during the production process
  - Applicable to Transportation and Storage of food products as well
  - Requires the definition of the Sampling Points, Sampling Frequency and specific Action and Alert limits
  - Linked to HACCP
  - Similar requirements exist in Pharmaceutical and Medical Device manufacturing and Healthcare

Proactive Environmental Monitoring regimes avoid costly line stops, illnesses, and deaths…

Defining an Environmental Monitoring Program

- What sites and sampling points are being sampled?
- How often is each sampling point being sampled?
- Which test(s) are to be performed?
- How frequently should the tests be performed?
- What are the Alert and Action limits for the Sample point and Test combination?
- What happens when an Alert or Action limit is exceeded?
- Who can manage the program and what happens when it changes?
- What qualifications are needed for staff involved in the program and how is this managed?

Managing Environmental Monitoring data

- How is the information for individual sampling points recorded and managed
- How is the data and information from across the entire process integrated?
- Is there clustering of problems points and can trends be identified?
- How are Corrective Actions associated with findings?
- How is relevant information exported or presented to relevant authorities
- How can potential fraud be prevented i.e. falsification of results

Using LIMS to manage your EM program

- **L**aboratory
- **I**nformation
- **M**anagement
- **S**ystem

Laboratory information management systems

- Commonly used in manufacturing and other industries to manage laboratory generated data
- Often used for QA/QC purposes but also in many other applications including Shelf Life studies and Environmental Monitoring

Using LIMS to Define an EM Program

Matrix GEMINI LIMS

Laboratory information management systems

Defining an EM Program

- What sites or sampling points are being sampled?
- How often is each being sampled?
- Which test(s) are to be performed?
- What are the Alert and Action limits for the Sample point and Test combination?
- What happens when an Alert or Action limit is exceeded?
- Who can manage the program and what happens when it changes?
- What qualifications are needed for staff involved in the program and how is this managed?

Defining an EM Program in Matrix Gemini LIMS

- Sampling points mapped to picture or schematic of the facility
- Define sampling frequency for each sample Point for automatic sampling
- Tests defined and managed in the system
- Specific limits set for test and sampling point combination, and checked when results entered
- Real time notification when limits are exceeded
- Set up defined by Users and system can be further configured to meet specific needs
- Access to specific function and options can be controlled and Certifications and Competencies can be managed

LIMS and Managing EM data

Laboratory information management systems

Managing EM Program Data

- How is the information for individual sampling points recorded and managed
- How is the data and information from across the entire process integrated?
- Is there clustering of problems points and can trends be identified?
- How are Corrective Actions associated with findings?
- How is relevant information exported or presented to relevant authorities
- How can potential fraud be prevented i.e. changing or modification of results

Managing EM Program Data in Matrix Gemini LIMS

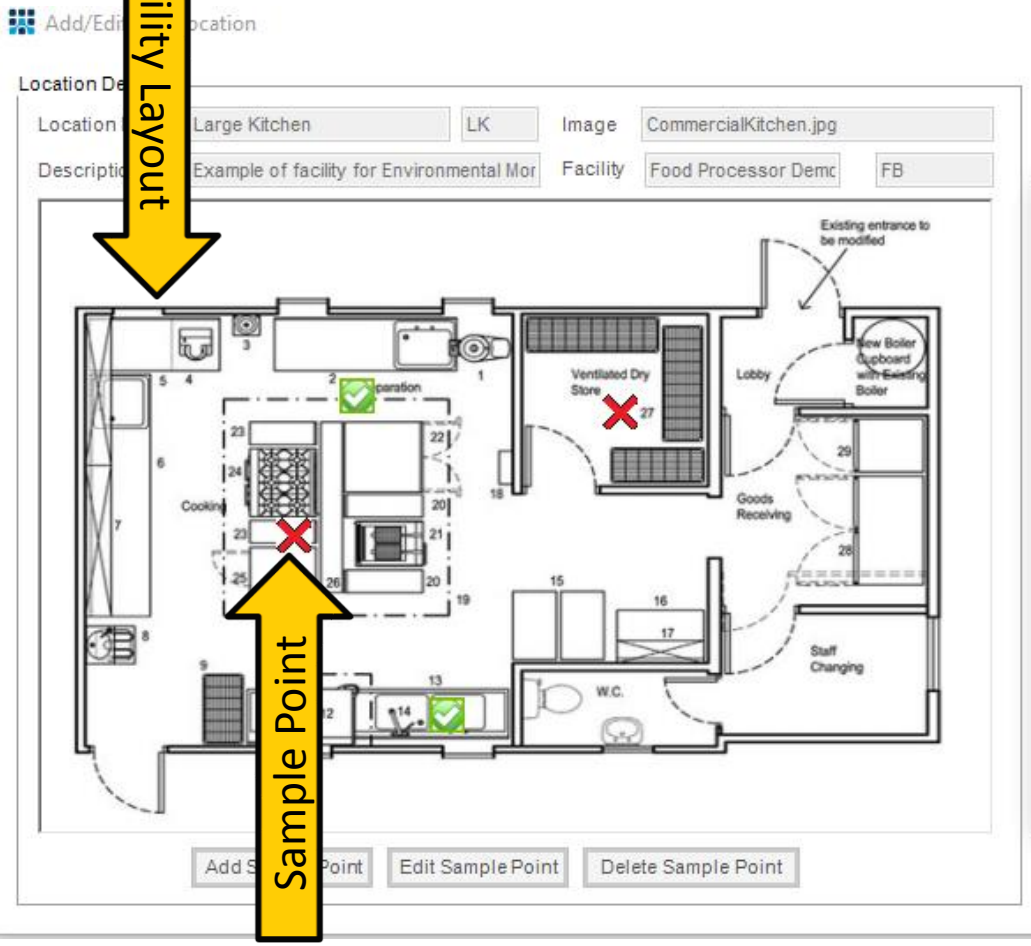
- Information and Results are associated with the Individual Sampling Points in the LIMS database and available through a graphical display
- Graphical representation of the process is displayed with the individual sampling points and results. Specific reports available
- Graphs and trends of results over a selected time period available for sampling points
- EM Module is integrated with the CAPA functionality of the system
- Information can be provided in a variety of formats depending on the authorities requirements
- System includes a full audit trail to record and monitor changes to data

Documenting Sampling Sites

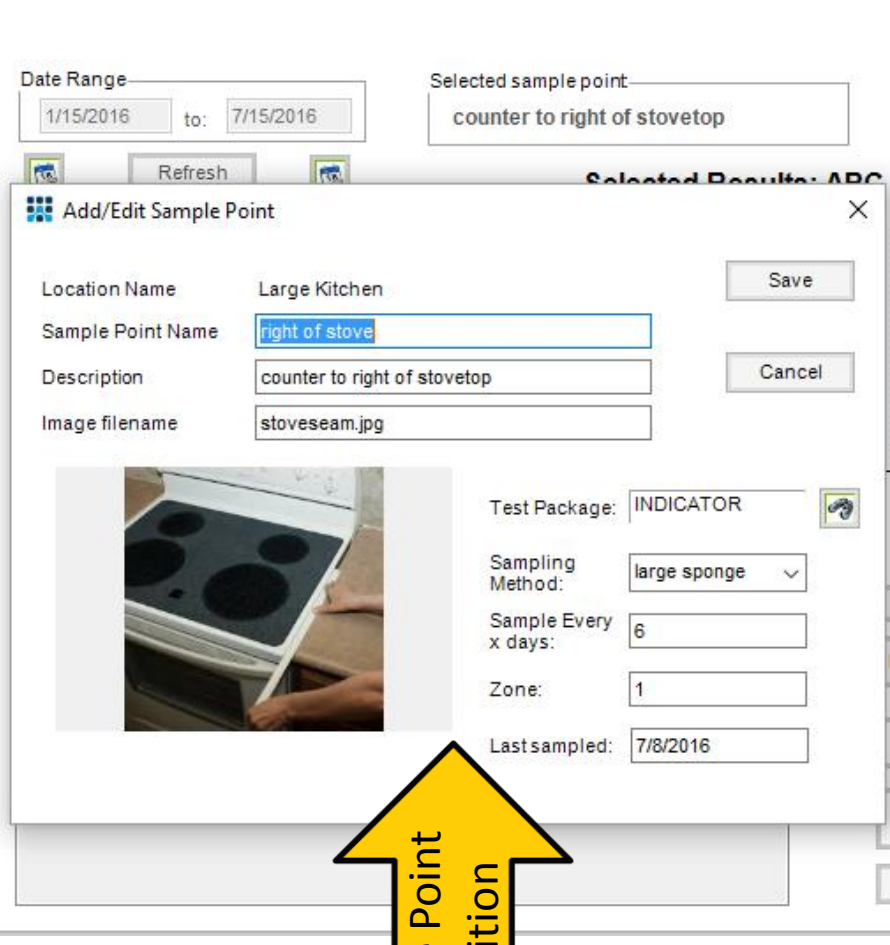
Matrix GEMINI LIMS

Laboratory information management systems

Facility Layout



Sample Point

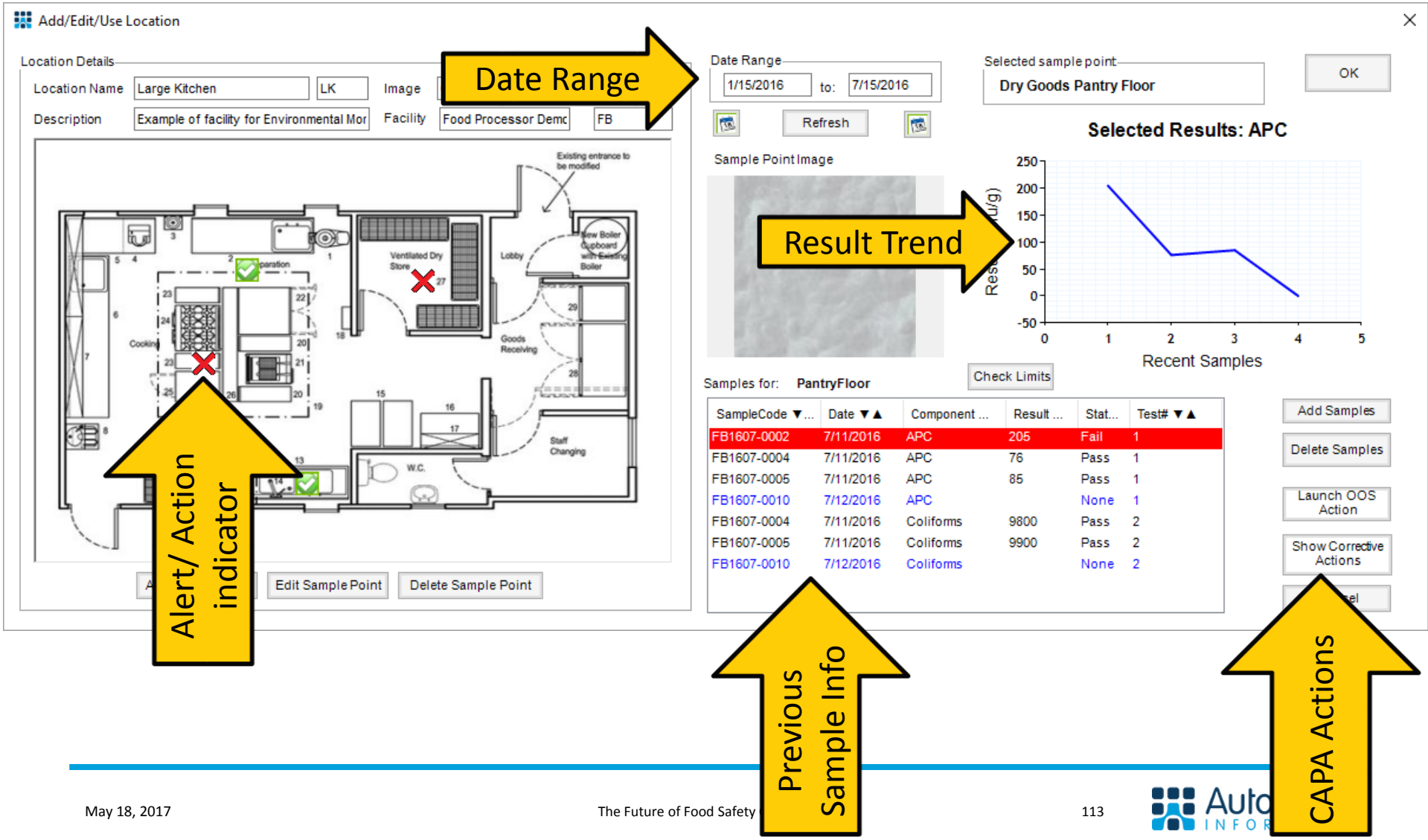


Sample Point Definition

Status Monitoring

Matrix GEMINI LIMS

Laboratory information management systems



It's Information Management Not Just Lab Management

- We don't have a laboratory why would we need a LIMS?
  - All analytical work is outsourced
- You still need to manage the analytical data from your contract lab or labs
  - How do you integrate information from different sources?
  - How do you add the value to it?
  - How do you make it work for you?
- LIMS helps manage that data and information and reduce risk in your organization

You don't need a laboratory to benefit from a LIMS

Matrix LIMS – An Complete Solution

- LIMS provides an integrated solution for food safety and QA/QC programs
- Provides support for Good Manufacturing Practice (GMP) principles
  - Helps ensure quality of manufactured product

LIMS and 10 Key GMP Principles

GMP Key Principle	Matrix LIMS Support for Key Principle
• Defined operating procedures and work instructions to establish controlled and consistent performance • Adherence to written procedures and instructions	• SOPs maintained within the integrated document management system and available within the LIMS • SOPs available within the LIMS. Visual workflows guide users; access rights and competency tracking control who can do what
• Prompt and accurate documentation of work for compliance and traceability	• Actions performed associated with who and when (Electronic Signatures). Changes recorded in Audit Trail. Results captured automatically from instruments and instrument ID recorded. Record of media and reagents used.
• Prove that the systems do what they should through validation • Properly defined and designed system and equipment	• LIMS provides data and information to support validation activities • Environmental Monitoring and mapping of facilities provides objective evidence

LIMS and 10 Key GMP Principles

GMP Key Principle	Matrix LIMS Support for Key Principle
• Properly maintain facility and equipment	• Equipment and Instrument Maintenance and Calibration schedules supported. Instruments can be made unavailable if out of maintenance or calibration
• Define, develop and prove job competency	• Competency and training records maintained in LIMS
• Protect products form contamination	• Support required QA/QC testing regimes as well as EM
• Build quality into products	• LIMS supports QA/QC processes. Test raw materials and finished products against Master Record specifications. Release mechanism and record for Batches and Lots. Full traceability of actions supported
• Perform regular audits to ensure compliance	• LIMS Data supports audit process (internal and external

Can You Risk Not Having This?

- Intuitive framework to define and manage an EM program
- Simple collection and aggregation of data for analysis, trend analysis and compliance purposes
- Support for, and evidence of adherence to, Quality procedures and GMP principles
- Assurance of the quality and safety of your products
- Protection of your reputation, profitability and the health of the public

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Lunch, Networking and Exhibition

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David Clarke

Chief Executive

Red Tractor Assurance

Third Party schemes in the UK supply chain

May 2017

Third Party Schemes

- Third party schemes in general
- Red Tractor scheme in particular
- Food safety in primary production
- Co-regulation
  - private and public sectors working in co-operation

UK Food Industry Standards

Reputation management driving high standards for >60 years

- M&S 1950s
  - First food retailer to focus on own label
  - First retailer to put their own reputation on the line
- Growth in retailer branding + 'Due Diligence' defence 1990

  + Food Scares of 1990s
  - = greater pressure for supply chain management

No matter who causes the problem the consumer brand gets the blame


Fussy pickers.
Careful packers.
Helpful drivers.
IVECO
Run for Your Lives Lads!!!

Mail Online

EXCLUSIVE: Shocking footage on Morrison's farm reveals pigs crammed into tiny cages

Due diligence & reputation management

- Plan A – do it yourself
  - Second party standards and inspections
  - Conflicting / inconsistent standards
  - Massive duplication of inspection effort
  - Inefficient; Hugely costly

- Plan B
  - Third party schemes
  - Co-operation on pre-competitive issues
  - Efficient
  - Effective?

Pennington Inquiry

Cardiff, 14 May 2008

Fatal E.coli outbreak – school meals in South Wales

.. the major supermarkets and food manufacturers do not rely on regulatory inspectors to ensure the safety of food being purchased. There is apparently in place a third party auditing system organised by the British Retail Consortium. These audits and inspections seem to be much more stringent ..

.. the families believe that their children should not have to eat meat which is less safe than that which they could have purchased in Tescos.

Third party schemes in the UK

Assurance of agricultural inputs

- Feed / organic fertilisers

Farming

- Red Tractor scheme
- Safe food / animal health and welfare / environmental protection / traceable

Processing

- BRC Global standard
- Safety / Integrity

Primary sector - what can possibly go wrong?

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30 September 2011 Last updated at 01:31

Share

Leek and potato soil linked to E. coli outbreak

By James Gallagher
Health reporter, BBC News

Soil stuck on leeks and potatoes may

Top Stories

North Korea nuclear test

Barclays announces 3,700 job cuts

Benedict 'to stand back' on new pop

Minister calls second meat summit

This is MONEY.co.uk
FINANCIAL WEBSITE OF THE YEAR

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'Frankenstein food' firm Monsanto to be sold to Bayer in £49bn deal - the biggest takeover in Germany's history

By CITY & FINANCE REPORTER FOR THE DAILY MAIL

PUBLISHED: 21:55, 14 September 2016 | **UPDATED:** 21:55, 14 September 2016

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Is Tesco's £1.99 chicken a blow to animal rights?

By BEN CLERKIN

Last updated at 23:26 06 February 2008

Hazards from the primary sector

- BSE
- FMD
- Campylobacter
- Pathogens in salads and beansprouts
- Pesticide residues
- Anti-microbial resistance
- Animal Health and Welfare
- Environmental pollution
- Traceability
- Etc etc etc ……

Red Tractor assurance

The certification scheme for the UK primary sector

- Owned and established by the UK food chain
  - Retailer / processor / farmer trade bodies
  - Operating independently
- Operates on a not for profit basis
  - Modest charges to cover costs

- About 80% of UK agricultural output from Red Tractor farms
  - >90% for some commodities – dairy, poultry
  - 80,000 farms across the UK

Standards

- Developed by panels of experts from all sections of the industry
- Based on legal requirements
  - + additional criteria where necessary
- Comprehensive book of farm standards for every (6) commodity sector
- Focussed scope – safety, animal health & welfare, pollution, traceability
- Updated at least every 3 years

Robust

Standards are worthless without conformity

- Operated as a formal Certification Scheme
  - .. by commercial Certification Bodies
  - .. accredited to ISO 17065 by UKAS
  - + strong oversight by the scheme owner
- Frequent and thorough inspections
  - Every farm, every requirement, every 12-18 months
  - (typical regulatory inspections 2% per annum)
- Serious sanctions
  - Exclusion from the scheme has serious consequences

Working with Government since 2006

Gone full Circle

Schemes created to address regulatory failure now used by regulators

UK Industry schemes ~90,000 members/100,000 inspections per year

Scheme inspections much more frequent than regulators

Avoiding duplication

Sharing of intelligence

Working with Government since 2006

- Proper validation
  - E.g. University Warwick study 2015*
  - Benchmarked against 40,000 animal health inspections
  - Certified farms significantly higher levels of compliance
- Formal agreements
  - 18 page MoU with FSA
  - Quarterly liaison and accountability
- Passed FVO scrutiny
- High level recognition
  - Cabinet Office January 2017
  - Commends industry “Regulated Self Assurance”
  - Cites Red Tractor as a prime exemplar

**Animal Welfare 2016, 25, 461-469*

Working with Government since 2006

- Real efficiencies - benefits both for producers and the public purse
  - E.g. Frequency of regulatory inspections
    - Most farms 25% per year
    - RTA farms 2% per year
  - Dairy hygiene
    - Default - every 2 years
    - Red Tractor farms – every 10 years
  - Environment Agency – pollution control regs
    - Default – 3 inspections per year
    - Red Tractor farms – 1 inspection per year

B2C – Red Tractor logo

Appears on £13 billion worth of product every year

A vehicle for promotion

CERTIFICATION AT EVERY LINK IN THE SUPPLY CHAIN

Delivering buyer protection, legal compliance and more throughout the supply chain.

1. FEED

Safe and nutritious feed and water for livestock. Free from pathogens & chemical contamination.

2. FARM

Prevent contamination of crops. Health and welfare of livestock. Safe food and avoid pollution.

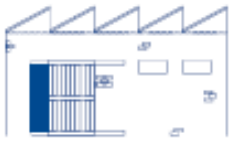
3. TRANSPORT

Approved vehicles, procedures and drivers to transport animals and crops.

4. STORAGE

Safe and hygienic storage of crops.

5. PROCESSOR & PACKER



Humane slaughter. Hygienic processing for safe food free from contamination. Traceable and integrity.

6. PRODUCT

Product that passes through a complete chain of certified businesses can be labelled with the Red Tractor logo.

Using the power of the Red Tractor logo to ensure integrity and traceabiliity throughout the supply chain

Summary

- Industry standards
  - Important drivers of best practice and legal compliance
- 3rd party schemes – an efficient approach to pre-competitive topics
  - But 3rd Party must be as reliable as 2nd Party
- Hazards from primary production are best controlled at source
  - Red Tractor is the leading assurance scheme in UK farming
- Originally designed to provide efficiencies within the industry.
  - Now avoiding duplication & achieving efficiencies with regulators

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Will Anderson

Business Manager

BST Detectable Products

Who Are We?

Joe Armstrong-Gore

Will Anderson

We work for BST Detectable Products. A market leading manufacturer and supplier of food safe detectable products. BST developed the world's first detectable products over 30 years ago, and are known for our high quality products and service.

BST DETECTABLE PRODUCTS
Global suppliers to the Food Industry Since 1985

Joe Armstrong-Gore

Will Anderson

DETECTABLE PRODUCTS BST EST 1985

Understanding Food Safe Detectable Materials & Applying Best Practice

A basic overview of food safe detectable materials intended for use with existing inspection systems in food & beverage production environments.

What Are We Talking About?

- Foreign body contamination
- The use of inspection systems
- The use of detectable materials
- The performance of detectable materials
- Examples of real life applications
- Mistakes, Assumptions & Best Practice
- Q&A + our new white paper

Foreign Body Contamination

The term foreign body refers to any extraneous material that finds its way into food or drink.

The Cost of a Recall

- A common estimate is that the direct costs of a food recall to a manufacturer is around $10 Million / £7.7 Million. (2015 Estimate)

- According to the FSA 2015 annual report of incidents, foreign bodies still account for 5% of all incidents. (76 / 1514)

2017 so far . . . . .

- Six major recalls caused specifically by plastic & rubber contamination from January – April 2017. Details in our whitepaper

- We're here to discuss materials available that reduce the risk of this happening in your company as far as possible.

The Rise of Detectable Products

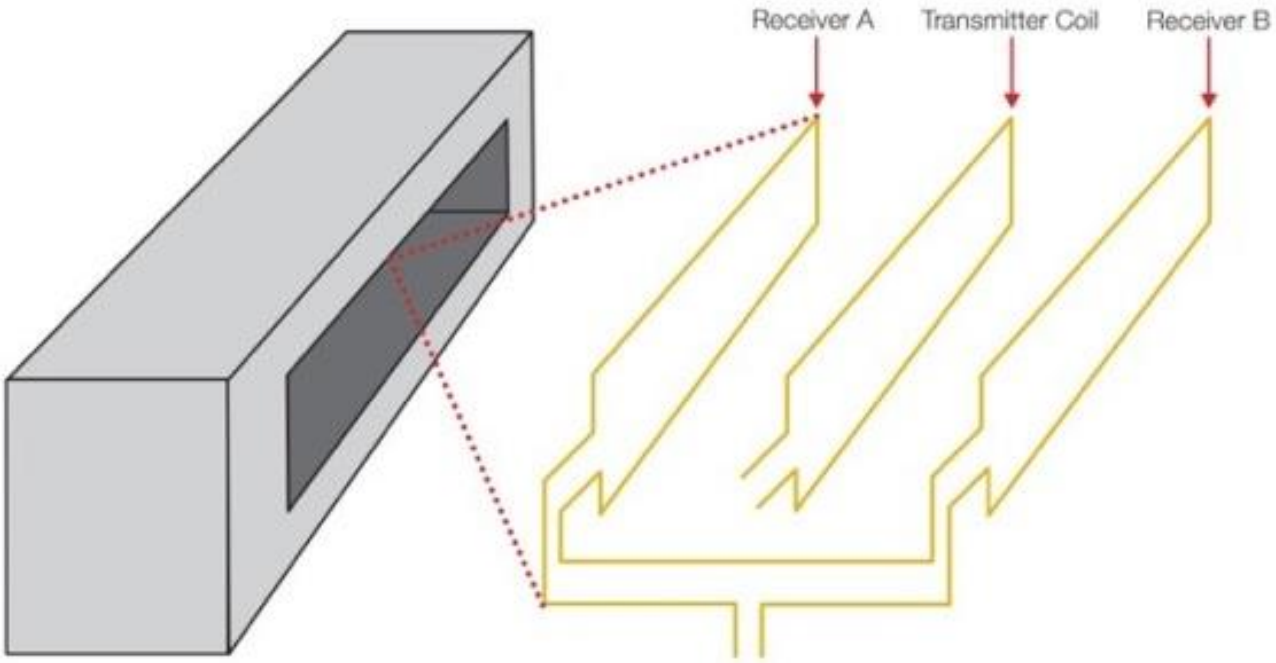
- 1980’s (Iron filings)
  Crumpet Rings / Seals
- 1990’s (Basic detectable materials)
  Basic metal detectable pens
- 2000’s (Diversification)
  Retractable Pens, Scrapers, Marker Pens, Hand Tools, Sheet Materials
- 2010’s (Dual Detectability)
  Colour Co-Ordination / Food Contact Compliance / Impact Resistance Testing / Documentation / Research

Product Inspection & Detectable Products

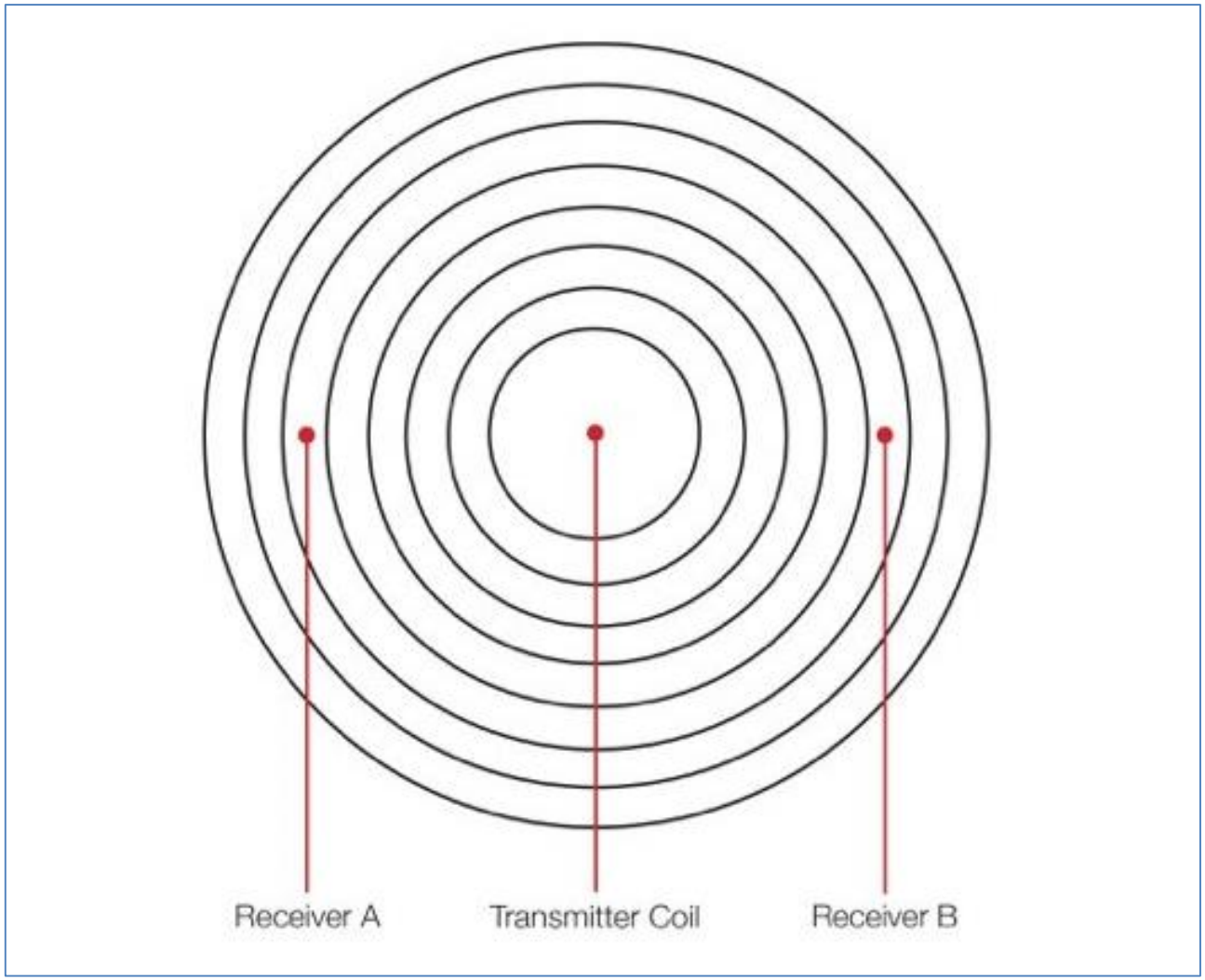
- Detectable plastics and rubbers are detected and rejected in the same way as other contaminants.
- Ferromagnetic additive is used for metal detectability
- High density additives are used for x-ray visibility
- Silver-ion additives are used for antibacterial protection
- Lets introduce the inspection systems to help understand the importance of this

Metal Detection

- Most industrial metal detectors used in food production are based on a balanced coil system.



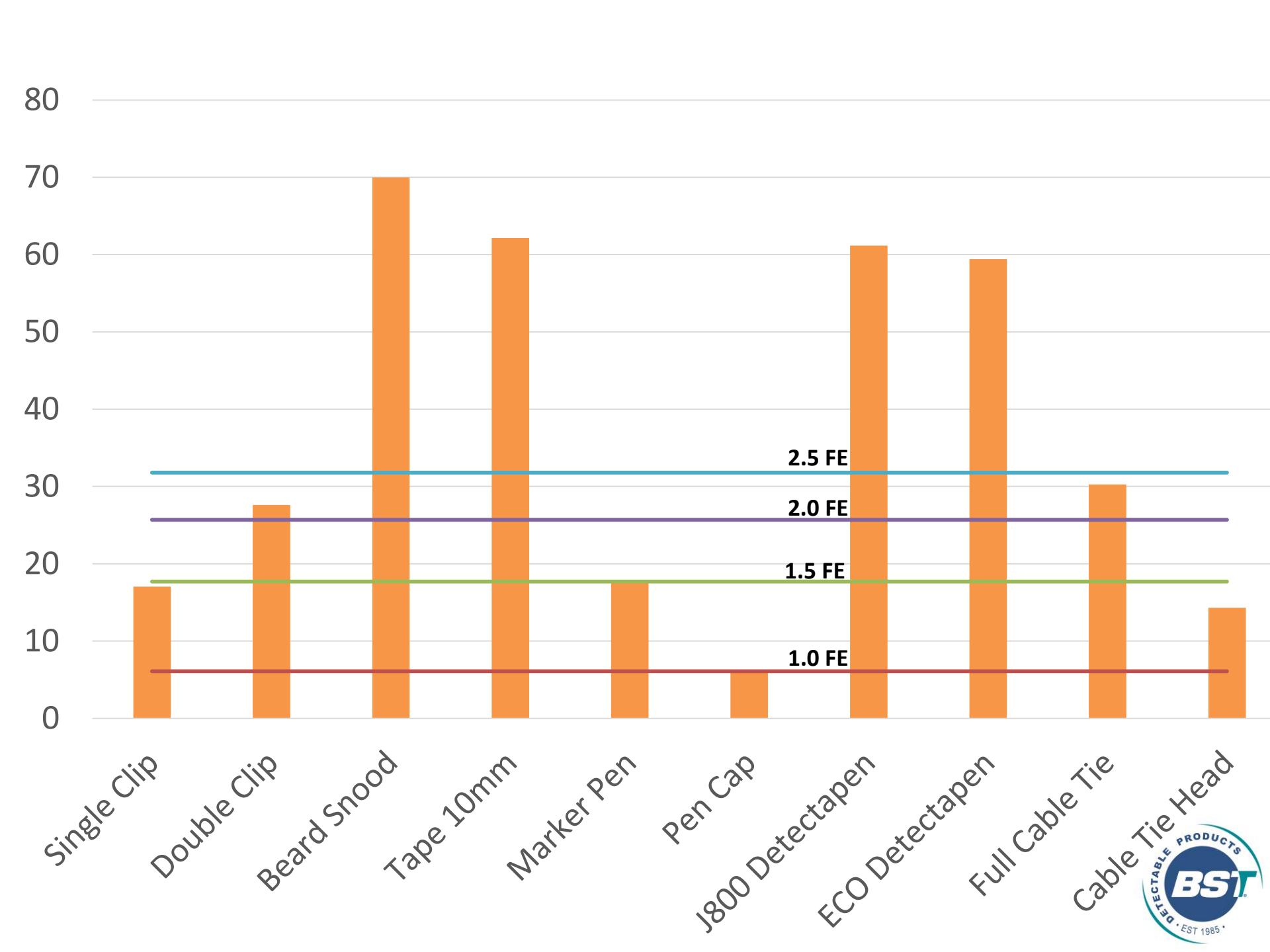
Metal Detection



Product Effect

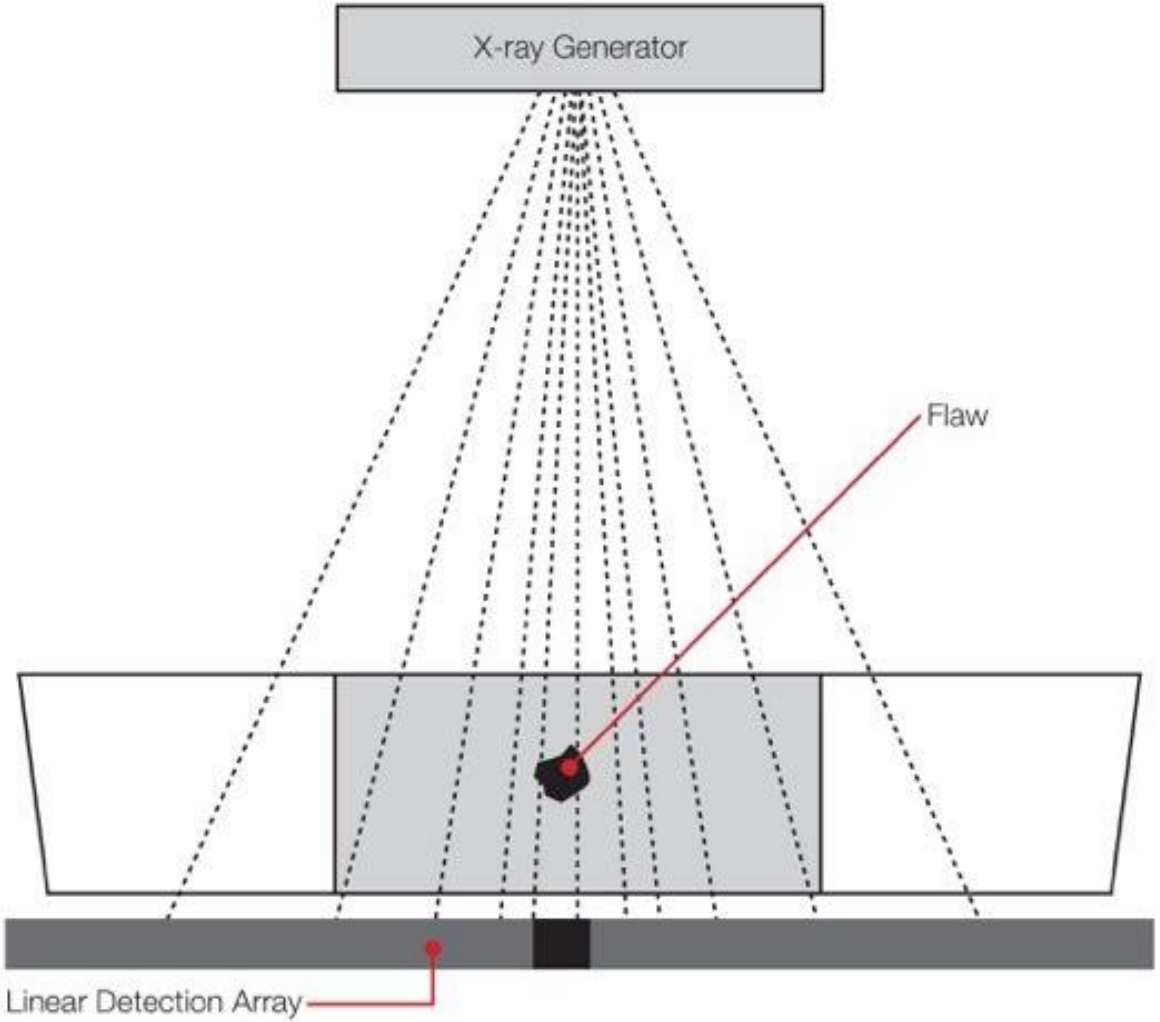
- The food passing through the metal detector also disturbs the magnetic field (product effect).
- The product signal has to be learnt and compensated for (calibration)

- The stronger the product effect the lower the sensitivity achievable.

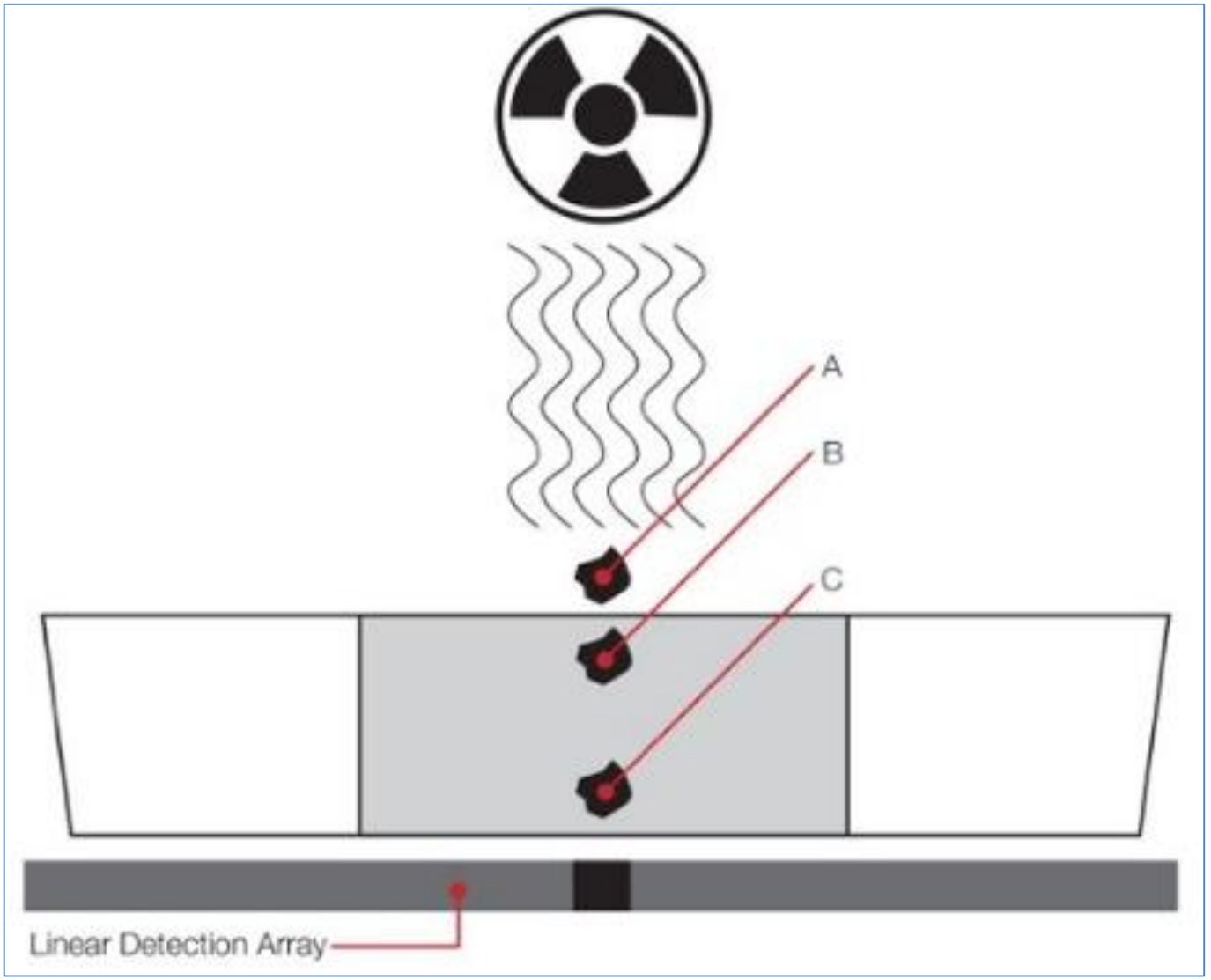

80
70
60
50
40
30
20
10
0
2.5 FE
2.0 FE
1.5 FE
1.0 FE
Single Clip
Double Clip
Beard Snood
Tape 10mm
Marker Pen
Pen Cap
J800 Detectapen
ECO Detectapen
Full Cable Tie
Cable Tie Head
DETECTABLE PRODUCTS
BST
EST 1985

X-ray Inspection

- Passes low energy x-rays (gamma radiation) through the product to generate a radiograph.
- The denser materials absorb more x-rays and show as a darker area.
- Capable of detecting a wider range of contaminants subject to their size & density



Simple X-ray System



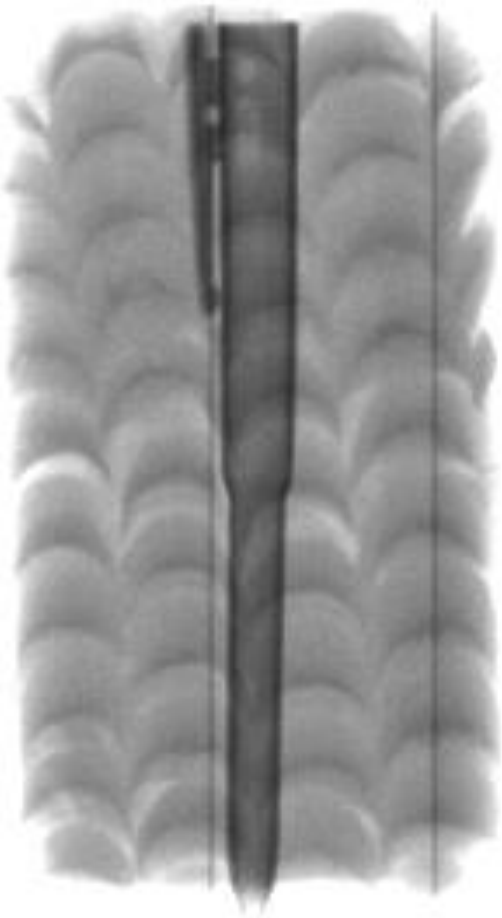
Vertical Contaminant Position

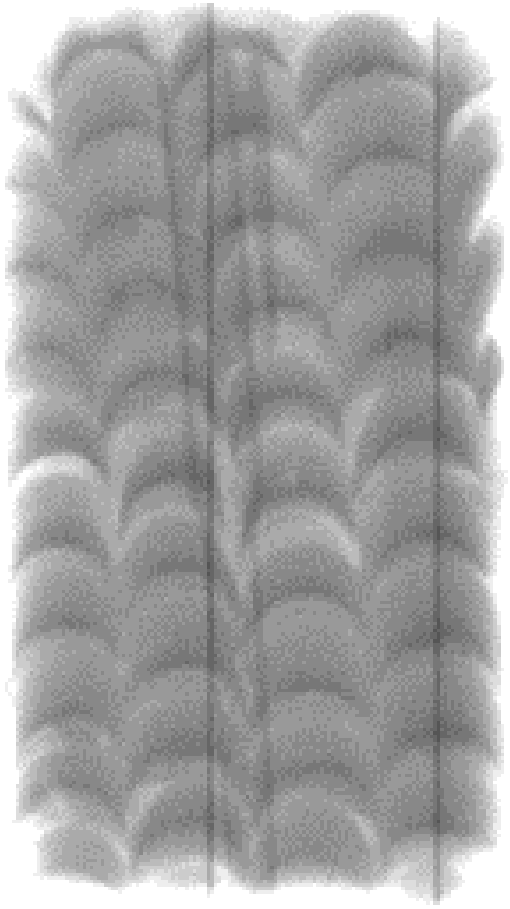

450g e
A pack (oven cooked)
ENERGY
1716kJ
409kCal
20%
MED
Fat
15.2g
100% British Beef
Use by
Keep refrigerated

Testing Session (Jan 17)

With great thanks to Peter Walker at Minebea Intec UK

Detectable vs Non Detectable

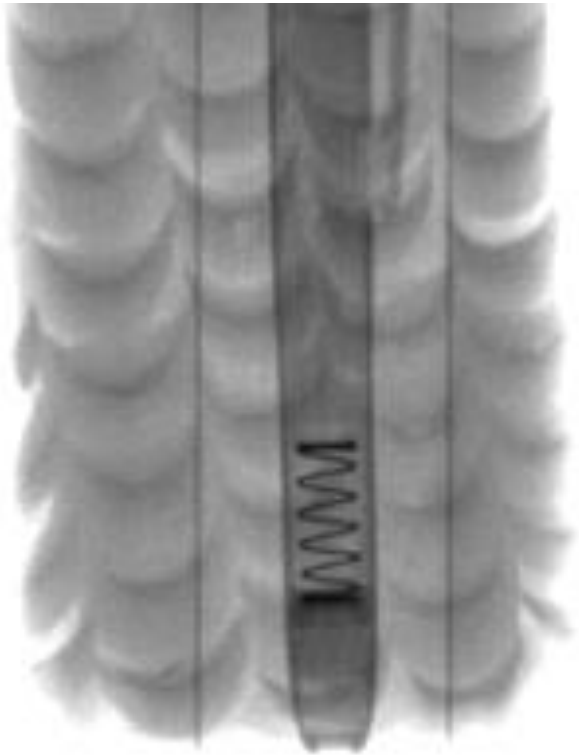


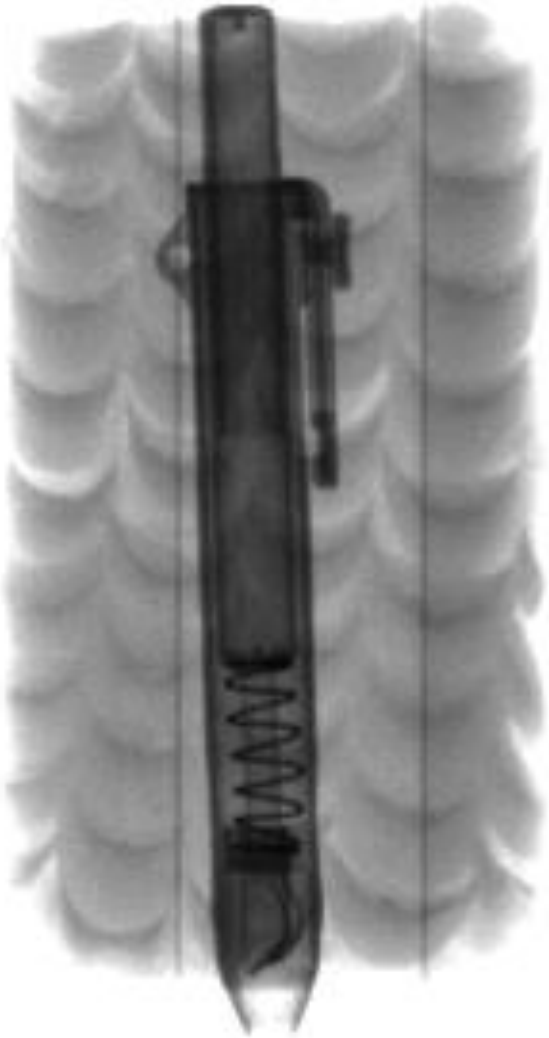


Dual Detectability

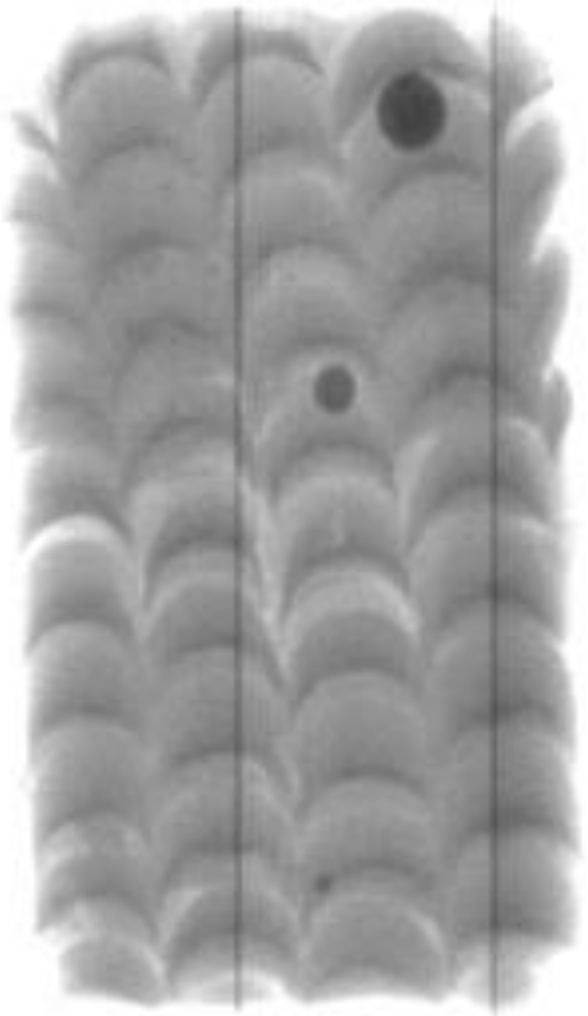
- Not all materials are optimised for x-ray
- Detectable materials are not born equal
- Be wary of the word ‘detectable’
- Metal Detectable / Part Detectable / X-Ray Visible / Dual Detectable

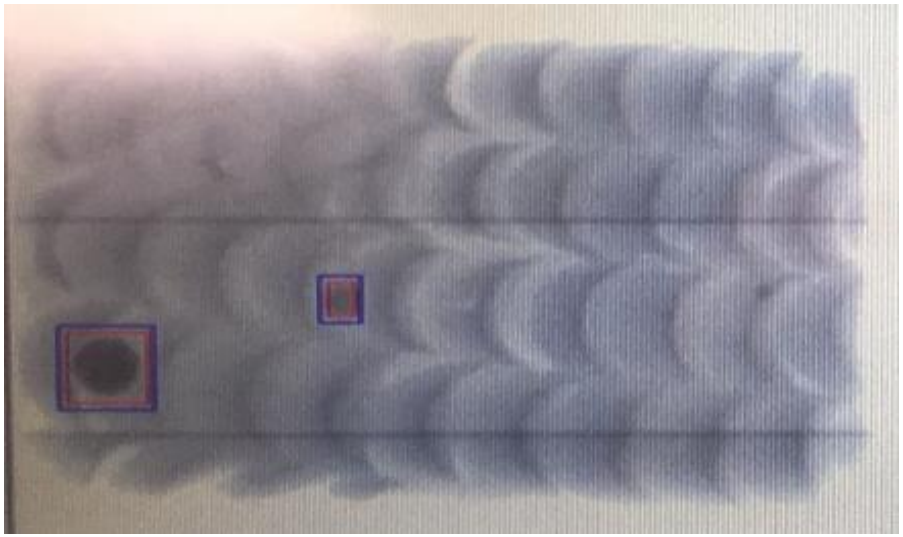
Metal Detectable v X-Ray Visible



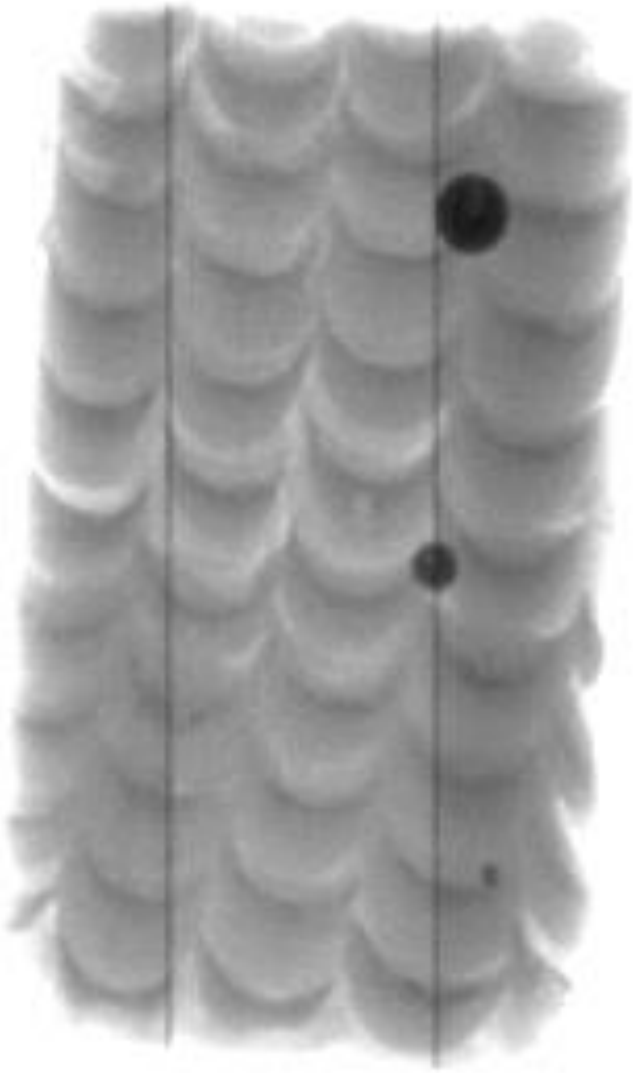


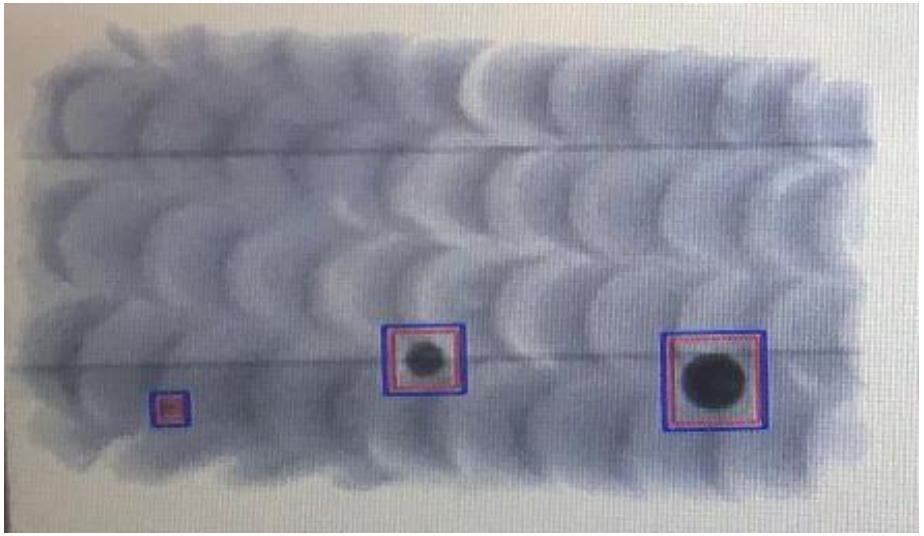
Non X-ray Optimised Polymer



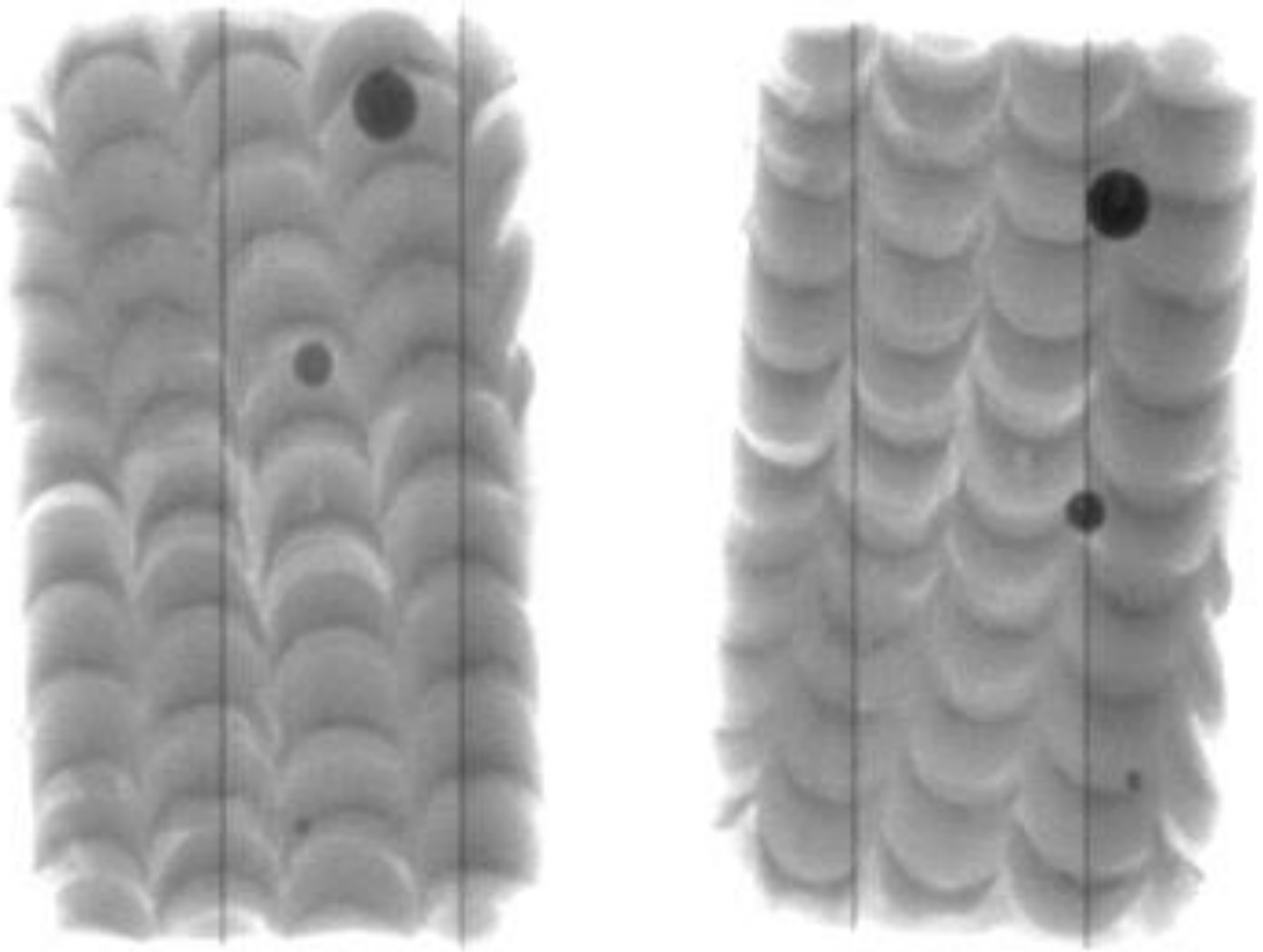


X-Ray Optimised Polymer





Direct Comparison



Additional Performance Factors

Detectability is of course a critical performance consideration but don’t forget to consider:

- Colour Brightness
- Food Contact Compliance
- Shatter Resistance
- Antibacterial Protection

Bad Detectable Products

- Shatter easy
- Dull colours
- No food approval
- Not x-ray optimised

Good Detectable Products

- Shatter & impact resistant
- Bold & bright colours
- Extensive food contact approval
- X-Ray optimised
- Additional benefits such as antibacterial protection


0645 643 0850

Case Studies on Bespoke Items

- The following are examples of BST customers operating in different environments using a variety of bespoke detectable products & materials developed specifically for their applications.

Richard Whittaker Limited

Industrial & Food Starches, Dry Powder Blenders & Contract Packers, Warehousing

- Richard Whittaker LTD blend and package a huge range of dry starches such as potato, maize (cornflower), rice, tapioca, wheat etc

- As a BRC standard accredited site, which aims to continually improve standards; RWL turned to BST for a bespoke modification to their blending line setup.

- The previous discharge sock was becoming problematic and change was required.

The Problem

- The flexible discharge sock where blended product falls from the grid magnet was becoming frayed and cracked.

- This was identified as a potential foreign body risk and an alternative was to be sought.

- A more durable, detectable material was needed

The Solution

- A woven fabric mesh sprayed with a blue neoprene rubber containing ferromagnetic additive.

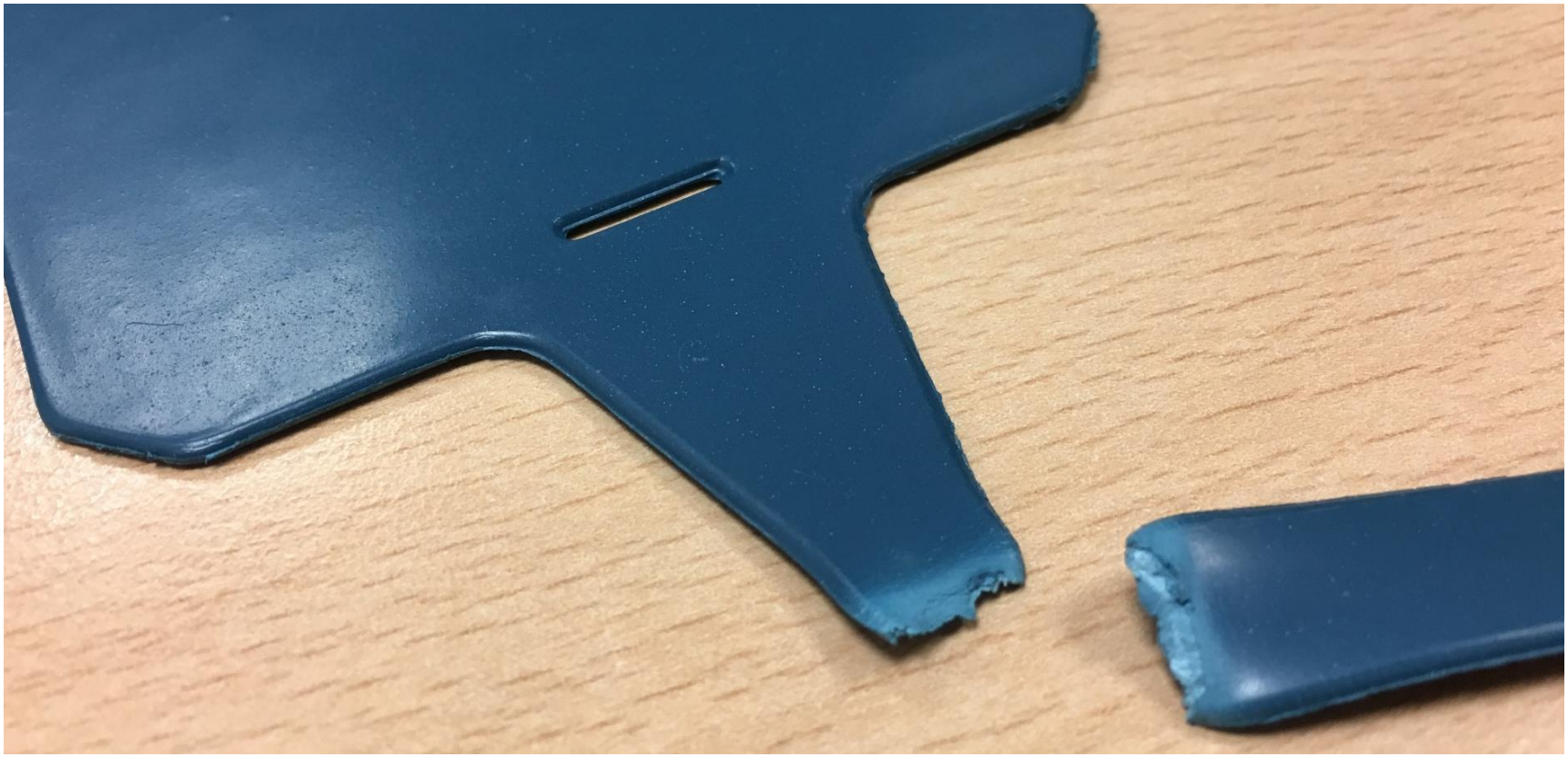
Ready Meal Producer

- Manufacturer of supermarket own brand frozen ready meals which include Traditional, Chinese, Indian, Italian and Dessert products.

- Operate five colour co-ordinated production lines with a sixth colour to identify multiple area items.

- Use tie ID tags to colour mark assets designated for use in specific production lines.

The Problem



The Solution

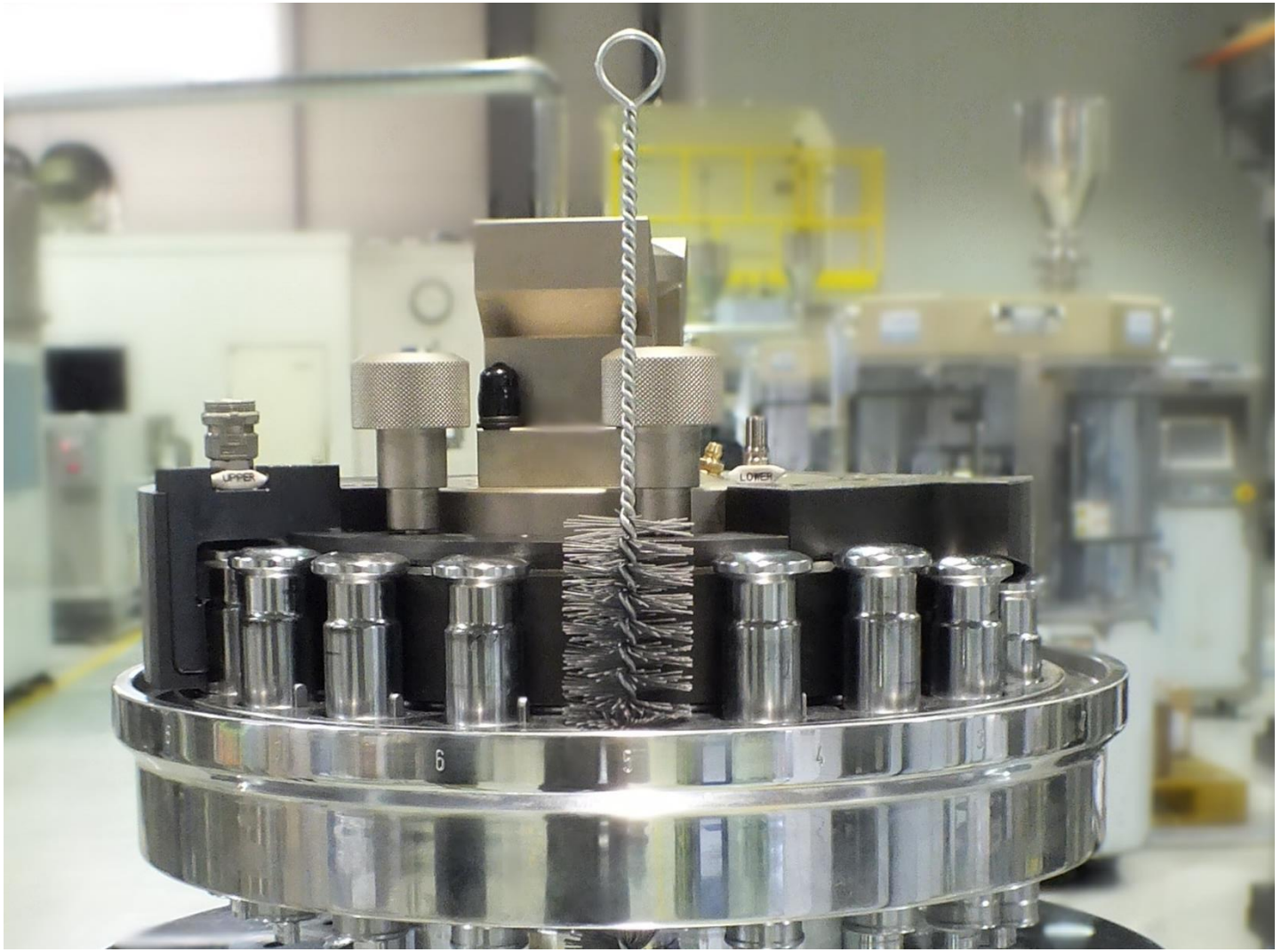
- New injection moulding tool, impact modified material.

- Supplied six colours of tags over 18 months ago. We never heard from them again . . .

Nutraceutical Environments

- A leading tablet press manufacturer approached BST, looking for ways to improve the safety of their machinery.
- Used BST's detectable plastic rod to machine driving rods.
- Used bespoke BST tube brushes for tablet press cleaning kits

Small Aperture = High Sensitivity



Mistakes & Assumptions

- Don’t assume all materials are x-ray visible
- Test all products and fragments on your system
- Don’t assume food contact approval, check with your manufacturer
- Make sure your inspection system is correctly and routinely calibrated
- For a detailed best practice guide, request a copy of our new whitepaper

- "A white paper explaining the safe & successful use of detectable products and materials in food production environments"
- Written by Joe & Will

Any Questions? Read Our Paper

- We hope that we have provided a good overview of detectable products and materials.
- We hope that it will help you consider the important factors when selecting materials and articles for your factory.
- See us on the stand or read our paper

University of Salford MANCHESTER

ONECPD Salford Professional Development

Greg Jones

Senior Microbiologist

Campden BRI

Campden BRI
food and drink innovation

Developments and Practices to extend shelf life

Dr. Greg Jones

Topics

- The 10 Day Rule
- Shelf life extension
- Pressures and solutions

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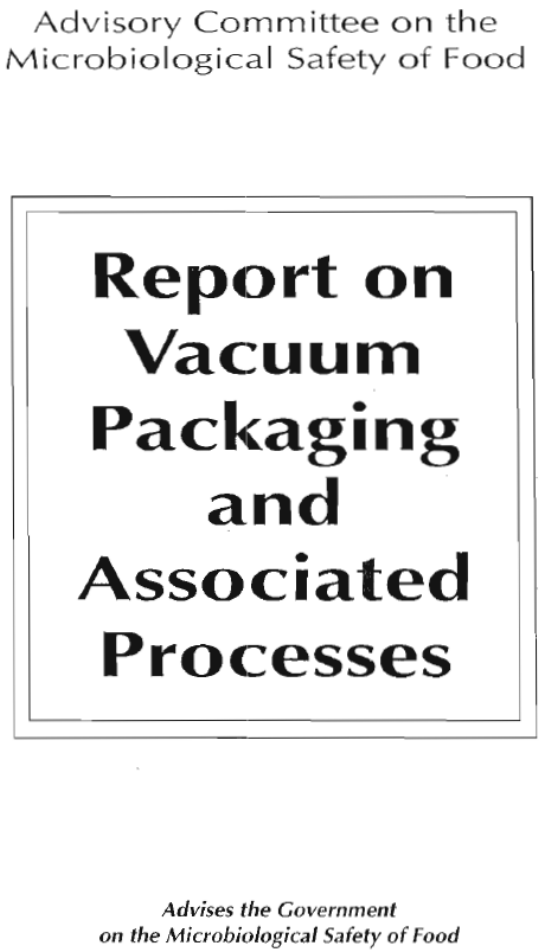
The ‘10 Day Rule’



- Produced in 1992
- Set down a set of ‘controlling factors’ for chilled VP/MAP food.
- Intention to reduce risk from non-proteolytic *Clostridium botulinum*

Controlling Factors for *C. botulinum* in chilled VP/MAP products

- A chilled shelf life of 10 days or more is permitted if one or more of the following are met:
  - pH of 5 or less throughout the product
  - Aw of 0.97 or less throughout the product
  - Heat treatment of 90°C for 10 minutes or equivalent throughout the product.
  - Salt of 3.5% (aq) or greater throughout the product.
  - Any combination of factors **proven** to inhibit growth or toxin production by *C. botulinum*.

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Updates to original document:

- 1996: Campden Guideline 11 published.
- 2008: FSA document published.
- 2009: Campden document updated.
- 2017: FSA document updated.

- Controlling factors do not change in any of these documents.

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Issues surrounding the 10 day rule:

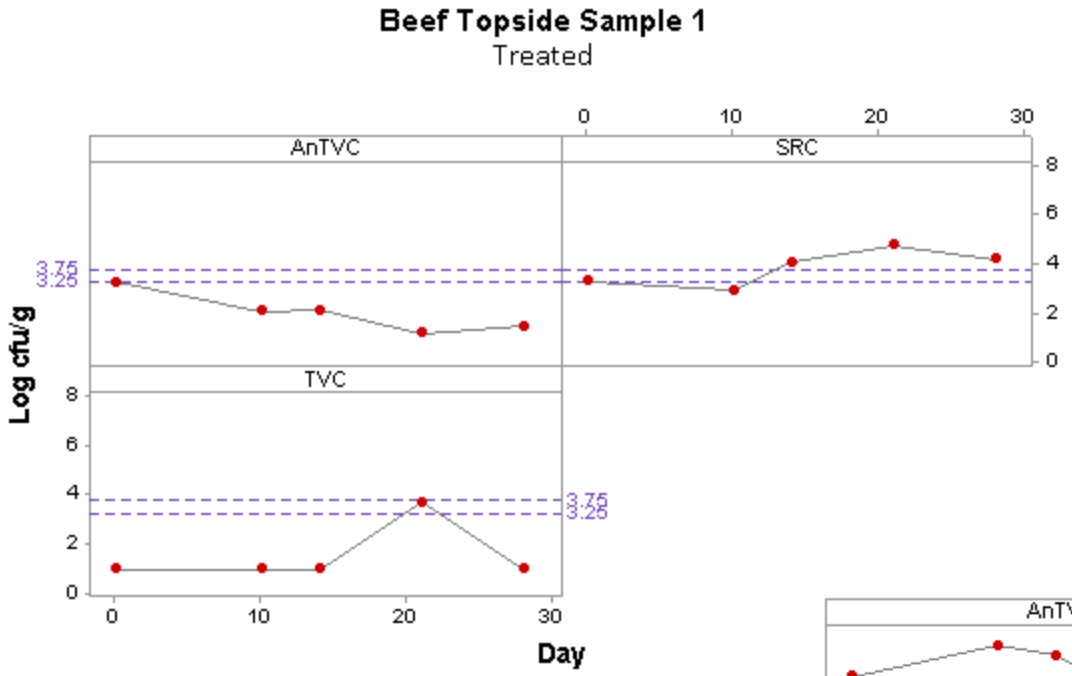
- Many products considered to be ‘safe’ by industry do not meet controlling factors.
  - Vacuum packed fresh meat
  - Bacon
  - Ham

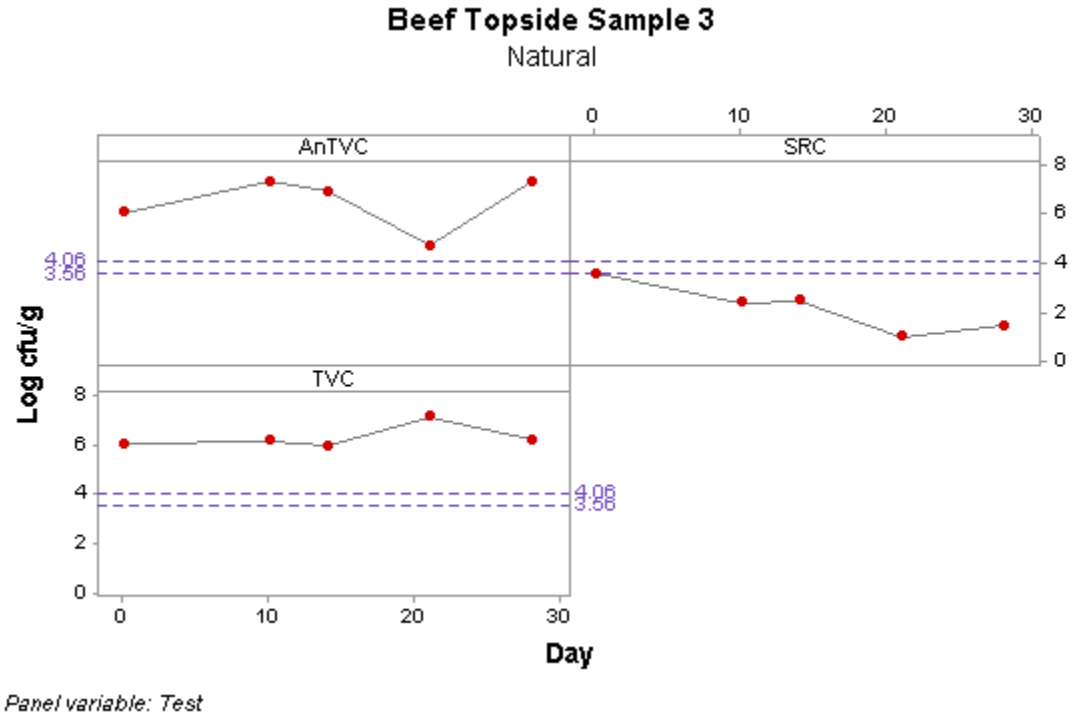
Example of Industry response

- BMPA (British Meat Processors Association)
  - Commissioned large scale series of challenge tests

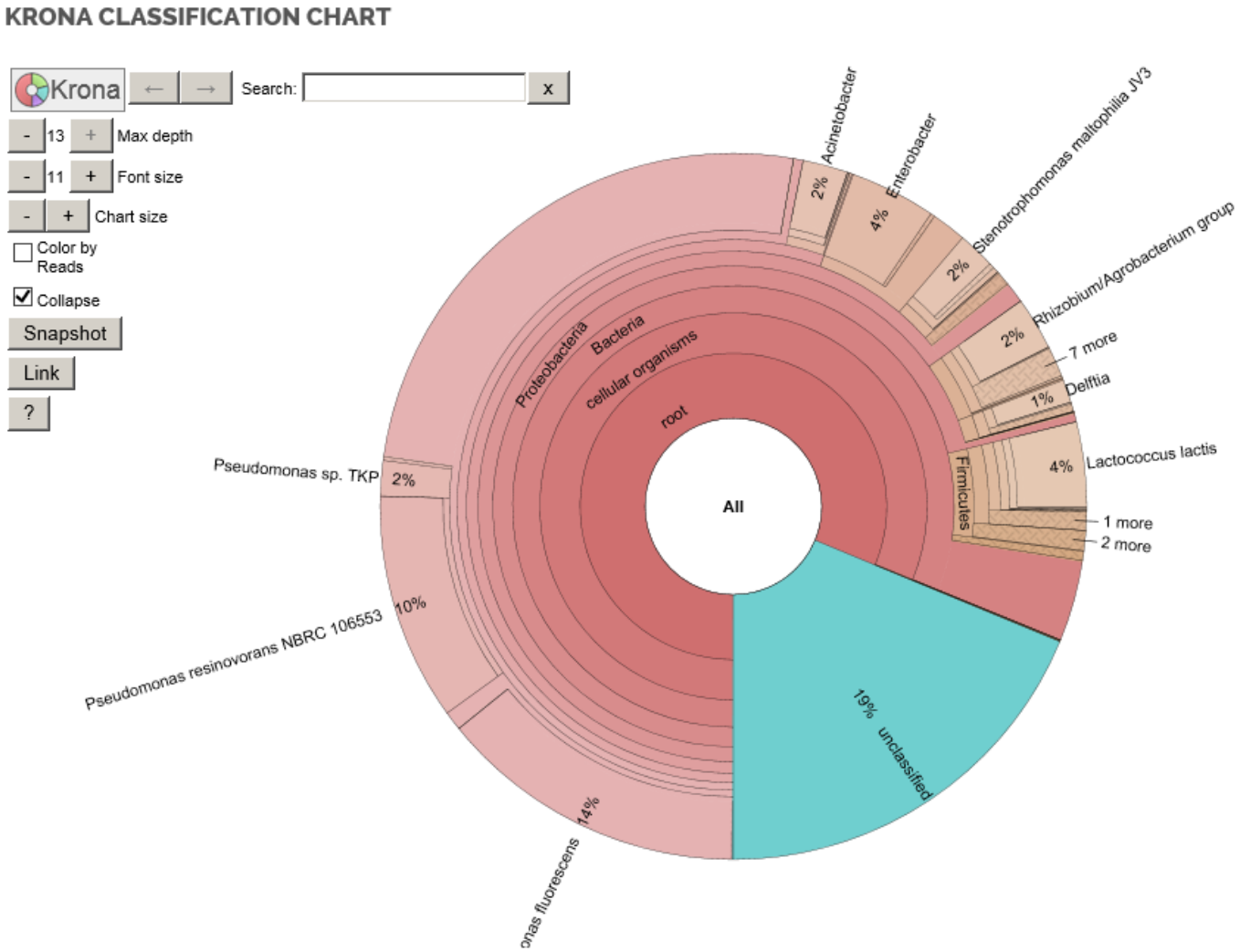
- Investigation into identifying the controlling factor(s) which has prevented *C. botulinum* poisoning in vacuum packed meat.

Example of outputs





Outputs continued



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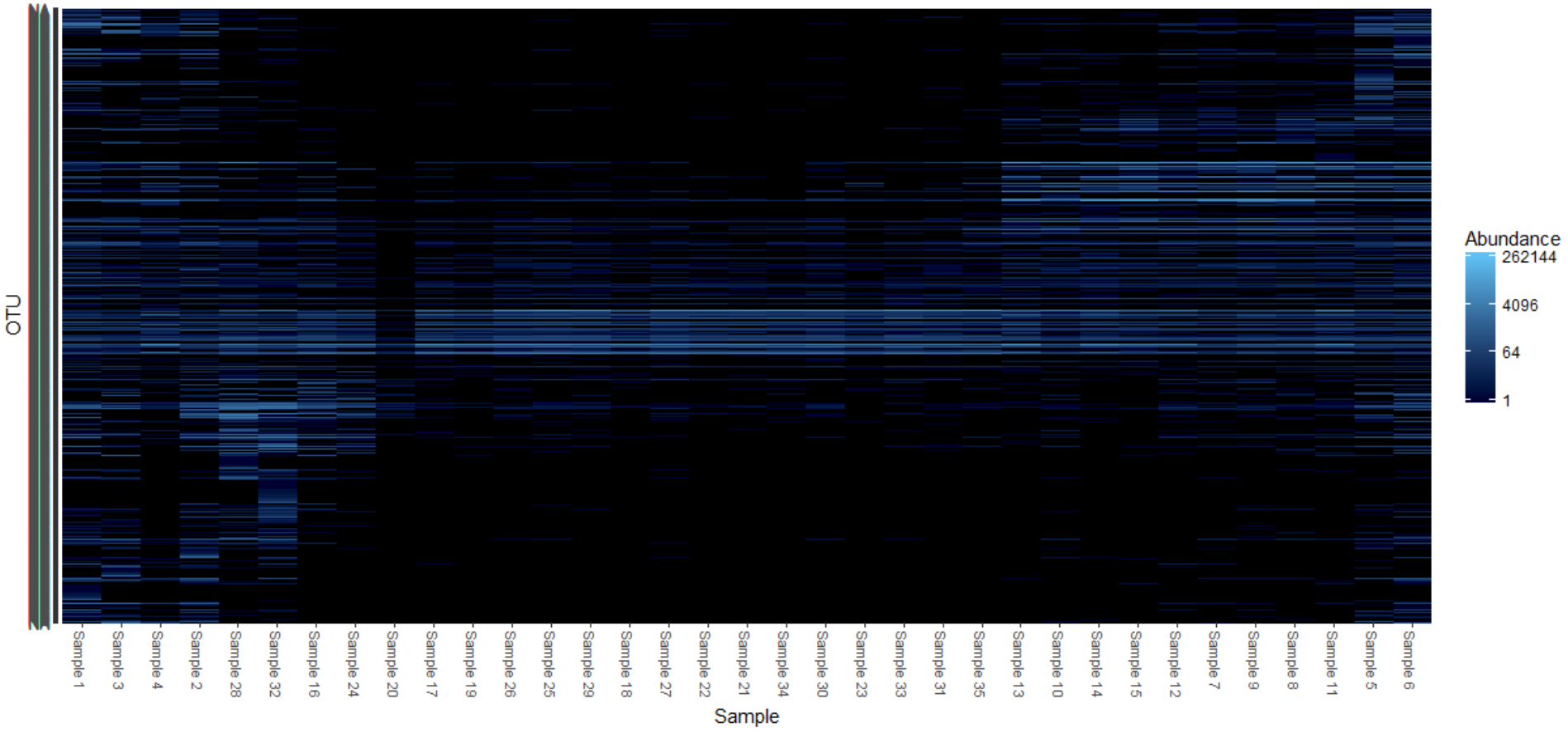
Outputs continued



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A victim of its own success?

- The food industry has been very good at presenting food as ‘fresh’ and ‘natural’ whilst extending shelf life through use of artificial aids.

- Those aids are being challenged, whilst at the same time shelf life is required to be the same or greater than before.

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History of Chemical Food Preservation

Early Age

- Salting
- Smoking
- Pickling
- Vinegar
- Oil
- Honey

Enthusiastic Industrial Age

- 1755 - Borax
- 1833 - Creosote (!)
- 1858 - Boric Acid
- 1859 to 1875 - formic, salicylic and benzoic acids
- 1907 - Formaldehyde and Hydrogen peroxide used in milk

Modern Age

- Increased use of benzoic acid salts.
- Sorbic acid discovered and produced industrially
- Revision of legislation in light of toxicological data.
- Increased use of protective gasses.

Pressures to reduce....

- Salt
- Sugar
- Weak acid preservatives
- Antioxidants
- ....anything that sounds “Chemical-ish”

- CLEAN LABEL

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Example of hysteria:

- Vitamin C is an antioxidant

What does that leave us with?

- Packaging
- Formulation
- Storage Temperature
- Processing
- “Natural” antimicrobials
- Quality of ingredients
- Hygiene of factories

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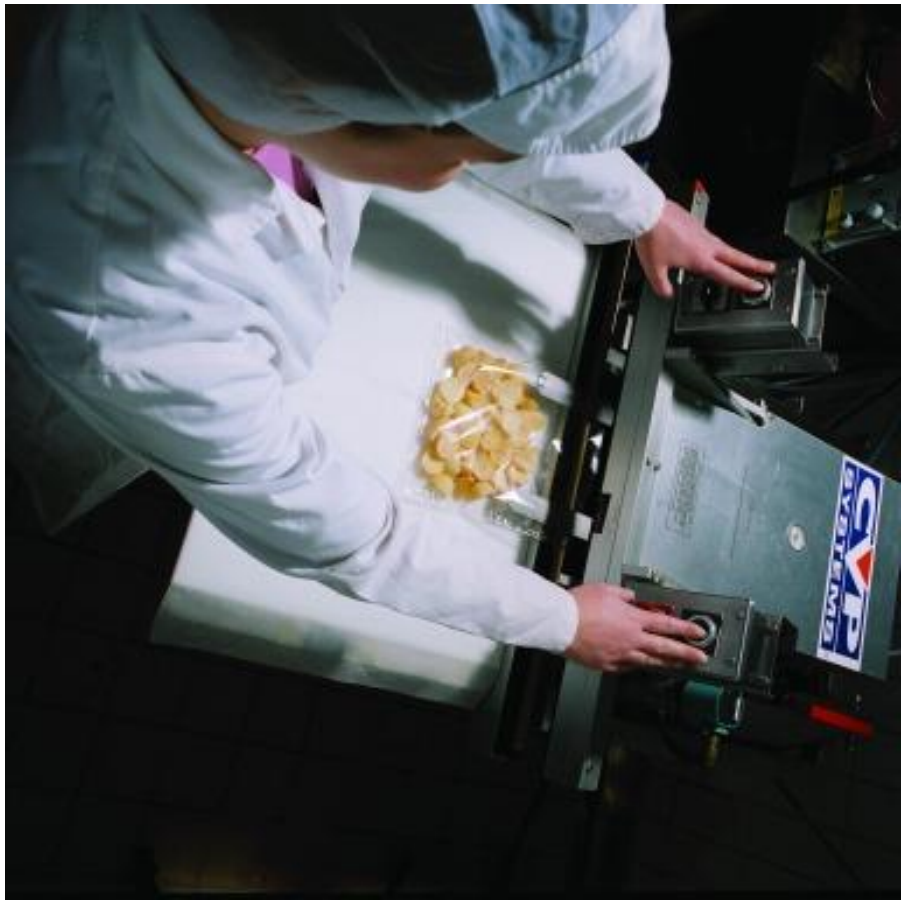
Packaging

- Vacuum / Modified Atmosphere
- Active Packaging
- Better barriers to gasses

- No “Big Thing” in the last decade



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Storage Temperature

- Superchilling
  - Offers a partial solution
- Attitude shift in favour of frozen?
- Better temperature control in retail and domestic chillers?

Processing

- High Pressure Processing
  - Cold Pressed Juices
  - Meats
- Novel technologies
  - Cold Plasma
  - Pulsed Electric Fields
  - Brief Cryogenic treatments

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Steps forward

- Evidence-based revision of guidance can remove unnecessary restrictions.
- “Marginal Gains” can lead to extended shelf life.
- Don’t expect a magic bullet!

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Thank You.

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Refreshments and Networking Break

University of Salford MANCHESTER

ONECPD Salford Professional Development

Dr Louise Manning

Senior Lecturer in Food Policy and Management

Harper Adams University

Risk perception in the food supply chain

Dr Louise Manning
Senior Lecturer in Food Policy and Management

Harper Adams University

Risk

Technical tools determine risk using rational criteria and analysis….

General public perceive “risk as a feeling” …

Supply chain stakeholders .. how do they
perceive risk?

Discussion points

- The way food suppliers/manufacturers and consumers make decisions
- Perception of safety, hazards and risk
- How do decision-making and risk perception affect safety standards in food production?

Scientific or technical decision-making tools used in the governance of the food supply chain are based on criteria, rules, logic, rational analysis, or mathematical calculation.

True or False?

Uncertainty

Lack of knowledge

Data swamping

Imperfect data

Inability to judge consequences or impact

Scientific or technical decision-making tools are based on criteria, rules, logic, rational analysis, or mathematical calculation.

True or False?

Rational decision making is bounded (Simon, 1978)

Risk as analysis

Divergence in risk perceptions between experts and general public are due to differences in levels of :

- Rationality.
- Knowledge.
- Education.
- Understanding of what can often be quite complex issues.

Risk as analysis

So if the general public just had more information, greater knowledge, more education, they could understand things the way we do and then make the same decisions ……

The way food suppliers/manufacturers and consumers make decisions

- Objective or subjective?
- Science sees risk as “real” using analytical and rational criteria.

See work of Slovic (1982) and after

The way food suppliers/manufacturers and consumers make decisions

- People generally see risk as “perception”, subjective, value based, using cues, often based on past experience or observation to make decisions.
- **People** make the decisions in the food supply chain too.

See work of Slovic (1982) and after

Analytical systems thinking	Experiential systems thinking
Analytical	Holistic
Logical, reason based thinking	Affective - pleasure or pain based thinking
Logical forming of connections	Connections based on association
Behaviour mediated by conscious appraisal	Behaviour mediated by “vibes” from past experience
Encodes reality in words, symbols, numbers	Encodes reality in concrete images, metaphors, narratives
Slower form of processing, justification by logic and evidence	More rapid processing, orientated towards immediate action, validity driven by belief

Adapted from Slovic et al. (2004)

Perception of safety, hazards and risk – using heuristics

An approach, or technique, that is used by individuals to solve problems, make judgements and form decisions.

A reductionist way of navigating a given set of issues or challenges using factors such as likelihood, probability, frequency.

Hazard Analysis Critical Control Point (HACCP) uses heuristics to determine risk e.g. decision tree questions..

Is risk ranking subjective?

High, Medium, Low

Risk

Hazard

Severity/Impact: Negligible, Minor, Moderate, Significant, Severe

Likelihood: Very unlikely, likely, possible, likely, very likely

Qualitative Risk Assessment

Semi- Quantitative Risk Assessment

Quantitative Risk Assessment

So do how do people assess risk and them make decisions?

Regulators, retailers, food suppliers/manufacturers, consumers

How is safety, hazard and risk perceived?

What kinds of heuristic do we use?

Heuristics range from broad judgmental strategies to narrow ones

Examples of heuristics

- Affect
- Effort
- Availability
- Representativeness
- Control

Heuristics are the decision rules we use to determine risk

- **Affect:** Determining the likelihood of an event based on how we “feel” about it e.g. fear, dread, anger
    - Would the fear of an event happening affect our risk decision-making?
    - Would we just use a ‘gut feeling” to determine the risk versus the benefit?

Heuristics are the decision rules we use to determine risk..

- **Effort:** Determining the quality of something based on the time and effort invested.
    - Is this how we approach decision-making based on vested interest?
    - Might we just make changes around the edges of a food safety management system because of the amount vested in its original creation?

Heuristics are the decision rules we use to determine risk ..

- **Availability:** Determining the likelihood of an event because it is easy to recall or imagine i.e. it is known, real, experienced.
    - If the event occurs frequently do we become immune to it as an issue
    - If the event occurs frequently do we believe it is more risky than an event we don’t know about?

Heuristics are the decision rules we use to determine risk ..

- **Availability:** Does the activity of the media increase availability? Does media attention amplify the perceived risk for the general public?
    - Credibility of message
    - Repeatability of message
    - The words (discourse) used
    - What about wider risk communication?

Heuristics are the decision rules we use to determine risk ..

- **Representativeness:** What category does this problem belong to? What is it similar to? Can we stereotype people, situations?
  - Does similarity affect our decision making?
  - When we determine sampling rate how do we consider representativeness?
  - Is sampling random?

Heuristics are the decision rules we use to determine risk ..

- **Control:** Can a person be too confident in their ability to control a given situation and this then influences how they determine risk?
  - Can someone believe they can control an event, an environment even when they do not have the capacity to do so?
  - Conversely can individuals believe that they have no means to control a situation and thus do not take action?

Examples of heuristics

- Affect
- Effort
- Availability
- Representativeness
- Control

Discussion points

- The way food suppliers/manufacturers and consumers make decisions
- Perception of safety, hazards and risk
- How do decision-making and risk perception affect safety standards in food production?

Concluding thoughts

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Sally-Ann Krzyzaniak

Research Fellow

University of Portsmouth

Food Fraud and Counter Fraud Best Practice

University of Portsmouth

The Future of Food Safety Conference: Hygiene and Supply Chain Solutions

Sally-Ann Krzyzaniak

Speaker Background

- Research Fellow in Accounting & Financial Management
- Previously worked in the food industry for more than 20 years in nutrition science and regulatory affairs
- Food Fraud Research Group:
  - Cross disciplinary
  - Centre for Counter Fraud Studies and Portsmouth Business School
- Research interests:
  - Food safety governance
  - Food fraud
  - Management control and the food supply chain

Outline of Talk

- What is food fraud?
- Cost of fraud
- Counter fraud best practice and using the “Red Flags of Food Fraud”
- Regulatory framework – is it enough?

Food Fraud

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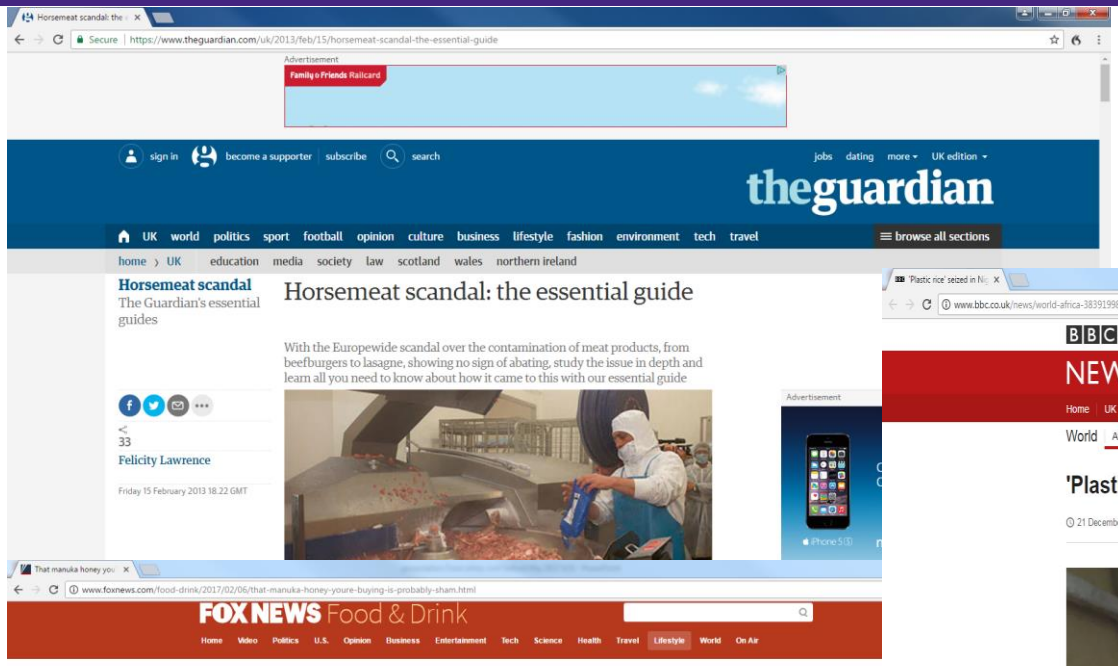
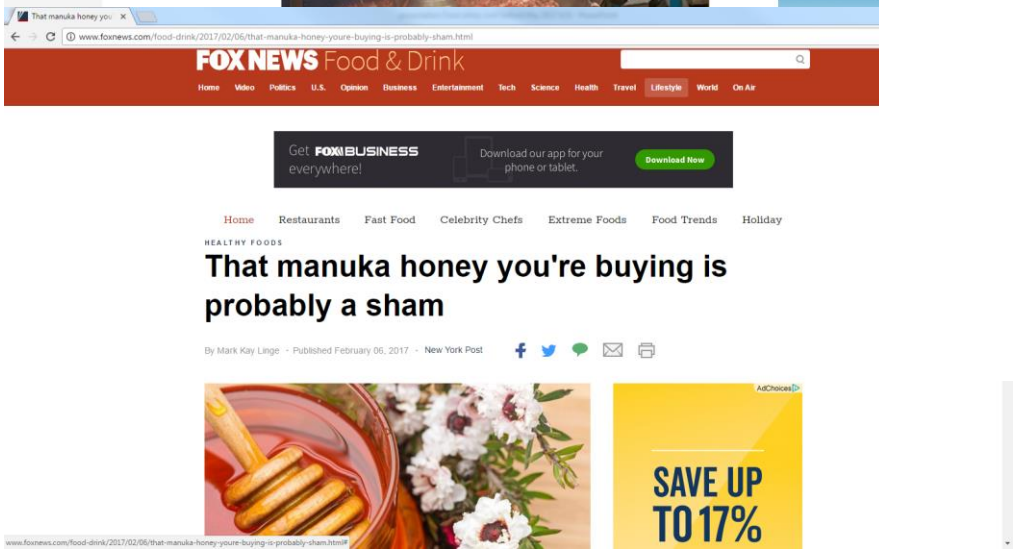
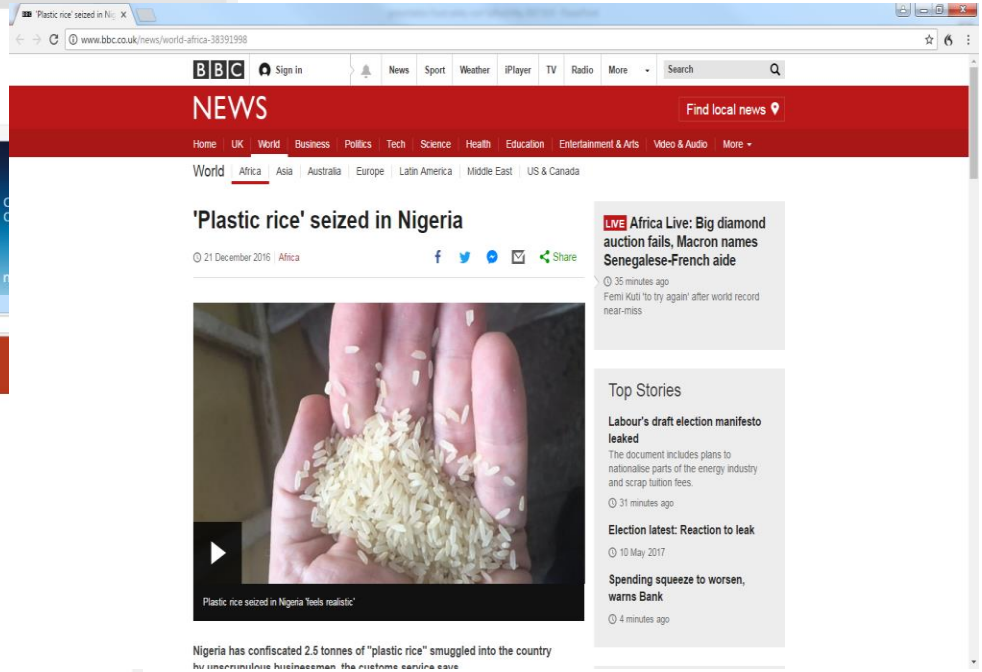
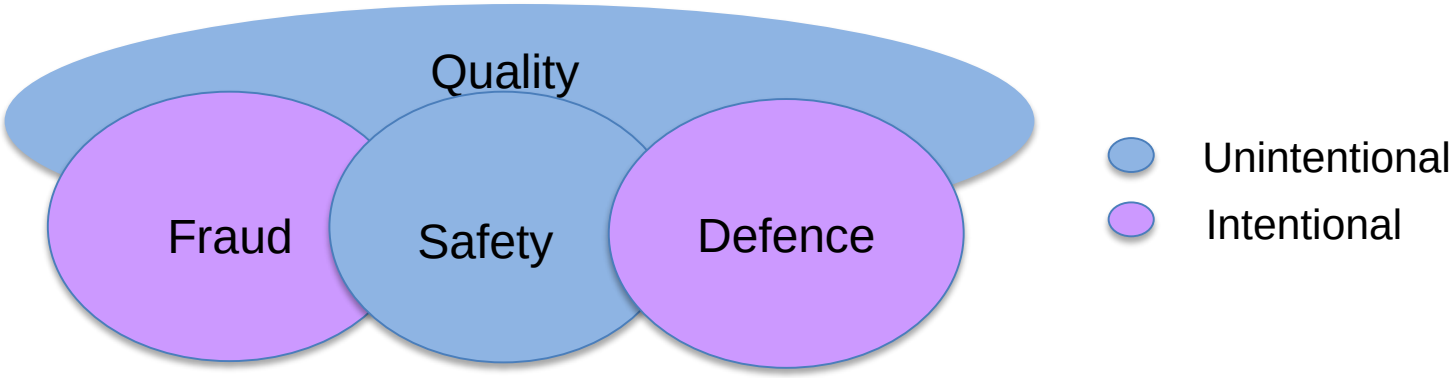






Food Fraud

- Encompasses the deliberate and intentional substitution, addition, tampering, or misrepresentation of food, food ingredients, or food packaging; or false or misleading statements made about a product for economic gain (Spink and Moyer, 2011).
- The customer is deceived in some way.



Food Fraud, Food Crime or Fraud in the Food Industry?

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- Food Crime - Elliott report

"Food fraud becomes food crime when it no longer involves random acts by 'rogues' within the food industry but becomes an organised activity ……"

"Concerns have been expressed during this review that the term food fraud creates an impression of some kind of low grade infraction of the law, of a harmless minor breach of technical regulations of the kind that many hard pressed businesses may be tempted to resort to in difficult times. But the serious end of food fraud is organised crime, and the profits can be substantial."

- Organised crime – or crime that is organised?
- Fraud in the food industry – it's not just about adulteration, substitution or mislabelling.

Why Worry?

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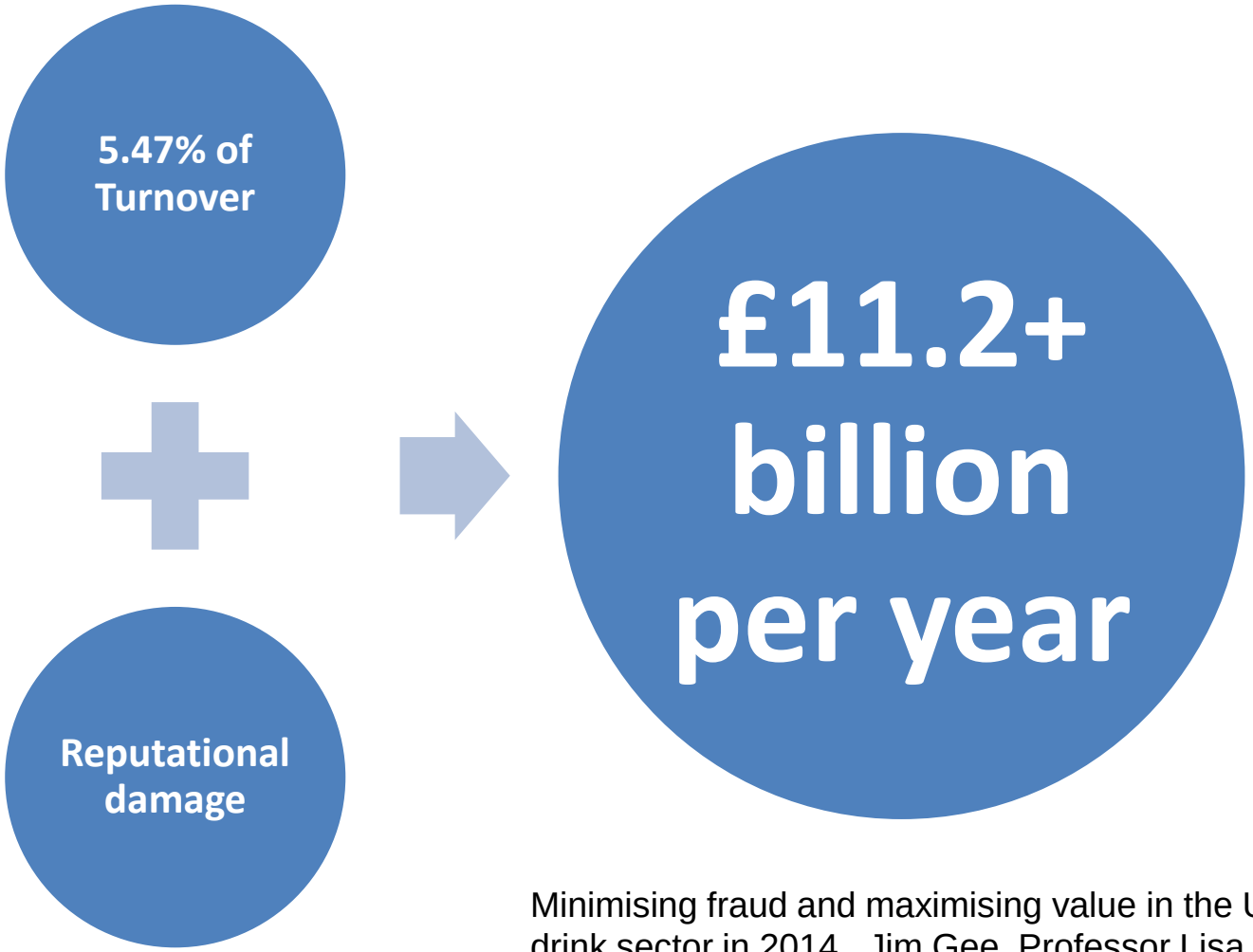
- **Safety**
- **Reputation**
- **Cost**

Financial Cost of Fraud



Minimising fraud and maximising value in the UK food and drink sector in 2014. Jim Gee, Professor Lisa Jack and Professor Mark Button.

Food Fraud Rarely Happens On Its Own

University of Portsmouth

- Food safety breaches
- Tax/duty evasion
- Bribery and corruption
- Extortion
- Money laundering
- Funding terrorism
- Smuggling
- False record keeping
- False accounting
- Subsidy fraud
- Other stakeholder fraud
- Grey markets

Tax evasion cuts prices which increases industry pressures which increases chances of food fraud

Businesses risk colluding with criminal activity

Into the supply chain

- In order to get into the supply chain of the retailer or caterer, the supplier or distributor must:
  - Make the product in such a way that it passes all diagnostic and visual tests
  - Deceive, collude with, bribe or blackmail someone inside the business
  - Understand the vulnerable points in the supply chain and exploit them
  - Know what paperwork needs to be changed.

Why are Food Supply Chains Vulnerable?

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- Long/fragmentary supply chains
- Short-medium term rather than long-term supplier/customer relationships
- Non-optimal use of information technology systems
- Reliance on marginal costing/pricing
- High volumes of raw materials and goods, widely dispersed
- Lack of information and intelligence sharing
- Inaccurate forecasting
- Multiple ways of invoicing and ordering
- Multiple sources of ingredients
- Imports/exports subject to customs duties
- Different levels of VAT between import and export countries
- Bewildered consumers
- Shelf life demands
- Easily counterfeited labels and packaging

The ideal product (from a criminal point of view)

Unlikely to be detected (low detection score)

Easy to perpetrate (high ease score)

Profitable (high profitability)

NB: highly profitable can mean

High margin, low volume

OR

Low margin, high volume

Thinking like a criminal

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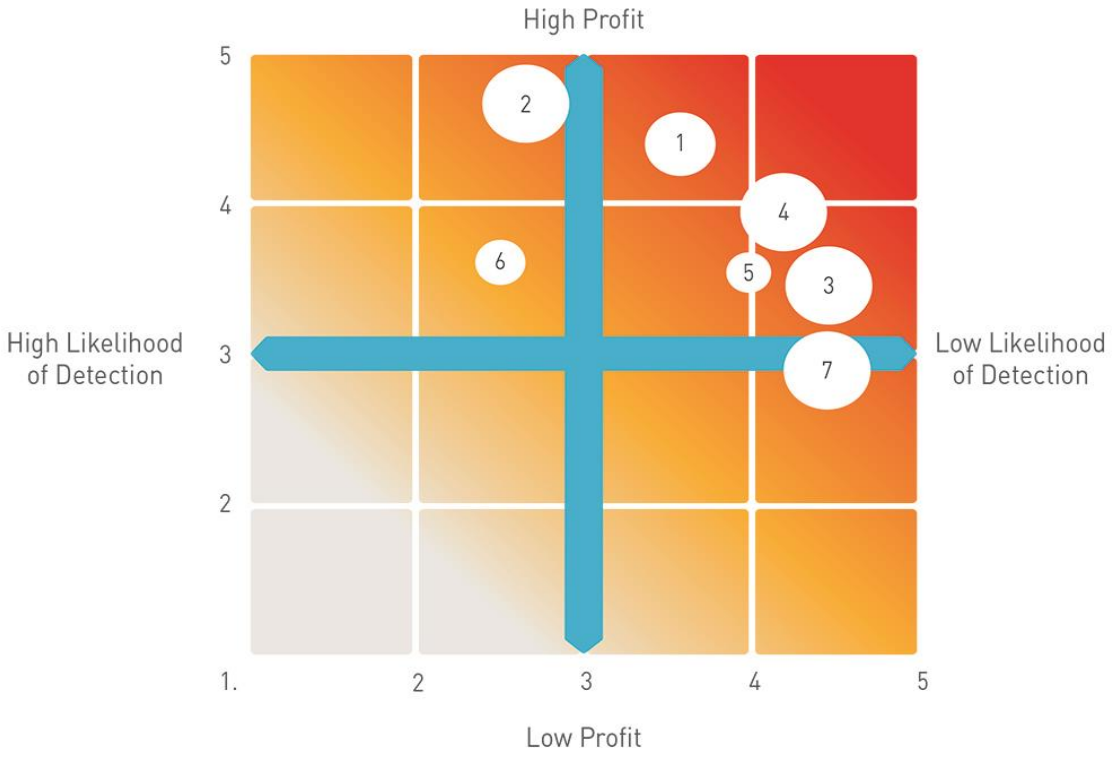
FOOD FRAUD TEMPTATION MODEL



Key

1. Saffron
2. Olive Oil
3. Wheat
4. Coffee
5. Beef Trim (pre horsegate)
6. Beef Trim (post horsegate)
7. Potato

Size of circle represents ease of perpetration of a fraud

NSF

Follow the money……..

Because food fraud and food crime is economically motivated - there is always money and paperwork involved somewhere.

Supply chain frauds in general

Collusion, bribery, corruption and blackmail

Inventory fraud

Purchase order frauds

Invoice frauds

Receiving frauds (pick and pack)

Shipping frauds/false consignments

Paperwork frauds.

The Red Flags of Food Fraud

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Unusual features in packaging and labelling

- Agreed specification?
- Agreed standard documentation?
- Staff trained to inspect goods and documentation?

Weak internal controls

- No paperwork / too much paperwork
- Checks: too few / not understood
- Little separation of duties

Common underpinning

- Communication
- Consistency of approach
- Training

Combating Fraud in the Food Industry

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Internal controls over authorisations, separation of duties, 'checks and balances' and so on.

Good Corporate Governance

Staff training

Internal audit

Whistle blowing mechanisms

Sound management controls

- policies and procedures on fraud
- level of tolerance
- sanctions
- reporting requirements
- due diligence on suppliers and employees

University of Portsmouth

CIEH Food Community

Chartered Institute of Environmental Health

Counter fraud good practice for food and drink businesses

Improve fraud resilience and reduce the financial cost of fraud

Written by

Eoghan Daly Policy and Technical Adviser, CIEH Food Community

Jim Gee Visiting Professor, University of Portsmouth Centre for Counter Fraud Studies

With contributions from

Andy Morling Head of Food Crime, Food Standards Agency

Ron McNaughton Head of Scottish Food Crime and Incidents Unit, Food Standards Scotland

Food Standards Agency food.gov.uk

Food Standards Scotland

Intellectual Property Office

University of Portsmouth Centre for Counter Fraud Studies

Regulatory Framework – Enough?

- Technical breaches of UK Food Safety Act
  - Rendering food injurious to health
  - Selling, to the purchaser's prejudice, food which is not of the nature, substance or quality demanded
  - Falsely or misleadingly describing or presenting food

- Failing to comply with traceability requirements General Food Law

- Challenges and opportunities
  - Common definitions of food fraud – and indeed fraud – across jurisdictions
  - Investigations must be legally and ethically compliant
  - Resources – Trading Standards, Environmental Health, Police
  - Prosecuting any fraud is challenging – proving "intent"
  - Information sharing – NFCU and Scottish Food Crime and Incidents Unit
    - NFCU hot line "Food Crime Confidential"
  - Using the Proceeds of Crime Act to incentivise prosecutions & act as a deterrent to fraudsters

Conclusion

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- Initiatives to reduce fraud usually pay for themselves
- Good controls against food fraud are good controls against all fraud
- The majority of people are honest
- Resilient organisations protect their staff, customers and supply chain from the dishonest minority

Our Training

University of Portsmouth

Food Fraud Awareness Online/Face-to-Face

The cost of fraud to your organisation
Understanding food fraud
Related crimes
Supply chain fraud
Food Fraud Temptation Model
Counter fraud and forensic accounting
-application to food fraud
Building resilience to food fraud
Detect and prevent food fraud

Our courses

Specialist Food Fraud pathway of Association of Counter Fraud Technicians training 20 Credits

Legal awareness
Investigation techniques
Forensic accounting for detection
Building resilience to fraud

Thank you

Food Fraud Group – Centre for Counter Fraud Studies

http://www.port.ac.uk/centre-for-counter-fraud-studies/food-fraud-group/

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