



IFST MIDLANDS BRANCH FOOD AUTHENTICITY AND TRACEABILITY BREAKFAST MEETING

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Andy Kerridge
IFST Regional Chairman - Midlands



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NOTTINGHAM TRENT UNIVERSITY
WELCOME

Professor Mary O'Neill
Dean of School of Science and Technology
Nottingham Trent University



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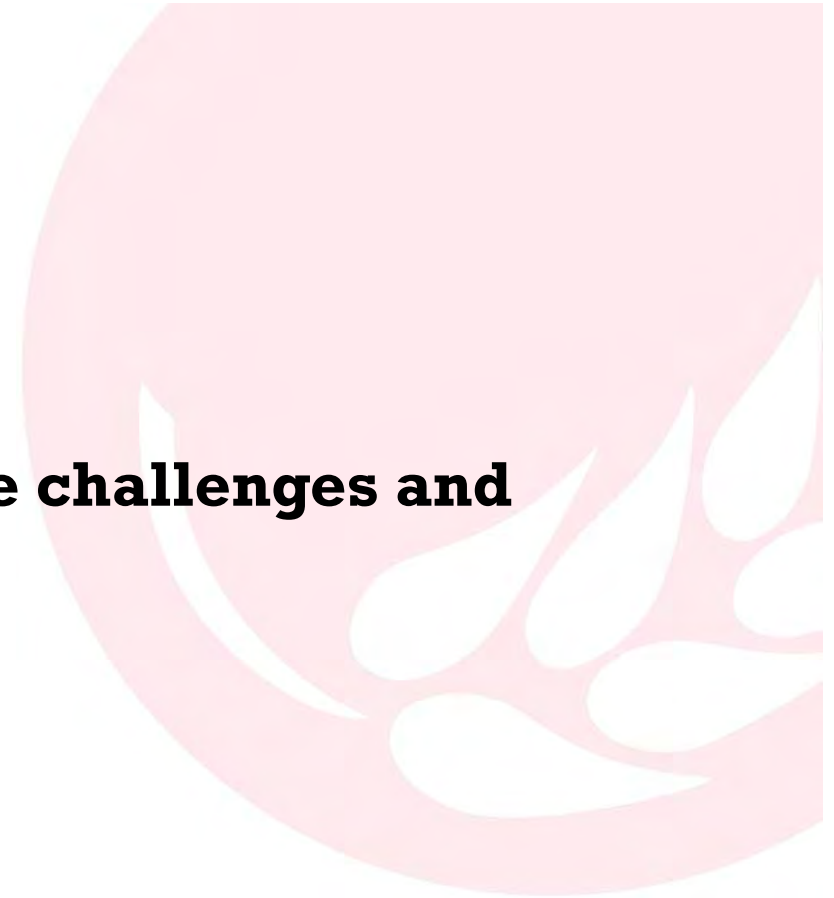
IFST MIDLANDS BRANCH
SESSION 1

‘Food authenticity testing - some challenges and solutions’

Professor Ellen Billett
Head of Food Authenticity
Nottingham Trent University

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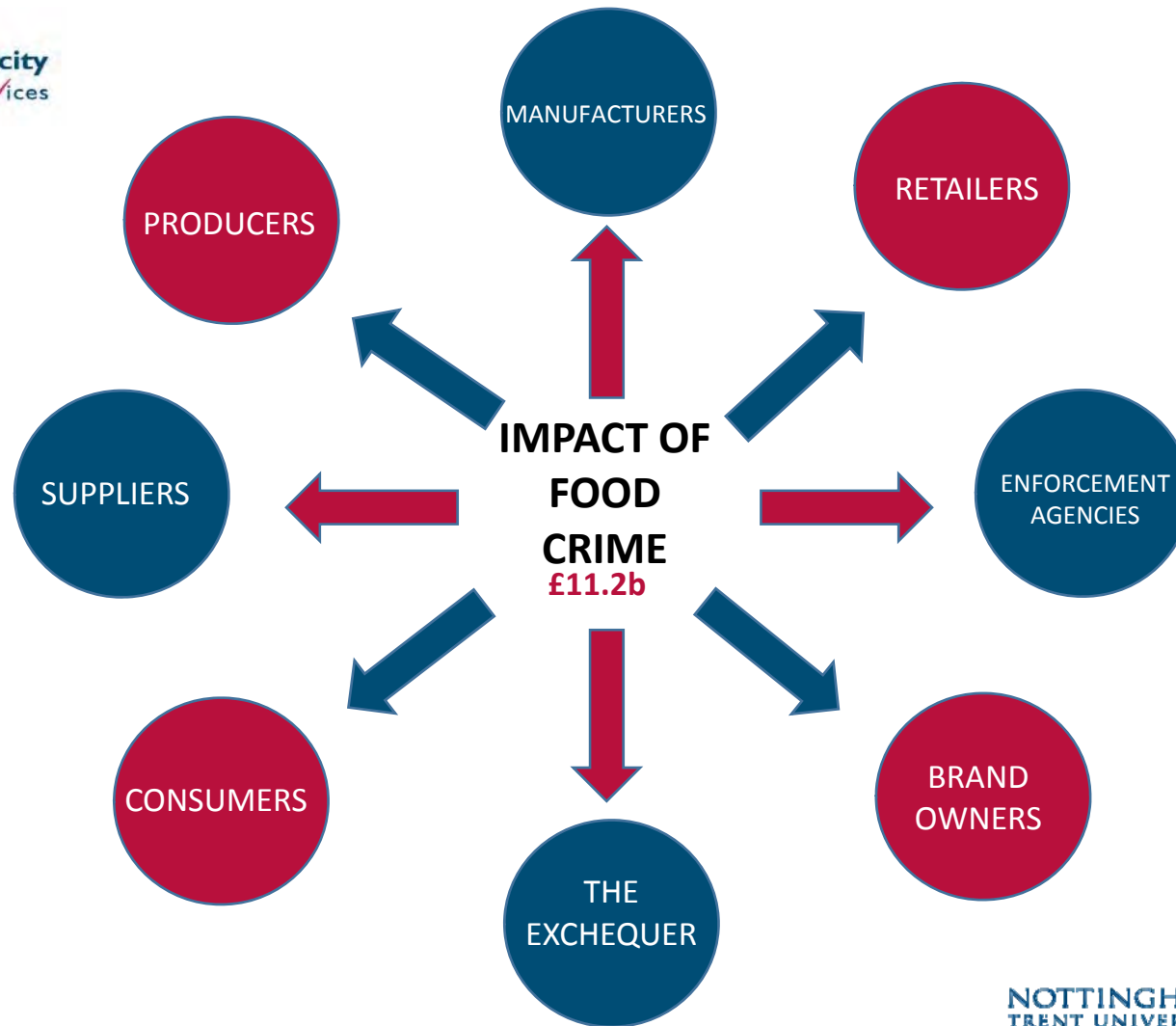


Food authenticity testing- some challenges and solutions

Professor Ellen Billett

Food Authenticity Research and Services
Nottingham Trent University





Food authenticity and food fraud

- Authentic- as described on the label, matches the description
- Fraud- acts of deliberate deceit for economic gain
- Food fraud is not new and is proliferating, as food and supply chains become more complex

Adulteration

Adding a foreign substance to lower costs or fake a higher quality

Substitution

Replacing a food or ingredient with another substance that is similar but inferior

Misrepresentation

Marketing or labelling a product to wrongly portray its quality, origin or provenance



Substitution

Replacing a food or ingredient with another substance that is similar but inferior



Some samples contained DNA from as many as four different animals, while others contained no trace of the meat that appeared on the product's label

The challenges:

Food fraud can only be addressed if we know about it

- Surveillance should be on-going
- Product labelling can only be checked if methods are available to measure ingredients
- Food fraud can be confirmed if tests are available to monitor the adulterant
- Tests must be fit for purpose and robust
- Experts needed to develop new tests

Intelligence needed to expose new adulterants

Fraud in meat and meat products

WHY ?

- high value commodity
- easy to disguise adulterants in processed meat

Meat species substitution is an ongoing problem



Leeds supermarket fined for food fraud and selling out-of-date produce

A supermarket in Hunslet has been fined nearly £18,000 for food fraud and selling out of date products. It came after trading standards officers visited the store in June last year, following a complaint, and found a 1kg sample of lamb actually contained 10 per cent beef as well as 23 food items past their use-by date.

September 2018

Meat labelling law

- 'meat' is defined as skeletal muscle with naturally included or adherent fat and connective tissues
 - heart, tongue, etc. are excluded from this definition
- the generic term 'offal' is not permitted
 - organ type and species must be clearly listed
- addition of non-meat protein must be declared on the label

- In 2003, no suitable test for detection of offal type and species existed
- DNA based methods cannot detect offal because DNA is the same in every tissue

Why is offal used as an adulterant?

- Cheaper than meat
- Easy to disguise (e.g. in frozen blocks)
- No routine surveillance
- Reinforced in Prof. Chris Elliott's review, 2014[†]

Pre 2006 - no reliable tests for offal

NTU commissioned by FSA to develop robust methods to detect offal in raw and cooked meat products (2006 -2010)

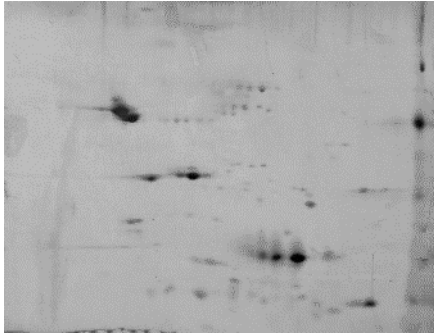
Offal methods used in study of 100 retail and food service meat products (commissioned by Defra, 2014-2015)

[†] <https://www.gov.uk/government/publications/elliott-review-into-the-integrity-and-assurance-of-food-supply-networks-final-report>

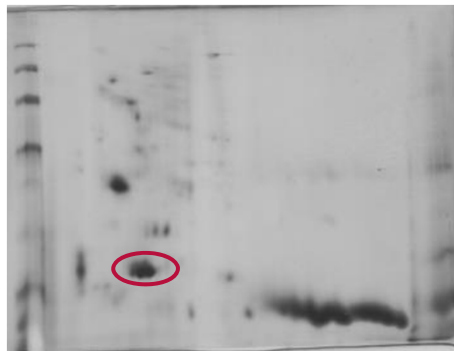
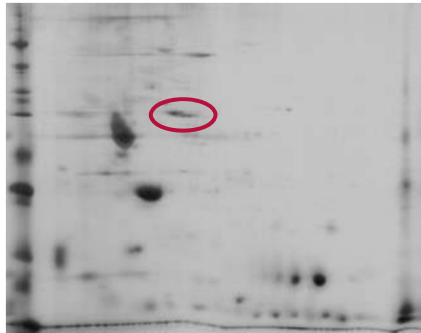
Detection of offal type and species- a proteomic solution

Identification of offal-specific proteins using 2-D gel electrophoresis

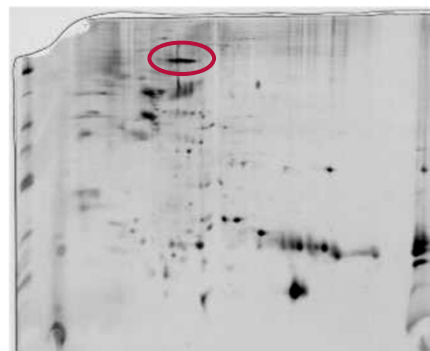
cooked skeletal muscle



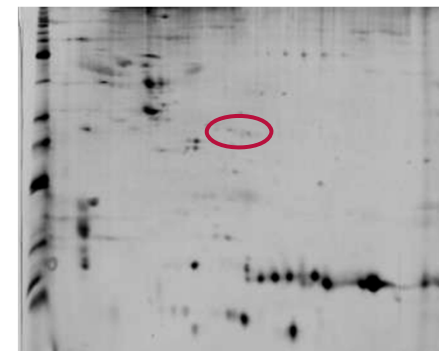
cooked heart



cooked liver



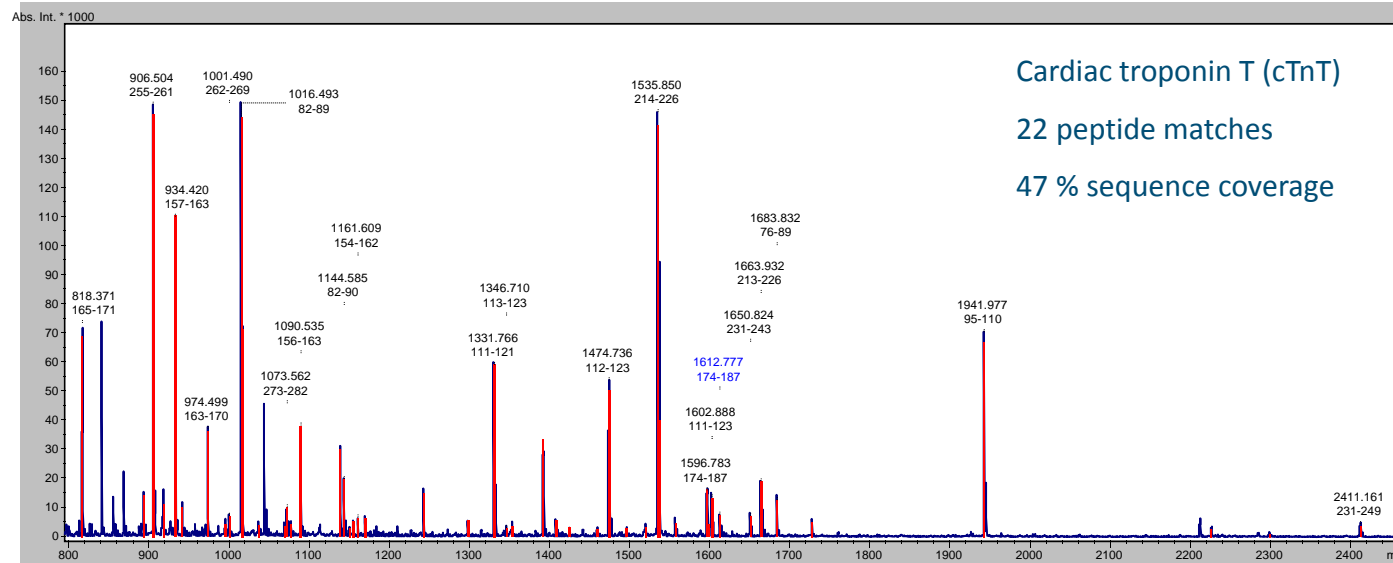
cooked kidney



cooked lung

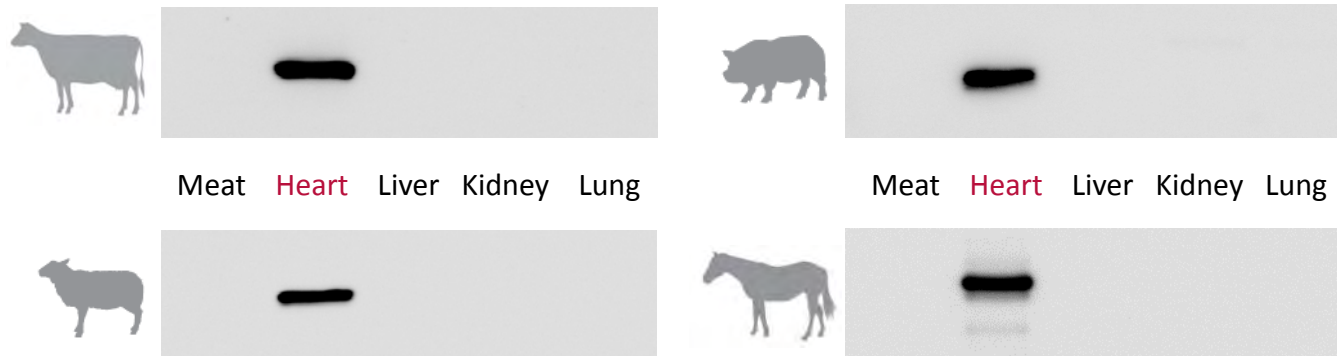
2D gels can reveal differences in protein expression in different organs

Identification of offal specific proteins by peptide mass fingerprinting







Western blotting used to detect offal

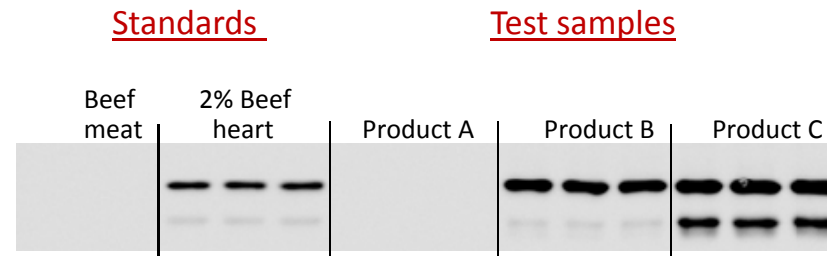
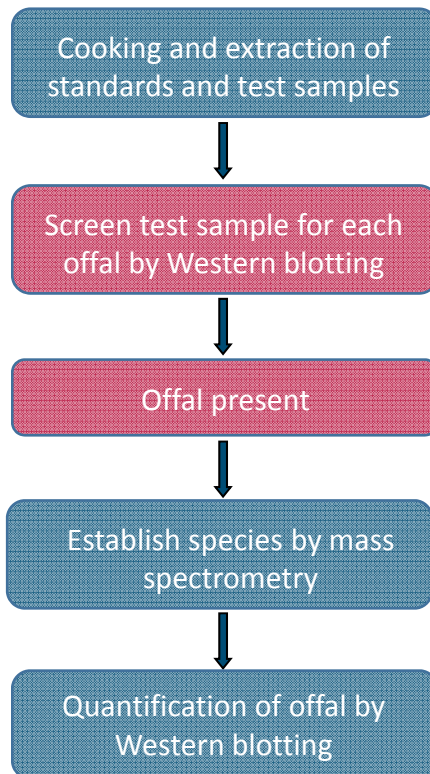
- combines antibody specificity with size validation
- easy to visualise non-specific reactions
- signal can be quantified



Proteomic methods can distinguish different offals

				
Heart	✓	✓	✓	✓
Liver	✓	✓	✓	✓
Kidney	✓	✓	✓	✓
Lung	✓	✓	✓	✓

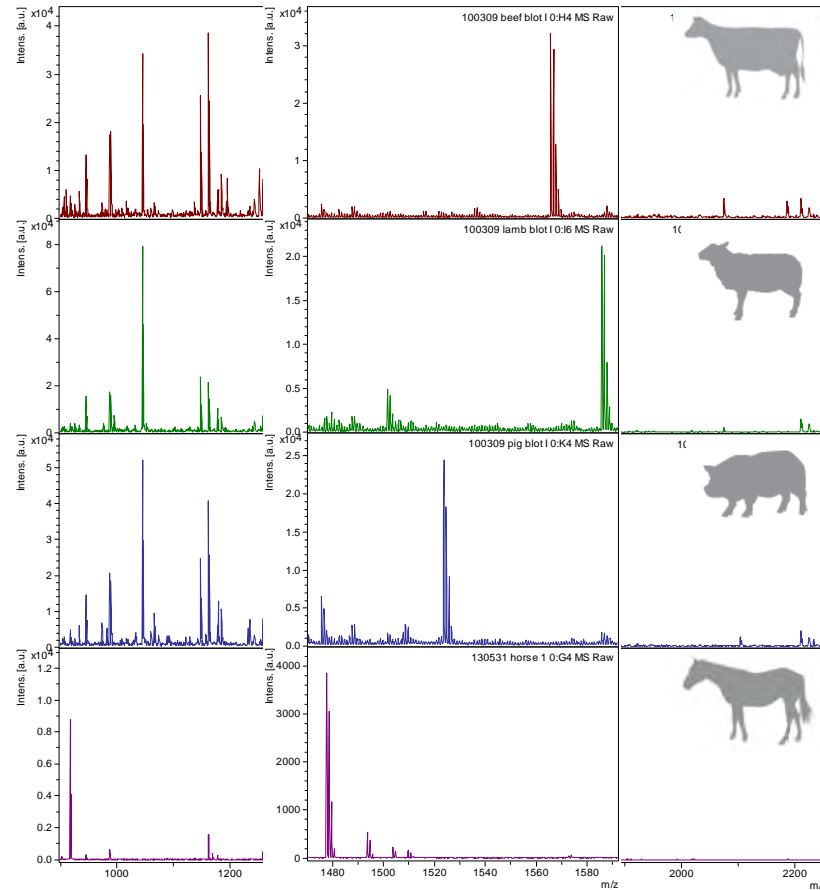
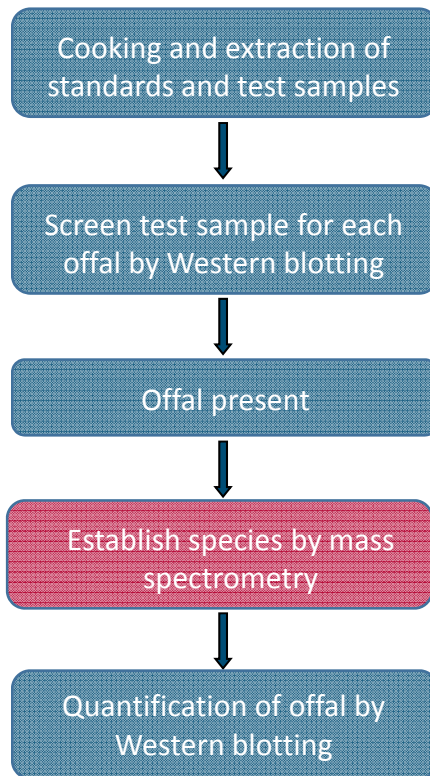
Offal detection, speciation and quantification



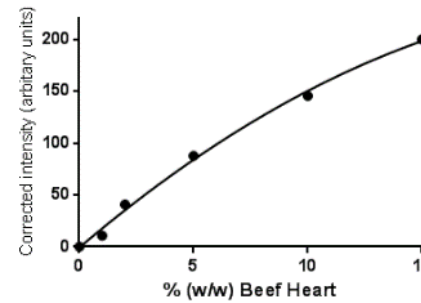
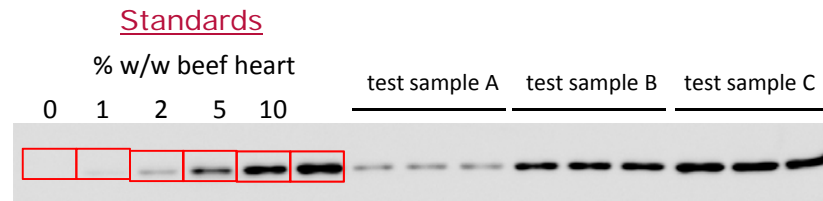
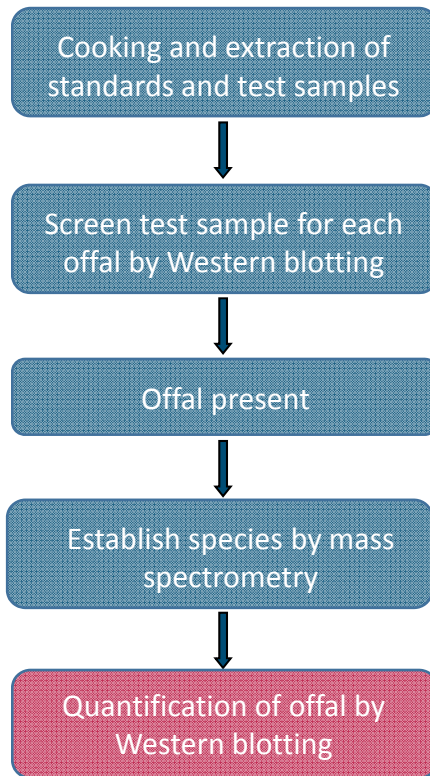
Products B and C contain > 2% undeclared heart

Product A contains no heart

Offal speciation



Quantification of beef heart



Test sample	% heart Actual	% heart (±SD) Estimated	Coefficient of variation (%)
A	3.0	2.2 ± 0.1	2.2
B	7.5	8.0 ± 0.5	6.2
C	12.0	13.3 ± 0.8	5.6



Survey of meat products for the presence of offal

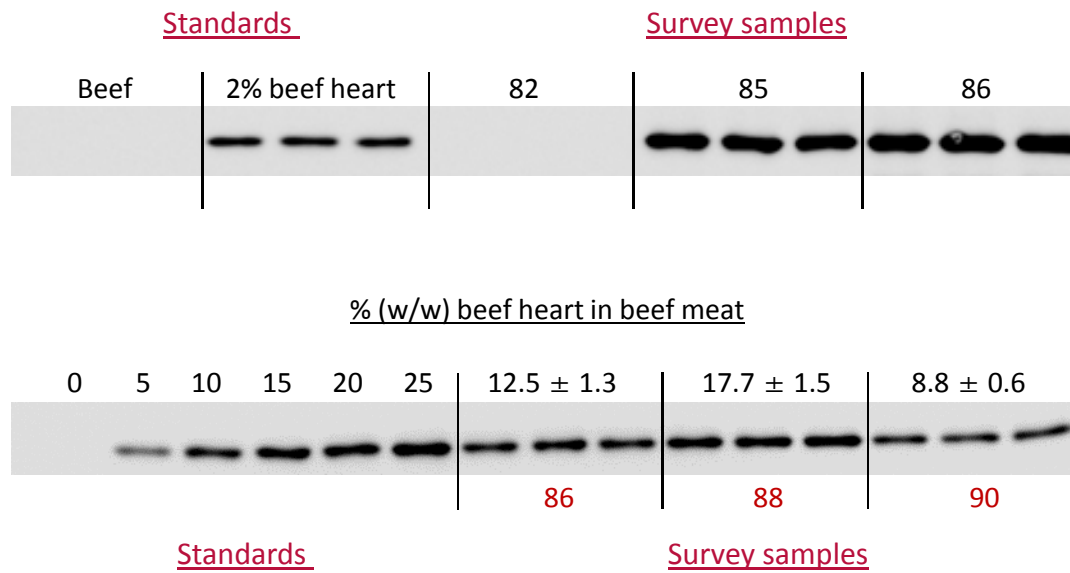
Commissioned by Defra, 2014-2015
Published September 2018

100 meat products tested for presence of offal

Store Type	Stores visited	Products collected
National retailer	12	63
Small national retailer	5	9
Independent retailer	6	8
Food service provider (National)	5	5
Food service provider (Independent)	15	15
TOTAL	43	100

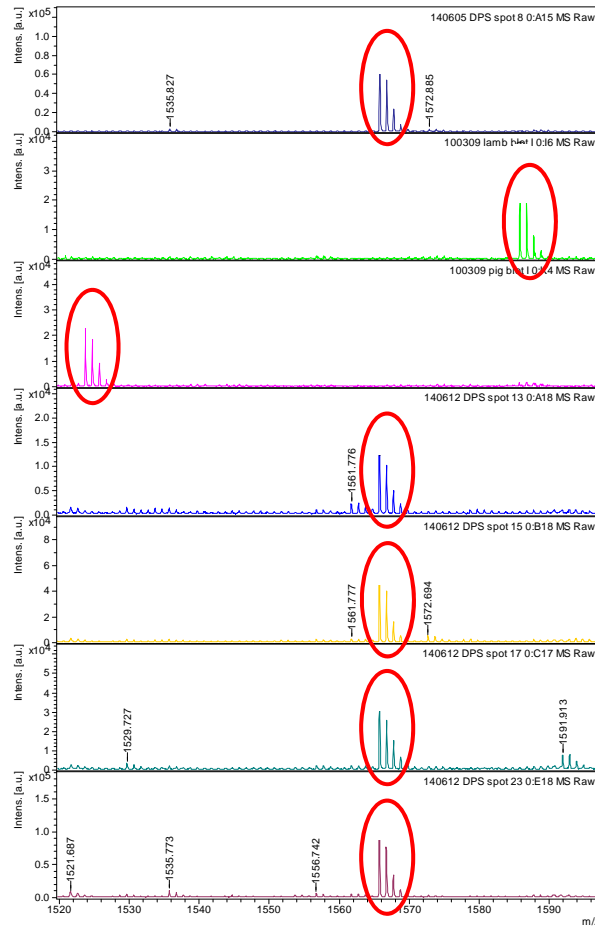
Product type: minced meat, burgers, sausages, ready meals, kebabs, canned

Detection and quantification of heart



DNA testing would not have detected heart

Examples of BEEF HEART validation/speciation by MS



Beef-specific peptide from heart marker protein

Lamb-specific peptide from heart marker protein

Pork-specific peptide from heart marker protein

Survey samples

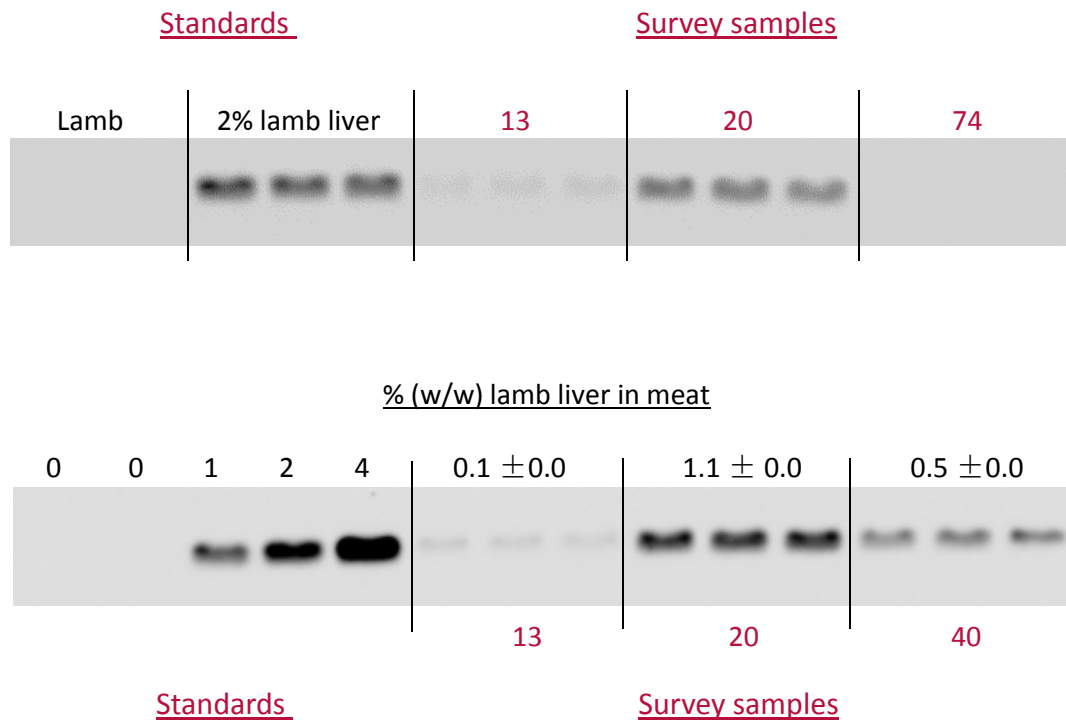
22 (2% [w/w] heart)

85 (6.5% [w/w] heart)

90 (8.8% [w/w] heart)

96 (12.9% [w/w] heart)

Detection and quantification of liver



Summary of results

	Product type	Number	Offal presence/ validation	Offal declared
Retail	Minced meat	17	5	No
	Burger/kebab/meatball	34	3	No
	Sausage	8	1	No
	Ready meal	10	0	
	Canned/Jar	11	0	
	TOTAL	80	9	
Food Service	Burger/meatball	15	10	Unknown at time of testing
	Kebab	4	0	
	Sausage	1	0	
	TOTAL	20	10	

- Post survey, label changed on 1 retail burger
- Following Local Authority visit, label confirmed heart in 8 food service burgers; 2 products needed further investigation

Survey conclusions

- 10% retail products tested contained undeclared offal
 - 5 out of 9 contained >2% offal, three containing > 10% offal
- 30% retail minced meat contained offal
- 50% food service products tested positive for offal
- Heart was the predominant offal detected
- Some products contained a non-skeletal muscle protein of unknown origin

Impact and recognition

- Provided scientific evidence which contributed to the successful prosecution of Freeza Meats for food fraud offences (June 2015)
- Following increased industry awareness of our offal detection service, labels on several products have been modified to comply with labelling legislation
- Recognised as a Centre of Expertise for Food Authenticity Testing (Jan 2016)
- Contributed to NTU being awarded the Queen's Anniversary Prize for Higher and Further Education – the highest national honour for a UK University (Nov 2015)



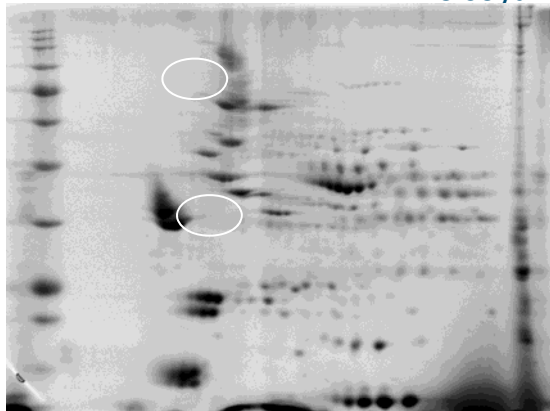
Other services

- Detection of added pork and beef serum in raw meat products
- Speciation of gelatin in meat products, confectionary, health supplement capsules, dairy products.
- Meat speciation
- Detection and identification of unexpected proteins in meat and other products e.g. soya
- Customised research and development
 - discovering problems and solving food authenticity challenges

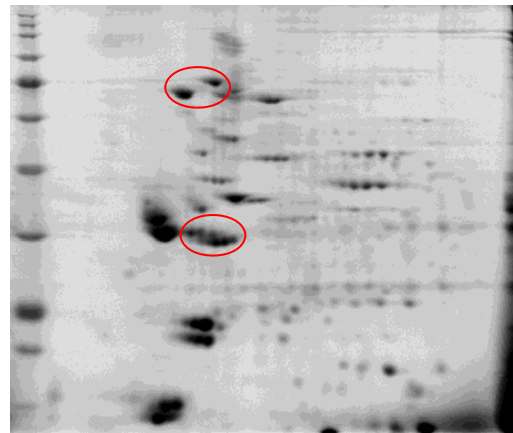
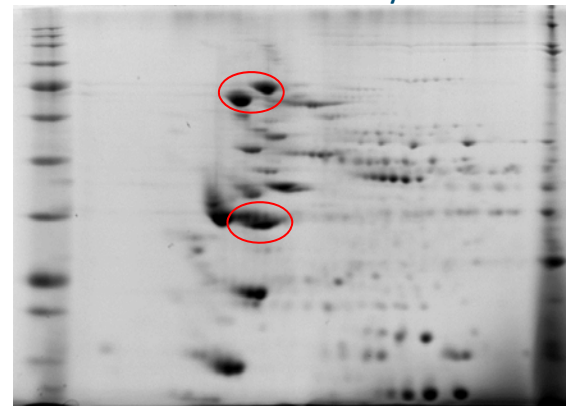


2-D gel profiles demonstrating presence of Soya protein in beef burgers

No soya



Soya declared



Soya detected
not declared

- Past funders



- C. Brumpton butchers for providing the meat and offal



Questions?



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0115 848 6356/3568

Ellen Billett, Lyndsey Durose, Cheryl Wells

IFST MIDLANDS BRANCH
SESSION 2

**Keynote Speech: 'The importance of Authenticity, a
Retailer's Perspective'**

Darina Hall

Senior Technical & Quality Director

Asda

#IFSTMidlandsbranch

www.ifst.org

Darina Hall

Food Authenticity – A Retailer Perspective

Senior Technical & Quality Director





Asda

The Customer

Industry Horizon

Retailer Reality

The Future

Agenda

- More than 19 million people shop at Asda's 645 stores every week
- 1,200 Own Brand manufacturing food sites
- 1,000 IPL Manufacturing Produce pack houses working with 50,000 growers

The Asda Estate



ASDA
Save money. Live better.

Market Context

Sugar tax on chocolate and sweets to cut childhood obesity

FSA praises campylobacter reduction

England to explore ban on plastic straws and cotton buds

UK supermarket may have infected thousands with hepatitis E from sausages and ham

Restaurant fish fraud not being caught, experts warn

Massive rise in modern slavery reports in Sussex

Early warning system for food fraud developed

Australia's largest honey manufacturer accused of selling 'fake' product made with syrups from China

Big data holds potential to transform farming sector and food chain

Trust = Transparency & Emotion

Transparency

Where it is from



Naturalness

What is in it



Waste

Where it ends up



It starts with the Consumer

Boomers

Gen X

Millennials

Gen Z

Alphas



Provenance

Mindful Eaters

Clean Labels

Considered

Honesty

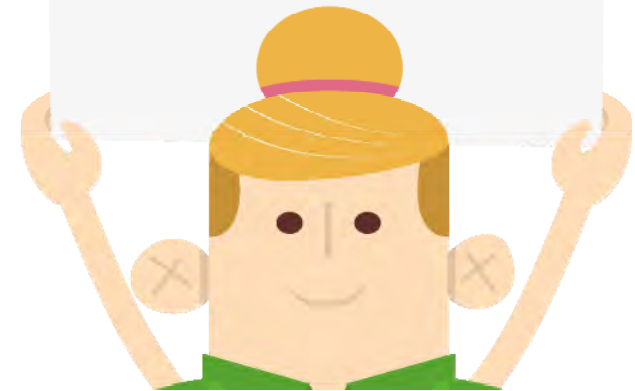
Traceability

Inclusivity

Authenticity

Purposeful Transparency

Gen Z ... the
purpose driven
influencers ...
they will
scrutinise labels



ASDA

Food Authenticity enables consumers to get what they pay for and increases their overall level of **trust** in Food.

Roberts – UCLA Food Law and Policy

ASDA
Save money. Live better.

Industry Examples

Fipronil in Eggs

Eggs containing fipronil found in 15 EU countries and Hong Kong

© 11 August 2017

Share



Fifteen EU countries as well as Hong Kong and Switzerland have received eggs contaminated with the insecticide fipronil, the European Commission says.

Meat Unspecified DNA

Meat testing: A fifth of samples reveal unspecified animals' DNA

By Hamish Mackay
BBC News

© 5 September 2018

Share



More than a fifth of meat sample tests in 2017 found DNA from animals not on the labelling, the BBC has learned.

Rising Commodity Prices

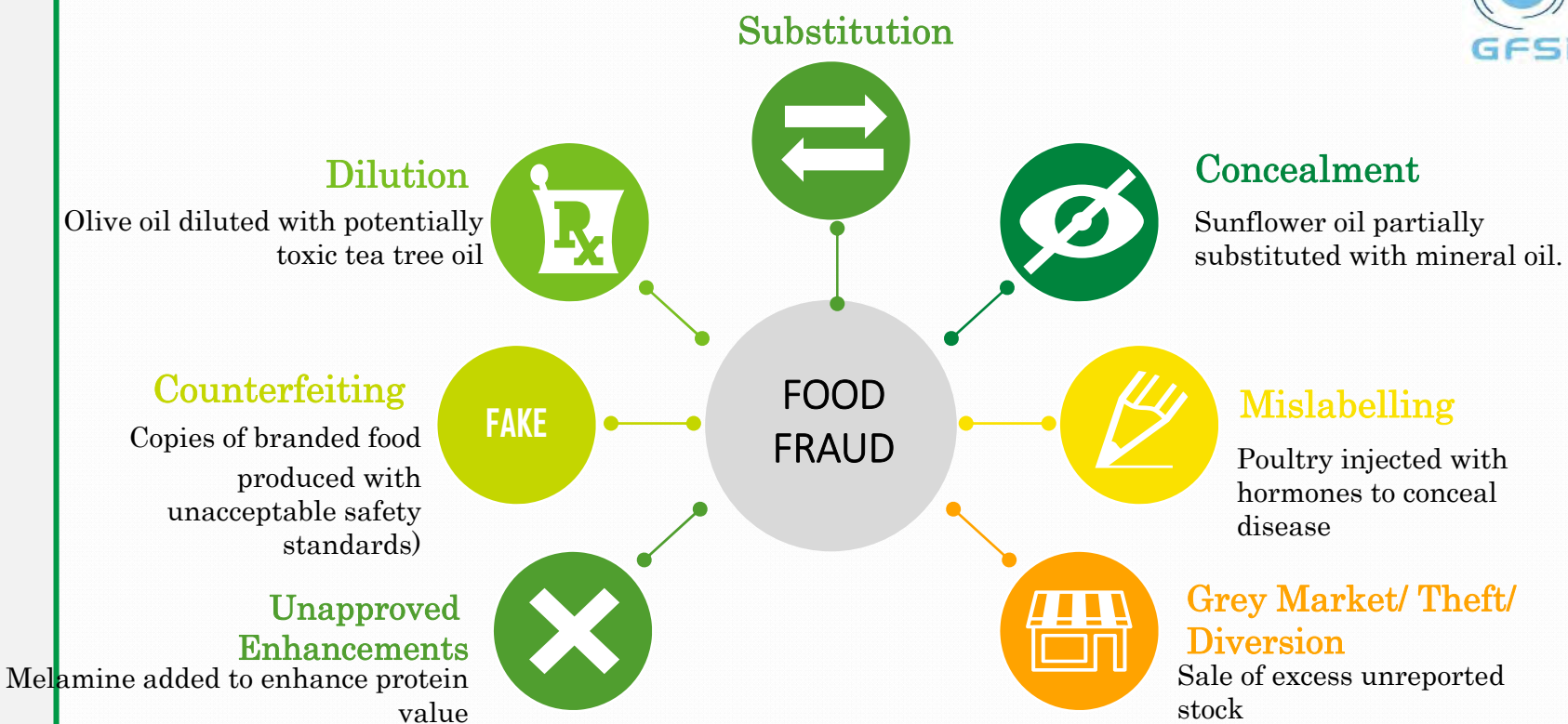
Madagascar's vanilla wars: prized spice drives death and deforestation

As the price of pods has soared so has violence - and forest defenders are increasingly risking their lives to protect precious wildlife habitat from being felled for profit



▲ Rich pickings: the price of vanilla has risen more than tenfold in the past five years. Photograph: Jonathan Watts for the Guardian

Terminology: Global Food Safety Initiative (GFSI)



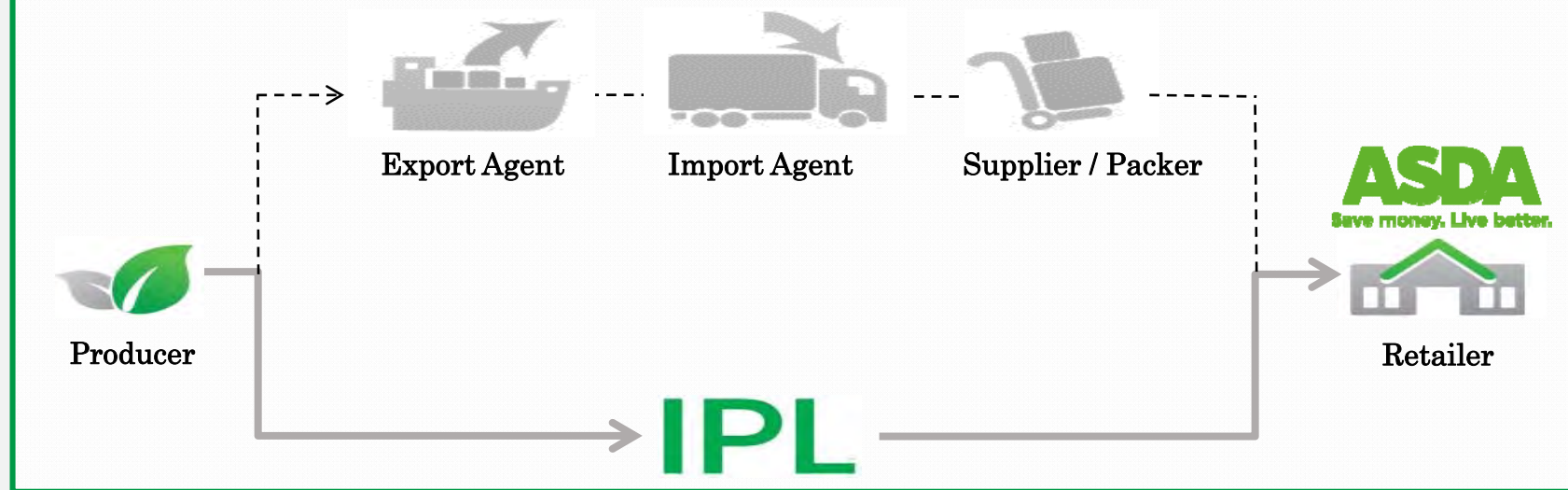
The Ultimate Goal

SUPPLY CHAIN
TRANSPARENCY

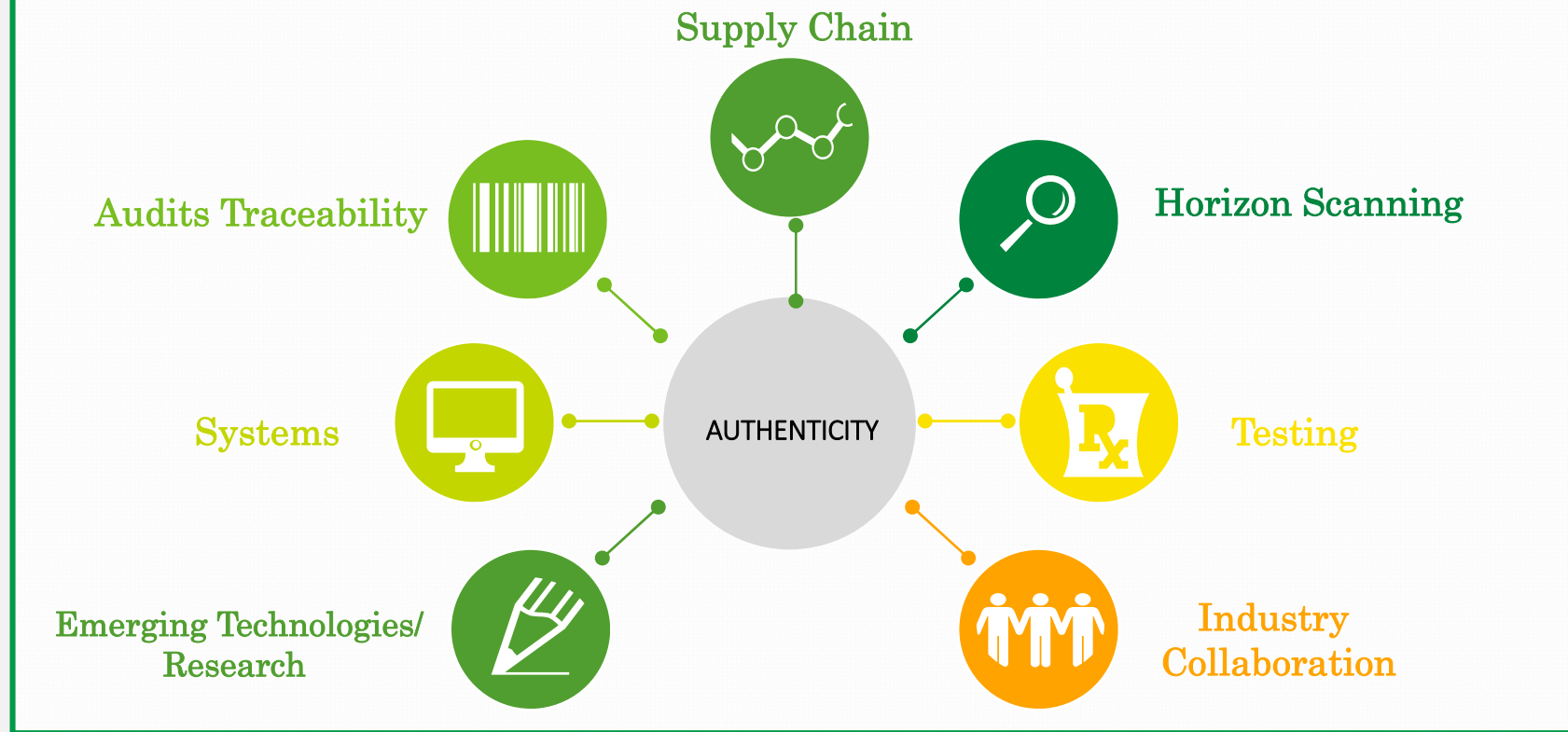
AUTHENTICIT
Y

The IPL Model

- To take control of supply chains
- Taking out middle men



Authenticity – Providing Trust



Industry Collaboration

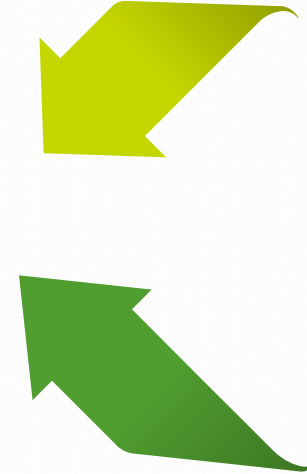
Supply Chain Integrity &
Consumer



Safe 'Haven' to Collect/Share
Intelligence



Share Intelligence with
Government



Food Industry Reputation

Industry Collaboration



QUEEN'S
UNIVERSITY
BELFAST

IGFS

THE INSTITUTE
FOR GLOBAL
FOOD SECURITY



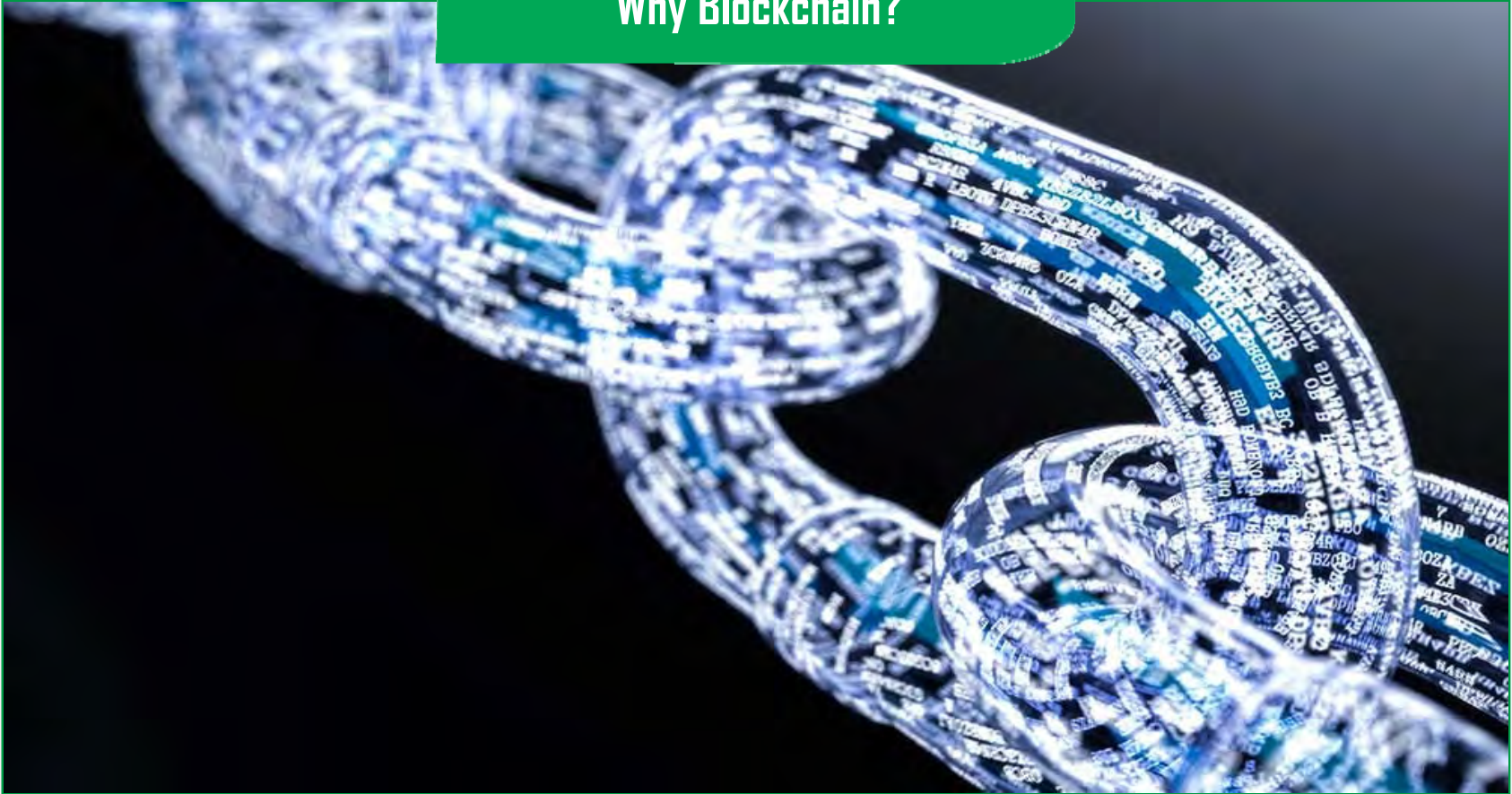
Global survey of oregano
indicated 27% of samples were
adulterated

Rapid detection of Herb and Spice Adulteration

Simon A. Haughey, Pamela Galvin-King, Christopher T. Elliott
Institute for Global Food Security, Queen's University Belfast, Northern Ireland.

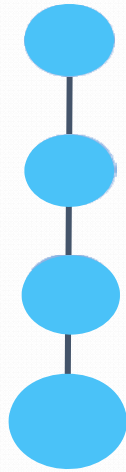
ASDA
Save money. Live better.

Why Blockchain?

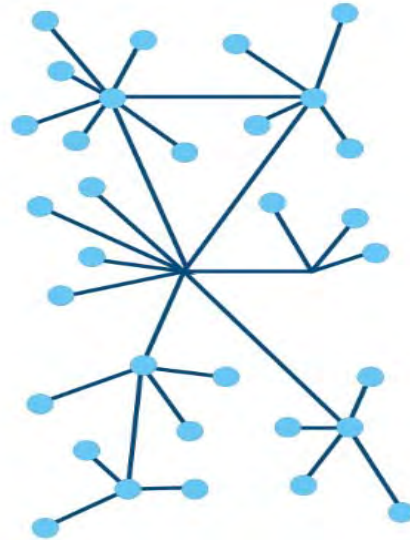


Blockchain...

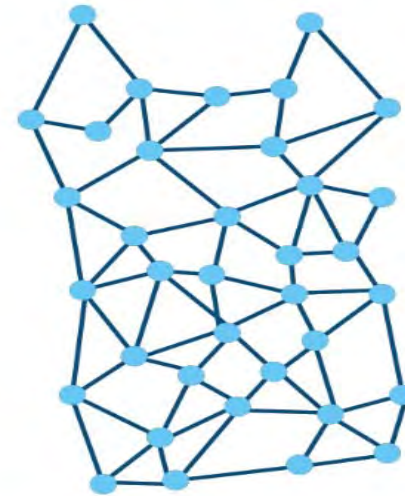
A decentralized and TRUSTED distributed digital ledger that is used to record transactions across a complex network so that the record cannot be altered retroactively without the alteration of all subsequent blocks and the consensus of the network.



Centralised



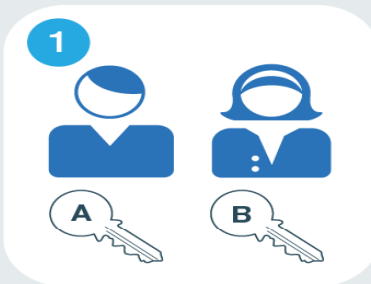
Decentralised



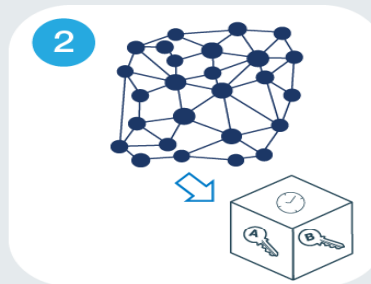
Distributed

Core features: **immutability** , **consensus** , **provenance**, **democratic**, & **TRUSTED**

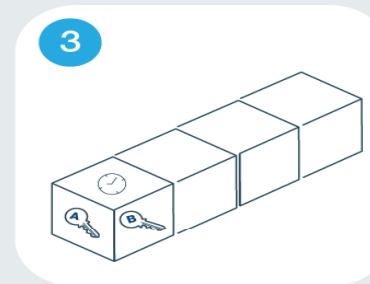
How Blockchain Works, Simplified



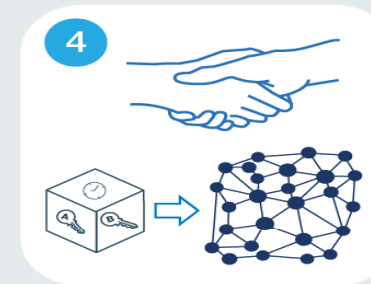
1
When 2 parties initiate a transaction, blockchain assigns an encryption



2
Blockchain verifies the transaction and creates a block




3
The new block is appended to the blockchain



4
The blockchain transaction is now complete and the ledger is updated

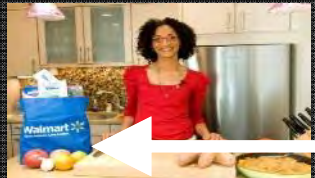
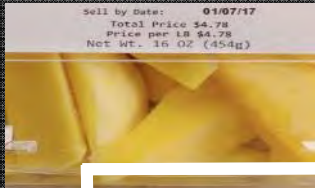
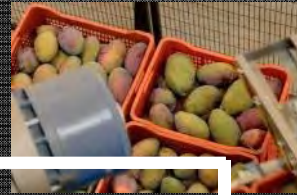
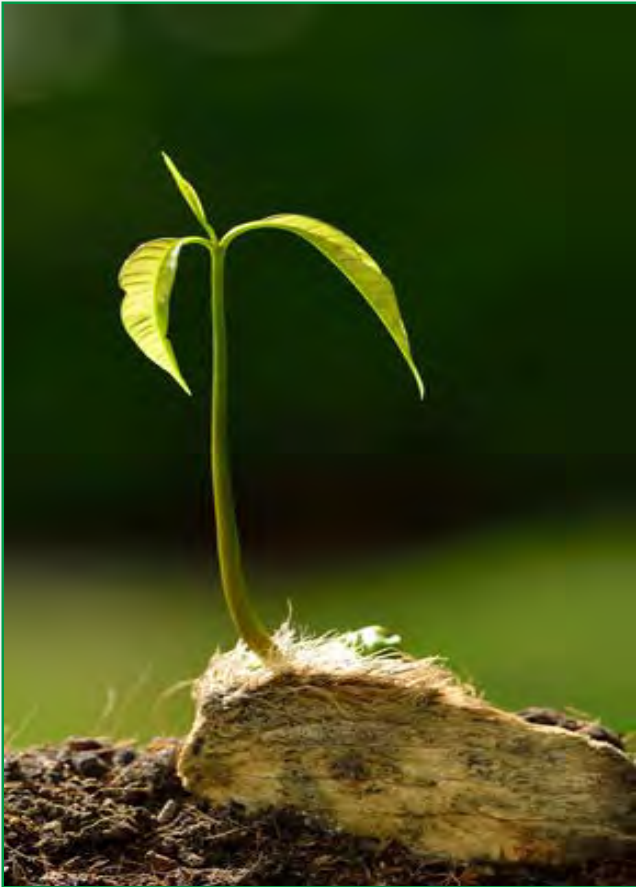
Data in a Block
(Hash)



```
ef7797e13d3a7552  
6946a3bcf00daec9  
fc9c9c4d51ddc7cc  
5d5888f74dd434d1
```



Source: McKinsey, Modified



The ASDA logo is displayed in white, bold, uppercase letters within a green rounded rectangular box at the top center of the slide.

ASDA

While we are starting with food **traceability**, our ultimate goal is greater **food** transparency which will benefit all system stakeholders.. and ultimately our customers’

Frank Yiannas– Vice President Food Safety Wal-mart Stores.

The ASDA logo is located in the bottom right corner, featuring the brand name in green and the tagline 'Save money. Live better.' in a smaller font below it.

ASDA
Save money. Live better.

IFST MIDLANDS BRANCH
SESSION 3

‘Authenticity and Traceability: requirements in new standards.

Simon Hill

Food Sector Regional Business Development Manager

BSI Group

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Authenticity and Traceability: Requirements in new standards

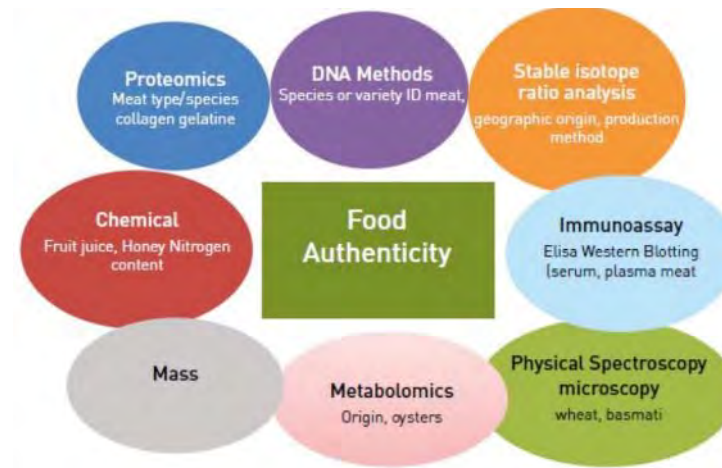
Richard Werran
Director – Food EMEA FIFST

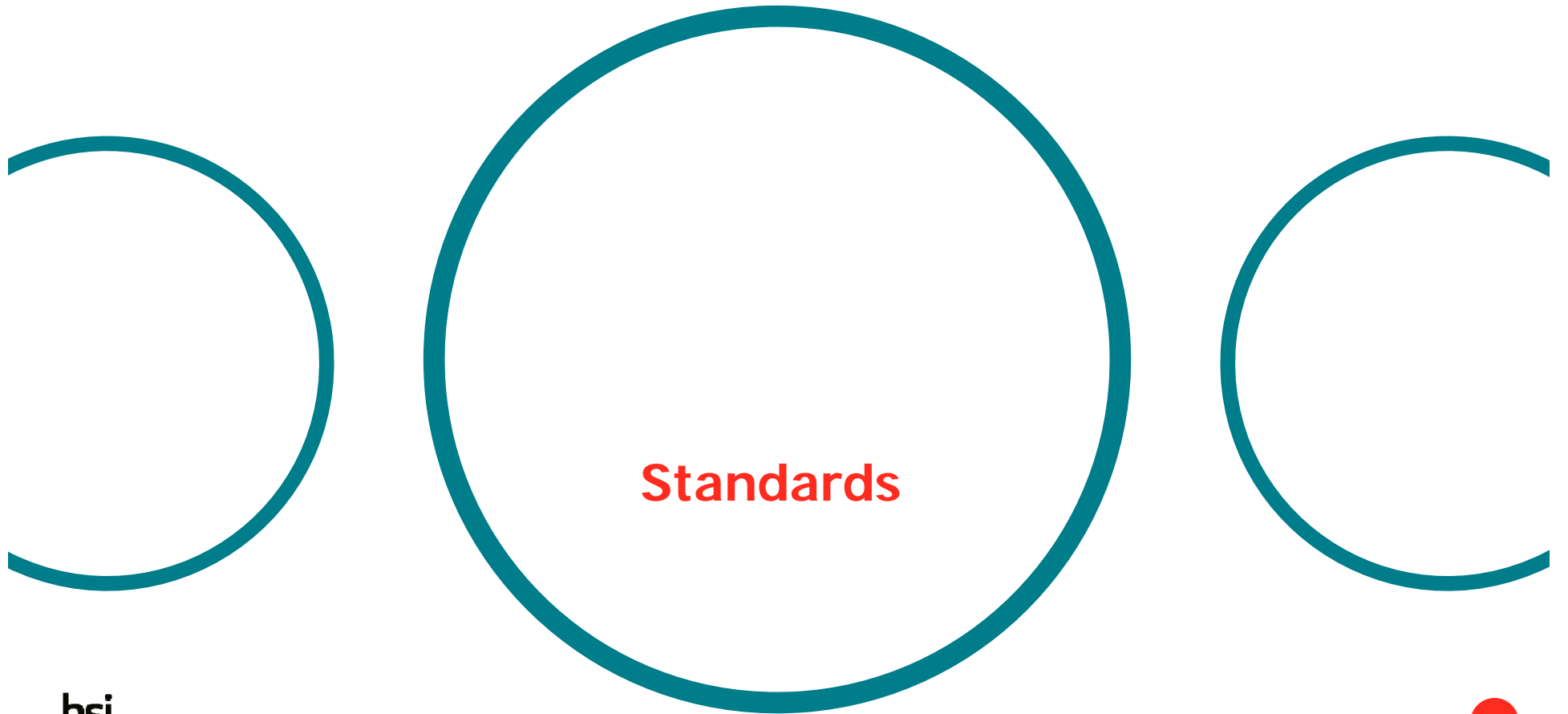


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The expanding choice of test methods





BRC Global Standard for Food Safety Issue 8

Authenticity and Integrity





A subtle change...

...but did you notice?



BRC Global Standard for Food Safety

Authenticity... and Integrity

	BRC Issue 7	BRC Issue 8	
	Authenticity defined	Authenticity defined <u>and extended to include 'authentic product'</u>	
Authenticity/authentic product	Food authenticity is ensuring that food or raw materials purchased and offered for sale, are of the nature, substance and quality expected.		
	The word 'integrity' is used but not defined	<u>Food integrity is defined</u>	
Food integrity	Products that are of the nature, substance and quality expected (e.g. not substituted, diluted, adulterated or misrepresented).		
	Features in: Specifications (3.6) and External Stds (4.1)	Features in 3.6, 4.1 <u>and Senior Management 1.1 Product testing 5.6</u>	

BRC Global Standard for Food Safety

Authenticity and Integrity – Yes, but what does this mean in practice?

1.1 SENIOR MANAGEMENT COMMITMENT AND CONTINUAL IMPROVEMENT



FUNDAMENTAL

The site's senior management shall demonstrate they are fully committed to the implementation of the requirements of the Global Standard for Food Safety and to processes which facilitate continual improvement of food safety and quality management.

1.1.5

The site shall have a demonstrable meeting programme which enables food safety, legality, integrity and quality issues to be brought to the attention of senior management. These meetings shall occur at least monthly.

Employees shall be aware of the need to report any evidence of unsafe or out-of-specification product or raw materials, to a designated manager to enable the resolution of issues requiring immediate action.

1.1.6

The company shall have a confidential reporting system to enable staff to report concerns relating to product safety, integrity, quality and legality.

The mechanism (e.g. the relevant telephone number) for reporting concerns must be clearly communicated to staff.

The company's senior management shall have a process for assessing any concerns raised. Records of the assessment and, where appropriate, actions taken, shall be documented.

1.2.1

The company shall have an organisation chart demonstrating the management structure of the company. The responsibilities for the management of activities which ensure food safety, integrity, legality and quality shall be clearly allocated and understood by the managers responsible. It shall be clearly documented who deputises in the absence of the responsible person.

- Integrity is a management responsibility
- Integrity is part of culture
- Attention of senior management
- An agenda item
- Recommend its picked up at internal audit
- Reporting system – does it work?

BRC Global Standard for Food Safety

Authenticity and Integrity – Yes, but what does this mean in practice?

5.6 PRODUCT INSPECTION AND LABORATORY TESTING

The company shall undertake or subcontract inspection and analyses which are critical to confirm product safety, legality, integrity and quality, using appropriate procedures, facilities and standards.

Recommendations:

- Risk assess both ingredient and the supplier
- Q. Is it reasonable to test for integrity?
- Have there been past incidences?
- Determine test type and frequency
- Carefully select test lab
- Start data base
- Start trend analysis

bsi.



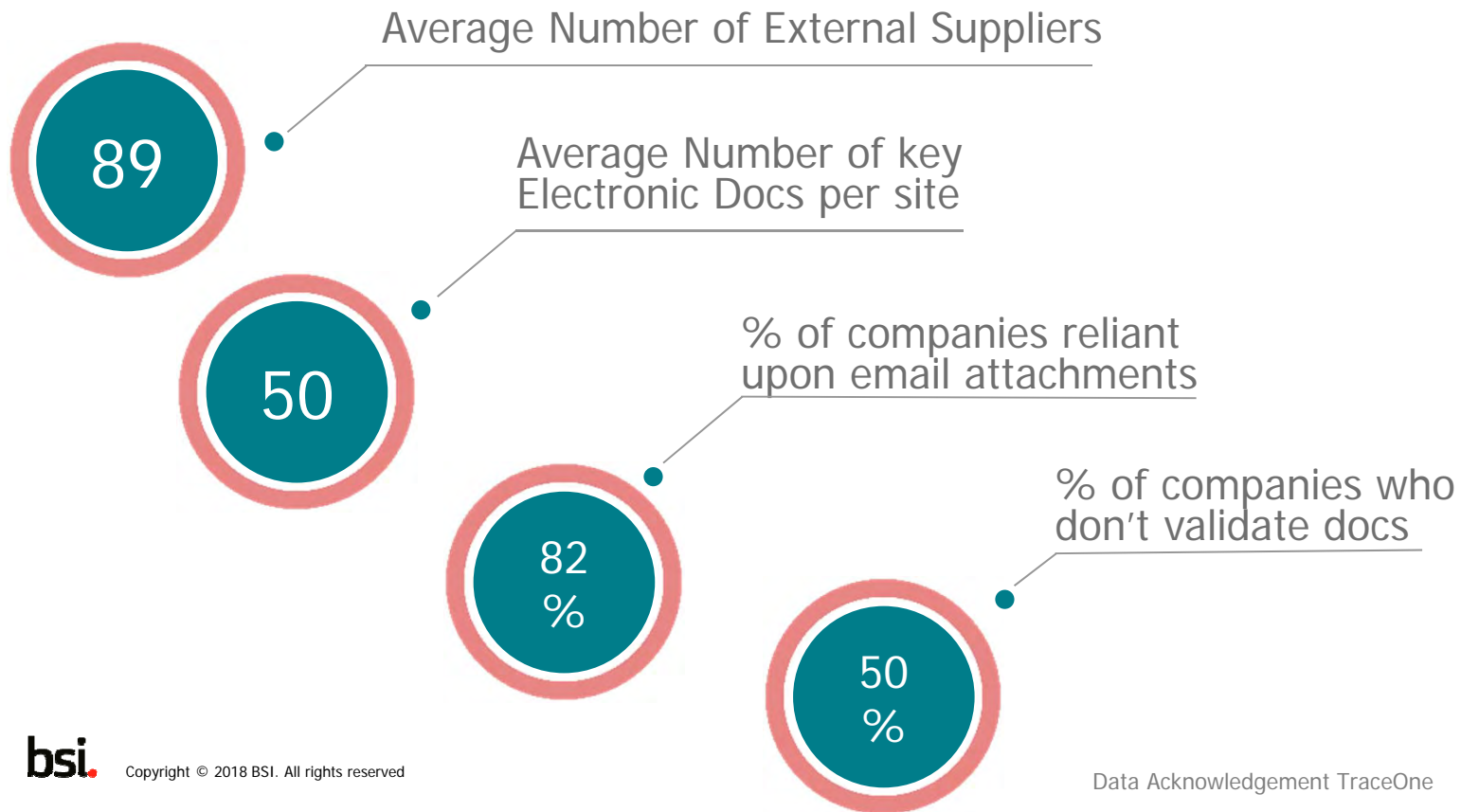
BRC Global Standard for Food Safety

Traceability extended to outsourced processes

CLAUSE	REQUIREMENTS
3.5.4.2	<p>The company shall ensure that outsourced processors are approved and monitored, to ensure that they effectively manage risks to product safety and quality and are operating effective traceability processes.</p> <p>The approval and monitoring procedure shall be based on risk and include either one or a combination of:</p> <ul style="list-style-type: none">• a valid certification to the applicable BRC Global Standard or GFSI-benchmarked standard. The scope of the certification shall include the raw materials purchasedor• supplier audits, with a scope to include product safety, traceability, HACCP review and good manufacturing practices, undertaken by an experienced and demonstrably competent product safety auditor. Where this supplier audit is completed by a second or third party, the company shall be able to:<ul style="list-style-type: none">• demonstrate the competency of the auditor• confirm that the scope of the audit includes product safety, traceability, HACCP review and good manufacturing practices• obtain and review a copy of the full audit report. <p>There shall be a documented process for ongoing supplier performance review, based on risk and defined performance criteria. The process shall be fully implemented. Records of the review shall be kept.</p>



Document authenticity



BRC – Issue 8 Record Keeping changes

Section 3.2 Document Control and 3.3 Records

CLAUSE	REQUIREMENTS
3.2.1	<p>The company shall have a procedure to manage documents which form part of the food safety and quality system. This shall include:</p> <ul style="list-style-type: none">• a list of all controlled documents indicating the latest version number• the method for the identification and authorisation of controlled documents• a record of the reason for any changes or amendments to documents• the system for the replacement of existing documents when these are updated. <p>Where documents are stored in electronic form these shall also be:</p> <ul style="list-style-type: none">• stored securely (e.g. with authorised access, control of amendments, or password protected)• backed up to prevent loss.
3.3.1	<p>Records shall be legible, maintained in good condition and retrievable. Any alterations to records shall be authorised and justification for the alteration shall be recorded. Where records are in electronic form these shall also be:</p> <ul style="list-style-type: none">• stored securely (e.g. with authorised access, control of amendments, or password protected)• suitably backed up to prevent loss.

Traceability - technology solutions





BLOCKCHAIN

Supply Chain Mapping and Risk Assessment Software

BSI SCM



What to do?

So many choices



A photograph of a grand, ornate hallway with a red carpet and classical columns. The hallway is long and narrow, with a red carpet running down the center. The walls are made of light-colored stone or marble, and the ceiling is high with decorative elements. A large chandelier hangs from the ceiling. The hallway leads to a set of double doors at the end, which are open, revealing a glimpse of another hallway beyond. The overall atmosphere is one of elegance and grandeur.

The objective of brands and retailers
A clear line of sight through your suppliers

Transparency
The new buzz word

BACK TO
BASICS

bsi.



Recommendations – know your supplier

- Risk assess both ingredient and supplier
- Install appropriate controls
- Keep records up to date
- Manage suppliers
 - Audit key suppliers
 - Encourage collaborative working
- Agree performance objectives
- Identify supply chain weaknesses and opportunities
- Share results, information and intelligence
- Communication
 - Encourage faults to be flagged up before they become problems

Resources from BSI

Supply Chain Resilience

Today we move from domestic to regional and then global supply chains which are more complex and spread over long distances. As a result the definition of quality has moved to include environmental, social, ethical and security issues. Reputational risk is becoming increasingly important as transparency and globalization accelerates.

Delivered by BSI Professional Services, our supply chain solutions can help protect your business, your brand and your customers.

Supply Chain Solutions – Suppliers Verification and Risk Assessment

An intelligence based approach from BSI can help an organization manage its supply chain risk and protect its brand reputation. It leverages standards, risk evaluation tools, verification and supply chain tools to help clients identify and manage their supply chain and thus mitigate risks.

BSI Supplier Verification Audits

On-site profile validation and verification audits based on BSI or client requirements.

SCREEN Intelligence

A comprehensive supply chain intelligence tool including living country heat maps covering security, food fraud vulnerability environmental and CSR. SCREEN helps organizations to identify and understand their supply chain threats.

BSI VerifEye™ Profile

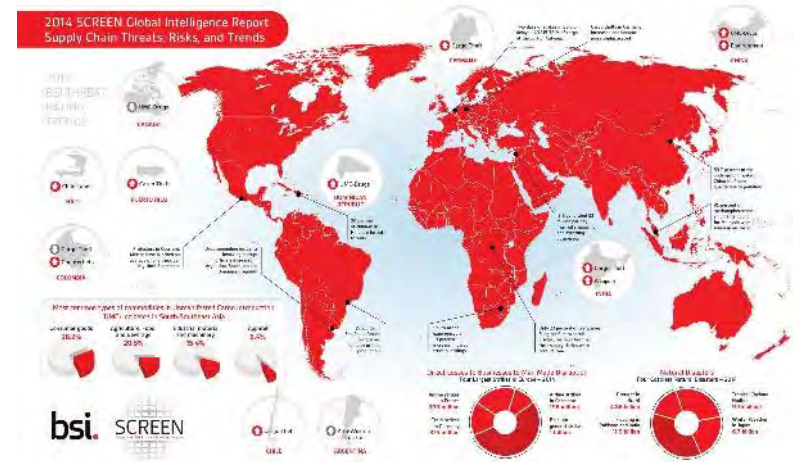
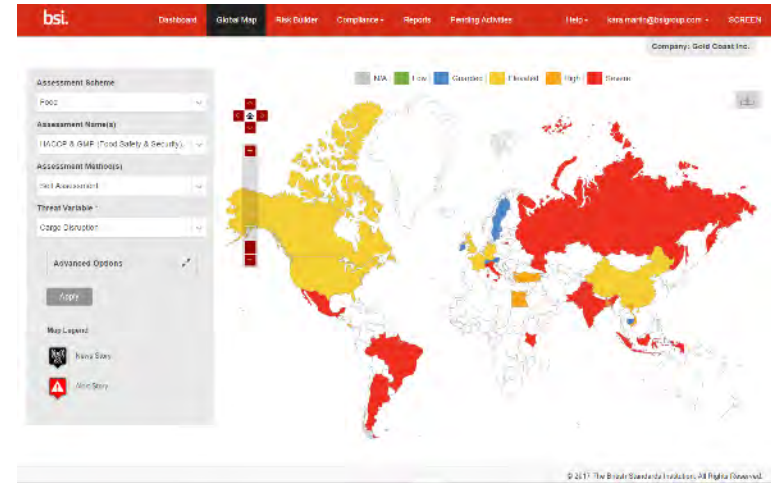
Providing greater visibility and traceability, a trusted BSI VerifEye profile turns certifications, site photos, and business credentials into a positive marketing tool, providing trust and confidence.

Supplier Compliance Manager (SCM) Platform

A web-based tool designed to facilitate and automate mandatory supplier risk assessments. Manage supplier self-assessment and on-site supplier qualification and verification programmes including on-boarding, scheduling, reporting, corrective and preventive action management and benchmarking.

Supplier Advisory Services

Offering technical advice and information on supply chain risk programme set-up and design.



BSI – Agri/food sector thought leaders



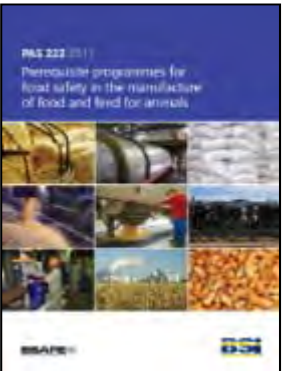
PAS 72:2006
Responsible Fishing



PAS 220:2008
GMP Food Manufacture



PAS 223:2011
GMP Food Packaging
Manufacture



PAS 222:2011
GMP Animal Feed
Manufacture



PAS 96:2014
Food Defence



About BSI

Trusted

Royal Charter Company

Experienced

The world's first National Standards Body and founding member of ISO in 1947

Thought Leaders

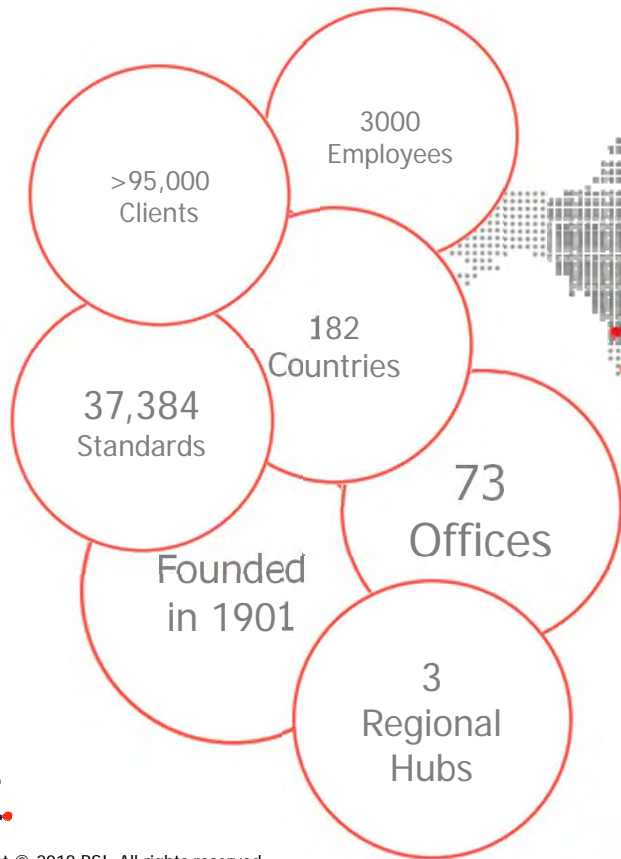
Shaped the worlds most adopted standards



BSI, a Royal Charter Company



BSI Global in food



bsi.

Thank you

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bsi.



THANK YOU

NETWORKING

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